



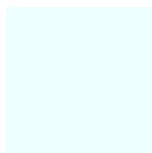
**Environmental Management Programme:** Expansion of the existing cemetery site on the Remaining Extent of Portion 33 of the farm Mabopane 702 JR.

**GDARD Reference:**  
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**4 June 2015**



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Document prepared by:

Aurecon South Africa (Pty) Ltd  
 4 Daventry Street  
 Lynnwood Bridge Office  
 Lynnwood Manor  
 0081

T +27 12 427 3080  
 F 086 766 1473  
 E Candice.Durr@aurecongroup.com  
 W www.aurecongroup.com

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Approval			
Author Signature		Approver Signature	
Name	Candice Dürr	Name	Barend Smit
Title	Environmental Scientist	Title	Technical Director

# Expansion of the existing cemetery site on the Remaining Extent of Portion 33 of the farm Mabopane 702 JR.

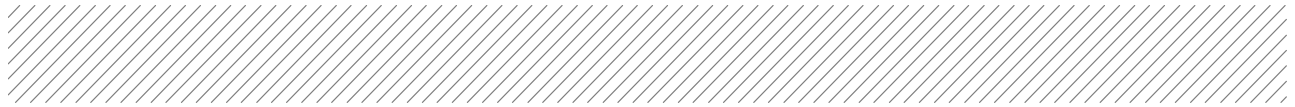
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Aurecon South Africa (Pty) Ltd  
4 Daventry Street  
Lynnwood Bridge Office  
Lynnwood Manor  
0081  
T +27 12 427 3080  
F 086 766 1473  
E [Candice.Durr@aurecongroup.com](mailto:Candice.Durr@aurecongroup.com)  
W [www.aurecongroup.com](http://www.aurecongroup.com)



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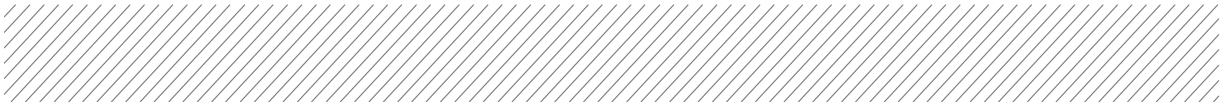
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## UNDERTAKING TO IMPLEMENT THE EMPr

### Undertaking by the Contractor

I, \_\_\_\_\_, acting on behalf of the Contractor, hereby indicate that I have read through the Environmental Management Programme, and understand the measures required to be implemented in terms of the EMPr. I hereby undertake to implement these measures and carry out my duties as specified herein.

Signed on \_\_\_\_\_ at \_\_\_\_\_

\_\_\_\_\_  
Contractor's Environmental Representative

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Witness

### Undertaking by the Environmental Control Officer

I, \_\_\_\_\_, the Environmental Control Officer appointed by CoT, hereby indicate that I have read through the Environmental Management Programme, and understand the measures required to be implemented in terms of the EMPr and hereby undertake to fulfil my duties as specified herein.

Signed on \_\_\_\_\_ at \_\_\_\_\_

\_\_\_\_\_  
Environmental Control Officer



# 1 CONTEXT AND INSTITUTIONAL MATTERS

## 1.1 Background to the project

Aurecon South Africa (Pty) Ltd was appointed by the City of Tshwane (CoT) to conduct the environmental impact assessment (EIA) for the extension of the existing Ga-Rankuwa cemetery. The expansion will cover an area of 6.5 hectares north of the cemetery and an area of 5.3 hectares towards the southern side of the existing cemetery.

## 1.2 Project locality

The site is located approximately in the suburb of Mabopane on the northern outskirts of Pretoria. It is accessible from Lucas Mangope Road (M21) via two unmarked roads (Map 1, Appendix A). The adjacent land-use mainly comprise of a number of smallholdings where a combination of agricultural activities are practised.

The cemetery is located on a watershed between three local drainages. The majority of the drainage is towards the Sand River towards the south west of the site. Both the south-eastern as well as the northern boundary of the cemetery site is drained by tributaries of the Sand River. Local drainage from the cemetery will be in a south-westerly direction (0.03 or 3%) towards the Sand River which flows in a north westerly direction. The Sand River flows into the Pienaars River which eventually flows into the Crocodile River.

The site locality is displayed in Figure 1.

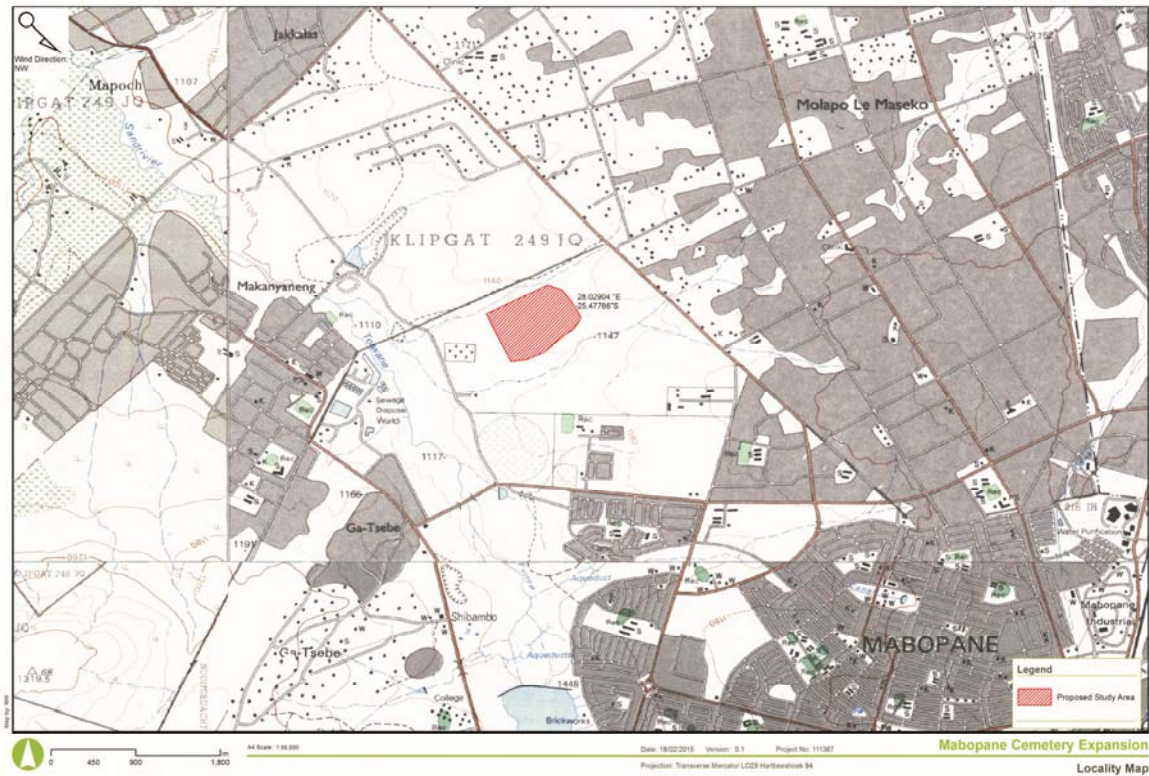


Figure 1: Locality map of the existing cemetery site and the proposed expansion area in red.

### 1.3 Purpose of document

The purpose of this document is to provide guidelines for environmental best practice to the Contractor commissioned to construct the proposed project. This document shall be seen as part of the contract. **The EMPr will thus be part of the enquiry document to make the recommendations and constraints, as set out in this document, enforceable under the general conditions of contract.**

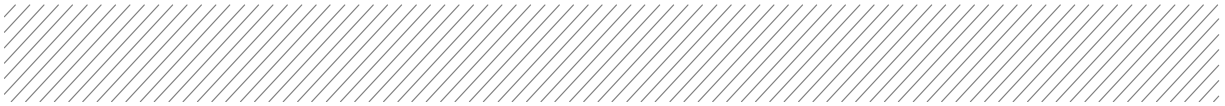
**The EMPr has a long-term objective to ensure that:**

- 1) Environmental Management considerations are implemented from the start of the project,
- 2) Precautions against damage and claims arising from damage are taken timeously, and
- 3) The completion date of the contract is not delayed due to problems with Landowners arising during the course of construction.

**CoT requires a commitment from the Project Manager and Contractor on the following issues:**

- 1) *Take into consideration the surrounding Landowners adjacent to the cemetery.*
- 2) *Always behave professionally on and off site.*
- 3) *Ensure quality in all work done, technical and environmental.*
- 4) *Resolve problems and claims arising from damage immediately to ensure a smooth flow of operations.*



- 
- 5) *To underwrite CoT's Environmental Policy at all times.*
  - 6) *To use this EMPr for the benefit of all involved.*
  - 7) *To preserve the natural environment by limiting destructive actions on site.*

## **1.4 Legislative context**

This EMPr has been compiled in terms of the EIA Regulations, published in accordance with section 33 of the Environmental Impact Assessment Regulations, promulgated in GN R543 of 18 June 2010, which provides a framework for the content and intent of an Environmental Management Plan. The EMPr also follows the rationale of the ISO 14001: Environmental Management System international standard in that it addresses and differentiates between *Activity, Aspect, Impact, Mitigatory Measures, Performance Indicators, Responsibility, Resources and Time Schedule*.



## 2 ROLES AND RESPONSIBILITIES

### 2.1 Environmental Control Officer

The Environmental Control Officer (ECO) is the independent person responsible for monitoring of the implementation of the EMPr and is the liaison person between CoT and the Landowners. The ECO may not be appointed by the Contractor, and will report to CoT and DEA only. The ECO has the authority to stop any works if, in his/her opinion, there is or may be a serious threat to or impact on the environment; caused directly by the contractor's actions or activities during the construction phase. In all such work stoppage situations the ECO is to inform the Contractor of the reasons for the stoppage within 24 hours. All ECO reports will be sent on a monthly basis to CoT to keep abreast of compliance on site.

Upon failure by the Contractor, or his employees, to show adequate consideration to the EMPr, the ECO may recommend to the Contractor to have the Contractor's representative or any employee(s) removed from the site, or work suspended until the matter is resolved.

### 2.2 Engineer

The Engineer responsible for the design of the cemetery expansion will be an CoT appointment. It will be the responsibility of the Engineer to oversee the overall implementation of the project as well as the compliance of the EMPr and incorporate any potential environmental aspects mentioned into the design.

### 2.3 Contractor

As part of being responsible for the construction of the proposed project, the Contractor will be responsible for the overall implementation of the EMPr. The Contractor will nominate a representative on site as his environmental representative, known as the Contractor's Environmental Control Officer (CECO). The contractor must issue site instructions to rectify any environmental non-compliance, based on the CECO's findings. The CoT Site Manager can also issue site instructions.

### 2.4 Contractor's Environmental Control Officer

The CECO will be responsible, on behalf of the contractor, to ensure that the EMPr is implemented and complied with on site on a daily basis. The CECO will liaise with the ECO (see below) in all matters relating to the implementation of the EMPr. The CECO needs a certain amount of environmental management experience in the field.



### 2.4.1 Environmental awareness training

Prior to construction all contractor teams involved in work on the project are to be briefed on their obligations towards environmental controls and methodologies in terms of this EMPr. It is recommended that the briefings take the form of an on-site talk and demonstration by the CECO. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. All new employees arriving on site shall undergo this training. Environmental induction must be done according to the Contractors Environmental Management System and must include all aspects of the site specific EMPr.

Toolbox talks are to be used as a tool for continuous training of employees and must be conducted on a weekly basis. Toolbox talks must be conducted in an interactive way as to ensure the employees understand the content and purpose of the specific EMPr requirements.

As construction continues, an effort must be made by the Contractor to assess the training needs of workers on site. Cognisance must be given to the specific work to be undertaken at the time and, if necessary, additional training on environmental requirements must be conducted to ensure all workers understand the risks involved as well as how to adequately implement mitigation measures.

An effort to ensure environmental awareness on site must be made at all times during construction.

A signed register documenting all employees' environmental training and awareness programmes must be kept on record.

### 2.4.2 Record keeping

The CECO is responsible for maintaining all records in relation to the EMPr requirements on site. Such records must be made available to the ECO on request during the monthly audits, as well as at any time as requested by the ECO, auditor or project managers. Record keeping must be done in an orderly fashion with the intent of ensuring easy reference.

## 2.5 Organisational and Institutional arrangements

Any changes to the EMPr or conditional requirements of the EA must be communicated in writing to the DEA within the timeframe as specified in the Environmental Authorisation (EA). A provisional reporting and communications structure is indicated in **Figure 2** below.

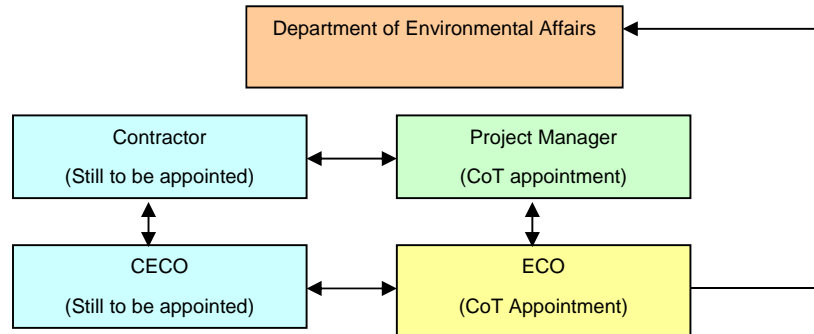


Figure 2: Proposed organisational and reporting structure.

## 2.6 Monitoring and auditing framework

### 2.6.1 Monitoring Programme

The purpose of the monitoring programme is to ensure that mitigation measures identified and described in the EMPr are implemented. Construction activities will be monitored and recorded by the ECO and audited against the EMPr on a monthly basis. A report must be submitted at the end of each month prior to the progress meetings where they will form part of the agenda. The ultimate target is to achieve 100% compliance with the EMPr.

### 2.6.2 Penalties

The Contractor will comply with the environmental management requirements of this EMPr on an ongoing basis, any failure on their part to do so will entitle the Project Manager, in consultation with the ECO to certify the imposition of a fine. The value of the fine will be agreed between the PM and ECO based on the nature, extent and duration of the offence and subsequent environmental damage. Such penalties shall be payable in addition to any remediation costs for correction of environmental damage as a result of non-compliance to this EMPr, that will also be for the Contractor's account. Time penalties may also be awarded by the contract's manager where the contractors do not comply. These details are to be included into the contracts.

Note that the following is applicable:

- In terms of the Conventional Penalties Act (1962) a creditor is not entitled to recover both the penalty and damages,
- Accordingly, where a Contractor causes damage, CoT can either enforce a penalty or make the Contractor make good the damage, but not both.

The Contractor is deemed NOT to have complied with this specification if:

- Within the boundaries of the site, site extensions and access roads there is evidence of contravention of the requirements of the EMPr,
- Environmental damage ensues due to negligence,
- The Contractor fails to comply with corrective or other instructions issued within a specific time,
- The contractor fails to comply with a site instruction given by the Engineer based on the ECO report.



- The Contractor fails to respond adequately to complaints from the public,
- Legal action is instituted against the developer in terms of Environmental laws.

Payment of any fines in terms of the contract will not absolve the offender from being liable from prosecution in terms of any law.



## 3 DESCRIPTION OF ACTIVITIES

The activities that are going to be undertaken involve, but are not limited to:

### 3.1 Pre-construction and Construction phase

- Establishment of the contractor's camp;
- Clearing of vegetation only at the proposed building / infrastructure areas;
- Removal and stockpiling of topsoil;
- Fencing of the construction sites;
- Personnel conduct;
- Storage of hazardous material;
- Handling and disposal of construction waste; and
- Protection of archaeological sites.

### 3.2 Rehabilitation phase

- Removal/decommissioning of Contractor's camp;
- Removal of all construction, hazardous and domestic waste;
- Rehabilitation of the disturbed areas as a result of construction works.

### 3.3 Operational phase

- Inspections, maintenance and repair of roads, access roads and signage.



# 4 HIGHLIGHTED EXPECTED PROBLEMS DURING THE PROJECT

## 4.1 Pre-construction

Most neighbouring landowners may see the construction period as interference with their daily activities. There may be a negative attitude towards the whole construction process. Landowners are always apprehensive toward changes they do not control. Affected landowners shall therefore be informed timeously of the construction programme, duration and all interference with their daily activities.

## 4.2 During construction

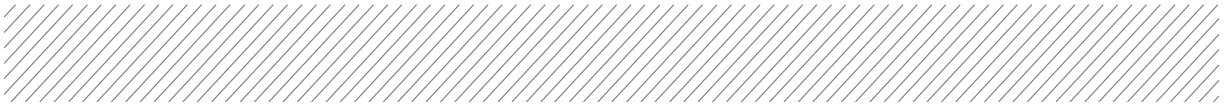
Due to the sensitivity surrounding cemeteries and the deceased, construction workers must be particularly mindful of not only the neighbouring landowners, but also of the families of the deceased visiting the cemetery to pay respect. Issues may arise should existing graves be even slightly disturbed or access to the graves be temporarily unavailable. All affected stakeholders must be notified should such an event be planned. All complaints must be dealt with appropriately, taking these sensitivities into account.

## 4.3 After construction

If damaged infrastructure is not repaired to the expectations of the neighbouring landowners or visitors to the cemeteries, they may issue formal complaints or engage in litigation.

## 4.4 Possible solutions to the problems

- Proper liaison between CoT, the Contractor and neighbouring landowners and visitors.
- A physical access plan along the site shall be compiled and the Contractor shall adhere to this plan at all times. Proper planning when the physical access plan is drawn up by the Environmental Control Officer in conjunction with the Contractor shall be necessary to ensure access to the site.
- The landowners shall be informed of the starting date of construction as well as the phases in which the construction shall take place. This information shall be displayed at the cemetery entrance as information to all visitors.
- The Contractor must adhere to all conditions of contract including the Environmental Management Programme.
- Where existing private roads are in a bad state of repair, such roads' condition shall be documented before they are used for construction purposes. If necessary some repairs should be done to prevent damage to equipment and plant.

- 
- All manmade structures shall be protected against damage at all times and any damage shall be rectified immediately.
  - Rehabilitation of the construction roads shall be done properly to ensure all landowners and visitors are not unnecessarily inconvenienced. The Contractor shall ensure that all damaged areas are rehabilitated to the satisfaction of CoT and each and every property owner and that outstanding claims are settled.
  - 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.
  - Appointment of a Landowner Liaison Officer on behalf of the Contractor to implement this EMP as well as deal with all Landowner related matters.
  - Environmental Audits to be carried out on a monthly basis during and upon completion of construction (at least two for the project).

## **4.5 SUMMARY OF IMPACTS AND ASSOCIATED MITIGATION MEASURES**

The following table covers the construction activities and associated environmental impacts that will occur during the construction of the cemetery expansion project.

The table considers the expected impacts on-site during the different phases of the project, as well as the mitigation measures and environmental management procedures required to manage the expected impacts. The following sections are dealt with in the table:

- Section 5 : Pre-construction and construction site environmental management
- Section 6 : Materials
- Section 7 : Waste
- Section 8 : Surrounding land
- Section 9 : Flora, fauna, air quality, noise, water and other
- Section 10 : Archaeological and heritage sites
- Section 11 : Planning and engineering considerations
- Section 12 : Rehabilitation



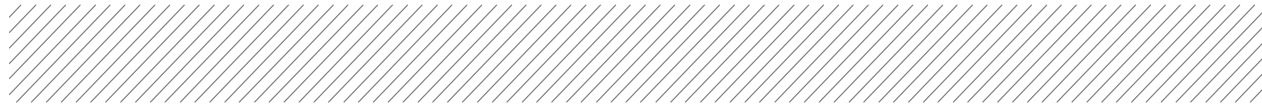
# 5 PRE-CONSTRUCTION AND CONSTRUCTION SITE ENVIRONMENTAL MANAGEMENT

**Table 1: General impacts and mitigation table**

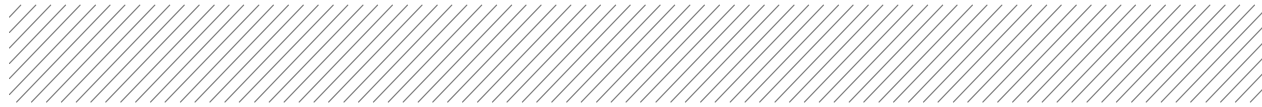
Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
5.1 Engineering Design	All the aspects listed in the EMPr	Design incompatible with environment	<p><b>Objective:</b> To ensure the design of the cemetery takes into account the environment.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Assimilate requirements of the EMPr in the design and construction management giving special attention to the proposed grave positions.</li> </ul>	Design meets objectives and does not degrade the environment	Engineering Design Consultant	Contract	During Tender Design & Design Review Stage	Engineering design consultant	Design Phase
5.2 Establishment of the construction camp sites	Construction camp	Damage or loss of existing vegetation and changes to the area's water quality	<p><b>Objective:</b> To prevent negative influence to the surrounding surface and groundwater.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>A comprehensive fauna and flora search and rescue operation must be conducted on the entire site area by a suitably qualified zoologist and botanist / ecologist. Protected species as listed in the Ecological specialist report (part of the EIA process) must be particularly looked out for.</li> <li>Protected species and other SCC should be rescued and placed in a nursery managed by City of Tshwane for the benefit of local communities (many of these species have value as medicinal plants) or donated to a research institute (e.g. SANBI or botanical garden) prior to conversion into a cemetery, rather than simply being destroyed upon receipt of a permit.</li> </ul>	Construction camp established in compliance with objectives.	Contractor, CECO.	Contract	Pre-construction, Establishment of Site	ECO	Once off



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>• Where feasible, viable populations of SCC can also be relocated to degraded or untransformed areas within the broader study area which provide potentially suitable habitats. However such relocations should ensure that no ecological degradation of the host habitat occurs as a result of the relocations or the introduced species, and will have to be evaluated by a botanist for each species and each potential translocation area.</li> <li>• Site establishment shall take place in an orderly manner and all amenities shall be installed at Camp sites before the main workforce move onto site</li> <li>• A method statement is required from the Contractor at tender stage that includes the layout of the camp, management of ablution facilities and wastewater management</li> <li>• The planning and design for the construction camp must ensure that there is a minimum impact on the environment.</li> <li>• A site plan of the construction camp must be provided indicating waste areas, storage areas and placement of ablution facilities.</li> <li>• The Contractor camp shall have the necessary ablution facilities with chemical toilets where such facilities are not available at commencement of construction</li> <li>• The Contractor shall supply a wastewater management system that will comply with legal requirements and be acceptable to CoT</li> <li>• Where CoT facilities are available the Contractor shall make use of such facilities where it is viable and possible</li> <li>• The Contractor shall inform all site staff to the use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities</li> <li>• The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at a registered waste dump</li> <li>• A certificate of disposal shall be obtained by the Contractor and kept on file</li> <li>• Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste</li> </ul>						



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>management. Under no circumstances may solid waste be burned on site unless a suitable incinerator is available</p> <ul style="list-style-type: none"> <li>• Refuse bins will be emptied and secured. All waste will be collected and disposed of at a registered waste disposal site. Proof of this must be provided to the ECO.</li> <li>• The construction camp must be placed on already disturbed land as far as possible.</li> <li>• The construction camp should be fenced off so as to limit the removal of unnecessary vegetation.</li> <li>• Fences and security access must be maintained, throughout the project.</li> <li>• All fences removed to facilitate access will be replaced by the contractor once machinery and personnel have been removed from the site to the satisfaction of all the relevant landowners.</li> <li>• Emergency and contact numbers of the contractors must be available and prominently displayed on a signage board that is clearly visible.</li> </ul>						
5.3 Establishment of the construction camp site	Construction camp	Loss of soil fertility.	<p><b>Objective</b></p> <p>The environmental objective when establishing the contractor's camp is to minimise the footprint of disturbance thereby preventing the degradation and loss of topsoil.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• Allowance for one contractors camp along the alignment.</li> <li>• Once the site has been cleared of vegetation, the topsoil should be stripped.</li> <li>• Topsoil must be stored in a demarcated area which protected from wind and rain.</li> <li>• The topsoil stockpiles must not exceed 1.5m in height.</li> <li>• The area must be rehabilitated once the construction camp has been decommissioned.</li> </ul>	Established construction camp in compliance with objectives and no evidence of environmental degradation	Contractor, CECO.	Contract	Pre-construction, Establishment of Site	ECO	Once off



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
5.4 Closure of the construction camp	Construction camp.	Potential impacts associated with the closure of the construction camp	<p><b>Objective(s):</b> To limit potential impacts on the environment for the period for which the construction camp is closed.</p> <p><b>Target :</b> Should the construction camp be closed for a period of more than one week, a report on compliance will be lodged with the Contractor, Engineer and Project manager confirming the following:-</p> <ul style="list-style-type: none"> <li>• No persons allowed other than project employees;</li> <li>• Minimal materials are stored;</li> <li>• Materials are stored in leak-proof, sealable containers or packaging;</li> <li>• The store area is secure and locked;</li> <li>• Fire extinguishers are serviced and accessible;</li> <li>• The area is secure from accidental damage through vehicle collision, etc.;</li> <li>• Emergency and contact numbers of the contractor are available and prominently displayed;</li> <li>• All stores will be secured;</li> <li>• Chemical toilets are empty, kept hygienically clean and secured;</li> <li>• 24 hour security will be on site during this period.</li> </ul>	Closure of the construction camp in line with the requirements of the EMPr.	Engineer, Contractor and CECO	Contract	Closure of camp	Engineer ECO	Whenever the construction camp is closed for longer than a week.
5.5 Storage of topsoil	Striping and stockpiling of topsoil.	Mixing of topsoil and subsoil. Erosion of topsoil. Contamination of top soil. Dust.	<p><b>Objective(s):</b> Topsoil is conserved, maintained and reused.</p> <p><b>Target :</b></p> <ul style="list-style-type: none"> <li>• The topsoil in the specific region is regarded as the top 300 mm (maximum) of the soil profile irrespective of the fertility appearance or physical depth, unless otherwise confirmed by the ECO.</li> <li>• Topsoil is to be stripped up to this depth when it is in as dry a condition as</li> </ul>		Contractor, CECO.	Contract		ECO	



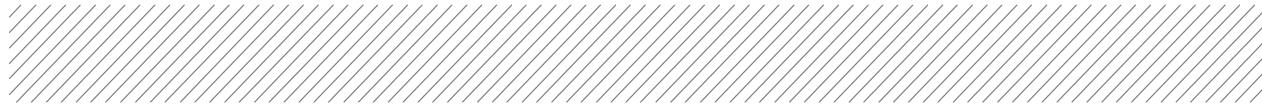
Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>possible in order to prevent compaction.</p> <ul style="list-style-type: none"> <li>• The topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process.</li> <li>• Topsoil stockpiles shall not be stored for a period longer than 4 months.</li> <li>• Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.</li> <li>• The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding.</li> <li>• All grass and other vegetation should be left on the topsoil stockpiles so that they colonize the area after construction.</li> <li>• Photographic record must be kept of the topsoil stockpiles.</li> <li>• Dust and erosion of topsoil from runoff must be minimised through appropriate watering and the avoidance of transporting and placing of topsoil in areas exposed to high wind or excessively rainy conditions.</li> <li>• The contractor shall devise a soil conservation and stockpiling plan, to be approved by the ECO and Engineer, which shall detail:-               <ul style="list-style-type: none"> <li>○ Stockpile sizes, layout and form;</li> <li>○ Means of erosion (wind and water) prevention for stockpiles;</li> <li>○ The rehabilitation measures to be taken for the area occupied by the temporary stockpile;</li> <li>○ A generic schedule of soil replacement for areas where work has been completed. Soil replacement should preferably run in parallel (where feasible) with the construction process;</li> <li>○ Soil erosion prevention measures for general site use.</li> </ul> </li> </ul>						



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>Alien vegetation growing on stockpiles must be eradicated.</li> <li>Herbicides shall not be used to remove alien vegetation unless approved by the ECO.</li> </ul>						
5.6 Construction of site buildings	Site buildings materials	Soil pollution and permanent alteration to the natural environment.	<p><b>Objective(s):</b> To ensure the material for site buildings are recyclable and to minimise the impacts of the construction of the buildings on the environment.</p> <p><b>Target :</b></p> <ul style="list-style-type: none"> <li>No permanent structures will be permitted at the contractor's camp.</li> <li>Temporary structures shall be founded on a platform, either subsoil or screed slab.</li> <li>Buildings should preferably be pre-fabricated or constructed of re-usable/recyclable materials.</li> <li>All temporary structures must be soundly built and not pose a danger to workers.</li> <li>Containers are to be used for the storage of materials which have the potential to release pollutants into the environment.</li> <li>All structure footprints to be rehabilitated and re-vegetated after construction is complete.</li> </ul>	On site buildings constructed according to the requirements of the EMPr.	Contractor and CECO.	Contract	Pre-construction, Establishment of site.	ECO	Once off
5.7 Fencing of the construction sites that will be affected by the proposed project	Demarcation of the site	<p>Unnecessary removal of vegetation.</p> <p>Loss of topsoil.</p> <p>Safety</p>	<p><b>Objective(s):</b> Whilst establishing the site, the footprint of disturbance must be minimised and the extent of soil erosion, loss of vegetation and the potential for the pollution of soils must be prevented.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>All excavations must be demarcated as indicated in the EMPr using danger tape with steel droppers or other methods approved by the ECO.</li> </ul>	The site is demarcated according to the requirements of this section of the EMPr.	Contractor and CECO.	Contract	Construction sites must be fenced off along the alignment before site clearance.	Engineer, ECO.	As construction proceeds along the alignment.

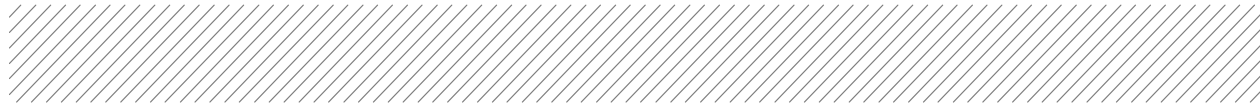


Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>The width of the construction footprint must be agreed upon by the ECO and the Engineer and as far as possible must be kept to a minimum.</li> <li>No personnel or construction materials will be allowed to move outside the designated/demarcated site during construction activities.</li> <li>Do not perform any activities or operations that are likely to adversely affect the aesthetic quality of the environment.</li> </ul>						
5.8 Cooking of food	Cooking facilities	Type and placement of cooking facilities used, and how they will be used.	<p><b>Objective(s):</b> To ensure that the cooking facilities used on site do not pose risks to the environment.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>The contractor must supply gas and /or electricity cooking facilities for the labourers at the construction camp.</li> <li>If gas cooking facilities are not available fires (for the purposes of cooking) will be allowed in a demarcated area that has been cleared of any combustible materials.</li> <li>Firewood, or other suitable fuels, must be supplied by the Contractor.</li> <li>No vegetative matter may be removed from the area for firewood.</li> <li>After use, all cooking fires must be extinguished.</li> </ul>	Evidence of presence of gas and /or electricity cooking facilities and/or demarcated area for cooking with fire.	Contractor.	Contract	Pre-construction, Establishment of site.	ECO	Once off.



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
5.9 Operation of the sanitation system(s)	Sanitation systems	<p>Unpleasant odours on site.</p> <p>Inadequate number of latrines on site.</p> <p>Position of latrines and shower systems.</p> <p>Bad management of waste water.</p>	<p><b>Objective(s):</b> To ensure good sanitation system and management throughout the construction period.</p> <p><b>Targets:</b></p> <ul style="list-style-type: none"> <li>● Adequate chemical toilets must be provided for all staff. Alternatively, existing ablution facilities on site can be utilised if available.</li> <li>● Chemical toilets must be emptied / serviced on a regular basis to prevent them overflowing. Proof of this must be provided to the ECO.</li> <li>● A minimum of one toilet must be provided per 11 persons at each working area within 100m from worker activity.</li> <li>● Where shower facilities be provided for use by staff the following must be imposed:-               <ul style="list-style-type: none"> <li>○ Positioning of the showers, specifically the discharge point , must be placed in a way to ensure that erosion and build up of detergents does not occur;</li> <li>○ All discharge from the shower and other washing facilities must pass through a suitable filter to reduce the load of detergents to the environment;</li> <li>○ Use of the shower facilities must be limited to staff or authorised persons only.</li> </ul> </li> </ul>	<p>Adequate toilets and showers will be positioned at the right places as per the EMPr and ECO.</p> <p>Absence of odours, erosion and build up of detergents.</p>	Contractor	Contract	Pre-construction, Establishment of site.	ECO	Once off





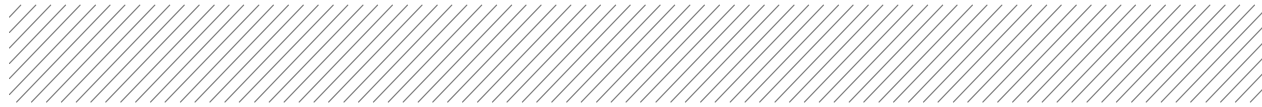
Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
5.10 Vehicle parking area. Storage of equipment	Vehicle parking and parking area(s). Storage of equipment.	Pollution of soils.  Disturbance of soils due parking of vehicles outside of designated areas.	<p><b>Objective(s):</b> To ensure vehicles are parked according to the specifications in the EMPr and that equipment is handled appropriately.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>No storage of vehicles or equipment will be allowed outside of the designated area.</li> <li>Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment when not in use.</li> </ul>	Drip trays must be provided and placed under vehicles and equipment which are not being utilised on site.	Contractor and CECO.	Contract	Throughout the construction period.	ECO	Whenever there are stationary vehicles or equipment present on site.
5.11 Servicing and washing of vehicles and machinery	Workshop and Equipment Storage Areas	Water contamination, Soil contamination, Noise pollution	<p><b>Objective(s):</b> To ensure that the environment is not polluted by ensuring that service areas and wash bays for vehicles and machinery are made available and utilised.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Where possible and practical all maintenance of vehicles and equipment shall take place in a workshop area.</li> <li>During servicing of vehicles or equipment, a suitable drip tray shall be used to prevent spills onto the soil, especially where emergency repairs are effected outside the workshop area.</li> <li>Leaking equipment shall be repaired immediately or be removed from site to facilitate repair.</li> <li>All potentially hazardous and non-degradable waste shall be collected and removed to a registered waste site.</li> <li>Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and re-mediated to the satisfaction of the ECO.</li> <li>A method statement is required from the Contractor showing how to show procedures for dealing with possible emergencies that can occur, such as</li> </ul>	Evidence of prescribed servicing and washing services.	Contractor, CECO.	Contract	During construction.	ECO	When ever servicing or maintaining of vehicles or equipment throughout the construction period.



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>fire and accidental leaks and spillage.</p> <ul style="list-style-type: none"> <li>The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site.</li> <li>Should emergency repairs be necessary, drip trays or tarpaulins must be utilised to ensure the collection of the oil. The area for emergency repairs should be identified by ECO.</li> <li>Only emergency repairs shall be allowed on site and a drip tray shall be used to prevent oil spills.</li> <li>The contractor must ensure that delivery drivers and plant operators are informed of all relevant procedures and restrictions required ensuring compliance with this document</li> <li>All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages.</li> <li>The following shall apply: <ul style="list-style-type: none"> <li>All contaminated soil / yard stone shall be removed and be placed in containers for further disposal;</li> <li>Contaminated material can be taken to one central point where bio-remediation can be done;</li> <li>Smaller spills can be treated on site;</li> <li>A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site; and</li> <li>All spills of hazardous substances must be reported to the ECO and relevant authorities.</li> </ul> </li> </ul>						
5.12 Personnel conduct	Personnel	Infringement of the EMPr requirements by personnel	<p><b>Objective(s):</b> To ensure that personnel are adhering to the EMPr requirements.</p> <p><b>Target:</b></p>	<p>Personnel wearing proper safety uniform.</p> <p>Absence of trespassers on site.</p>	Contractor and labourers.	Contract	Approved PPE must be issued to all employees pre-construction but must be used for the	ECO	Throughout construction period.



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>• The Contractor will adhere to all requirements of the Occupational Health and Safety Act (Act 56 of 2004), including the drafting of a suitable Health and Safety Plan which will be implemented during the construction phase.</li> <li>• All personnel to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof.</li> <li>• CoT induction must be attended by all parties involved in the construction.</li> <li>• Tool box talks to include aspects of the EMPr.</li> <li>• Labourers associated with the contractor must be easily recognizable (i.e. company issued overalls with company name/logo etc.), and other persons will not be allowed within the construction camp at any time without prior permission from the project manager.</li> <li>• The Contractor shall take all necessary precautions against trespassing on private properties.</li> <li>• Warning signs must be placed on and around the site as per the Occupational, Health and Safety requirements.</li> <li>• Adequate first aid services must be provided by the contractor at the contractor's camp.</li> <li>• The contractor will be responsible for his own security arrangements and shall comply will all site security instructions.</li> <li>• Basic fire fighting equipment must be available on site.</li> <li>• PPE to be provided and well maintained at contractor's camp.</li> <li>• All incidents should be reported to ECO, investigated, documented and kept in safety file.</li> </ul>				duration of the construction period.		



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
5.13 Construction activities	Safety of the Public / surrounding landowners	Injuries to Public / landowners  Health of Public / landowners	<p><b>Objective(s):</b> To ensure that the Public at large is not injured or affected negatively in any way.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>The Contractor shall recognise that the Site is situated close to inhabited and agricultural areas and shall therefore take all reasonable measures to ensure the safety of people in the surrounding area.</li> <li>Where the public could be exposed to danger by any of the Works or Site activities, the Contractor shall as appropriate provide suitable flagmen, barriers and/ or warning signs in English, Afrikaans and Xhosa, all to the approval of the Project Manager.</li> <li>All unattended open excavations shall be adequately demarcated (fencing shall consist of a minimum of three strands of wire and made clearly visible). Adequate protective measures must be implemented to prevent unauthorised access to and climbing of protective scaffolding. No firearms shall be permitted on Site without the prior approval of the Project Manager.</li> </ul>	<p>No injuries or health consequences to neighbouring people.</p> <p>No complaints from neighbouring people.</p>	Contractor and CECO.	Contract	Throughout the construction period.	ECO	Whenever there are stationary vehicles or equipment present on site.

# 6 MATERIALS

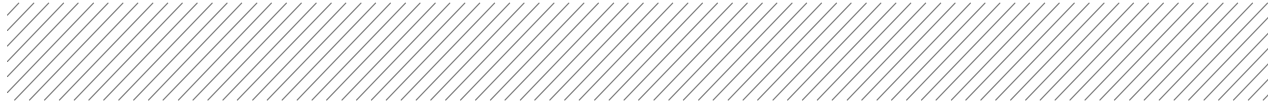
Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
6.1 Transportation of material	Material transport	Traffic congestion. Dust during transportation. Excessive noise.	<p><b>Objective(s)</b></p> <p>To ensure that whilst material is transported, it cannot negatively influence the surrounding environment.</p> <p><b>Target:</b></p> <p>The contractor should note that existing roads are sufficient to facilitate access to the site but the following should be adhered to:</p> <ul style="list-style-type: none"> <li>• Access to privately owned land will be arranged with the various landowners along the alignment by the contractor.</li> <li>• Adequate and appropriate traffic warning signage must be erected where applicable, along transport routes and access roads.</li> <li>• The Contractor shall take preventative measures e.g. screening, muffling, timing, pre-notification of affected parties to minimise complaints regarding noise and vibration nuisance from sources.</li> <li>• Fine materials (such as sand) must be covered during transportation.</li> <li>• Appropriate response plans must be prepared by Contractors to ensure the fastest possible reaction to spills or accidents.</li> <li>• Deliveries must be scheduled for off-peak hour traffic times.</li> <li>• All trucks and vehicles removing spoil from the site must have load areas and must be covered by a tarpaulin (plastic/synthetic sheets (covers) to prevent rocks and spoil falling onto the road surfaces.</li> <li>• Vehicle speeds on site should not exceed 30km/hr.</li> <li>• All drivers and operators are to have licences for driving and moving of plant</li> </ul>	<p>Mufflers and silencers fitted to construction vehicles and equipment.</p> <p>Covering of material during transportation.</p> <p>Emergency reaction plan (for spills/accidents) must always be readily available on site.</p>	Contractor and CECO	Contract	Prior to construction start.	ECO	Throughout construction period or as required by the ECO.



Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>on site.</p> <ul style="list-style-type: none"> <li>All road vehicles to be road worthy.</li> </ul>						
6.2 Storage of Hazardous Material	Hazardous Material storage areas	<p>Contamination of soil by hazardous material.</p> <p>Inadequate remediation measures for spills.</p>	<p><b>Objective(s):</b></p> <p>To ensure adequate protection of soil and soil remediation measures in case of spills.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Hazardous materials – such as paint, cement, fuels, bitumen, fuel, oil, herbicides, battery acid or detergents – must be stored in sealed, lockable containers when not in use</li> <li>A register shall be kept on all substances and be available for inspection at all times. Areas shall be monitored for spills and any spills shall be contained, cleaned and rehabilitated immediately</li> <li>No decantation into unmarked containers or containers with irrelevant or incorrect labelling.</li> <li>No decanted fuel to be left unattended in the sun to avoid fire.</li> <li>When handling hazardous materials, manufacturer's specifications must be complied with. The 16 point Material Safety Data Sheet is available on site.</li> <li>All reasonable care must be taken to prevent spills of any hazardous material when in use.</li> <li>All spills (minor and major) must be cleaned and remediated to the satisfaction of the ECO and CECO within 24 hours of occurrence.</li> <li>The contractor must ensure that there is a supply of absorbent material (e.g. Drizit) and cleanup materials readily available to absorb, breakdown and, where possible, encapsulate minor hazardous material spillages.</li> <li>No material may be stacked higher than 2m.</li> <li>All products are to be stored with compatibility in mind.</li> </ul>	<p>Storage of hazardous materials in sealed and lockable containers.</p> <p>No evidence of spills on site.</p> <p>Absorbent and clean-up material readily available on site.</p>	Contractor and CECO.	Contract	Construction period	ECO	For the duration of the construction period dependent on the presence of hazardous material on site.



Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>Storage areas shall display the required safety signs depicting "No smoking", "No naked lights" and "Danger". Containers shall be clearly marked to indicate contents as well as safety requirements.</li> <li>The contractor shall supply a method statement to the engineer for approval for the storage of hazardous materials prior to site preparation works.</li> </ul>						
6.3 Storage of Fuel	Storage areas	Contamination of soil by fuel.  Inadequate remediation measures for spills.	<p><b>Objective(s):</b> To ensure that there is optimum environmental protection (especially soil) from fuel spills.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Fuel must be stored in above ground storage tanks or sealed containers, contained within a bunded area with sump drainage.</li> <li>All bunds must be designed to contain at least 110% of the tank or drum storage capacity (this shall apply to above ground storage, and include fuels, welding equipment and oxy-acetylene cutting equipment).</li> <li>No drainage from fuel storage areas shall be permitted.</li> <li>Any other hazardous substances stored in bulk will require bunding.</li> </ul>	Established fuel storage areas in compliance with the objectives of the EMPr.	Contractor and CECO.	Contract	Pre-construction, Establishment of site.	ECO	Once off



Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
6.4 Use of cement	Cement	Contamination of soil and surrounding environment by cement.  Decrease in ambient air quality.	<p><b>Objective(s):</b> To ensure that the environment is protected from cement that will be used on site.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• Cement must be delivered in sound and properly secured bags or in approved bulk containers.</li> <li>• Cement products in bags must be stored in storage containers to be provided at the construction camp and should only be opened when needed.</li> <li>• The storage facility and surrounding area must be swept and cleaned regularly as required to ensure that cement products do not pollute the surrounding environment.</li> <li>• Cement bags are not to be burnt on site but should be disposed of at a registered waste disposal site.</li> <li>• No concrete batching on bare soil.</li> </ul>	Cement delivery, storage and use will be in line with the EMP requirements.	Contractor and CECO.	Contract	Construction period.	ECO	As long as cement is in use on site.



# 7 WASTE

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
7.1 Storage, removal and disposal of construction waste	Construction waste	Land pollution.  Compaction of soil by rubble.  Decreased aesthetic integrity of the site.	<p><b>Objective(s):</b> To ensure that waste is correctly stored and disposed of, decreasing the visual impact during the construction and post construction period. To keep the site neat and clean. Disposal of rubble and refuse in an appropriate manner. Minimise litigation. Minimise landowner complaints.</p> <p><b>Targets:</b></p> <ul style="list-style-type: none"> <li>No material shall be left on site that could be of harm to humans and animals.</li> <li>Broken, damaged and unused nuts, bolts and washers shall be picked up and removed from site</li> <li>Surplus concrete may not be dumped indiscriminately on site, but shall be removed from site when nearing completion of the different stages of work.</li> <li>Concrete trucks shall not be washed on site unless adequate washing and concrete collection facilities be introduced to site.</li> <li>Bins and containers must be made available by the contractor for the storage of construction waste.</li> <li>Temporary storage of construction waste will take place within the site, and within areas designated by the ECO and the contractor although construction waste will not be stored on site for longer than 30 days.</li> <li>The Contractor will be responsible to remove and transport all construction waste material off site to a registered waste disposal facility (proof of this as well as a copy of the sites Registration Permit, must be provided by the</li> </ul>	Construction waste stored, collected and disposed of as per the requirements of this EMPr.	Contractor and CECO	Contract	Waste bins/skips must be available prior to construction.  Removal of waste throughout the construction period.	ECO	The ECO will determine the frequency of waste removed from site.



Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			Contractor to the ECO) <ul style="list-style-type: none"> <li>No burning of waste permitted on site.</li> </ul>						
7.2 Storage, removal and disposal of domestic waste	Domestic waste	Land pollution. Bad odours. Decreased aesthetic integrity of the site.	<b>Objective(s)</b> To ensure that waste is correctly stored and disposed of, decreasing the visual and possible environmental impact during the construction and post construction period.  <b>Target:</b> <ul style="list-style-type: none"> <li>The Contractor must supply sealable waste bins at the construction camp for the storage of domestic waste.</li> <li>Personnel must be informed about the necessity of using the waste drums.</li> <li>The Contractor must do site clean-ups of litter other than construction waste on a daily basis, and dispose of it in the designated refuse bins provided at the Contractor's Camp.</li> <li>The contractor must ensure that general site-wide litter clean-up will occur at least once a week.</li> <li>The Contractor must dispose of all domestic refuse generated by his staff and Sub-Contractors on a weekly basis at a registered waste disposal facility. The Contractor must provide proof of this to the ECO in the form of a safe disposal certificate.</li> <li>Sealable waste drums should be provided at strategic places on site.</li> </ul>	Evidence of domestic waste stored, removed and disposed of according to the requirements indicated in this EMPr.	Contractor and CECO	Contract	The waste bins/ skips must be available prior to construction.  Removal of waste throughout the construction period.	ECO	The ECO will determine the frequency of waste removal from site.
7.3 Storage, removal and disposal of hazardous waste.	Hazardous waste.	Soil pollution.	<b>Objective(s):</b> To ensure that soil and the rest of the surrounding environment on site is protected from hazardous waste.  <b>Target:</b> <ul style="list-style-type: none"> <li>The Contractor is required to refer to the Hazardous Substances Act No 15</li> </ul>	All mitigation measures with regards to Hazardous waste mentioned in the EMPr are implemented.	Contractor and CECO	Contract	Hazardous Wastes must be collected in sealable, safe containers.  Removal of	ECO	Old hydrocarbons and other hazardous materials must be removed every 7 days.



Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>of 1973 act to determine whether any substance (new or waste) stored on site is subject to controls contained within the act.</p> <ul style="list-style-type: none"> <li>• All hazardous waste must be stored in sealed and suitably marked containers for removal to a registered hazardous waste disposal facility.</li> <li>• Any oil spillage on site will be excavated to a depth determined between the CECO and ECO and disposed of for removal to a registered hazardous waste disposal site. Excavated areas are to be refilled with suitable replacement material. Alternative <i>in-situ</i> remediation techniques could be used, if approved by the ECO.</li> <li>• Grey water must be stored in sealable marked containers and disposed of with other waste water from the construction works.</li> </ul>				hazardous waste throughout the construction process.		

## 8 SURROUNDING LAND

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
8.1 Entering different properties	Access roads	<p>Damage to access roads.</p> <p>Damage to environment.</p> <p>Loss of topsoil.</p> <p>Erosion.</p>	<p><b>Objective(s):</b></p> <p>To minimise damage to existing access roads. To minimise damage to the environment due to construction of new access roads. To minimise loss of topsoil and erosion.</p> <p><b>Targets:</b></p> <ul style="list-style-type: none"> <li>• Planning of access routes must be done in conjunction between the Contractor, ECO, Engineer and applicable Landowners.</li> <li>• All agreements reached should be documented and no verbal agreements should be made.</li> <li>• The Contractor shall properly mark all access roads. Markers shall show the direction of travel. Roads not to be used shall be marked with a " NO ENTRY " sign.</li> <li>• The introduction of concrete pipes and drifts, to facilitate access, shall be at the discretion of ECO on site. Any dangerous crossings shall be marked as such and where necessary, speed limits shall be enforced.</li> <li>• Where necessary, a suitable mixture of grass seed shall be used to re-seed damaged areas.</li> <li>• Deteriorated areas shall be fenced-in to enhance rehabilitation.</li> </ul>	<p>No claims from Landowners due to further damage on existing access roads.</p> <p>No erosion visible on access roads three months after completion of construction.</p> <p>No loss of topsoil due to run-off water on access roads.</p>	Contractor and CECO.	Contract	During the establishment of the construction site.	ECO	Once off
	Gate installation and control	Damage to existing fences, security	<p><b>Objective(s):</b></p> <p>Properly install gates to allow access to the site. To minimise damage to fences, limit access to CoT and Contractor personnel with gate keys. To minimise the extent of removal of vegetation.</p>	<p>No transgressions of the Fencing Act.</p> <p>No damage to</p>	Contractor and CECO.	Contract	During the establishment of the construction sites along the	ECO	9.4



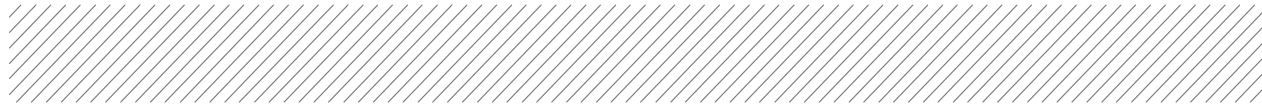
Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>Target:</p> <ul style="list-style-type: none"> <li>• Gate installation shall be according to CoT standards.</li> <li>• All gates installed in electrified fencing shall be electrified as well</li> <li>• All gates shall be fitted with locks and be kept locked at all times during the construction phase. Gates shall only be left open on request of the landowner if he accepts partial responsibility for such gates in writing, once the Contractor has left site and the gates are fitted with CoT locks.</li> <li>• All claims arising from gates left open shall be investigated and settled in full by the Contractor</li> <li>• If any fencing interferes with the construction process, such fencing shall be deviated until construction is completed.</li> </ul>	<p>fences and subsequent complaints from Landowners.</p> <p>All gates equipped with locks and kept locked at all times to limit access to key holders.</p> <p>All fences properly tied off to the gate posts.</p> <p>All gates properly and neatly installed according to specifications.</p> <p>No complaints about open gates.</p>			alignment.		

# 9 FLORA, FAUNA, AIR QUALITY, NOISE, WATER & OTHER

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
9.1 Construction activities (Physical issues and their control)	Terrain	Scarring of soil surface, disturbance/loss of topsoil	<p><b>Objective(s):</b> Minimise scarring of the soil surface and land features. Minimise disturbance and loss of topsoil. Rehabilitate all disturbed areas on site.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• Topsoil to be stripped to 300 mm where required by ECO</li> <li>• Topsoil only to be stripped where absolutely necessary for the construction of the infrastructure and facilities.</li> <li>• The areas within and around the site will most likely be disturbed by construction activities and rehabilitation is required to reinstate such areas.</li> <li>• Topsoil shall be stockpiled separately from subsoil or any other materials and shall be used for rehabilitation and landscaping of the cemetery.</li> </ul>	<p>No visible erosion scars once construction is completed.</p> <p>Minimum loss of topsoil at any one site.</p> <p>No barren areas visible three months after construction is completed.</p> <p>All damaged areas successfully rehabilitated.</p>	Contractor and CECO.	Contract	During the establishment of the construction sites along the alignment.	ECO	Vegetation will be cleared as construction proceeds along the alignment.
9.2 Vegetation clearing	Vegetation	Damage to vegetation. Erosion due to removal of vegetation.	<p><b>Objective(s):</b> Minimise damage to vegetation. Minimise possibility of erosion due to removal of vegetation. Eradication of alien invader species.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• The objective of vegetation clearing is to trim, cut or clear the minimum number of trees and vegetation necessary for the construction of the</li> </ul>	<p>No trees and vegetation removed unnecessarily.</p> <p>No visible erosion scars three months after completion of the contract due to vegetation removal.</p>	Contractor and CECO.	Contract	During the establishment of the construction sites.	ECO	Vegetation will be cleared as construction proceeds on site.



Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>facilities and infrastructure. No vegetation shall be removed unnecessarily.</p> <ul style="list-style-type: none"> <li>• Only a 4m strip may be cleared flush with the ground to allow vehicular passage.</li> <li>• No scalping shall be allowed on any part of the site unless absolutely necessary.</li> <li>• Permits from the Department of Forestry will be attained and the removal of all economically valuable trees or vegetation shall be negotiated with the Landowner before such vegetation is removed. All trees and vegetation cleared from the site shall be cut into manageable lengths and neatly stacked at local villages for further use.</li> <li>• No vegetation shall be pushed into heaps or left lying on site.</li> <li>• Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are removed.</li> <li>• Stumps shall be treated with herbicide. Smaller vegetation can be flattened with a machine, but the blade should be kept above ground level to prevent scalping.</li> <li>• Protected or endangered species of plants shall not be removed unless they are interfering with a structure. Where such species have to be removed due to interference with a structure, the necessary permission and permits shall be obtained from Provincial Nature Conservation.</li> <li>• All protected species not to be removed must be clearly marked and such areas fenced off if required.</li> <li>• The use of herbicides shall only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent.</li> <li>• CoT's approval for the use of herbicides is mandatory . Application shall be</li> </ul>	<p>No visible damage to the vegetation along the site one year after completion of the contract due to herbicide use.</p> <p>No litigation due to unauthorised removal of vegetation.</p> <p>All alien invaders eradicated from the site.</p>					

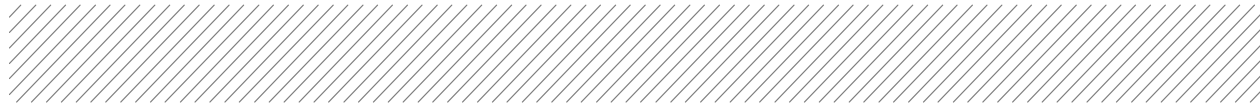


Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			under the direct supervision of a qualified technician. All surplus herbicide shall be disposed of in accordance with the supplier's specifications.						
	Wet areas	Unnecessary removal of flora. Removal of vegetative matter for firewood.	<p><b>Objective(s):</b> Avoid wet areas to prevent damage</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>No vehicular traffic shall be allowed in such areas</li> <li>Only existing roads through such areas may be used with the approval of CoT and the Landowner</li> <li>No equipment shall be used which may cause irreparable damage to wet areas</li> <li>The contractor shall use alternative methods of construction in such areas. Refer to CoT standards regarding access through seasonally wet areas.</li> <li>The conditions of the water use license must be complied with (if applicable).</li> <li>No go signs must be erected in all wetlands in close proximity to the construction area. These sensitive areas must be identified by the ECO in conjunction with the specialist reports compiled as part of the EIA process.</li> </ul>	No damage to wet areas.	Contractor and CECO.	Contract	During the establishment of the construction sites along the alignment.	ECO	Vegetation will be cleared as construction proceeds along the alignment.
9.3	Groundwater	Groundwater pollution	<p><b>Objective(s):</b> Monitor groundwater conditions for possible pollution.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>A groundwater monitoring program should be implemented to monitor the impact of the cemetery on the hydrogeological environment.</li> <li>Should it become evident from the monitoring program that pollution of the groundwater occurs, corrective and remedial actions should be implemented.</li> </ul>	A groundwater monitoring plan is drawn up and implemented.	Contractor and CECO.	Contract	During construction phase.	ECO	As determined by the groundwater monitoring plan.





Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>Community members must be notified if the groundwater is polluted or contaminated as the groundwater is being used for drinking purposes at the cemetery.</li> </ul>						
9.4	Conservation and protection of flora	<p>Unnecessary removal of flora.</p> <p>Removal of vegetative matter for firewood.</p>	<p><b>Objective(s):</b> To minimise the extent of removal of vegetation.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Plants outside of the construction area are not to be disturbed, destroyed or removed.</li> <li>The Contractor will be held liable for the replacement of any plant or feature under the protection of these specifications that is removed or damaged by the Contractor's negligence or mismanagement.</li> <li>No open fires permitted on site.</li> <li>No material storage or lay down is permitted under trees.</li> <li>All woody material not donated to local villages is to be chipped and used back on site for rehabilitation.</li> </ul>	No unnecessary loss of vegetation.	Contractor and CECO.	Contract	During the establishment of the construction sites along the alignment.	ECO	During construction



Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
9.5 Removal and control of alien vegetation	Alien vegetation	Introduction of alien plants/seeds on site.	<p><b>Objective(s):</b> To prevent alien plants/ seeds from being introduced on site. To remove alien plants where possible, from site</p> <p><b>Targets:</b></p> <ul style="list-style-type: none"> <li>All sites disturbed by construction activities must be monitored for exotic or invasive plant species and weeds.</li> <li>Chemical removal shall be used in accordance with manufacturer's specification for weeds.</li> <li>The type of chemical to be utilised must be approved by the ECO.</li> <li>Any eradicated exotic/invasive plant or weed vegetation must be removed from site and disposed of at an approved waste disposal facility.</li> <li>Operator, if not an CoT employee, must have Pest Control Operators licence.</li> <li>CoT will be responsible for the implementation of the maintenance schedule.</li> </ul>	Decrease of alien plants on site.	Contractor, Labourers, CECO.	Contract	For the duration of the construction period.	ECO	During construction
9.6 Protection and handling of fauna on site.	Protection of Fauna	Intentional or unintentional killing of fauna on site. Loss of fauna due to habitat disturbance.	<p><b>Objective(s):</b> To ensure that fauna found on site are protected and not interfered with.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>The contractor must ensure that the site is kept clean and free of rubbish that could potentially attract animal pests, and that rubbish bins are scavenger proof.</li> <li>The contractor must report problem animals or vermin to the ECO.</li> </ul>	<p>No evidence of domestic animals on site.</p> <p>The site is kept clean and does not attract fauna.</p>	Contractor, CECO.	Contract	Throughout the construction and post construction period.	ECO	Ongoing



Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>Ensure that domesticated and livestock animals belonging to the local community are kept away from the construction works.</li> <li>The contractor may under no circumstances make use of pesticide or poison to control unwanted animals.</li> <li>Workers should be educated so as not to kill any fauna found onsite.</li> <li>The footprint of disturbance should be kept to a minimum.</li> <li>No hunting or trapping is permitted along the alignment.</li> <li>Access roads should be planned so that only minimum linear distances are developed.</li> <li>Excavations must be checked on a daily basis for any signs of animal life which may have fallen in.</li> </ul>						
9.7 Trenching	Dust control	Air pollution	<p><b>Objective(s):</b> To reduce the generation of dust on the construction site.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Dust suppression is to be conducted during construction, or as complaints are received.</li> <li>Warning barricading should be placed around open trenches and should be suitable for high winds.</li> <li>The Contractor is to take appropriate measures to minimise the generation of dust as a result of excavation works. Such measures include frequent spraying during low rainfall periods or by using chemical dust binding agents approved by the ECO.</li> <li>Speed limits must be enforced in all areas to reduce the generation of dust.</li> </ul>	Dust is kept at its lowest level on site.	Contractor and CECO.	Contract	Throughout construction period.	ECO	During periods of low rainfall or as required by the ECO.



Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
9.8 Use of construction vehicles and equipment	Construction vehicles, plant and machinery.	Noise and vibration.	<p><b>Objective(s):</b> Reduction in the amount of noise on site.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Working hours shall be 06:30 to 17:00 on weekdays and 07:00 to 13:00 on Saturdays. No work shall be done on Sundays without prior notice given to the community.</li> <li>Should construction have to continue after hours, all residents affected must be notified timeously.</li> <li>All machinery and equipment must be maintained in good working order, and fitted with approved and specified muffler systems.</li> </ul>	<p>Construction vehicles and machinery fitted with mufflers silencers.</p> <p>Working hours are adhered to.</p>	Contractor and CECO.	Contract	<p>The vehicles and machinery must be fitted with mufflers prior to the commencement of construction.</p> <p>Work hours, unless otherwise permitted, must be adhered to through the construction period.</p>	ECO	Ongoing

# 10 ARCHAEOLOGICAL AND HERITAGE SITES

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
10.1 Protection of archaeological sites	Heritage & Archaeology	Destruction of graves and other sites of archaeological and heritage value.	<p>Objective(s): To make sure that sites of archaeological interest are preserved.</p> <p>Target:</p> <ul style="list-style-type: none"> <li>The heritage impact assessment (HIA) conducted during the EIA found no heritage important cultural heritage sites or graves.</li> <li>Should any archaeological sites be uncovered during construction, their existence shall be reported to CoT immediately.</li> <li>Artefacts may not be removed under any circumstances</li> <li>No dolomite, breccia or stomatolites may be removed or disturbed without the required permits from SAHRA</li> <li>Any destruction of a site will only be allowed once a permit is obtained and the site has been mapped and noted</li> <li>Permits shall be obtained from SAHRA should the proposed project affect any world heritage sites or if any sites are to be destroyed or altered</li> <li>An archaeologist will then take the necessary action so that construction can continue</li> <li>Construction must be immediately stopped, should any elements of cultural or heritage significance be found</li> <li>A qualified and registered archaeologist must be appointed and consulted at</li> </ul>	<p>No places of archaeological value are being disturbed or affected due to the construction of the project.</p> <p>No destruction of or damage to known archaeological sites.</p> <p>Management of existing sites and new discoveries in accordance with the recommendations of the Archaeologist</p>	Contractor, CECO.	Contract	For the duration of the construction period.	ECO	Ongoing



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			such a finding to appropriately excavate any artefacts in agreement with SAHR A.						
	Monuments & Historical sites	Damage or loss of monuments or historical sites. Vandalism, theft of such sites	<p><b>Objective(s):</b> To protect sites and land considered to be of cultural value. To protect sites against vandalism, destruction and theft .</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• All monuments, heritage sites and historical sites shall be treated with the utmost respect.</li> <li>• All graves shall be clearly marked and treated as no go areas</li> <li>• Destruction of such sites is strictly not allowed. Should it be necessary (according to the below site specific requirements) to remove any graves, the necessary procedures shall be followed and permits obtained</li> </ul>	<p>No destruction of or damage to known sites.</p> <p>Management of existing sites and new discoveries in accordance with legislation.</p> <p>No litigation due to destruction of sites.</p>	Contractor, CECO.	Contract		ECO	During construction

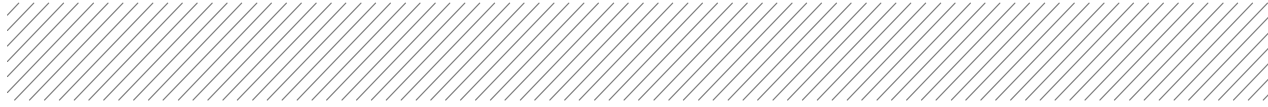
# 11 PLANNING AND ENGINEERING CONSIDERATIONS

Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
11.1 Construction activities	Existing infrastructure	Disruption of services, damage to installations, damage or loss of plant	<p><b>Objective(s):</b> To have control over and prevent temporary or permanent damage to plant and facilities. To prevent interference with the normal operation of plant and facilities. Securing of the safe use of infrastructure, plant and facilities and to have control over actions and activities in close proximity to inhabited areas.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• Telephone lines shall not be dropped during the stringing operations.</li> <li>• All crossings shall be with at least with 'rugby posts' to protect the lines.</li> <li>• Where pipe lines are found along the route, the depth of the pipes under the surface shall be determined to ensure that proper protection is afforded to such structures.</li> <li>• Any damage to pipe lines shall be repaired immediately.</li> <li>• All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties.</li> <li>• Speed limits shall be enforced in such areas and all drivers shall be sensitised to this effect.</li> <li>• Upon completion of the project all roads directly damaged by construction activities shall be repaired to their original state.</li> </ul>	<p>No unplanned disruptions of services.</p> <p>No damage to any plant or installations.</p> <p>No complaints from authorities or Landowners regarding disruption of services.</p> <p>No litigation due to losses of plant, installations and crops.</p>	Contractor, CECO.	Contract		ECO	During construction



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>Power cuts to facilitate construction, especially stringing, must be carefully planned. If possible, disruptions must be kept to a minimum and should be well advertised and communicated to the Landowners.</li> <li>Care must be taken not to damage irrigation equipment, lines, channels and crops.</li> <li>The position of all pipelines and irrigation lines must be obtained from the Landowners and be shown on the physical access plan.</li> </ul>						
11.2 Batching concrete	Batching plants	Damage to vegetation.  Damage to topsoil.  Surface water contamination.  Disturbance to area.	<p><b>Objective(s):</b> To ensure all agreements with Landowners are adhered to. To prevent complaints from Landowners. Successful rehabilitation of disturbed areas</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>All areas designated as sensitive should be incorporated into an open space system. Development should be located on the areas of lowest sensitivity.</li> <li>Development structures should be clustered as close as possible to existing development.</li> <li>The open space system should be fenced off prior to construction commencing (including site clearing and pegging). All construction-related impacts (including service roads, temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment/building materials/vehicles or any other activity) should be excluded from the open space system. Access of vehicles to the open space system should be prevented and access of people should be controlled, both during the construction and operational phases. Movement of indigenous fauna should however be allowed (i.e. no solid walls, e.g. through the erection of palisade fencing).</li> <li>Outside lighting should be designed to minimize impacts on fauna. All</li> </ul>	No complaints from Landowners.  All disturbed areas successfully rehabilitated three months after completion of the Contract.	Contractor, CECO.	Contract			During construction





Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<p>outside lighting should be directed away from sensitive areas. Fluorescent and mercury vapour lighting should be avoided and sodium vapour (yellow) lights should be used wherever possible.</p> <ul style="list-style-type: none"> <li>• The siting of batching plants shall be done in conjunction with the engineer and ECO. Also see detail mitigation measures in later sections.</li> <li>• CoT specifications regarding batching plants must be adhered to.</li> <li>• The batching plant area shall be operated in such a way as to prevent contaminated water to run-off the site and polluting nearby streams or water bodies. To this effect diversion berms can be installed to direct all wastewater to a catchment area.</li> <li>• CoT shall ensure that all agreements reached with the Landowner are fulfilled, and that such areas be rehabilitated once construction is completed</li> <li>• Should any claim be instituted against CoT, due to the actions of the Contractor at a batching plant site, CoT shall hold the Contractor fully responsible for the claim until such time that the Contractor can prove otherwise with the necessary documentation.</li> </ul>						
11.3 Construction activities on private land	Interaction with Landowners	<p>Damage to expensive structures and crops.</p> <p>Disruption of services.</p>	<p><b>Objective(s):</b> To maintain good relationships with Landowners</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>• The success of the project depends heavily on the good relations with the Landowners. It is required that the Contractor will supply one person to be the liaison officer (CLO) for the entire contract, and that this person shall be available to investigate all problems arising on the work sites concerning the Landowners.</li> </ul>	No delays in the project due to Landowner interference.	Contractor, CECO.	Contract		ECO	During construction



Activity	Aspect	Potential Impact	Mitigatory Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
			<ul style="list-style-type: none"> <li>All negotiations for any reason shall be between CoT, the Landowner and the Contractor.</li> <li>No verbal agreements shall be made. All agreements shall be recorded properly and all parties shall co-sign the documentation.</li> <li>The Contractor shall keep a photographic record of access roads. This will then be available should any claims be instituted by any Landowners.</li> <li>All claims instituted by the Landowners shall be investigated and treated promptly.</li> <li>Unnecessary delays should be avoided at all costs.</li> <li>The Landowners shall always be kept informed about any changes to the construction program should they be involved.</li> <li>If the ECO is not on site the Contractor's liaison officer should keep the Landowners informed.</li> <li>The contact numbers of the Contractor's liaison officer and the CoT ECO shall be made available to the Landowners. This will ensure open channels of communication and prompt response to queries and claims.</li> <li>All contact with the Landowners shall be courteous at all times.</li> <li>The rights of the Landowners shall be respected at all times and all staff shall be sensitised to this.</li> </ul>						
11.4 Actions by site staff	Littering on site	Untidy and polluted site and surrounding land	<p><b>Objective(s):</b> To maintain a neat and tidy workplace</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Littering by the employees of the Contractor shall not be allowed.</li> <li>The ECO shall monitor the neatness of the work sites as well as the campsite.</li> </ul>	<p>No visible sign of littering.</p> <p>No complaints from Landowners</p>	Contractor, CECO.	Contract		ECO	During construction

# 12 STORMWATER MANAGEMENT PLAN

The purpose for this plan is to prescribe measures to control storm water flow during the construction as well as operational phases of the cemetery expansion. Such measures would aim to prevent soil erosion and water quality pollution due to sedimentation and contamination.

The successful appointed contractor will be required to submit a detailed stormwater management plan according to their proposed work methodology based on this plan and the above listed EMP requirements, as these documents are only aimed to stipulate basic principles of stormwater management. It is too early at this stage to understand the exact work methodology since it will be up to the contractor to submit his own work methodology for approval. Such methodology as well as associated stormwater management plan must be submitted prior to commencement of any construction activities on site.

## 12.1 Objectives

The stormwater management plan for cemetery expansion project has the following objectives.

- To protect all life and property from damage by storm water and floods;
- To prevent erosion of soil by wind and water;
- To conserve the flora and fauna of the natural environment;
- To protect water resources in the catchment and downstream from pollution and siltation during construction and operation;
- To prevent clean water contamination by diverting water around proposed construction activities.

## 12.2 Pollution risk and control

### 12.2.1 Sediment Trap

- A temporal sediment trap shall be used as necessary to remove sediment from the storm water runoff from disturbed areas.
- Sediment traps shall be protected from unauthorized acts.

### 12.2.2 Existing Channels

- The channels will be inspected after each major storm event. Any eroded areas shall be regarded and redlined. Debris shall be removed from the channels.

### 12.2.3 Parking areas and Yards

- Any external parking area, yard or other paved area, will be designed to attenuate storm water runoff from a major storm to an acceptable degree.
- Drip trays must be positioned underneath standing vehicles / machinery so as to prevent contamination of storm water flowing over site.



#### 12.2.4 Driveways/Roads

- Road surfaces shall be cleaned regularly as required per month and after major rain events. Debris shall be removed and disposed of properly.
- Access, parking and pathways should be designed and constructed such that the rate of flow of storm water into the surrounding area is decreased when compared with the pre-development state.

#### 12.2.5 Incident, Spills / leaks management

- An incident, spill / leak management procedure should be developed and made available to site personnel on site.
- Records or reporting relating to the above will be retained as evidence of the incident and subsequent clean-up.


### 12.3 Stormwater pollution control

- Contractor shall ensure that no materials, fluids or substances are allowed to enter the storm water system that could have a detrimental effect on the environment.
- Any hazardous, dangerous or potential pollutants must be contained within a bunded area and under lock and key. Any equipment or machinery should be placed on drip trays or drip trays are to be positioned in such as way so as to prevent contamination from any spill / leak.
- Regular monitoring of storm water management system will be applied on site. No storm water, wash water, or wastewater may be directed towards any water courses without the installation of a suitable filtration system to prevent pollution, including silt.
- The contractor will ensure soil erosion and watercourse sedimentation is prevented during construction.
- Drip tray contents and effluent water from a cement mixer and other equipment washings shall be contained and disposed and / or treated in a suitable manner.
- No cement mixing will be permitted outside the designated cement mixing area. This designated area should be bunded or have an adequate berm diverting stormwater around contaminated areas.
- Contractor shall not permit any of his employees to make use of any natural water sources in the vicinity of the site for the purposes of washing of machines, cloths, tools or utensils.
- Littering will be prohibited and waste receptacles will be covered and skips should be placed on hard standing and covered.
- Where possible the contractor must prevent standing water accumulation on site during construction. The contractor shall ensure any standing water does not become contaminated with oil, petrol, diesel or any other hazardous substances. Only once verified that contamination has been prevented / abated will storm water be released from site.

### 12.4 Stormwater erosion control

Particular attention will be given to erosion management of the soil cover to prevent exposure to the waste fill and entrainment of waste into the storm water system. Measures that will be used to control erosion may include, *inter alia*:

- Where possible soil cover slopes will be terraced to prevent soil erosion;
- On slopes where there is potential for erosion, rock treatment or dense vegetation will be used to stabilise slopes;
- Areas of open / bare soil will be kept to the minimum;

- 
- Erosion gullies which may occur will be rehabilitated using stabilization methods as soon as practical; and
  - Pedestrian traffic will be directed away from terraced areas by means of fences and low barriers.

## 12.5 Management and monitoring of stormwater

In order to ensure that the storm water collection and treatment system is effective a short-term monitoring program will be implemented. Storm water which may be contaminated with hazardous / dangerous chemicals such as hydrocarbons should be sampled and analysed as appropriate. Silted storm water must be filtered prior to release.

## 12.6 Stormwater management during the operational phase

Rehabilitation measures to ensure storm water and erosion control during the operational phase includes the following:

- All scarred areas must be tilled either mechanically or manually in order to provide suitable conditions for grass germination and minimise water/wind disturbances.
- Soil is to be tilled to a minimum depth of not less than 60 mm and with a scarification spacing of not more than 200 mm apart.
- Adequate seeding mixture should be identified (as preferred by the CoT) and utilised for re-vegetation of the area e.g. *Eragrostis teff*, *Digitaria smutsii*, *Chloris gayana*, *Cynodon dactylon*, *Themeda triandra* and *Panicum maximum*.
- Monitoring of re-vegetated areas will be completed to ensure adequate coverage and rehabilitation effectiveness / success. The project Rehabilitation Plan must be consulted and adhered to when the rehabilitation phase is implemented.

# 13 REHABILITATION

Rehabilitation must be carried out as soon as possible after the construction is completed. All rehabilitation is to be done with approval of CoT environmental management's approval.

## 13.1 Rehabilitation of construction camps

The removal of all construction facilities and materials from the construction camp will be required, and rehabilitation will have to be carried out, including the removal of the following:-

- Concrete and compacted earth platforms;
- Fuel storage tanks; and
- Chemical toilets.

Construction roads will need to be rehabilitated according to the requirements below.

Any contaminated material or soil must be removed to a registered hazardous waste disposal facility and the prescribed re-vegetation process must then be followed thereafter.

Only indigenous plant species, preferably species that are indigenous to the natural vegetation of the area, should be used for landscaping in communal areas. As far as possible, plants naturally growing on the development site, but would otherwise be destroyed during clearing for development purposes, should be incorporated into landscaped areas. Forage and host plants required by pollinators should also be planted in landscaped areas.

Where possible, trees naturally growing on the site should be retained as part of the landscaping, with specific emphasis on the following species: *Acacia erioloba*, *Boscia albitrunca*, *Combretum imberbe*, *Ilex mitis* var. *mitis*, *Pittosporum viridiflorum*, *Prunus africana*, *Sclerocarya birrea* subsp. *caffra*. Measures to ensure that these trees survive the physical disturbance from the development should be implemented. A tree surgeon should be consulted in this regard.

## 13.2 Eradication of alien vegetation

**All alien vegetation borne from construction activities spread over the entire construction footprint must be removed on a regular basis.** Chemical removal shall be used in accordance with manufacturer's specification for weeds. All chemicals used must be approved by the ECO. Once the weeds have perished they shall be removed mechanically by use of an offset disk plough thereby digging up the vegetation including the root ball.



### 13.3 Control of alien vegetation

The remainder of the site including the re-vegetated areas shall be kept free of weeds and alien vegetation.

### 13.4 Rehabilitation

- Filling of the excavations with subsoil and topsoil to a minimum of 300 mm above ground level to allow for subsidence;
- Shaping of the disturbed areas to blend with the surrounding landscape;
- Placing of topsoil on all disturbed areas (minimum depth 200 mm);
- Organic fertilizers must be added to the topsoil prior to seeding (if required).
- Re-vegetation of all areas where topsoil is placed using a mixture of indigenous grasses and bushes;
- Maintenance of these areas until an acceptable cover has been established. Acceptable cover shall mean 75% ground cover with no gaps exceeding 500 mm. Maintenance may include watering, mowing and weeding as well as preventing the development of erosion channels or, backfilling where they have occurred.



Aurecon South Africa (Pty) Ltd

4 Daventry Street  
Lynnwood Bridge Office  
Lynnwood Manor  
0081

**T** +27 12 427 3080

**F** 086 766 1473

**E** Candice.Durr@aurecongroup.com

**W** www.aurecongroup.com

Aurecon offices are located in:

Angola, Australia, Botswana, China,  
Ethiopia, Hong Kong, Indonesia,  
Lesotho, Libya, Malawi, Mozambique,  
Namibia, New Zealand, Nigeria,  
Philippines, Singapore, South Africa,  
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