






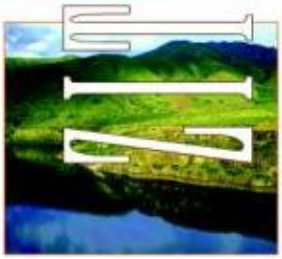

Zitholele Consulting
Reg. No. 2000/000392/07

PO Box 6002 Halfway House 1685
South Africa
Thandanani Park, Matuka Close
Halfway Gardens, Midrand
Tel + (27) 11 207 2060
Fax + (27) 86 674 6121

E-mail : mail@zitholele.co.za

Camden Power Station Ash Disposal Facilities Expansion Project

DRAFT REPORT FOR STAKEHOLDER REVIEW

Proponent:

Eskom Holdings SOC Limited
Megawatt Park
Maxwell Drive, Sunninghill

DEA Reference Number: 12/12/20/2300

February 2013 **Zitholele Project No: 12670**

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

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List of abbreviations

AWRD	Ash Water Return Dam
DEA	Department of Environmental Affairs
DWA	Department of Water Affairs
DWEA	Department of Water and Environmental Affairs (Ministry)
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EM	Environmental Manager (ESKOM)
EMPr	Environmental Management Programme
GNR	Government Notice Regulation
IEM	Integrated Environmental Management
IEM	Integrated Environmental Management
kV	Kilo Volts
mamsl	Metres Above Mean Sea Level
NEM:WA	National Environmental Management: Waste Act
NEMA	National Environmental Management Act
PM	Project Manager (ESKOM)
PPP	Public Participation Process
RA	Regulating Authority (DEA)
SHEQO	Safety, Health, Environment and Quality Officer
WMLA	Waste Management License Application

1. BACKGROUND INFORMATION

1.1 Context and objectives of this EMPr

The preparation of an Environmental Management Programme (EMPr) is recognised as a tool in Integrated Environmental Management (IEM) to mitigate or minimise negative impacts and enhances positive impacts on site. Typically an EMPr document is aligned to the project life cycle addressing each project phase i.e. the Construction, Operation and Decommissioning phases.

An EMPr, in the context of the EIA Regulations (2010), is a tool that takes a project from a high level consideration of issues down to a detailed workable action plan that can be implemented in a cohesive and controlled manner. An EMPr is defined as "an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction phase of a project are prevented and that the positive benefits of the projects are enhanced". Impacts range from those incurred during start up (site clearing, erection of the construction camp), and to those incurred during operation. Specifically, the objectives of this EMPr can be articulated as follows:

- To give effect to the construction related requirements;
- To give effect to the environmental commitments to the various role players;
- To ensure that these requirements / commitments are expressed in a manner that is accessible to all parties and is binding upon those responsible for project implementation;
- To ensure that sufficient resources are allocated to the project budget in order to give effect to the environmental requirements / commitments, and to ensure that the scale of EMPr-related interventions is consistent with the significance of identified impacts;
- To provide a coherent and pragmatic framework for the implementation of the requirements, ranging from the roles and responsibilities of the key project participants to the auditing and reporting of compliance;
- To facilitate appropriate and proactive response to unforeseen events or changes in project implementation that were not considered in the EIA process; and
- To ensure that the construction phase of the project does not result in undue or reasonably avoidable adverse environmental impacts, and that any potential environmental benefits are enhanced.

This report constitutes the draft EMPr for the construction and operation of the Camden Power Station Ash Disposal Facility. This draft EMPr has been compiled according to the findings of the environmental impact assessment, and is included as an appendix to the EIA for consultation purpose. The draft EMPr will accompany the EIA which will submitted to the

authorities for consideration. The Final EMPr will be published as a standalone document for ease of use.

1.2 Details of Environmental Assessment Practitioner (EAP)

In terms of the National Environmental Management Act ([NEMA] No 107 of 1998) and Environmental Impact Assessment (EIA) Regulations (Government Notice Regulation [GNR] 543 to 546, June 2010) the proponent must appoint an EAP to undertake an EIA and / or PPP for listed activities regulated in terms of the aforementioned act. In this regard, ESKOM appointed Zitholele Consulting (Pty) Ltd. (Zitholele) to undertake the EIA for the proposed project, in accordance with the aforementioned regulations.

Zitholele is an empowerment company formed to provide specialist consulting services primarily to the public sector in the fields of Water Engineering, Integrated Water Resource Management, Environmental and Waste Services, Communication (public participation and awareness creation) and Livelihoods and Economic Development.

Zitholele Consulting has no vested interest in the proposed project and hereby declares its independence as required by the EIA Regulations. The details of the EAP representatives are listed below.

The details of the key individual representing Zitholele, and acting as the EAP on this project is given below.

Warren Kok, as Project Director

Name:	Warren Kok
Company Represented:	Zitholele Consulting (Pty) Ltd.
Address:	P O Box 6002, Halfway House, 1685
Telephone:	071 250 5371
Fax:	086 674 6121
E-mail:	WarrenK@zitholele.co.za

Warren Kok is the designated Project Director on behalf of Zitholele. Warren will ensure regulatory compliance, quality assurance and overseeing the Technical Environmental Team. Warren holds a B.Hons degree in Geography and Environmental Management from Rand Afrikaans University (2000) and a Higher Certificate in Project Management from Damelin. He is a certified Environmental Assessment Practitioner (EAP) who is registered with EAPASA. Warren has in excess of 11 years' experience in environmental consulting in

South Africa. His experience spans both the public and private sector. Warren has successfully undertaken countless integrated EIA processes that require integration of the MPRDA, NEM:WA, WULA and NEMA regulatory processes. Many of these projects are considered landmark projects in South Africa's environmental mining sector and included several hazardous waste facilities. He is ideally skilled and experienced to manage this project to its conclusion.

1.3 Legal Context

Environmental legislation in South Africa was promulgated with the aim of, at the very least, minimising and, at the most, preventing environmental degradation. The Acts and Regulations applicable to the Camden Ash Disposal Facilities Expansion Project are summarised Table 1-1.

The list below was compiled to ensure that the applicant is aware of their legal responsibilities and liabilities during the implementation of the ash storage facility.

The Contractor should note that obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. Non-compliance to environmental law is a criminal offence and if prosecuted ESKOM will be liable for any environmental damage incurred.

Table 1-1: Legal Requirements for this EMPr.

Act name	Act no	Notes/remarks
The Constitution	108 of 1996	Includes the Bill of Rights, Environmental rights, Rights to property, Adminisytative justice and Access to information, *inter alia*.
National Environmental Management Act	107 of 1998	List of activities and competent authorities identified in terms of Sections 24 and 24D.
National Environmental Management: protected Areas Act	57 of 2003	Provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes.
National Environmental Management: Biodiversity Act	10 of 2004	Strategy for achieving the objectives of the United Nation's Convention on Biological Diversity, to which South Africa is a signatory.
Conservation of Agricultural Resources Act	43 of 1983	Control of utilisation and protection of wetlands; soil conservation; control and prevention of veld fires; control of weeds and invader plants.
The National Environmental Management: Waste Act	59 of 2008	Φ Waste management Φ Application of waste disposal license
National Heritage Resources Act	25 of 1999	Section 38 provides for Heritage Impact Assessments (HIAs), which are not already covered under the ECA.

Atmospheric Pollution Prevention Act	45 of 1964	Provides for control of dust control and air pollution.
National Environmental Management: Air Quality Act	39 of 2004	Control of dust, noise and offensive odours.
Fencing Act	31 of 1963	Any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5 metres on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora.
National Forest Act	84 of 1998	No person may cut, disturb, damage or destroy any indigenous, living tree in a natural forest, except in terms of a licence issued under section 7(4) or section 23.
Veld and Forest Fires Act	101 of 1998	Prevention of unauthorised veld and forest fires
Hazard substances Act, and regulations	15 of 1973 of	Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.
Occupational Health and Safety Act	85 of 1993	Prescribes health and safety measures necessary to adhere to for all construction workers
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act	36 of 1947	Control of the use of registered pesticides, herbicides (weed killers) and fertilisers. Special precautions must be taken to prevent workers from being exposed to chemical substances in this regard.
National Water Act, and regulations	36 of 1998	Prevention of effects of pollution, control of emergency incidents, and water use and licencing.
All relevant Provincial and Municipal bylaws		

2. PROJECT DESCIPTION

2.1 Project components

This EMPr has been developed to specifically address the management of the proposed extension of ash disposal facilities and associated infrastructure for the Camden Power Station during the construction, operational, and decommissioning phases of the project.

It is envisaged that the Camden Ash Disposal Facility Expansion project will consist of the following components:

- A suitably designed and lined ash containment facility (wet facility) able to accommodate the ~19 years of ash still to be generated by Camden Power Station;
- Clean and dirty water separation and containment facilities, including Ash Water Return Dams (AWRD) and trenches / drains; storm water drainage canals and discharge; and monitoring boreholes;
- Pipelines for the transportation of ash slurry to the disposal facility (containment dam);
- Access roads around the facility, fencing around the facility and access control;
- Relocation of existing service infrastructure (including power lines and roads); and
- Rehabilitation of redundant infrastructure.

The new ash disposal site will need to cater for an estimated 12,86 million m^3 of ash up to 2023, plus 5 years contingency (2028). Additional structures inter alia AWRD and channels, roads, pipelines and fences will also increase the footprint of the project. It is envisaged that the rate of rise of the ash storage facility will not exceed the current 3 m per annum. The new facility will be ~36 m high at its highest point once fully constructed.

2.2 Project alternatives

A site identification and evaluation exercise was undertaken in line with the Minimum Requirements for the Disposal of Waste by Landfill, both the 2nd Edition (1998) and the Draft 3rd Edition 2005 were taken into account, technical engineering requirements were also used in the initial identification of the site alternatives and refined later in the conceptual engineering of the feasible alternatives. The identification and evaluation of site alternatives is a phased approach consisting primarily of the following:

- Identification of potential sites against a set of technical criteria;
- Fatal flaw analysis of potential site alternatives; and
- Screening and ranking of sites against economic, environmental and public criteria.

The site identification and evaluation exercise was undertaken by the environmental consultants (environmental, geotechnical and engineering) and Eskom personnel (site engineer, environmental manager station and environmental advisor head office).

The site identification and evaluation exercise identified 4 site alternatives, of which two site alternatives were fatally flawed due to their proximity to a 1:100 year flood line and geo-technically unstable geology. The remaining two sites that were assessed futher were Site 1 and Site 3. A comparative impact assessment exercise identified Site 1 to be the preferred alternative based on the comparative impact assessment methodology employed for the project. A simplified site layout plan for Site 1 showing all of the project elements is included below as Figure 2-1.

Site 1 was identified as the preferred alternative based on the following reasons:

- A single facility can be constructed on Site 1 as opposed to Site 3, thus making it an easier alternative to construct and manage;
- Site 1 is more than 30% smaller than Site 3 when all infrastructure is combined;
- There will be a smaller impact to land use and agricultural activities if Site 1 is implemented;
- The drainage of the site is in one direction, allowing for impacts to be contained and managed easier;
- This solution allows for easier and more cost effective integration with existing infrastructure;
- This site alternative does not cross the Richards Bay Coal Line;
- No complicated mitigation measures are required in order to reduce the impact on the receiving environment;
- With the exception of installing a barrier system (which is very costly) all mitigation measures are relatively inexpensive to implement;
- This site is the least costly to construct and operate;
- The impact risk post closure does not result in an increase of the current baseline impacts to the receiving environment; and
- There are no substantial water resources in close proximity to Site 1.

The primary impact risks that must be managed includes:

1. The most significant impact risk to the environment from the Camden Ash Disposal Facility Expansion project, **during the construction phase**, will be to the Topography, Surface Water and Wetlands Resources, and existing infrastructure. This can be explained as follows:

- Topography: permanent alternation of surface water drainage patterns;
- Surface Water and Wetlands: increased suspended solids and sedimentation of surface water resources from construction activities, decreased recharge of surface water resources from alterations of topography, and installation of a barrier system to prevent water from leaving the contaminated area of the development site;
- Existing infrastructure: at least three 400 kV transmission lines will need to be relocated;
- Site 1 is located in close proximity (~500m) to the Camden Village, which although it has been decommissioned still has some residents residing the area. Camden Village is a sensitive receptor with regards to air quality, noise, and visual impacts; and
- The only residual impacts that are HIGH after the construction phase is complete are the Geological, Topographic, Groundwater, and Visual impacts. This is as a result of the already highly impacted receiving environment. The project will not increase the significance of these existing impacts, but mitigation measures cannot reduce these impacts either.

2. The most significant risk to the environment from the Camden Ash Disposal Facility Expansion project, **during the operational phase**, will be to the Soil and Land Capability, and groundwater environment. This can be explained as follows:

    - Soil and Land Capability: leachate will form below the facility and will pollute soil resources; and
    - Groundwater: the leachate draining from the facility will percolate through soil and into groundwater resources.

3. The most significant risk to the environment from the Camden Ash Disposal Facility Expansion project, **during the closure phase**, will be to the Groundwater and Visual elements of the receiving environment. This can be explained as follows:

    - Visual Environment: capping and vegetation of the dam will have a positive impact;
    - Groundwater: the leachate draining from the facility will percolate through soil and into groundwater resources; and
    - Closure activities will have a positive impact on the environment, although the residual impact in almost all cases remains negative. This is as a result of the already high baseline impacts that mitigation measures specific to this project will not reduce.

4. The most significant risk to the environment from the Camden Ash Disposal Facility Expansion project, **during the post closure phase**, will be to the Groundwater and Visual elements of the receiving environment. This can be explained as follows:

- Soil and Land Capability: leachate will form below the facility and will pollute soil resources; and
- Groundwater: the leachate draining from the facility will percolate through soil and into groundwater resources;

Impact mitigation

Unmitigated project impact risks to the soil and land capability, surface water and groundwater environment would be unacceptable if not mitigated. Fortunately these impacts can be mitigated. With mitigation measures implemented at Site 1 all impacts can be reduced to within acceptable limits. Mitigation measures identified are relatively well understood, and with the exception of the installation of a liner system below the dirty water facilities (such as the Ash Disposal Facility and Ash Water Return Dam), the mitigation measures are relatively inexpensive to implement.

The following elements were considered in drawing the stated conclusions for the Camden ash disposal facility:

1. The baseline environment is already substantially impacted by industrial (Camden Power Station and associated activities), mining (opencast and underground mining), and wide spread agricultural (cultivated lands) activities. The geology, topography, surface water, groundwater, and terrestrial environments are most affected. Should Site 1 be implemented it is expected that the additional impact will not increase the current impact on the environment. It is the EAP's opinion that the environment can accommodate the proposed development if mitigation measures are successfully implemented.

2. The Camden Power Station was re-commissioned specifically to circumvent the power crises in South Africa, and its on-going operation is of strategic significance to further the objectives of sustainable energy production in South Africa;

3. The proposed infrastructure is required for the on-going operation of the Camden Power Station and there is no other feasible solution that can be implemented within reasonable cost and with less environmental impacts;

4. The No-Go alternative is considered to be fatally flawed because it will result in the closure of Camden Power Station – having an unacceptable impact to the social and economic environment at a national level. This impact will persist beyond the post closure life of this project if it were implemented;

5. No specific issues or concerns have been raised by I&APs that indicate the project should not proceed.

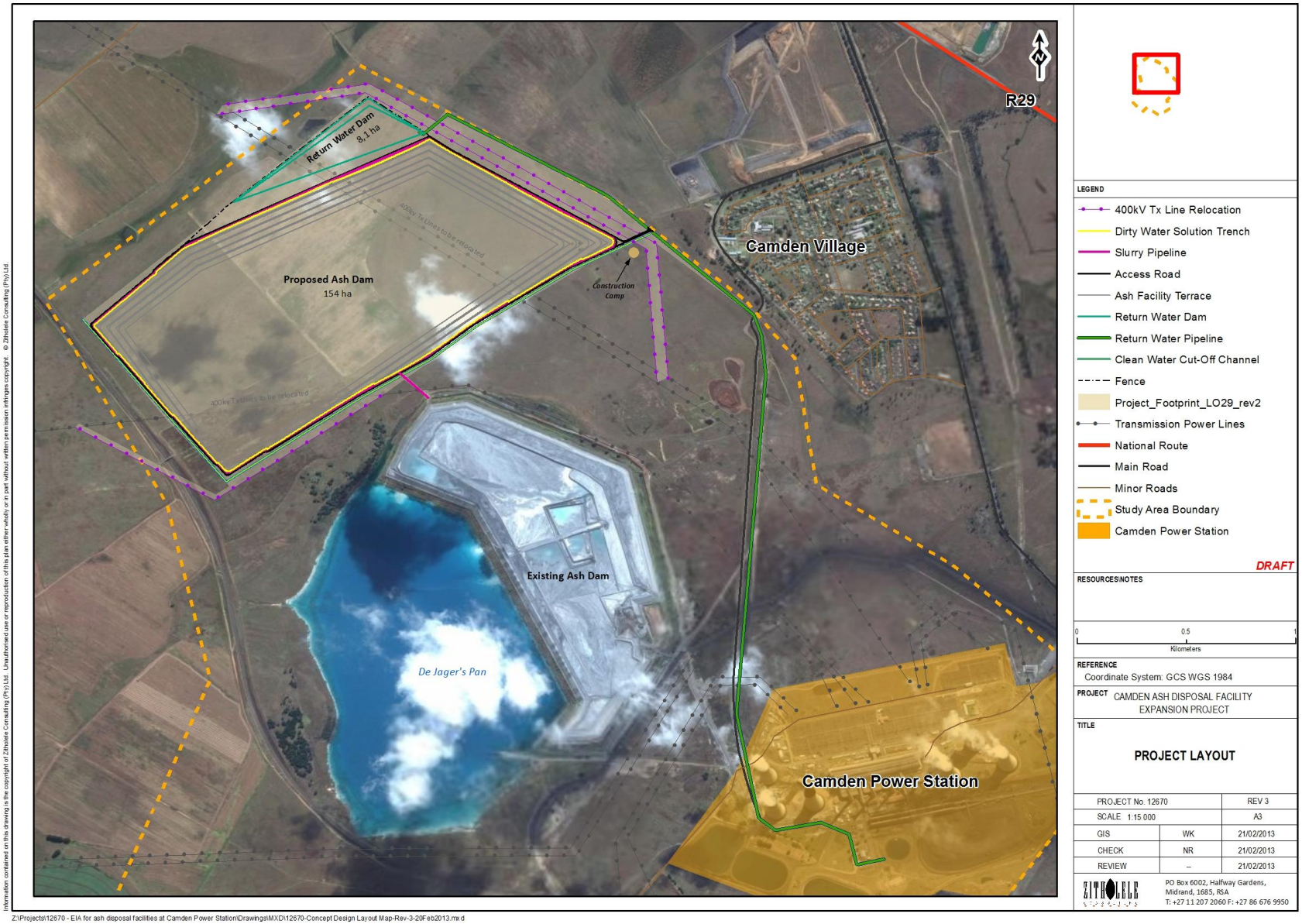

Figure 2-1: Camden Ash Disposal Facility Expansion Project Layout Map for Site 1.

2.3 Waste streams

The ash disposal facility needs to handle two main sources or streams of waste:

1. Fly ash and coarse ash from coal burning operations originating from the Camden Power Station; and
2. Brine salts originating from the Camden Power Station Reverse Osmosis (RO) / ash water treatment plant.

The ash and brine received by the current ash disposal facilities is transported via pipelines to the ash disposal facility from the various source areas. The wet ash in slurry form is pumped to the ash containment facility, where some water is evaporated and some is retained through penstocks. Surplus water that does not evaporate drains to the De Jagers pan, through penstocks, from where the water is abstracted and treated through a RO plant. The clean water from the RO plant is recirculated and reused in the power station. The concentrated brine from the RO plant is discharged back into the Ash water return lines to the station's ash water high level reservoir on site, to be used for ash removal from boilers ash and dust hoppers and subsequently forms part of the ash water that assists with the transportation of ash slurry to the ash disposal facility. The pipelines are placed strategically from the source areas in the power station and the RO plant.

The waste streams were classified by a specialist consultant in terms of both the Minimum Requirements as well as the draft Revised Waste Classification and Management Regulations. Based on the DWAF's Minimum Requirements waste classification methodology and when subjected to an ARLP, the Camden Ash is classified as a Hazard Group 1 waste. This is caused by the concentration of leachable chrome VI (Hazard Group 1) being higher than its ARL, which means that the waste cannot be delisted to a general waste. Hazard Group 1 wastes need to be disposed of on H:H waste disposal facilities.

However, when considering the quality of the ash seepage water not one of the elements of concern was detected at a concentration higher than its respective ARL value. Therefore the ash and ash carrier water can be delisted to a general waste as per the Minimum Requirements for disposal purposes. Although delisted liquid waste should be disposed of on landfills with H:H Lagoon barrier systems, the ash and ash carrier can be disposed of on a G:L:B+ waste disposal facility, provided the seepage water (leachate) head can be maintained at equal or less than 300mm on top of the barrier layer and the drainage piping system on the barrier is of adequate size, spacing and strength to ensure atmospheric pressure within the drainage system for the service life of the landfill.

The RO brine was classified as a Hazard Group 2 waste or High Hazard Waste due to the lead concentration in the brine being greater than its ARL value. The brine has to be disposed of on a hazardous lagoon (H:H lagoon).

In terms of the DEA's proposed Revised Waste Classification and Management Regulations for disposal, the Camden Ash was subjected to a Total Concentration (TC) extract and a Deionised (DI) water leach. Based on the analysis both the fine and coarse ash samples are classified as Type 3 wastes requiring disposal on a Class C landfill. This is because the TC of arsenic, barium, copper, lead and zinc where higher than their respective TC Threshold (or TCTi) values. In addition, the leach concentrations (LC) of barium, chromium, hexavalent chromium and molybdenum were also higher than their respective LCTi values for the fine ash. The coarse ash sample also classified as a Type 3 waste because of the boron, mercury, molybdenum, Total Dissolved Salts (TDS) and sulphate LC values being higher than their respective LCTi values. In addition, the TDS concentration of the DI water leach solutions in both cases is greater than the LCTi value of 250 mg/ℓ. The leachate from the existing site also classifies as a Type 3 waste because of the barium, sulphate, chloride and TDS concentrations being higher than their respective LCTi values. This is considered the true classification of the ash waste, as the leachate (seepage water) constitutes actual field conditions.

The Camden Power Station ash should therefore be disposed of on a facility that has been designed and constructed as a Class C landfill (DEA, 2011b). Class C landfills are very similar in design to the current G:L:B+ landfills, with the major difference being the HDPE layer added to the barrier system. This barrier system is considered appropriate for the wet ash disposal facility provided the seepage water (leachate) head can be maintained at equal or less than 300mm on top of the HDPE barrier layer and the drainage piping system on the barrier is of adequate size, spacing and strength to ensure atmospheric pressure within the drainage system for the service life of the landfill.

2.4 Barrier system design

In terms of the Minimum Requirements (DWAF, 1998a) a H:H Lagoon Barrier System is required. The typical cross section of the H:H Lagoon Barrier System is given in Figure 2-2 below.

An HDPE sheet is used for the geo-membrane, and river sand is proposed for the cushion layer. Grade A4 bidim is proposed for the geotextile layer. The barrier system also calls for a 900 mm clay layer. Large quantities of clay are not available on site. Importation of clay is possible however may not be economically viable.

The following are alternatives to the clay liner:

- HDPE;
- Geosynthetic Clay liner (GCL); and
- Bauxite.

These options need to be investigated during detailed design of the facility.

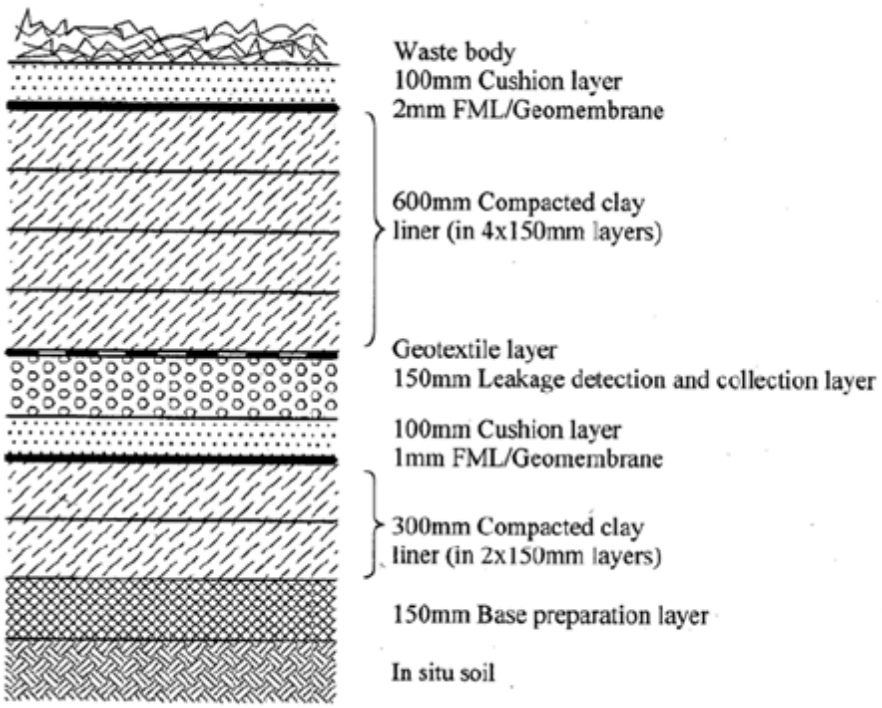

Figure 2-2: H:H Lagoon Barrier System

The Waste Classification report proposes a Class C barrier, show in Figure 2-3 below, as per the DEA's regulations (not promulgated as yet) for both the co-disposal as well as mono-disposal of ash.

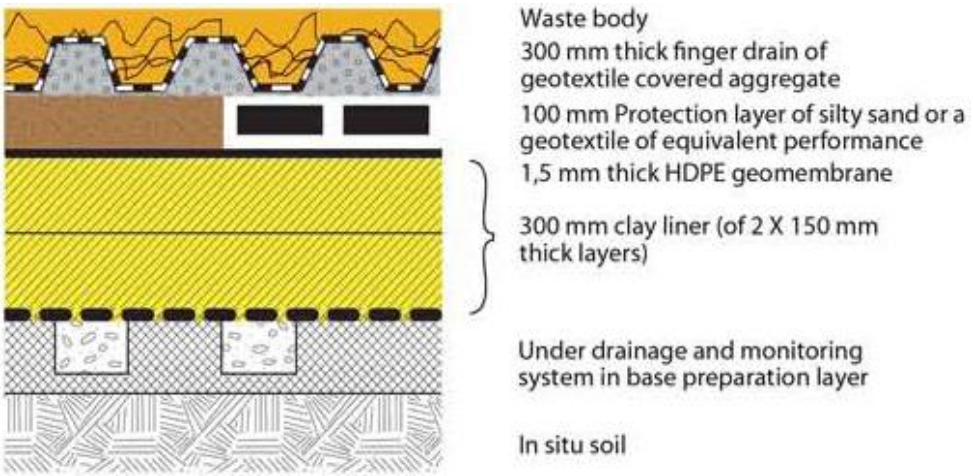

Figure 2-3: Proposed Class C landfill barrier system (DEA, 2011)

2.5 Clean and Dirty water separation and containment infrastructure

An upstream concrete lined channel shall be constructed to divert clean water around the proposed facility and discharge into the natural environment. The channel will be sized to

accommodate the 1:100 year storm event. The sites have been positioned such that the "clean" area between the natural watershed and the proposed facility is as small as possible.

Water draining from the deposited wet ash will be recycled via a system consisting of an Ash Water Return Dam (AWRD) and drains that collect the runoff from the ash disposal facility (containment dam) prior to pumping the water to the power station or RO plant for treatment or reuse.

For the foreseeable future water from the AWRD will be sent to the RO Plant, where it will be treated, clean water will be sent to the power station for reuse; while brine will be combined with the ash slurry for transportation of ash to the proposed ash disposal facility. As a barrier system will be installed at the new facility it is anticipated that no water will be lost through seepage, but may be lost through evaporation, and as such a closed loop system is formed.

Stormwater captured at the Ash Dam pool level will be conveyed to the AWRD via penstocks. The penstocks and the discharge pipes will be designed such that the flow is attenuated at the pool level and drained over a 24 hour period (with two penstock inlets in operation) to the AWRD.

A silt trap will be installed to remove silt from the decanted water before is enters the lined return water dam. The amount of silt in the water will need to be determined and will provide input into the detailed sizing and cleaning frequency of the silt trap. A well prepared and compacted base is essential for the liner. The liner requirement for the AWRD is the same for the ash facility.

2.6 Leachate collection and managhement

The leachate collection system will comprise of a toe drain as well as a main drain system. A leachate collection system will be designed such that a maximum leachate head of 300 mm will be maintained over the liner system. The leachate will be drained to the solution trench, discussed below, which ultimately discharges to the AWRD.

2.7 Ongoing groundwater monitoring

On-going monitoring of the storm water drainage features, relevant surface water resources, and groundwater monitoring boreholes will be undertaken; if necessary additional groundwater monitoring boreholes will be installed for monitoring.

2.8 Pipelines

Once the existing ashing facility has reached its design capacity, the slurry pipeline will be discontinued to the discharge point at the existing facility. The pipeline will be extended from the existing facility to the new facility by a 6 mm thick, 350 mm diameter steel pipeline. The existing ash return water pipeline from De Jagers Pan will need to remain in place after the

existing facility has reached its design capacity. This will be required in order to manage stormwater that either runs off the contaminated terrain and side slopes of the facility or any stormwater that recharges through the facility before it is capped. A new return water pipeline will need to be installed from the new AWRD back to the power station. A 400 mm diameter High Density Polyethylene (HDPE) pipeline will be installed. This pipeline will be buried within a trench approximately 1.5 m deep.

2.9 Access

The site will be accessed from the existing access roads located on the north eastern boundary of the site. The current gravel access road is in a fair condition and does not require any upgrade. A new access road to the facility will be constructed for vehicle access. This new road will be taken from the existing site access road, and will circumvent the entire facility, located at the toe of the ash disposal facility. The road will have no servitude. The proposed access road will consist of a gravel base with a stabilised wearing course.

2.10 Capping of ash disposal site

The permit / license for the existing ash dam require rehabilitation of the facility through capping with soil material in order to cover the waste, and successful re-vegetation of rehabilitated areas of the site. This process has to date been very successful and the current practice will be continued at the preffered site.

3. DESCRIPTION OF DEVELOPMENT ACTIVITIES

The development activities proposed for the extension of ash disposal facilities and associated infrastructure for the Camden Power Station during the construction, operational, and decommissioning phases of the project are discussed below.

3.1 Construction phase

The construction phase will include the following activities:

1. *Obtaining the Environmental Authorisation:* This will signal the commencement of the project construction phase. If a positive EA is obtained, the construction of the ash disposal facility and rerouting of transmission lines will be undertaken over a period of 12 - 24 months.

2. *Installation of fences and access control:* The construction area will be secured with a fence installed at the outset of construction phase.

3. *Site preparation and clearance for contractor's camp:* Preparation of this area will include vegetation clearing, compaction, installation of bunded areas for hydro-carbon storage, establishment of temporary offices / storage facilities (such as containers or park homes), chemical toilets (portable / conservancy tanks), potable water storage, and fences and access control. This area will be rehabilitated as per the EMPr requirements post construction.

4. *Vegetation clearing to facilitate access and construction activities:* Vegetation must be cleared to facilitate access, construction and safe operation. Where protected indigenous vegetation needs to be removed it must be replanted or relocated after the relevant permits have been onbtained.

5. *Establishing of access roads:* Once the contractor is established on site the access roads to the construction site will be established. Each road alignment will first be walked to ensure that site sensitivities are accounted for and avoided / planned for wherever encountered. Each road will then be cleared of vegetation, graded, and where necessary a nominal wearing course of gravel may be imported and/or the road may be compacted for added stability.

6. *Site services:* Apart from the access roads, no other services are envisaged for the proposed development. Portable chemical toilets will be used during the construction phase, and a reserve water tank of 2500 litres will supply potable water requirements at the construction camp as required.

7. *Relocation of 400 kV power lines:* The new power lines will first be constructed, and then a switch will be made between the existing line and the new power line.

Thereafter the existing line will be dismantled. The power line construction will include a corridor walkdown, vegetation clearance, concreting of the pylon footings and installation of steelwork structures, strining, and switching the feed. Once stringing and tensioning is complete the line is considered constructed, where after it will be tested prior to being commissioned.

8. *Pipeline construction:* A slurry and return water pipeline will be constructed. Pipeline construction will include a route walk down, identification of plinth positions, soil nominations at plinth positions, excavation for foundations, reinforcing and concreting of foundations (installation of concrete plinths), assembling and installation of pipelines on plinths, connection to pumping source, and inspection of the pipeline prior to commissioning. Additional activities include excavation of the trenches, temporary stockpiling of soils, placement of a nominal gravel bedding inside trenches, testing of pipelines for leaks, replacement and profiling of stockpiled soils, and seeding and re-vegetation.

9. *Installation of clean and dirty water separation and containment infrastructure:* Construction will include surveying and pegging, walk down of the proposed alignment to identify site specific sensitivities and concerns, geotechnical investigations, vegetation clearance, channel excavation, material compacted to improve stability, and installation of concrete lining.

10. *Installation of a barrier system:* This involves the deposition and compaction of specific layers of material in a specific order on the proposed facility footprint.

11. *Construction of the starter wall for the first compartment:* Once all the protective measures are installed such as the clean and dirty water separation and containment infrastructure and the barrier system, then the starter wall for the first compartment can be constructed. Initial deposition needs to be contained using a starter earth wall for each compartment, built to a height that allows for a 3 m / year rise in the ash disposal facility.

12. *Remediation of construction activities:* It is envisaged that rehabilitation / remediation activities will include at a minimum profiling of the terrain, soil amelioration and improvement to promote establishment of a sustainable vegetation layer, seeding to ensure that a sustainable vegetation cover is established, irrigation, and alien invasive control.

3.2 Operational phase

The operational phase will include the following activities:

1. *Taking over the facility from the Contractor:* Eskom will take ownership of the ash disposal facility from the Contractor upon completion of construction phase.

2. *Access roads, fences, and access control:* Periodic maintenance will be undertaken and will include grading and profiling, importation of additional wearing course were required, debriding of storm water infrastructure such as cut-off / mitre drains, vegetation clearing (including firebreaks) and alien invasive control, repairing of fences, and litter collection and clean up.

3. *Relocated 400 kV power lines:* The power line and its servitude will be inspected quarterly. Maintenance of the power line and servitude will be the same as what is envisaged for access roads and fences above.

4. *Pipelines:* Regular inspections of the pipelines will be undertaken to ensure the integrity of the pipelines is retained and to identify any leaks / damage that may have occurred. General maintenance of the pipeline servitude such as vegetation clearing, alien invasive control, and repairs to fencing etc will also include maintenance of the flow meters and periodic flushing of the pipeline, replacement of pipe segments, and cleaning of spills / leaks that occur.

5. *Clean and dirty water separation and containment infrastructure:* Maintenance of the clean water separation channel will include clearing of the channel of debris, repairing of the channel as may be required, correction of any erosion identified, and control of alien invasive species. Futher maintenance of the clean and dirty water systems will include regular monitoring.

6. *Barrier System Maintenance:* Once installed the barrier system will be inspected monthly in advance of deposition of waste. Any damage to the barrier system will be repaired immediately. Once the area has been covered with waste it is assumed that the integrity of the barrier system is intact, and will operate for the life of the facility.

7. *Ash disposal:* The ash slurry will be pumped from the power station to a central distribution point situated at a high point. From the distribution point the fly ash and the coarse ash are channelled through various open trenches and allowed to gravitate into the appropriate paddocks.

8. *Dewatering of the ash slurry:* Water on top of the ash dam will be decanted from the pool using penstocks. Up to two temporary penstock inlets per compartment in the initial phases will be required. A permanent penstock, central to each compartment will then be installed and operated for the life of the facility.

3.3 Decommissioning phase

The decommisioning phase will include the following activities:

1. *Consecutive capping of ash disposal facility:* Rehabilitation of the ash disposal facility will commence during the operational phase and continue consecutively with

operation, ensuring that that the footprint for rehabilitation post operation is reduced. The methods for rehabilitation will be confirmed on site, and will be in compliance with the approved EMPr for the project.

2. *Profiling of the terrain:* This will ensure that it is free draining, and ties into the existing terrain without causing erosion;

3. *Soil amelioration and improvement:* This will be undertaken prior to placement to promote establishment of a sustainable vegetation layer;

4. *Placement of improved soil:* The improved soil will be placed in a 200 – 300 mm thick layer capping over the ash body;

5. *Hydro-seeding:* Seeding of the area will be undertaken with an appropriate seed mix to ensure that a sustainable vegetation cover is established;

6. *Irrigation:* Water of the area, usually in the first two years, during dry spells to ensure vegetation cover is properly established is common; and

7. *Alien invasive control:* This is practiced to ensure that the area is maintained in a weed free condition.

4. DESCRIPTION OF THE RECEIVING ENVIRONMENT

The following aspects of the receiving environment have been considered in the EMPr.

1. *Climate:* The project area is characterised by warm, wet summers, and mild, dry winters, with equivalent evaporation depths exceeding precipitation. Regular dust storms can also be expected during periods of prolonged dry weather. Average annual rainfall for the highveld decreases from 900 mm in the east to 650 mm in the west, with approximately 85% falling between October and April. In the vicinity of Camden Power Stations the estimated rainfall from showers and thunderstorms is about 726 mm/year and the evaporation 1400 mm/year.

2. *Geology:* The site falls within the Carboniferous to early Jurassic aged Karoo Basin, a geological feature that covers much of South Africa. Sediments in this part of Mpumalunga Province fall within the Permo-Triassic aged Northern facies of the Ecca Series, forming part of the Karoo sequence. Sediments of the Vryheid formation comprise the local geology. Shales, mudstones, siltstones and sandstones constitute the bulk of the formation, with interlayering of these sediments throughout. The coal seams have relatively high dirt content. Coal measures currently mined in the area form part of the Highveld Coal Field. The study area fall within the sediments of the Vryheid Formation consisting of grit, sandstone, shale and coal seams.

3. *Topography:* The study area ranges from 1 620 Metres Above Mean Sea Level (mamsl) to 1 760 mamsl. The highest parts of the study area are northwest of the site and the lowest parts are in the southeastern portions of the study area, south of the Vaal River. The topogrpahy is undulating with shallow incised valleys where the main watercourses flow. Several pans are found throughout the area, especially on the sandstone geology.

4. *Soils:* The study site is underlain by siltstone, mudstone and sandstone that belong to the Vryheid Formation of the Ecca Group, Karoo Supergroup. Generally these geological structures will decompose in-situ, forming residual soils that may be silty and clayey, with the possibility of expansive soil being present. These soils are often blanketed by a considerable thickness of transported soils of colluvial origin that consist of silty and clayey fine sands.

5. *Agricultural potential:* The regional land capability is mostly Class II or IV soils with few limitations. This is evident in the large number of cultivated lands found in the region. In the areas where the soil is too shallow or too wet to cultivate, livestock are grazed. The study site is made up of several land capability classes, namely Class II, III, IV, V, VI and VII. The Class II - III soils are suitable for cultivation and can be used for a range of agricultural applications in the case of Class II. Class IV – V soils

have features that reduce their potential for agricultural use, this can be flood hazards, erosion risk, texture or drainage.

6. *Surface water:* The main drainage features of the area are the Witpuntspruit which drains south-eastwards to the Vaal River, which is located some 6 km from Camden Power Station. Several unnamed tributaries are also found in the area. In addition to the streams, several wetlands and pans can also be found in the region. These support a number of faunal and floral species uniquely adapted to these aquatic ecosystems, and therefore all surface water bodies are earmarked as sensitive features. The De Jagers Pan is a natural depression/pan that is located adjacent to the existing ash disposal site. This pan is used as a return water dam as part of the approved water management system for the station. In addition to the pan there are small non-perennial drainage lines and wetlands present on site. It should however be noted that several of the so-called wetlands could also be classified as riparian zones as they follow the drainage path of the perennial and non-perennial streams. All the area's identified above perform critical ecosystem functions and also provide habitat for sensitive species.

7. *Terrestrial ecology:* The area under investigation is located within the Grassland Biome. Each biome comprises several bioregions which in turn has various vegetation types within the bioregion. The Grassland Biome is represented by Mesic Highveld Grassland and Inland Azonal Vegetation bioregions. Vegetation units located within the study site include Eastern Temperate Freshwater Wetlands and Eastern Highveld Grassland. Due to the recent efforts of organisations such as Ramsar, Eastern Temperate Freshwater Wetlands unit is now 4.6 % conserved and rated as least threatened. This vegetation type on site includes De Jager's Pan. Eastern Highveld Grassland is considered endangered with a conservation target of 24%. Only a very small fraction is conserved in statutory reserves (Nooitgedacht dam and Jericho dam Nature Reserves) and in private reserves (Holkranse, Kransbank, Morgenstond). Approximately 44% is transformed primarily by cultivation, plantations, mines, urbanisation and by the building of dams. Cultivation may have had a more extensive impact, indicated by land-cover data. No serious alien invasions are reported, but *Acacia mearnsii* can become dominant in disturbed areas. No red data species were found. However species of importance noted on site include *Boophone disticha.*

   A total of 568 arthropods are recorded for the study area. The large number is mainly due to the wide range of habitat available and the large area covered by the study site. A total of 3 reptilian species were recorded for the study site, whereas only one amphibian was recorded as occurring within the study area - *Rana angolense*. These species are not restricted in terms of habitat or distribution and none of the species recorded are classified as Red Data species. Mammal species diversity was low across the bulk of the study area, as very little natural habitat remains. Most of

the mammals occur in small pockets of remaining natural vegetation, with a total of 6 species being recorded. Of these only the Aardvark is listed as vulnerable.

8. *Visual:* The proposed study site is found in a mostly rural landscape that has been infiltrated by mining and industrial development around the power station. The bulk of the study area is utilised for agriculture and coal mining with a varying topography.

5. ROLES AND RESPONSIBILITIES

5.1 Contractual obligation

In order to ensure that ths EMPr and/or derivatives thereof are enforced and implemented, these documents must be given legal standing. This shall be achieved through incorporating the EMPr and/or derivatives documents as an addendum to the contract documents for the particular project and specifying under particular conditions of the contract for the tender that the requirements of this EMPr and/or derivatives apply and must be met. This will ensure that the obligations are clearly communicated to contractors and that submitted tenders have taken into account, and budgeted for the environmental requirements specified in this EMPr and/or its derivatives. The successful tender ultimately becomes the signed contract, thereby ensuring that the included EMPr becomes legally binding.

5.2 Responsibilities and Duties

5.2.1 The Developer

ESKOM is the Developer and has overall responsibility for ensuring that the construction and development of the project is undertaken in an environmentally sound and responsible manner, and in particular, reflects the requirements and specifications of the EMPr and recommendations from the relevant authorities.

The responsibilities of the Developer will include:

Appoint or designate a suitably qualified Project Manager to manage the implementation of the proposed project;

- Establish and maintain regular and proactive communications with the designated/ appointed PM, Contractor(s) and ECO; and
- Ensure that the EMPr is reviewed and updated as necessary.

Reporting Structure:

The developer will liaise with and/or take instruction from the following:

- Authorities; and
- General Public.

5.2.2 Project Manager (PM)

The primary role of the PM is to ensure that the Contractor and Developer's staff complies with the environmental specifications in the EMPr. The PM shall further:

- Oversee the general compliance of the Contractor with the EMPr and other pertinent site specifications; and
- Liaise between and with the Contractor and ECO on environmental matters, as well as any pertinent engineering matters where these may have environmental consequences.

In addition the PM shall:

- Designate or appoint a suitably qualified Environmental Manager (EM) that will manage all environmental aspects on behalf of the PM and the Developer
- Review and approve Method Statements produced by the Contractor in connection with the EMPr;
- Assume overall responsibility for the effective implementation and administration of the EMPr;
- Be familiar with the contents of the EMPr, and his role and responsibilities as defined therein;
- Ensure that the EMPr is included in the Contractor's contract;
- Communicate to the Contractor, verbally and in writing, the advice of the ECO and the contents of the ECO reports;
- In conjunction with the Construction Supervisor; undertake regular inspections of the Contractor's site as well as the installation works in order to check for compliance with the EMPr in terms of the specifications outlined therein. Inspections shall take place at least once a week and copies of the monitoring checklist contained in the file;
- Review and approve drawings produced by the Contractor or professional team in connection with, for example, the construction site layout, access/haul roads, etc.;
- Issue site instructions giving effect to the ECO requirements where necessary;
- Keep a register of all complaints and incidents (spills, injuries, complaints, legal transgressions, etc) and other documentation related to the EMPr;
- Report to the ECO any problems (or complaints) which cannot first be resolved in co-operation with the Contractor(s);
- Implement recommendations of possible audits;
- Implement Temporary Work Stoppages as advised by the ECO, where serious environmental infringements and non-compliances have occurred;

- Facilitate proactive communication between all role-players in the interests of effective environmental management; and
- Ensure that construction staff is trained in accordance with requirements of the EMPr.

Reporting Structure:

The PM will report to the Developer, as and when required.

5.2.3 Contractor

The Developer, or PM acting on his behalf, will appoint a Contractor(s) to implement the development. The Contractor(s) will be contractually required to undertake their activities in an environmentally responsible manner, as described in the EMPr.

The role of the Contractor shall be to:

- Ensure that the environmental specifications of this document (including any revisions, additions or amendments) are effectively implemented. This includes the on-site implementation of steps to mitigate environmental impacts;
- Preserve the natural environment by limiting any destructive actions on site;
- Ensure that suitable records are kept and that the appropriate documentation is available to the PM;
- Take into consideration the legal rights of the individual Landowner, Communities and ESKOM Regional staff;
- Ensure quality in all work done, technical and environmental;
- Underwrite ESKOM's Environmental Policy at all times, and
- Ensure that all subcontractors and other workers appointed by the Contractor are complying with and implementing the EMP during the duration of their specific contracts.

The responsibilities of the Contractor will be to:

- Discuss implementation of and compliance with this document with staff at routine site meetings;
- Designate, appoint and/or assign tasks to personnel who will be responsible for managing all or parts of the EMPr. The Contrator must appoint or designate a Safety, Health, Environment and Quality Officer (SHEQO) to monitor daily implementation of the EMPr on the Contractor’s behalf as a minimum;
- Monitor environmental performance and conformance with the specifications contained in this document during site inspections;

- Report progress towards implementation of and non-conformances with this document at site meetings with the PM;
- Advise the PM of any incidents or emergencies on site, together with a record of action taken;
- Report and record all accidents and incidents resulting in injury or death; and
- Resolve problems and claims arising from damage immediately to ensure a smooth flow of operations;

Reporting Structure:

The Contractor will report to the PM and ECO, as and when required.

5.2.4 Subcontractors

The Contractor may from time to time appoint Subcontractors.

The role of the Subcontractors shall be to:

- Perform certain services and/or provide certain products on behalf of the Contractor. The Subcontractors will be contractually required to undertake their activities in an environmentally responsible manner, as described in the EMPr; and
- Ensure environmental awareness among employees so that they are fully aware of, and understand the Environmental Specifications and the need for them.

The responsibilities of the Subcontractor will be to:

- Be familiar with the contents of the EMPr, and his role and responsibilities as defined therein;
- Comply with the Environmental Specifications in the EMPr and associated instructions issued by the Contractor to ensure compliance;
- Notify the Contractor verbally and in writing, immediately in the event of any accidental infringements of the Environmental Specifications and ensure appropriate remedial action is taken; and
- Notify the Contractor, verbally and in writing at least 10 working days in advance of any activity he/she has reason to believe may have significant adverse environmental impacts, so that mitigation measures may be implemented timely.

Reporting Structure:

Subcontractors will report to and receive instructions from the Main Contractor.

5.2.5 Environmental Control Officer (ECO)

Through the PM the Developer will appointed an independant ECO to monitor and oversee implementation of the EMPr for the proposed construction works. The ECO is independent from the Developer, the PM and the Contractor(s). The ECO is given authority to ensure that the EMPr is fully implemented and that appropriate actions are undertaken to address any discrepancies and non-compliances.

The role of the ECO shall be to:

- Act as site 'custodian' for the implementation, integration and maintenance of the EMPr in accordance with the contractual requirements;
- Ensure successful implementation of the EMPr; and
- Ensure that the Contractor, his employees and/or Subcontractors receive the appropriate environmental awareness training prior to commencing activities.

The responsibilities of the ECO will be to:

- Liaise with the PM on the level of compliance with the EMPr achieved by the Contractor on a regular basis for the duration of the contract;
- Advise the PM on the interpretation and enforcement of the Environmental Specifications (ES), including evaluation of non-compliances;
- Supply environmental information as and when required;
- Review and approve Method Statements produced by the Contractor, in conjunction with the PM;
- Demarcate particularly sensitive areas (including all No-Go areas) and to pass instructions through the PM concerning works in these areas;
- Monitor any basic physical changes to the environment as a consequence of the construction works according to an audit schedule;
- Attend regular site meetings and project sterring committee meetings;
- Undertake regular monthly audits of the construction works and to generate monthly audit reports. These reports are to be forwarded to the PM who will communicate the results and conclusions with the Developer;
- Communicate frequently and openly with the Contractor and the PM to ensure effective, proactive environmental management, with the overall objective of preventing or reducing negative environmental impacts and/or enhancing positive environmental impacts;

- Advise the PM on remedial actions for the protection of the environment in the event of any accidents or emergencies during construction, and to advise on appropriate clean-up activities;
- Review complaints received and make instructions as necessary; and
- Identify and make recommendations for minor amendments to the EMPr as and when appropriate.

Reporting Structure:

The ECO will report to the PM, who in turn will report to the Developer.

5.3 Training

- The SHEQO shall be appropriately trained in environmental management and shall possess the skills necessary to impart environmental management skills to all personnel involved in the construction, rehabilitation and operation of the corridor;
- The PM and SHEQO shall ensure, on behalf of ESKOM, that the employees (including construction workers, engineers, and long-term employees) are adequately trained on the stipulations of the EMPr; and
- All employees shall have an induction presentation on environmental awareness. The cost, venue and logistics shall be for ESKOM's account.

Where possible, training must be conducted in the language of the employees. The induction and training shall, as a minimum, include the following:

- The importance of conformance with all the specifications of the EMPr and other environmental policies and procedures;
- The significant environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the EMPr and other environmental policies and procedures;
- The potential consequences of departure from specified operating procedures; and
- The mitigation measures required to be implemented when carrying out their work activities.

5.4 Commissioning of Tenders for the Project

- All tendering Contractors / Sub-contractors will be made aware of the contents of this EMPr and any penalties arising from non-compliance; and

- All appointed Contractors / Sub-contractors will be required to attend the EMPr training and induction as detailed in the section above.

5.5 Environmental Authorisation

The Environmental Control Officer (ECO) shall convey the contents of this EMPr and the conditions of the Record of Decision (Environmental Authorisation) from the Authorities and discuss the contents in detail with the ESKOM Project Manager and Contractor at a pre-construction meeting. This formal induction training is a requirement of ISO 14001 and shall be done with all main and sub-contractors. Record of the training dates, people who attended and discussion points shall be kept by the ECO.

5.6 Environmental Management Measures

The management measures documented in each of the sub-sections below have been compiled using the following information:

- Impact Assessment and mitigation measures documented in the Draft EIR for the Camden ash disposal facility.
- The standard EMPr utilised by ESKOM

In addition to the abovementioned information sources, the EMPr will be updated to include the conditions documented in the Environmental Authorisation to be received upon approval of the EIA.

6. ENVIRONMENTAL SPECIFICATIONS

6.1 Pre-construction planning

Table 6-1: Environmental Management Measures during pre-construction planning.

Objectives	
	• Ensure that all necessary legal obligations and contractual conditions have been met prior to the commencement with construction; • To ensure that all role players and stakeholders are aware of the pending construction activities and have received timeous notice; and • To ensure that all construction staff are aware of their responsibilities and are informed about environmental sensativities and the concequences of non-conformance.

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
Pre-Construction Phase								
1	Labour Issues	ESKOM must appoint a suitably qualified Environmental Control Officer (hereafter referred to as ECO) who would act on behalf of the applicant, monitor project compliance with the conditions of environmental authorisation, environmental legislation and the recommendations of the approved EMPr.	Life of the Project	Once off	PM	PM	EM	Contractor
		The ECO must be appointed prior to the commencement of construction and pre-construction related activities and the authorities must be notified of such and appointment.	Life of the Project	Once off	PM	PM	EM	Contractor / RA
		The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed	Life of the Project	Daily	PM	PM	EM	C

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
		and the site is handed over to ESKOM by the contractor for operation;						
		The Contractor shall designate or appoint a suitably quialified Safety, Health, Environment and Quality Officer (SHEQO) to oversee implementation of the EMPr	Life of the Project	Once off	C	C	C	EM PM ESKOM
		The following shall be maintain on site: • Environmental authorisation and pertinent legislation, • Relevant permits and licences, • Method Statements, • A daily site dairy; • A non-conformance register; and • A public complaint registers.	Life of the Project	Daily	PM	EM C	SHEQO	EM PM ESKOM
2	Initiation	The authorised activity/s may not commence within thirty (30) days of the date of signature of the authorisation;	Prior to construction	Once off	PM	PM	EM ECO	RA C
		Should ESKOM be notified by the minister of a suspension of the authorisation pending appeal procedures, ESKOM may not commence with the activity / activities unless authorised by the minister in writing.	30 days of the date of signature of the authorisation	Once off	PM	PM	EM ECO	RA C
		Fourteen (14) days written notice must be given to the Department that the activity will commence. Commencement for the purposes of this condition includes site	Prior to commencement	Once - off	PM	EM	EM	RA

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
		preparation. The notice must include a date on which it is anticipated that the activity will commence.						
		All relevant permits and permissions shall be obtained from the relevant authorities to undertake construction activities as necessary.	Prior to commencement	Once - off	PM	EM	EM ECO	RA
		A copy of the authorisation must be kept at the property where the activity will be undertaken. The authorisation must be produced to any authorised official of the Department who requests to see it and must be made available for inspection by any employee or agent of the holder of the authorisation who works or undertake work at the property.	Throughout	Monthly Inspection	PM	EM C	SHEQO C	EM PM C
		Method Statements shall be submitted at least 10 working days prior to the commencement of work.	Prior to commencement	Once-off	C	C	SHEQO	ECO EM PM
		No works shall commence on any activity until such time as the Method Statement has been approved in writing.	Prior to commencement	Once-off	PM ECO	EM ECO	EM	C SHEQO
		Activities/works shall carry out the in accordance with the approved Method Statement.	Life of the Project	Daily	C	C	SHEQO	ECO EM PM
		Obtain a signed agreement statement from the contractor indicating their willingness to comply to the EMPr.	Prior to commencement	Once - off	PM	PM	EM SHEQO	C ECO PM

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
		An environmental awareness training session for all of the Contractor's staff of is required.	Prior to commencement	Once - off	PM	EM ECO	SHEQO ECO	C EM PM
		The course content for the environmental awareness training course shall be provided to the Contractor.	Prior to commencement	Once - off	PM	ECO EM	ECO	SHEQO C PM
		The training session shall be delivered in the languages of the site staff.	Prior to commencement	As required	PM	EM ECO	ECO SHEQO	C PM
Construction Phase								
1	Construction Initiation	Ensure that the approved site is considered throughout the construction phase.	Throughout construction	Throughout construction	PM	C	SHEQO	PM EM ECO
		Where any of the applicant's contact details change, including then name of the responsible person, the physical or postal address and/or telephonic details, the applicant must notify the Department as soon as the new details become known to the applicant;	Throughout construction	Throughout construction	PM	EM	EM	C SHEQO ECO RA
		In all other cases, the holder of the authorisation must notify the Department, in writing, within 48 hours if a condition of the authorisation is not adhered to. Any notification in terms of this condition must be accompanied by reasons for the non-compliance.	Life of the Project	As required	PM	EM ECO	ECO SHEQO	C PM RA
		Non-compliance with a condition of this authorisation may result in criminal prosecution or other actions	Life of the Project	Life of the Project	PM	PM	ECO EM	C SHEQO RA

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
		as per the National Environmental Management Act, 1998 and the regulations.						
2	Labour Issues	Ensure proper supervision of employees at all times.	Life of the Project	Daily	PM C	EM SHEQO	EM SHEQO	PM C RA

6.2 Site Establishment and Demarcation

Table 6-2: Environmental Management Measures during site establishment and demarcation.

Objectives	
	Project Area • Ensure proper demarcation of the project area prior to construction; • Ensure timely notice and negotiation with stakeholders in the event that access is required for construction purposes; • Ensure that all areas impacted during construction are rehabilitated to suitable levels; and • Ensure site is of sufficient size to accommodate the needs of all subcontractors that may work on the project. **Existing services** • The Contractor must be familiar with the position of existing services and infrastructure; • The Contractor shall ensure that existing services are not damaged or disrupted unless required by the contract; • The Contractor shall be responsible, at his own cost, for the repair and reinstatement of any infrastructure that is damaged or services that are interrupted. Such repair or reinstatement shall receive top priority over all other activities. **Gate Installation** • Properly installed gates to allow access to the site; • Minimise damage to fences; and • Limit access to ESKOM and Contractor personnel with gate keys. **Servicing Vehicles**

Objectives	• Prevention of pollution of the environment; and • Minimise chances of transgression of the acts controlling pollution. **Traffic** • Ensure the movement of trucks to and from the construction site must be well coordinated; • Ensure plant and heavy-duty machinery are not left unattended outside the contractor's site camp or designated area; • Ensure appropriate signage indicating construction works ahead is erected at strategic locations along the site access road(s), and • Ensure all temporary or permanent traffic calming measures, if required, is erected. **Batching Plants** • To ensure all agreements with Landowners are adhered to; • Prevention or minimisation of contamination and pollution; and • Successful rehabilitation of disturbed areas. **Wet Areas** • Avoid impact to wet areas. **Sanitation** • Ensure that proper sanitation is received. **Visual** • Ensure that the construction site is kept neat and tidy at all times; • Contain and store general and construction related waste in the appropriate manner; and • Ensure the construction site or contractor's camp is cordoned off or shielded from view with appropriate material. • •

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
Pre-Construction Phase								
1	Site identification/ demarcation	A demarcated area at or close to the site must be provided for the storage of machinery and trucks as necessary.	Prior to site establishment	Daily	C	C	SHEQO ECO	EM PM
		A Site Layout Plan illustrating the location and layout of the proposed site camp and working areas must be produced. This plan must be approved by the PM.	Prior to site establishment	Once off	C	C	SHEQO	ECO EM PM
		A photographic record of the area earmarked for the site camp must be	Prior to site establishment	Once off	C	C	SHEQO	ECO EM

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
		produced prior to site establishment. This will serve as the benchmark against which rehabilitation will be measured and shall be kept in the site environmental file.						PM
		Prior to construction commencing, the site shall be inspected to identify any sensitive environments.	Prior to site establishment	Once off	PM EM ECO	EM ECO	SHEQO ECO	C
		Where necessary, the No-Go areas shall be demarcated and enforced.	Prior to site establishment	Once off	PM EM ECO	EM ECO	SHEQO ECO	C
		Minimum amount of vegetation clearance must take place in accordance with the Site Layout Plan.	Pre-Construction	As required	C	SHEQO	SHEQO	ECO EM PM
		Alien vegetation within the designated area must be destroyed.	Life of the Project	As required	C	SHEQO	SHEQO	ECO EM PM
2	Batching Plants	The siting, if necessary, of batching plants shall be done in conjunction with the ESKOM PM and the ECO.	Construction phase	As required	C	C SHEQO	SHEQO ECO	EM PM
3	Sanitation	The Contractor shall install mobile chemical toilets on site. The Contractor camp shall have the necessary ablution facilities with chemical toilets where such facilities are not available at commencement of construction.	Throughout	As required	C	SHEQO	SHEQO ECO	EM PM
		The Contractor will be responsible for the provision of and proper utilisation, maintenance and management of toilet, wash and waste facilities. Toilet facilities supplied by the contractor for the workers shall occur at a maximum ratio of 1 toilet per 15 workers. All temporary / portable toilets shall be secured to the ground to	Throughout construction	Daily	C	SHEQO	SHEQO ECO	EM PM

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
		prevent them from toppling due to wind or any other cause.						
		Prior to the establishment of the ablution facilities, an appropriate location must be approved.	Pre-Construction	Once-off	PM	EM ECO	SHEQO ECO	C PM
		The entrances to the ablution facilities shall be adequately screened from public view.	Pre-Construction	Once-off	C	SHEQO	SHEQO ECO	EM PM
4	Site Establishment – Contractors camp, wastewater management, Shower facilities	The contractor's camp shall be sited so as to cause the least amount of disturbance to adjacent landowners.	Pre-Construction	Once-off	C	SHEQO	SHEQO ECO	EM PM
		The contractor's camp shall be fenced and the contractor shall maintain in good order all fencing for the duration of the construction activities.	Throughout Construction	Weekly	C	C SHEQO	SHEQO ECO	EM PM
		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.	Pre-construction	Monthly	C	C SHEQO	SHEQO	ECO EM PM
		The Contractor shall supply a wastewater management system that will comply with legal requirements and be acceptable to ESKOM. A septic tank system is recommended considering the anticipated construction period.	Pre-Construction	Once-off	C	C SHEQO	SHEQO	ECO EM PM
		Where ESKOM facilities are available the Contractor shall make use of such facilities where it is viable.	Pre-Construction	Once-off	C	C SHEQO	SHEQO	ECO EM PM
		Should shower facilities be provided for the use by staff staying on site, the following controls must be imposed: • Positioning of the shower, and specifically its discharge point, will be	Throughout Construction	Daily	C	C SHEQO	SHEQO ECO	EM PM

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
		carried out to ensure that erosion and build up detergents does not occur; • All discharge from the shower and other washing facilities must pass through a suitable filter to reduce the load of detergents to the environment; • Filtered water discharge may thereafter be released to the environment, but mechanisms will be investigated to ensure that the water is evenly dispersed so as to lead to "greening up" and / or swampy conditions in one limited area; • Use of the shower facilities must be limited to staff or authorised persons only.						
5	Eating Areas	The cooking area will be positioned such that no vegetation is in close proximity thereto, including overhanging trees. An area around the cooking area will be cleared such that any escaping embers will not start an uncontrolled fire.	Pre-Construction	Once-off	C	SHEQO	SHEQO ECO	EM PM
		Eating areas shall be designated and demarcated.	Pre-Construction	Once-off	C	SHEQO	SHEQO ECO	EM PM
		Sufficient bins shall be present in this area for all waste material.	Pre-Construction	Once-off	C	SHEQO	SHEQO ECO	EM PM
		Dish washing facilities shall be provided. These may be very basic, but a process must be put in place to ensure that wastewater is disposed of appropriately (see Site Establishment - showers).	Pre-Construction	Once-off	C	SHEQO	SHEQO ECO	EM PM
Construction Phase								

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
1	Gate Installation and Control	All gates shall be fitted with locks and be kept locked at all times.	Construction phase	Throughout	C	SHEQO	SHEQO ECO	EM PM
		Gates shall only be left open on request of the Landowner if he accepts partial responsibility for such gates in writing.	Construction phase	When necessary	C	SHEQO	SHEQO ECO	EM PM
		Claims arising from gates left open shall be investigated and settled in full by the Contractor.	Construction phase	When necessary	C	C SHEQO	SHEQO	ECO EM PM
		If any fencing interferes with the construction process, such fencing shall be deviated / protected until construction is completed.	Construction phase	When necessary	C	SHEQO	SHEQO ECO	EM PM
2	Project Area	Construction activities are limited to the area as demarcated by EM / ECO within the site identified for the construction of the Power Station.	Construction phase	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Any area outside the construction area, required to facilitate access, construction activities, construction camps or material storage areas, where necessary, shall be negotiated with the affected stakeholders and written agreements shall be obtained.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		All construction areas shall be cleared in accordance with the EA / EM Standard for Bush clearing.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Any extra space to be cleared outside the construction area shall be negotiated and approved by EM / ECO. All areas marked as no go areas inside the site shall be treated with the utmost care and responsibility.	Throughout Project	Monthly	PM	EM ECO	SHEQO ECO	C PM
3	Batching	The batching plant area shall be operated	Throughout	Weekly	C	C	SHEQO	EM

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
	Plants	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 catchments area.	Construction			SHEQO	ECO	PM
4	Sanitation	Staff shall be sensitised to the fact that they should use these toilets at all times. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities.	Throughout Construction	Daily	C	SHEQO	SHEQO ECO	EM PM
		No use of the veld shall be allowed, as this always creates problems with the landowners and may lead to claims for problems with stock diseases.	Throughout Construction	Daily	C	SHEQO	SHEQO ECO	EM PM
		Toilet paper is also a source of littering, and the Contractor shall be forced to clean up any litter.	Throughout Construction	Daily	C	SHEQO	SHEQO ECO	EM PM
		Ablution facilities must be maintained in a hygienic state and serviced regularly. Toilet paper will be provided.	Throughout Construction	Daily	C	SHEQO	SHEQO ECO	EM PM
		The Contractor will ensure that no spillage occurs when the toilets are cleaned or emptied and that a licensed provider removes the contents from the site.	Throughout Construction	Weekly	C	SHEQO	SHEQO ECO	EM PM
		Disposal of such waste is only acceptable at a licensed waste disposal facility.	Throughout Construction	Weekly	C	SHEQO	SHEQO ECO	EM PM
5	Emergency procedures	The site must be kept tidy and hygienic at all times with special reference to sanitation & water management.	Throughout Construction	Weekly	C	SHEQO	SHEQO ECO	EM PM
		Open uncontrolled fires will be forbidden	Throughout	Weekly	C	SHEQO	SHEQO	EM

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
		at the site camp. Rather "contained" cooking mechanisms will be used – e.g. gas stoves or an enclosed braai facility.	Construction				ECO	PM
		The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site.	Throughout Construction	Weekly	C	SHEQO	SHEQO ECO	EM PM
6	Workshop	Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediate to the satisfaction of the ECO.	Throughout Construction	Weekly	C	SHEQO	SHEQO ECO	EM PM
		Where possible and practical all maintenance of vehicles and equipment shall take place in the workshop area.	Throughout Construction	Weekly	C	SHEQO	SHEQO ECO	EM PM
		No equipment shall be used which may cause irreparable damage to wet areas. The contractor shall use alternative methods of construction in such areas.	Throughout Construction	Daily	C	SHEQO	SHEQO ECO	EM PM
7	Eating areas	The feeding of, or leaving of food for animals, is strictly prohibited.	Throughout Construction	Monthly	C	SHEQO	SHEQO ECO	EM PM
		No fires for the purpose of cooking or warming purposes will be permitted other than within designated areas, for instance, at the site camp.	Throughout Construction	Daily	C	SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Batching Plants	All areas used as batching areas must be rehabilitated once construction is completed. Should any claim be instituted against EM, due to the actions of the Contractor at a batching plant site, EM shall hold the Contractor fully responsible for the claim until such time that the Contractor can prove otherwise with the	Once Construction is completed – during rehabilitation	Monthly	C	C SHEQO	SHEQO ECO	EM PM

No	Activity	Mitigation Measures	Duration	Frequency	Responsibe	Accountable	Management	Informed
		necessary documentation.						
2.	Site Decommis-sioning	All areas where site infrastructure or camp sites are established must be rehabilitated to their original state in which they were found.	Once Construction is completed – during rehabilitation	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Prior to the removal of structures an assessment of the end land use will be undertaken to determine which structures will be removed or retained.	Once Construc-tion is completed – during rehabilitation	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Any specific requirements to prevent pollution during demolition of structures must be identified prior to the commencement of rehabilitation activities.	Prior to rehabilitation	Once - off	C	C SHEQO	SHEQO ECO	EM PM
		Disposal requirements must be identified prior to the commencement of rehabilitation or structure removal.	Prior to rehabilitation	Once - off	C	C SHEQO	SHEQO ECO	EM PM
		Equipment, structures and building material that can be reused will be identified prior to the commencement of rehabilitation activities.	Prior to rehabilitation	Once - off	C	C SHEQO	SHEQO ECO	EM PM
		Scrap metal and equipment will be sold as scrap or disposed of at a suitably licensed facility.	Once Construc-tion is completed – during rehabili-tation	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Vegetation that was removed for the establishment of site infrastructure shall be reinstated into the area.	Once Construction is completed – during rehabilitation	Monthly	C	C SHEQO	SHEQO ECO	EM PM

6.3 Water Management (including Storm water, Water Sources, Wet Areas)

Table 6-3: Environmental Management Measures for Water Management.

Objectives	**Storm-water Management** • Effectively control storm water runoff to ensure that impacts to surface water resources are controlled, and erosion is not present on site. **River Crossings** • Minimise damage to river and stream embankments; • No access roads through river and stream banks; • No visible erosion scars on embankments once construction is completed; and • Minimise erosion of embankments and subsequent siltation of rivers, streams and dams. **Wetlands** • No construction activities within designated wetland areas as identified in the EIA; and • No pollution or effluent is to come in contact with wetland areas.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Water Sources	Should water be required from sources other than ESKOM supply, a written agreement shall be reached between the Contractor and the stakeholder involved.	Throughout Project	When necessary	PM	PM	EM ECO	C SHEQO
		Should the Contractor be required to use water from a natural source, the Contractor	Throughout	Monthly	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		shall supply a method statement to that effect and obtain the required permits. No construction shall take place in the wetland, streams and other river courses without the necessary water license from the Department of Water Affairs and Forestry;	Project					
Construction Phase								
1	Water Sources	Strict control shall be maintained and the ECO shall regularly inspect the abstraction point and methods used.	Throughout Project	Weekly	PM	EM ECO	ECO	C SHEQO
2	Wetlands	No construction is to take place in wetland areas. Including no vehicular traffic in wet areas / wetlands.	Throughout Project	Weekly	C	C SHEQO	SHEQO ECO	EM PM
		Only existing roads through such areas may be used with the approval of ESKOM.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		The contractor shall use alternative methods of construction in such areas, once approved by the PM.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Berms should be created not closer than 10m from identified wetland areas, so as to ensure that no construction material and/or	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		waste flow into wetland systems.						
3	Dust control	The dust control measures, such as watering, chemical stabilisation and the reduction of surface wind speed through the use of windbreaks and source enclosures must be put in place during construction activities. Emission control efficiencies of 50% can readily be achieved through the implementation of effective watering programme for unpaved roads and material handling points.	During construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
4	Storm water Management	Storm water shall be channelled away from construction activities.	Prior to commence ment of Construc-tion	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		No storm water may be discharged into areas where construction is taking place.	Prior to commence ment of Construc-tion	Once-off	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		Storm water flowing from the footprint of the proposed development may not be contaminated by any substances, whether the substance is solid, liquid or vapour or any combination thereof.	Throughout Construc-tion	Weekly	C	C SHEQO	SHEQO ECO	EM PM
		During construction, the Contractor will protect areas susceptible to erosion by installing necessary temporary and / or permanent drainage works as soon as possible and by taking suitable measures to prevent surface water concentration into nearby roadways or river courses.	Prior to commence ment of Construc-tion	As required	C	C SHEQO	SHEQO ECO	EM PM
		Silt trap mechanisms will be installed on all temporary storm water channels. These silt traps will be regularly checked and serviced as required.	Throughout Construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		All excavated and filled slopes and stockpiles must be of a stable angle and capable of accommodating normal expected flows.	Throughout Construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Stabilisation of cleared areas to prevent and control erosion will be actively managed. The	Throughout Construc-	Monthly	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		method chosen (e.g. watering, planting, retaining structures, commercial anti-erosion compounds) will be selected according to specifics and ensure acceptable rehabilitation.	tion					
		Traffic and movement over stabilised areas will be restricted. Any damage to stabilised areas will be repaired and maintained to the satisfaction of the Site Manager.	Throughout Construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Where erosion and sedimentation occur, rectification will be carried out in accordance with details specified by the PM.	Throughout Construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Storm water Management	Any runnels or erosion channels will be backfilled and compacted, and the areas restored to a proper condition.	Throughout Construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM

6.4 Hazardous Substance Spills

Table 6-4: Environmental Management Measures for Hazardous Substance Spills

Objectives	
	• To ensure that spills occurring during the construction phase a suitably managed to reduce potential impacts on the environment.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsibility	Accountable	Contacted	Informed
Pre-Construction Phase								
1	Hazardous Spills	Ensure that potential hazardous materials on site are identified and documented in a register.	Prior to site establishment	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		Appropriate training for the handling and use of such materials is to be provided by the Contractor as necessary. This includes providing for any spills and pollution threats that may occur.	Prior to site establish-ment	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		Products should be clearly labelled and symbolic safety/hazard warning signs should be provided.	Prior to site establish-ment	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		Fuel and chemical depot(s) shall be located	Prior to site establish-	Once-off	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsibility	Accountable	Contacted	Informed
		at least 100 m from any water body.	ment					
		Ensure that suitable spill kits and absorption materials are purchased prior to commencement with construction, and stored suitably in places where there is a high risk of hazardous spills occurring.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
Construction Phase								
1	Hazardous Spills	All contaminated soil / yard stone shall be removed and be placed in containers. Contaminated material can be taken to one central point where bio-remediation can be done.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		All potentially hazardous raw and waste materials are to be handled by the Contractor's trained staff and stored on site in accordance with manufacturer's instructions and legal requirements	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		Areas for the storage of fuel and other flammable materials shall comply with standard fire safety regulations.	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM
		The relevant Material Safety Data Sheets (MSDS) shall be available on site. Procedures detailed in the MSDS shall be followed in the event of an emergency	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsibility	Accountable	Contacted	Informed
		situation.						
		Smaller spills can be treated on site.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		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.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		All spills of hazardous substances must be reported to the ECO.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Hazardous Spills	Ensure that rehabilitated areas are free of visible spills and are suitably vegetated.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		Where hazardous substances is removed from site for disposal, proof of disposal for auditing purposes shall be kept in the form of disposal certificates.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM

6.5 Delivery of Materials

Table 6-5: Environmental Management Measures for the delivery of materials.

Objectives	
	• To ensure that all sub-contractors responsible for delivering materials to site operate in an environmentally friendly manner whilst on site; and • To ensure that the activities related to material deliveries do not create an unnecessary impact on the environment.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Heavy machinery	All drivers and operators must be appropriately licensed and have undergone environmental awareness training or induction.	Prior to construction	Once off	C	C SHEQO	SHEQO ECO	EM PM
Construction Phase								
1	Heavy machinery	No vehicles coming on sites must spill oil.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
		No construction equipment, vehicles or unauthorised personnel will be allowed onto areas that have been re-vegetated.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Heavy Machinery	All areas where heavy machinery has access must be rehabilitated in terms of soil	Throughout construc-	Daily	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		pollution.	tion					
Operational Phase								
1	Heavy Machinery	No oil/ petrol spills / leaks may occur.	Throughout operational phase	Daily	C	C SHEQO	SHEQO ECO	EM PM

6.6 Building, Civil's and Structural Steel Work

Table 6-6: Environmental Management Measures for building, civil's and Structural Steel Work

Objective	• To ensure that all construction related activities including civils, building erection, and structural work is undertaken in such a manner that it reduces unnecessary impact to the environment.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
None								
Construction Phase								
1	Excavate foundations	During excavations no oil leaks from heavy vehicles may occur.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
		PPE must be used by all workers using hand	Throughout construc-	Daily	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		tools during the excavations of foundations.	tion					
		Spoil must be evenly spread.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
2	Excavate earth moving materials	During the excavation of earth materials no oil leaks may occur from heavy vehicles.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
3	Mixing concrete	During the mixing of concrete, concrete dust is emanated. Workers mixing concrete must wear PPE.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
		Cement bags must not become litter after use. They must be disposed of in bins/skips (see Waste Management).	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
4	Trenches	All workers using hand tools must make use of PPE.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
		No spills may occur. All spills should be reinstated into foundations as backfill.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
5	Cast Blinding Layer	No concrete spills may occur. All spills should be reinstated into foundations as backfill.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
6	Place Copper Earthing	All copper off-cuts must be collected for recycling purposes.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
7	Construct Cable	No concrete spills may occur. All spills should be reinstated into foundations as backfill.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
8	Place steelwork on foundations	All steel off-cuts must be collected for recycling purposes.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
		During steel cutting and grinding, all old discs must be managed and must not become litter.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
9	Connect earthing to steelwork	During welding and brazing, all old welding rods must be managed and must not become litter.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
10	Reinstate yard stone	No oils spills may occur as a result of heavy vehicles.	Throughout construc-	Daily	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
			tion					
		Workers with rakes must use PPE at all times.	Throughout construc-tion	Daily	C	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	De-establish contractors yard / store	All waste, garbage, surplus materials and oils spills to be cleared and site must be rehabilitated.	During Rehabili-tation	Once - off	C	C SHEQO	SHEQO ECO	EM PM
2	Final inspection	During site inspection the site is to be cleared and rehabilitated back to its original state.	During Rehabili-tation	Once - off	C	C SHEQO	SHEQO ECO	EM PM
Operational Phase								
1	Take over works	During site take / hand over the site must be accepted from the contractor and handed over.	Operations	Once - off	C	C SHEQO	SHEQO ECO	EM PM

6.7 Circuit Breakers and Current Transformers

Table 6-7: Environmental Management Measures for Circuit Breakers and Current Transformers.

Objective	
	• See deliveries, site establishment, and civils and structural work.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Supply and delivery of new circuit breakers and current transformers	All drivers and operators delivering new circuit breakers and current transformers must be licensed.	Throughout Project	Once - off	C	C SHEQO	SHEQO ECO	EM PM
Construction Phase								
1	Install new cables, clamps and conductors	The crane operators must be licensed in accordance with the OHS Act.	Throughout Project	Once - off	C	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Clear site	The site must be cleared and rehabilitated so that there is no damage to the surrounding infrastructure.	Post contruction	Once - off	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		All personal must be suitably accredited to perform duties.	Throughout Project	Once - off	C	C SHEQO	SHEQO ECO	EM PM
		All cable cut offs must be collected and sent for recycling.	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM
		All waste, garbage, scrap and oil spill must be disposed of (see Waste Management). The site must be cleared and rehabilitated.	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM
2	Final Inspection	During site inspection the site is to be cleared and rehabilitated back to its original state.	On termination of construc-tion	Once - off	C	C SHEQO	SHEQO ECO	EM PM
Operational Phase								
1	Take over works	During site take / hand over the site must be accepted from the contractor and handed over.	On termination of construc-tion	Once-off	C	C SHEQO	SHEQO ECO	EM PM

6.8 Access Roads

Table 6-8: Environmental Management Measures for Access Roads.

Objectives	
	• Minimise damage to existing access roads; • Minimise damage to environment due to construction and rehabilitation of new access roads; and • Minimise loss of topsoil and enhancement of erosion.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Access Roads	If required, planning of access routes must be done in conjunction between the Contractor and ESKOM.	Once off	As necessary	PM	PM C	ECO	EM
		The condition of existing access / private roads to be used shall be documented with photographs.	Prior to construc-tion	Once-off	C ECO	C SHEQO	SHEQO ECO	EM PM
		The Contractor shall properly mark all access roads.	Prior to construc-tion	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		Markers shall show the direction of travel.	Prior to construc-tion	Once-off	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		Roads not to be used shall be marked with a "**NO ENTRY** "sign (refer also TRMSCAAC1 REV 3).	Prior to construc-tion	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		Where required, speed limits shall be indicated and speed control measures applied on the roads.	Prior to construc-tion	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		Water diversion berms shall be installed from the start of the contract.	Prior to construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		Where berms are installed on severe slopes the outflow shall be suitably stone pitched to prevent erosion from starting at the base of the berm.	Prior to construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		All structures shall be properly designed and drawings shall be available for reference purposes.	Prior to construc-tion	Once-off	PM	PM	EM ECO	C SHEQO
		Permanently wet areas are shown on the profiles. No vehicular traffic shall be allowed in such areas. Only existing roads through such areas may be used with the approval of ESKOM and the Landowner.	Throughout construc-tion		C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Construction Phase								
1	Access Roads	All speed limits shall be strictly adhered to at all times.	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM
		Where new access roads are constructed, this must be done in accordance with TRMSCAAC1 REV 3 Section 4.4.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		Berms shall be maintained at all times.	Throughout construc-tion	Monthly inspection	C	C SHEQO	SHEQO ECO	EM PM
		No roads shall be constructed on slopes of more than 20% unless such roads follow contours.	Throughout construc-tion	Monthly inspection	PM C	PM C	EM ECO	SHEQO
		In such areas the Contractor shall only use existing roads or alternative methods of construction. The Contractor shall take such areas into consideration during the tender.	Throughout construc-tion	Monthly inspection	C	C SHEQO	SHEQO ECO	EM PM
		The installation of concrete pipes and drifts, to facilitate access, shall be at the discretion of the Environmental Control Officer on site.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		Any dangerous crossings shall be marked as such and where necessary, speed limits	Throughout construc-	Monthly	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		shall be enforced.	tion	inspection				
		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.	Throughout construc-tion	Monthly inspection	C	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Access Roads	Berms must be repaired at the end of the contract.	End of contract	Once off	C	C SHEQO	SHEQO ECO	EM PM
		Upon completion of the project all roads shall be repaired to their original state.	End of contract	Once off	C	C SHEQO	SHEQO ECO	EM PM
Operational Phase								
None.								

6.9 Waste Management

Table 6-9: Environmental Management Measures for waste management.

Objectives	• To keep the construction site neat and clean. • Disposal of rubble and refuse in an appropriate manner • Minimise litigation • Minimise neighbour complaints • No visible concrete spillage on the site.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Refuse and Rubble Removal	A method statement is required from the Contractor that includes the layout of the camp, management of ablution facilities and waste management.	Prior to construc-tion	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		The Contractor camp shall have the necessary ablution facilities with chemical toilets where such facilities are not available at commencement of construction.	Prior to construc-tion	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		The Contractor shall provide a wastewater management system that will comply with legal requirements and be acceptable to ESKOM.	Prior to construc-tion	Weekly inspection	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		The Contractor will supply waste collection bins where such is not available and all solid waste collected shall be disposed of at a registered waste disposal facility.	Throughout Project	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		A certificate of disposal shall be obtained by the Contractor and kept on site. All waste generated during construction and operation of the facility must be removed and disposed of at a waste disposal facility permitted in terms of Section 20 of the Environment Conservation Act, 1989 (Act 73 of 1989);	Throughout construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		In the case where a registered waste site is not available close to the construction site, the Contractor will be responsible to provide a method statement with regard to waste management.	Prior to construc-tion	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		Under no circumstances may solid waste be burned on site unless a suitable incinerator is available.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		The Contractor shall supply waste collection bins where such is not available, as approved by the Environmental Control Officer, and all solid waste collected shall be	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		disposed of at a registered waste dump.						
		A certificate of disposal shall be obtained by the Contractor and kept on file.	Prior to construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management.	Prior to construc-tion	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		The disposal of waste shall be in accordance with all relevant legislation.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
Construction Phase								
1	Refuse and Rubble Removal	The Contractor shall dispose of all excess material on site in an appropriate manner and at a designated place.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		All packaging material shall be removed from site and disposed of and not burned on site.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		No landfill may be used without the consent from the Landowner.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		Should a landfill be used for biodegradable materials only, the rubble shall be	Throughout	Throughout	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		compacted and at least 1m of soil shall cover the waste material.	Project					
		No hazardous material, e.g. oil or diesel fuel shall be disposed of in any unregistered waste site.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		No material shall be left on site that may harm man or animals.	Throughout Project	Weekly inspection	C	C SHEQO	SHEQO ECO	EM PM
		All construction rubble shall be removed and disposed off as described above.	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM
		Broken, damaged and unused material shall be picked up and removed from site.	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM
		Surplus concrete may not be dumped indiscriminately on site, but shall be disposed of in designated areas as agreed by the Landowner. Concrete trucks shall not be washed on site after depositing concrete into foundations. Any spilled concrete shall be cleaned up immediately.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Under no circumstances may solid waste be burned or buried on site unless a suitable	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		incinerator is available.						
		The Contractor shall dispose of all excess material on site in an appropriate manner and at a designated place.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		All packaging material must be removed from the site and disposal of and not burned on site.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		No material shall be left on site that may harm man or animals.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		Surplus concrete may not be dumped indiscriminately on site and will be disposed of in designated areas as agreed by the Landowner.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		The washing of concrete trucks on site is prohibited. Any spilled concrete shall be cleaned up immediately.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		The Contractor must provide Authorities with proof of confirmation of service provision from waste service providers for the removal of wastes.	Throughout Project		C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		A general site-wide litter clean up will occur at least once a week.	Throughout Project	Weekly	C	C SHEQO	SHEQO ECO	EM PM
		Waste will be collected from site by a licensed contractor and removed to an appropriate waste disposal facility.	Throughout Project	Weekly	C	C SHEQO	SHEQO ECO	EM PM
		Wherever possible, materials will be recycled via a “Greens waste site”. To this end, containers for glass, paper, metals, plastics, organic waste and hazardous wastes (e.g. oil rags, paint containers, thinners) will be provided in sufficient quantity on the site.	Throughout Project	Weekly	C	C SHEQO	SHEQO ECO	EM PM
		Waste will be removed during off-peak traffic periods to minimise impacts on local traffic patterns.	Throughout Project	Weekly	C	C SHEQO	SHEQO ECO	EM PM
		All waste generated during construction and operation of the facility must be removed and disposed of at a waste facility permitted in terms of Section20 of the Environmental Conservation Act, 1989 (Act 73 of 1989).	Throughout Project	Weekly	C	C SHEQO	SHEQO ECO	EM PM
		Littering by the employees of the Contractor shall not be allowed.	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		All potentially hazardous and non-degradable waste shall be collected and removed to a registered waste site.	Throughout Project	Weekly	C	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Refuse and Rubble Removal	Same as construction phase.						
Operational Phase								
1	Refuse and Rubble Removal	Same as construction phase.						

6.10 Fire Prevention

Table 6-10: Environmental Management Measures for Fire Prevention.

Objectives	• No veld fires started by the Contractor's work force. • No claims from Landowners for damages due to veld fires. • No litigation.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Fire Prevention	The Contractor shall have fire-fighting equipment available on all vehicles working on site, especially during the winter months.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		The Contractor will document a fire reduction management plan. The plan will identify sources of fire hazard, and appropriate management measures to reduce the identified risk. The relevant authority will be notified of such potential fire hazards.	Prior to commence ment of construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
Construction Phase								
1	Fire Prevention	Preferentially no fires will be lit on the site, if however required, fires must be limited to use for cooking and heating use only within a designated area. This area will be a suitable distance from fuel sources. A fire will be constantly monitored while present.	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM
		In terms of the Atmospheric Pollution Prevention (APPA), burning is not permitted for waste disposal.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		Suitable precautions will be taken (e.g. suitable fire extinguisher, welding curtains) when working with welding or grinding	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		equipment near potential sources of combustion.						
		All fire control mechanisms (fire fighting equipment) will be routinely inspected by a qualified investigator for efficacy thereof and be approved by local fire services. Such mechanisms will be present and accessible at all times.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		All staff on site will be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire.	Throughout Project	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		The Contractor will advise the relevant authority of a fire outside of a demarcated area as soon as it starts and will not wait until he can no longer control it.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Fire Prevention	None.						
Operational Phase								
1	Fire	None.						

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
	Prevention							

6.11 Designated Storage Areas

Table 6-11: Environmental Management Measures for Designated Storage Areas.

Objective	
	• To ensure that cognisance is taken of proper storage of dangerous goods and hazardous materials so as to avoid accidents, spillage, and impacts to the environment.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Workshop, equipment maintenance and storage	Where possible and practical all maintenance of vehicles and equipment shall take place in the workshop area, on a paved or concrete lined surface.	During construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		All hazardous substances shall be stored in suitable containers and storage areas shall be bunded. This includes all carbon substances like fuel and oil as well as herbicides and battery acid.	During construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		A register shall be kept on all substances	Throughout	Monthly	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		and be available for inspection at all times.	Project					
Construction Phase								
1	Workshop, equipment maintenance and storage	Servicing of vehicles within Power Station perimeters is strictly prohibited.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		Only emergency repairs shall be allowed on site and a drip tray shall be used to prevent oil spills.	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM
		In the event of a breakdown within the substation perimeter, any oil spills shall be cleaned up immediately and appropriate environmental investigations undertaken and recorded.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		The following shall apply:						
		• All contaminated soil shall be removed and be placed in containers. Contaminated soil can be taken to one central point at the Contractors campsite where bio-remediation can be done; • Smaller spills can be treated on site; • A specialist Contractor shall be used for the bio-remediation of	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		contaminated soil; • The area around the fuel storage drum at the Contractor's campsite shall also be re-mediated upon completion of the contract; and • All oil spills must be reported to ECO immediately.						
		Under no circumstances shall such waste be buried on site indiscriminately.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		No maintenance or repair of construction vehicles or machinery will occur on site during the construction phase. Maintenance of equipment and vehicles will be preformed off-site at a suitably designed workshop.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Movement of construction vehicles and machinery must be restricted to areas outside of sensitive areas on site.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		No washing of plant may occur on the site.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		The contractor will ensure that if emergency plant maintenance occurs on site, that there is no contamination of soil or vegetation (e.g.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		use of drip trays).						
		Drip trays will be provided for the stationary plant and for the “parked” plant.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		All vehicles and equipment will be kept in good working order and serviced regularly. Leaking equipment will be repaired immediately or removed from the site.	Throughout Project	Daily	C	C SHEQO	SHEQO ECO	EM PM
		The relevant contractor must ensure that facilities for the collection of hydraulic and other vehicle oils are provided within the hard park area.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		The repair of construction vehicles must be done on a paved surface to avoid leaking oils sipping into the ground.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
2	Materials use, handling and storage	The Contractor will ensure that delivery drivers are informed of all procedures and restrictions required by this document. Such drivers will be supervised during off-loading, by a person knowledgeable of the requirements.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		Materials will be appropriately secured to ensure safe passage between destinations. Loose loads (e.g. sand, stone chip, fine vegetation, refuse, paper and cement) will be covered.	Throughout Project	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		The Contractor will be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		All material lay-down areas and stockpiles will be subject to the Site Manager's approval.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Imported fill / soil / sand materials will be free of weeds, litter and contaminants.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		Storage areas will be roofed in an impervious material, with a suitable overhang or side cladding. Rainwater run-off will be channelled away from the storage area as required.	Throughout Project	Once-off	C	C SHEQO	SHEQO ECO	EM PM
		Hydraulic fluids are stored in concrete lined surfaces with bund walls and must be designated in such a manner that any	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		spillages can be contained and reclaimed without any impact on the surrounding environment.						
		Hazardous and flammable substances must be stored and used in compliance with applicable regulations and safety instructions.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		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.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Leaking equipment shall be repaired immediately or be removed from site to facilitate repair.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		Areas shall be monitored for spills and any spills shall be contained, cleaned and rehabilitated immediately.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Any leaking containers shall be repaired or removed from site.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
1	Servicing of Vehicles	None.						
Operational Phase								
1	Servicing of Vehicles	None.						

6.12 Ash Disposal Facility

Table 6-12: Environmental Management Measures for Ash Disposal Facility.

Objectives	• Minimise damage to topsoil and environment. • Successful rehabilitation of all damaged areas • Prevention of erosion and no visible erosion scars three months after completion of the contract

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
		None						
Construction Phase								
1	Ash Disposal Facility Positioning	Disturbance of topsoil site with severe slopes shall be minimised at all costs.	Throughout Project	As required	C	C SHEQO	SHEQO ECO	EM PM
		During backfilling operations, the Contractor shall take care not to dump the topsoil in the	Throughout	As required	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		bottom of the foundation and then put spoil on top of that.	Project					
		In accordance with the Conservation of Agricultural Resources Act, No 43 of 1983, slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced.	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		Contour banks shall be spaced according to the slope on tower sites. The type of soil shall also be taken into consideration.	Throughout Project	Monthly	C	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Ash Disposal Facility Positioning	Re-seeding shall be done on disturbed areas as directed by the Environmental Control Officer.	Post construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		Other methods of rehabilitation of the sitesmay also be used at the discretion of the Environmental Control Officer, e.g. stone pitching, logging, etc.	When necessary	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		A mixture of seed can be used provided the mixture is carefully selected to ensure the following:	Throughout Project	When necessary	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		• Annual and perennial plants are chosen; • Pioneer species are included; • All the plants shall not be edible; • Species chosen will grow in the area without many problems; • Root systems must have a binding effect on the soil; and • The final product should not cause an ecological imbalance in the area.						
		To get the best results in a specific area, it is a good idea to consult with a vegetation specialist or the local extension officer of the Dept of Agriculture. Seed distributors can also give valuable advice as to the mixtures and amount of seed necessary to seed a certain area. Re-seeding, as well as fencing in of badly damaged areas, will always be at the discretion of the Environmental Control Officer, unless specifically requested by a Landowner.	Post construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
Operational Phase								

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
1	Ash Disposal Facility	None.						

6.13 Claims from Damages

Table 6-13: Environmental Management Measures for Claims from Damages.

Objectives	
	• Minimise complaints from Landowners • Prevent litigation due to outstanding claims by ensuring that claims are settled within one (1) month. • Successful completion of the contract and all Landowners signing release forms within 6 months of completion of the project.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Claims from Damages	None.						
Construction Phase								
1	Claims from Damages	All damage to ESKOM property shall be recorded and reinstated immediately.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		The Environmental Control Officer should	When	When	ECO	ECO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		also keep a photographic record of such damage.	necessary	necessary				C
		The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable.	Throughout construc-tion	When necessary	ECO	ECO	SHEQO ECO	EM PM C
		All claims for damage should be directed to the Environmental Control Officer for appraisal.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		The Contractor shall be held liable for all unnecessary damage to ESKOM property.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		A register shall be kept of all complaints from Landowners.	Throughout construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		All claims shall be handled immediately to ensure timeous rectification / payment.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Claims from	None.						

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
	Damages							
Operational Phase								
1	Claims from Damages	None.						

6.14 Erosion, Donga and River Crossings

Table 6-14: Environmental Management Measures for Erosion, Donga and River Crossings.

Objectives	
	• Minimise erosion damage There should be no visible damage caused by construction activities. • Minimise impeding the natural flow of water • Minimise initiation of erosion through donga embankments

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Erosion and donga Crossings	Crossing of dongas and eroded areas of asscociated infrastructure shall be thoroughly planned.	Prior to construc-tion	Once-off	PM	PM EM	ECO EM	C SHEQO
		All structures shall be properly designed and drawings shall be available for reference purposes.	Prior to construc-tion	Once-off	PM	PM EM	ECO EM	C SHEQO

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		All structures constructed for access purposes shall be properly designed and drawings of such structures shall be available for record purposes.	Prior to construc-tion	Once-off	C	C SHEQO	SHEQO ECO	EM PM
Construction Phase								
1	Erosion and Donga Crossings	Water diversion berms shall be installed at donga crossings to ensure runoff water on the servitude does not run into dongas and cause an erosion hazard.	Throughout construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Suitable erosion containment structures shall be constructed at donga crossings where required and viable.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		No unplanned / improperly planned cutting of donga embankments is allowed as this leads to erosion and degradation of the environment.	Throughout construc-tion	Throughout	C	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Erosion and Donga Crossings	None.						
Operational Phase								

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
1	Erosion and Donga Crossings	None.						

6.15 Flora Management (including Vegetation Clearing, General, and Herbicides)

Table 6-15: Environmental Management Measures for Flora Management.

Objective	• Minimise damage to vegetation by only clearing 8m vegetation along the centre of the servitude for access purposes. • Keep site as natural looking as possible. • No vegetation interfering with structures and statutory safety requirements upon completion of the contract. • Minimise possibility of erosion due to removal of vegetation by not de-stumping vegetation on river and stream embankments. • Eradication of alien invader and densifier species that cause a fire hazard. • No visible herbicide damage to the vegetation on site one year after completion of the contract due to incorrect herbicide use. • No litigation due to unauthorised removal of vegetation.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Vegetation Clearing	Vegetation clearing shall be done in accordance with ESKASABG3 REV 0 (Standard for bush clearance and maintenance within overhead power line servitudes) and the Vegetation Management Guideline.	Prior to construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		The removal of all economically valuable trees or vegetation shall be negotiated with the Landowner before such vegetation is removed.	Prior to construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		The Contractor will remove plants containing any diseases and /or pests fro the site.	Prior to construc-tion	Weekly	C	C SHEQO	SHEQO ECO	EM PM
Construction Phase								
1	Vegetation Clearing	Only an 8m strip may be cleared flush with the ground to allow vehicular passage during construction.	Throughout construc-tion	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		The removal of indigenous plant material from the site or surrounding and adjacent land will not be allowed.	Throughout construc-tion	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		No scalping shall be allowed on any part of the servitude road unless absolutely necessary.	Throughout construc-tion	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		All trees and vegetation cleared from the site shall be cut into manageable lengths and removed from the site.	Throughout construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		No vegetation shall be pushed into heaps or left lying all over the site.	Throughout construc-tion	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		Vegetation clearing on site must be kept to a	Throughout	When	C	C	SHEQO	EM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		minimum.	construc-tion	necessary		SHEQO	ECO	PM
		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.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		Stumps shall be treated with herbicide.	Throughout construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		Smaller vegetation can be flattened with a machine, but the blade should be kept above ground level to prevent scalping.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		No vegetation clearing in the form of de-stumping, scalping or uprooting shall be allowed on river and stream banks.	Throughout construc-tion	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		Vegetation shall only be cut to allow for the passage of the pilot-cables and headboard.	Throughout construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		No vegetation clearing shall be allowed across ravines and gullies.	Throughout construc-tion	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		Protected or endangered species of plants shall not be removed unless they are interfering with a structure.	Throughout construc-tion	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		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.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		All protected species not to be removed must be clearly marked and such areas fenced off if required.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		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. ESKOM's approval for the use of herbicides	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		is mandatory (Contact Dr. Eugene van Rensburg—Vegetation Management).						
		Application shall be under the direct supervision of a qualified technician. All surplus herbicide shall be disposed of in accordance with the supplier's specifications.	Throughout construc-tion	Monthly	C	C SHEQO	SHEQO ECO	EM PM
		All alien vegetation on site and densifiers creating a fire hazard shall be cleared and treated with herbicides. (Refer to the Vegetation Management Guideline attached). • The application shall be according to set specifications and under supervision of a qualified technician. • The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used.	Throughout construc-tion	Weekly	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		It is recommended that a contractor for vegetation clearing should comply with the following parameters: • The contractor must have the necessary knowledge to be able to identify protected species as well as species not to be interfering with; • The contractor must also be able to identify declared weeds and alien species that can be totally eradicated; and • The contractor must be in possession of a valid herbicide applicators license.	Throughout construc-tion	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		The removal of protected vegetation and medicinal plants during construction must be done in consultation with the provincial environmental authorities, and the appropriate post-construction rehabilitation	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		measures must be implemented in cooperation with the provincial environmental authorities.						
2	Harvesting of Medicinal Plants	The removal of protected vegetation and medicinal plants during construction must be done in consultation with the provincial environmental authorities, and the appropriate post-construction rehabilitation measures must be implemented in cooperation with the provincial environmental authorities.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		Should Medicinal Plants be found on site, these plants will be demarcated and cordoned off.	Throughout construc-tion	When necessary	C	C SHEQO	SHEQO ECO	EM PM
		Once demarcated, they will be removed and translocated to an established nursery. The plants shall be removed by a certified Nursery with experience in the handling and translocation of plants. The South African National Biodiversity Institute (SANBI) shall be contacted for assistance should a certified nursery not be available.	Throughout construc-tion	When necessary				

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
3	Protection of Indigenous Vegetation	Removal of indigenous plant material from the site or surrounding and adjacent land will not be allowed;	Throughout construc-tion	Throughout	C	C SHEQO	SHEQO ECO	EM PM
		Only indigenous vegetation is to be used in any landscaping which may be undertaken;	Throughout construc-tion	Throughout	C	C SHEQO	SHEQO ECO	EM PM
4	Search and Rescue of Endangered Plant Species	Should Protected or Endangered Plant Species be found on site they will be demarcated and cordoned off. An Ecological Management Plan will be compiled and submitted to DEA for approval. The Ecological Management Plan will include the following: • Ensure the persistence of the plant species; • Include a monitoring programme that monitors the size, stage structure and vigour of the plant species population and threats to the population; • Facilitate/augment natural ecological processes such as fire and herbivory; • Provide for the habitat and life history needs of important pollinators;	Throughout construc-tion	When necessary	PM	EM ECO	ECO SHEQO	C

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		• Minimise artificial edge effects (e.g. water runoff from developed areas and application of chemicals; • Include an ongoing monitoring and eradication programme for non-indigenous/alien invasive species; • Result in a Report to be submitted to the relevant authority (GDACE, DEAT, etc) • Where feasible, appropriate genetic material such as seeds or propagules of the plant species shall be collected and stored at a licensed facility.						
		• In situ conservation of Protected and Endangered Plant Species is preferable to ex situ conservation. Thus, should the plant species not "interfere" with the construction of a structure, the area surrounding the plant species shall be declared a "no-go" area as outlined in the Ecological Management Plan; and	Throughout construc-tion	Throughout	PM	EM ECO	ECO SHEQO	C
		• The area surrounding the plant species shall be declared a "No-go" area and a buffer zone will be applied as outlined in	Throughout construc-tion	Throughout	PM	EM ECO	ECO SHEQO	C

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		the Ecological Management Plan;						
5	Alien Plant Control and Monitoring	The Developer will be responsible for controlling all alien invasive species, as per the requirements of the Conservation of Agricultural Resources Act (CARA), during the contract and vegetation establishment period;	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		All exotic trees will be identified and marked;	Throughout construc-tion	When necessary	PM	C SHEQO	SHEQO ECO	EM PM
		Alien invasive plant material will be preferentially removed in entirety through mechanical means (e.g. chainsaw, bulldozer, hand-pulling of smaller specimens);	Throughout construc-tion	When necessary	PM	C SHEQO	SHEQO ECO	EM PM
		The exotic trees must be cut down leaving the stumps behind to ensure that soil erosion is prevented; The trees can be chipped on site and the chips seeded with indigenous vegetation and spread over the site to allow for re-growth and to reduce erosion potential;	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Immediately after being cut, a herbicide solution must be applied to the exotic trees to ensure no further growth. The person	After being cut – imme-	Throughout	PM	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		applying the herbicide must have read and understood the instructions. Care must be taken that there is no spillage of solution in the wetland and that the correct protective equipment must be used;	diately					
		If plants are not removed in entirety but cut-back and systematically treated with approved herbicides, then remaining plant will be monitored for re-growth / re-establishment;	Throughout construc-tion	Monthly	PM	C SHEQO	SHEQO ECO	EM PM
		Herbicides used must be approved by authorities and as per the supplier's specifications;	When necessary	Once-off	PM	C SHEQO	SHEQO ECO	EM PM
		Alien invasive plant material will not be stockpiled. All such material removed will be removed from the site and dumped at an approved disposal site;	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		If during the establishment period any noxious or excessive weed growth occurs, such vegetation will be removed; and	Throughout construc-tion	When necessary	PM	C SHEQO	SHEQO ECO	EM PM
		It is the developer's responsibility to implement a monitoring programme that will be instituted to ensure that re-growth of alien invasive plants species does not occur, or	Throughout construc-tion	Monthly	PM	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		that such re-growth is controlled.						
Rehabilitation Phase								
1	Traffic on rehabilitated areas.	If disturbed areas are left to rehabilitate naturally, they must be frequently monitored and interventions put in place immediately should it become necessary. Special attention must be given to the potential for soil erosion and the associated environmental degradation. It is also essential to undertake alien vegetation control and management.	Post construc-tion	Monthly	PM	C SHEQO	SHEQO ECO	EM PM
		No construction equipment, vehicles or unauthorised personnel will be allowed onto areas that have been re-vegetated	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Only persons / equipment required for maintenance thereof will be allowed to operate on such areas.	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
2	Plant Material	All plant material used on site will be obtained from an approved nursery;	Post construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		The Contractor will remove plants containing any diseases and/or pests from the site;	Throughout construc-	Throughout	PM	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
			tion					
		Propagation of suitable indigenous vegetation that is quick to establish such as grasses, should be encouraged in areas where vegetation has been removed	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		On planting, there will be sufficient topsoil around each plant to prevent desiccation of the root system. Where plants are stored on site prior to planting they will be maintained to ensure that the root systems remain moist; and	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Each plant brought onto site will be handled and packed in an approved manner for that species or variety, and that all necessary precautions are taken to ensure that the plants arrive on the site in a proper condition for successful growth (e.g. good plant specimens chosen, disease and/or pest free, potting material weed free, plants covered during transportation, containers in good condition);	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
3	Reseeding of Disturbed Areas	All reseeding activities will be undertaken at the end of the dry season (middle to end September) to ensure optimal conditions for germination and rapid vegetation	Throughout construc-tion	Wet Season	PM	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		establishment;						
		The seed mix will be approved by the ECO prior to seeding;	Throughout construc-tion	Wet Season once-off	PM	C SHEQO	SHEQO ECO	EM PM
		Seeds should be covered by use of an agricultural roller or similar mechanism;	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Inspect rehabilitated area at three monthly intervals during the first and second growing season to determine the efficacy of rehabilitation measures; and	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Take appropriate remedial action where vegetation establishment has not been successful or erosion is evident within the first two growing seasons.	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
4	Alien Plant Control and Monitoring	Alien plant control will be conducted as described in Section 5.14, for a period of two years after the rehabilitation phase is completed.	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
5	Soil and Land	All excess building material and rubble must be collected and disposed of at a suitably registered landfill site.	Throughout construc-	Throughout	PM	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
	Capability		tion					
		Soils must be ripped to refusal or a minimum of 300mm prior to seeding.	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		All areas must be profiled to tie in with adjacent terrain. Where necessary suitable soil must be imported obtain a suitable profile.	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Suitable erosion control measures must be installed in areas where erosion may occur;	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Apply a suitable mixture of N:P:K fertiliser prior to seeding;	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Harrow the disturbed areas after spreading the topsoil and fertilizer uniformly;	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Rehabilitated and profiled areas must be inspected for erosion every three months for the first two years. Additional measures must be implemented to remediate erosion	Throughout construc-tion	Throughout	PM	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		where it is observed.						
Operational Phase								
1	Vegetation Clearing	None						

6.16 Fauna Management

Table 6-16: Environmental Management Measures for Fauna Management.

Objectives	• Minimise disruption of farming activities (No stock losses where construction is underway); • Minimise disturbance of animals; • Minimise interruption of breeding patterns of birds; and • No litigation concerning stock losses and animal deaths.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Planning	Construction planning must be undertaken prior to construction to ensure that it does not conflict with breeding seasons.	One week	Once off	PM	C SHEQO	SHEQO ECO	EM PM
		The breeding sites of raptors and other wild bird species shall be taken into consideration during the planning of the construction	One week	Once off	PM	C SHEQO	SHEQO ECO	EM PM

		programme.						
2	Fencing	Ensure that suitable fencing is erected prior to the commencement of construction to ensure that live stock does not wonder into dangerous areas.	Throughout the project	Weekly inspections.	PM	C SHEQO	SHEQO ECO	EM PM
Construction Phase								
1	Construction	The Contractor's workforce will have to be very careful not to disturb the animals as this may lead to fatalities which will give rise to claims from the Landowners.	Throughout the project	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		The Contractor shall under no circumstances interfere with livestock without the Landowner being present. This includes the moving of livestock where they interfere with construction activities.	Throughout the project	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Should the Contractors workforce obtain any livestock for eating purposes, they must be in possession of a written note from the Landowner.	Throughout the project	When necessary	PM	C SHEQO	SHEQO ECO	EM PM
		Should any new sites or nests be found, during the construction process, that was not	Throughout	When	PM	C SHEQO	SHEQO ECO	EM PM

		known or have been noted before, each site shall be assessed for merit and the necessary precautions be taken to ensure the least disturbance.	the project	necessary				
Rehabilitation Phase								
1	Construction	Same as construction phase.						
Operational Phase								
1	Construction	Same as construction phase.						

6.17 Interaction with adjacent landowners

Table 6-17: Environmental Management Measures for Interaction with Adjacent Land Owners

Objectives	
	• Maintain good relations with Landowners; • No delays in the project due to Landowner interference; and

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
		No verbal agreements shall be made. All agreements shall be recorded properly and all parties shall co-sign the documentation. It is proposed that a photographic record of access roads be kept.	Throughout the project	When necessary	PM	C SHEQO	SHEQO ECO	EM PM
Construction Phase								
1	Interaction with Land Owners	The construction process will use the services of the Power Station Environmental Monitoring / Management Committee (EMC) for communication with the land owners.	Throughout the project	Monthly	PM	PM	EM ECO	C SHEQO
		Any claims instituted by the Landowners shall be investigated and treated promptly. Unnecessary delays should be avoided at all costs.	Throughout the project	When necessary	PM	PM	EM ECO	C SHEQO

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		Landowners shall always be kept informed about any changes to the construction programme should they be involved. If ESKOM's Environmental Control Officer is not on site the Contractor's Environmental Control Officer should keep the Landowners informed.	Throughout the project	Monthly	PM	C SHEQO	SHEQO ECO	EM PM
		The contact numbers of the Contractor's ECO officer and the ESKOM ECO shall be made available to the Landowners.	Throughout the project	Once-off	PM	C SHEQO	SHEQO ECO	EM PM
		All contact with the Landowners shall be courteous at all times.	Throughout the project	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		The rights of the Landowners shall be respected at all times and all staff shall be sensitised to the effect that we are working on private property.	Throughout the project	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Interaction with Land Owners	Same as for construction phase above.						
Operational Phase								

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
1	Interaction with Land Owners	The rights of the Landowners shall be respected at all times and all staff shall be sensitised to the effect that we are working on private property.	Throughout the project	Throughout	PM	PM	EM ECO	C SHEQO

6.18 Noise / Working Hours

Table 6-18: Environmental Management Measures for Noise Management.

Objective	• To ensure that noise is managed in such a manner that no complaints are received.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
None								
Construction Phase								
1	Noise	In order to prevent noise impacts resulting from construction activities, working hours are to be limited to weekdays between 7h00 to 17h00.	Throughout the project	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		If certain construction requires work outside of these hours, all adjacent landowners have	When	Once – off,	PM	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		to be informed prior to any construction outside of the specified hours commencing.	necessary	if necessary				
		If there are complaints about low frequency noise after the refurbishment, ESKOM would have to get a noise expert to do measurements and recommend mitigation.	When necessary	If necessary	PM	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Noise	Same as Construction Phase.						
Operational Phase								
1	Noise	Same as Construction Phase						

6.19 Infrastructure

Table 6-19: Environmental Management Measures for Infrastructure.

Objectives	• Ensure that existing infrastructure is taken into account during planning and project execution to eliminate impacts to existing infrastructure; and • To avoid claims and litigation.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Planning	Demarcate all existing infrastructure on site layout plans. Document condition of existing infrastructure prior to construction.	One day	Monthly Inspections	PM	C SHEQO	SHEQO ECO	EM PM
Construction Phase								
1	Construction activities	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.	Throughout Project	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Speed limits shall be enforced in such areas and all drivers shall be sensitised to this effect.	Throughout Project	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								

1	Re-instate all roads and infrastructure.	Upon completion of the project all roads and infrastructure shall be repaired to their original state.	Post construc-tion	Once-off	PM	C SHEQO	SHEQO ECO	EM PM
Operational Phase								
1	Re-instate all roads and infrastructure.	Same as rehabilitation phase.						

6.20 Archaeology

Table 6-20: Environmental Management Measures for Archaeology.

Objective	• Protection of archaeological sites and land considered to be of cultural value; • Protection of known sites against vandalism, destruction and theft; and • The preservation and appropriate management of new archaeological finds should these be discovered during construction.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Planning	Ensure all known sites of cultural, archaeological, and historical significance are demarcated on the site layout plan, and	Throughout Project	Weekly Inspection	PM	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		marked as no-go areas.						
Construction Phase								
1	Emergency Response	Should any heritage resources be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped.	When necessary	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Should any heritage resources be exposed during excavation or be found on site, a registered heritage specialist must be called to site for inspection.	When necessary	Throughout	PM Heritage specialist	Heritage specialist	Heritage specialist ECO	EM C SHEQO
		Should any heritage resources be exposed during excavation or be found on site, the relevant heritage resource agency must be informed about the finding;	When necessary	Throughout	PM	ECO SHEQO	SHEQO ECO	EM PM
		Under no circumstances may any heritage material be destroyed or removed form site;	Throughout Project	Throughout	PM	C SHEQO	SHEQO ECO	EM PM
		Should remains and/or artefacts be discovered on the site during earthworks, all work will cease in the area affected and the Contractor will immediately inform the PM.	Throughout Project	When necessary	PM	C SHEQO	SHEQO ECO	EM PM
		Should any remains be found on site that is potentially human remains, the South African	Throughout	When	PM	C SHEQO	SHEQO ECO	EM PM

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
		Police Service should also be contacted.	Project	necessary				
Rehabilitation Phase								
		Same as construction phase.						
Operational Phase								
		Same as construction phase.						

6.21 Residential Property

Table 6-21: Environmental Management Measures for Management of residential property

Objectives	
	• Control actions and activities in close proximity to inhabited areas; • No complaints from Landowners; • No damage to private property.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
Pre-Construction Phase								
1	Planning	All private residences will be demarcated on a site layout plan prior to construction phase commencing.	One day	Weekly Inspections	PM	C SHEQO	SHEQO ECO	EM PM
Construction Phase								

No.	Activity	Mitigation Measures	Duration	Frequency	Responsible	Accountable	Management	Informed
1	Construction execution	The Contractor shall under no circumstances interfere with the property of adjacent landowners.	Throughout project	Weekly Inspections	PM	C SHEQO	SHEQO ECO	EM PM
Rehabilitation Phase								
1	Rehabilitation execution	Same as construction phase.						
Operational Phase								
1	Maintenance of the power line	Same as construction phase.						

6.22 General Requirements during Construction

- Proper and continuous liaison between ESKOM, the contractor and Landowners to ensure everyone is informed at all times.
- A physical access plan 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 all construction areas within the route corridor parameter.
- The adjacent landowners shall be informed of the starting date of construction as well as the phases in which the construction shall take place.
- The Contractor must adhere to all conditions of contract, including the Environmental Management Plan.
- Proper planning of the construction process to allow for disruptions due to rain and very wet conditions.
- 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.
- 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.
- Appointment of an Environmental Control Officer on behalf of the Contractor to implement this EMPr as well as deal with all Landowner related matters.
- Environmental Audits to be carried out during and upon completion of construction (at least three for the project).
- The Contractor shall not be released from site until all Landowners have signed off the release documentation to the satisfaction of the ESKOM Environmental Control Officer.

6.23 Site Documentation / Reporting

The standard ESKOM site documentation shall be used to keep records on site (Table 6-22). In addition all non-compliances to the environmental authorisation will be reported to the Director: Environmental Impact Evaluation within 48 hours. All

documents shall be kept on site and be available for monitoring and auditing purposes. Site inspections by an Environmental Audit Team may require access to this documentation for auditing purposes. The documentation shall be signed by all parties to ensure that such documents are legitimate. Regular monitoring of all site works by the Environmental Control Officer is imperative to ensure that all problems encountered are solved punctually and amicably. When the Environmental Control Officer is not available, the Contract Manager/Site Supervisor shall keep abreast of all works to ensure no problems arise. The following checklist shall be used as an environmental performance monitoring tool.

Table 6-22: Checklist for monitoring environmental performance on site.

Person responsible for this audit / deviation is:
Name:
Designation:
Reporting of environmental performance, problems and priorities are as follows:
Environmental monitoring of the deviation is according to the following schedule:

The following negative environmental impacts have been identified at the site:

Environmental Problem	Location

In order to solve (mitigate) the above identified negative environmental impacts, the following plan of action is to be implemented:

Problem	Solution	Date to be Completed

Monitoring (follow-up plan of implemented remedial action

Person responsible for environmental monitoring (follow-up) is:

Name:
Designation:
Substation Name:
Monitoring Date:

Problem	Solution as implemented	Has the solution worked, if not, what actions are still to be taken

6.24 Monitoring

6.24.1 Undertaking audits

The PM shall appoint a qualified and experienced ECO to ensure implementation of and adherence to the EMPr.

The ECO shall conduct audits to ensure that the system for implementation of the EMPr is operating effectively. The audit shall check that a procedure is in place to ensure that:

- The EMPr and the Method Statements being used are the up to date versions.
- Variations to the EMPr, Method Statements and non-compliances and corrective actions are documented.
- Emergency procedures are in place and effectively communicated to personnel.

The audit programme shall consist of the following at a minimum:

- First audit no later than 1 month after construction commences;
- Thereafter audits at monthly intervals, at a minimum;
- An audit one week prior to practical completion of the project is granted; and
- A post construction audit within 1 week after the contractor has moved off site.

6.24.2 Compliance with the EMPr

The Contractor and/or his agents are deemed not to have complied with the EMPr and remedial action if:

- There is evidence of contravention of the EMP clauses within the boundaries of the site or extensions.
- Environmental damage ensues due to negligence.
- The Contractor fails to comply with corrective or other instructions issued by the PM, within a time period specified by the PM.

7. Environmental Contact Persons

- To Be Confirmed

8. Emergency Numbers

- Police: 10111
- Ambulance 10177
- Netcare 911 082 911
- ER24 084 124
- Emergency 107
- Crimestop 08600 10 111