KUSILE POWER STATION

Employer Policies and Procedures **Section 4**

Environmental Management Plan **Part 10**

Rev 2 0311

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PROJECT BRAVO

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

September 2007

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PROJECT DETAILS

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GLOSSARY OF TERMS

Bi-monthly	means every second month. This term is used throughout the Record of Decision, but is not defined. Similarly "*two-monthly*" is assumed to have the equivalent meaning to "*bi-monthly*"
Contractor	means the **main contractor** as engaged by Eskom for the construction of the subject infrastructure, including all Sub-contractors and service provides appointed by the main contractor of his own volition for the execution of parts of the Works. "*Contractor*" also includes any other contractor engaged by Eskom directly in connection with any part of the construction operations, which is not a nominated sub-contractor to the main contractor
Environment[1]	means the surroundings within which humans exist and that are made up of: (i) the land, water and atmosphere of the earth; (ii) micro organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing
Environmental Control Officer	means a person who is responsible for the monitoring of the implementation of the requirements of an EMP
Environmental Officer	means a person who is responsible for the implementation of the requirements of an EMP
Environmental Impact Assessment (EIA)	means a study of the environmental consequences of a proposed course of action
Environmental Impact Report (EIR)	means a report assessing the potential significant impacts as identified during the Scoping phase
Environmental impact	means an environmental change caused by some human act

[1] As defined in terms of the National Environmental Management Act (No 107 of 1998).

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Environmental Monitoring Committee	means a committee that monitors the implementation of an EMP and provides an advisory role to the authorities and project proponent
Method Statement	means setting out in detail how the management actions contained in an EMP will be implemented, in order to ensure that the environmental objectives are achieved
Public Participation Process	means a process of involving the public in order to identify needs, address concerns, in order to contribute to more informed decision making relating to a proposed project, programme or development
Scoping	means a procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail
Scoping Report	means a report describing the issues identified

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ABBREVIATIONS

CEMP	Construction Phase Environmental Management Plan
DEAT	Department of Environmental Affairs and Tourism
DME	Department of Minerals and Energy
DWAF	Department of Water Affairs and Forestry
ECA	Environment Conservation Act (No. 73 of 1989)
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Plan
FBC	Fluidised bed combustion
FGD	Flue gas desulphurisation
GDACE	Gauteng Department of Agriculture, Conservation and Environment
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
km	Kilometre
kV	Kilovolt
kWH	Kilowatt Hour
m	Metre
m^3	Cubic Metre
MDALA	Mpumalanga Department of Agriculture and Land Affairs
NEMA	National Environmental Management Act (No. 107 of 1998)
MPRDA	Mineral and Petroleum Resources Development Act (No. 28 of 2002)
MW	Megawatt
NHRA	National Heritage Resources Act (No. 25 of 1999)
NWA	National Water Act (No 36 of 1998)

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OEM	Original Equipment Manufacturer
PES	Project Environmental Specification
ppm	Parts per Million
pf	Pulverised fuel
PPP	Public Participation Process
RoD	Record of Decision
SAHRA	South African Heritage Resources Agency
SES	Standard Environmental Specification
UCG	Underground Coal Gasification
ToR	Terms of Reference

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PART A: INTRODUCTION

Part A provides a brief introduction and overview of the purpose and structure of this guideline document.

1 BACKGROUND

The Project Bravo power station is a response by Eskom towards meeting South Africa's growing electricity demand, and entails the construction of a coal-fired power station and associated infrastructure[2] in the Witbank geographical area. Regulation 1182 of the Environment Conservation Act (ECA) (No. 73 of 1989)[3], lists "*the construction, erection or upgrading of facilities for commercial electricity generation with an output of at least 10 megawatts*" and "*the change of land use from agricultural or zoned undetermined use or an equivalent zoning to any other land use*" as activities with the potential to cause substantial detrimental effects to the environmental. Accordingly, the proposed power station required authorisation from the competent environmental authority[4] in terms of the Environmental Impact Assessment (EIA) process outlined in Regulations 1183.

Ninham Shand Consulting Services was appointed by Eskom to assist them in complying with the environmental requirements for the proposed project. The EIA process was initiated on Eskom's behalf in February 2006, and culminated with the submission of a Final Environmental Impact Report (EIR) in February 2007. After consideration of the environmental reporting, the competent environmental authority, *viz.* the Department of Environmental Affairs and Tourism (DEAT), issued a Record of Decision (RoD) authorising the proposed activity on 5 June 2007 (refer to Annexure A for a copy of this RoD). As a condition of the authorisation (Condition # 3.2.12.1), Eskom was required to submit a site specific Construction Phase Environmental Management Plan (CEMP) to the relevant authorities (*viz.* DEAT) for acceptance prior to the commencement of any construction activities associated with Project Bravo. The current document was compiled in response to this requirement.

[2] A separate EIA process will be undertaken for the transmission lines that will be required to feed electricity into the national electricity grid. With respect to fuel supply, an EIA is currently being undertaken for the coal mine proposed to supply the coal.

[3] On 3 July 2006 new EIA Regulations were enacted in terms of the National Environmental Management Act, which superceded the ECA EIA Regulations. However, in terms of the transitional arrangements provided for in the NEMA EIA Regulations any application for authorisation submitted in terms of the ECA EIA Regulations, and which was pending when the new Regulations took effect, was to be completed in terms of the ECA.

[4] Since Eskom is a state-owned enterprise, the competent authority was the national Department of Environmental Affairs and Tourism (DEAT).

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2 PURPOSE OF THIS DOCUMENT

In response to the RoD requirement that "*compliance with the accepted* [CEMP] *must form part of all tender documentation … and must be endorsed contractually*"[5], the CEMP has been developed as a set of environmental specifications, to be integrated into the tender documentation. However, in order to ensure that these environmental specifications are appropriately contextualised and that clear guidance is provided in terms of their on-site implementation, it has been necessary to compile this guideline document. Accordingly, the CEMP for Project Bravo is primarily comprised of the following three components: (1) this guideline, (2) the environmental specifications (included as Annexure D) and (3) various monitoring and implementation tools (included in Annexures E and H to J)[6]. Specifically, the purpose of the guideline document is to:

- Sketch the background for the development of the CEMP;
- Introduce the structure of the CEMP, particularly in terms of the contractual application of the environmental specifications;
- Highlight the salient features of the CEMP;
- Detail the roles of the various parties with respect to the implementation and monitoring of the EMP;
- Clarify and streamline the implementation of the EMP;
- Define requirements and procedures for monitoring; and
- Outline procedures for proactive environmental management and environmental control, in the event of pollution or similar incidents.

It should be noted that since this CEMP represents an extension of the EIA process undertaken for Project Bravo, it is important that this guideline document and associated annexure be read in conjunction with the Final Scoping Report and Final EIR. This will contextualise the CEMP and enable a thorough understanding of its role and purpose in the integrated environmental process.

3 STRUCTURE OF THIS DOCUMENT

This guideline document has been divided into four parts, each addressing a different aspect of the CEMP:

- **Part A** provides a brief introduction and overview of the purpose and structure of this guideline document;

[5] Condition # 3.2.12.3.

[6] In addition to these three elements, the CEMP also includes the Terms of Reference for the Environmental Monitoring Committee (Annexure G)and a list of residual environmental issues that could not been addressed at the time of writing the CEMP (Annexure F), since these help in addressing its intended purpose.

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- **Part B** sets the context for the CEMP by providing an overview of the project, summarising the objectives of the CEMP, highlighting the scope of the CEMP and briefly emphasising Eskom's environmental commitments;
- Since this CEMP has been developed as a set of environmental specifications, **Part C** provides an introduction to the specification, provides an overview of the structure and application of the specification and highlights the environmental considerations that should inform the tender adjudication process; and
- **Part D** provides guidance in terms of the on-site implementation of the CEMP, highlighting the organisation structure and various roles and responsibilities, emphasising the importance of awareness training, summarising the requisite approach to monitoring and auditing and addressing the requirement for review and amendment of the environmental specifications.

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PART B: SETTING THE CONTEXT

The purpose of Part B is to set the context for the CEMP by providing an overview of the project, summarising the objectives of the CEMP, highlighting the scope of the CEMP and briefly emphasising Eskom's environmental commitments. In developing the environmental specifications and documentation related to the on-site implementation of the CEMP cognisance has been take of these requirements.

4 OVERVIEW OF THE PROPOSED PROJECT

4.1 BACKGROUND

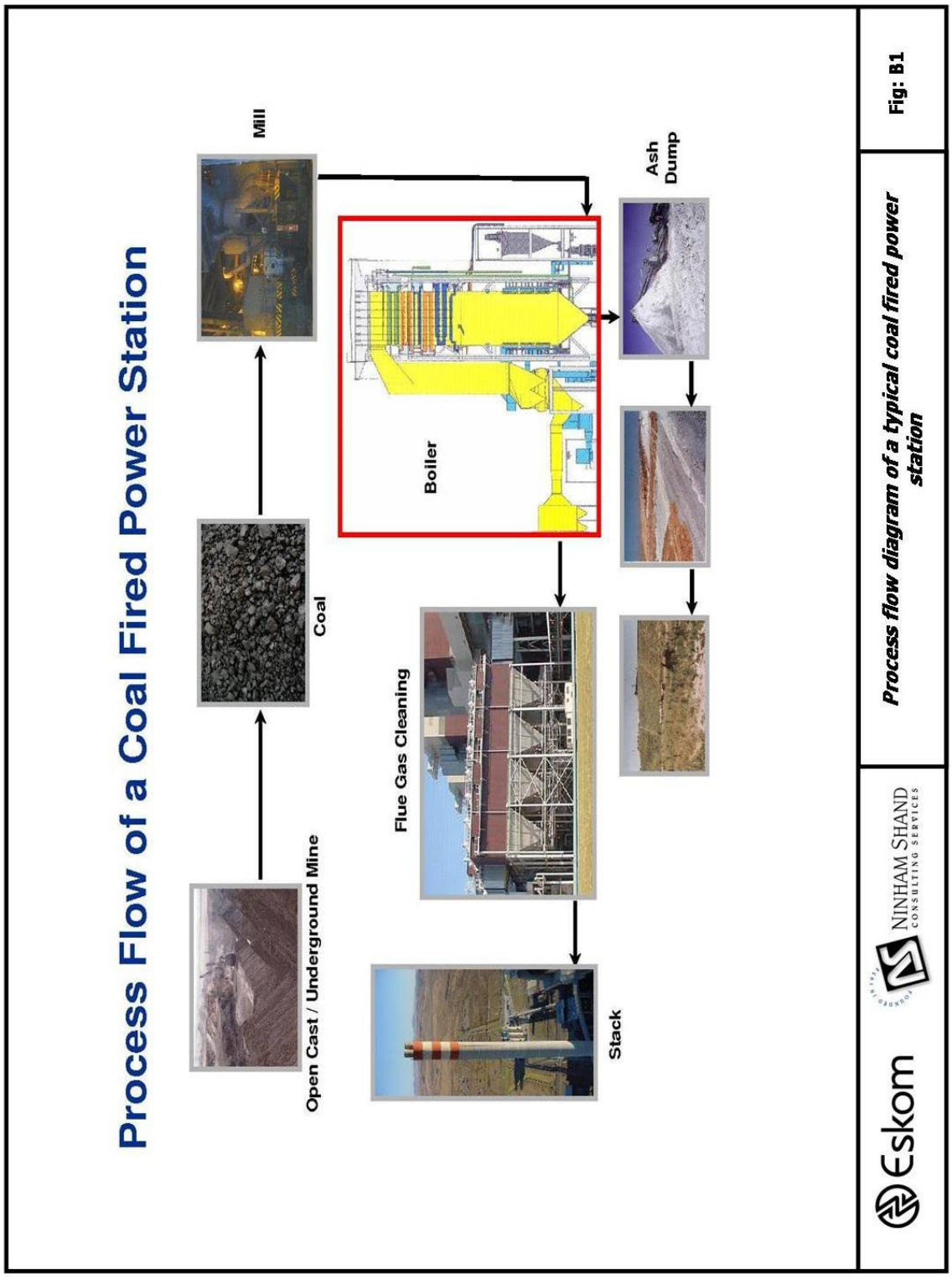
The project comprises the construction, commissioning and operation of a coal-fired power station and its associated infrastructure in the Witbank area. The power station itself would comprise six boiler/ turbine sets with a nominal electricity generation capacity of approximately 5 400 MW (900 MW per unit[7]). The project would include the following infrastructure:

- Power Station Precinct:
    - Power station buildings;
    - Administrative buildings (control buildings, medical, security etc.); and
    - High voltage yard.
- Associated Infrastructure:
    - Coal stock yard;
    - Coal and ash conveyors;
    - Water supply pipelines (temporary and permanent);
    - Electricity supply (temporary, during construction[8]);
    - Water and wastewater treatment facilities;
    - Ash disposal systems;
    - Access roads (including haul roads);
    - Dams for water storage; and
    - Railway siding and/or line for sorbent supply.

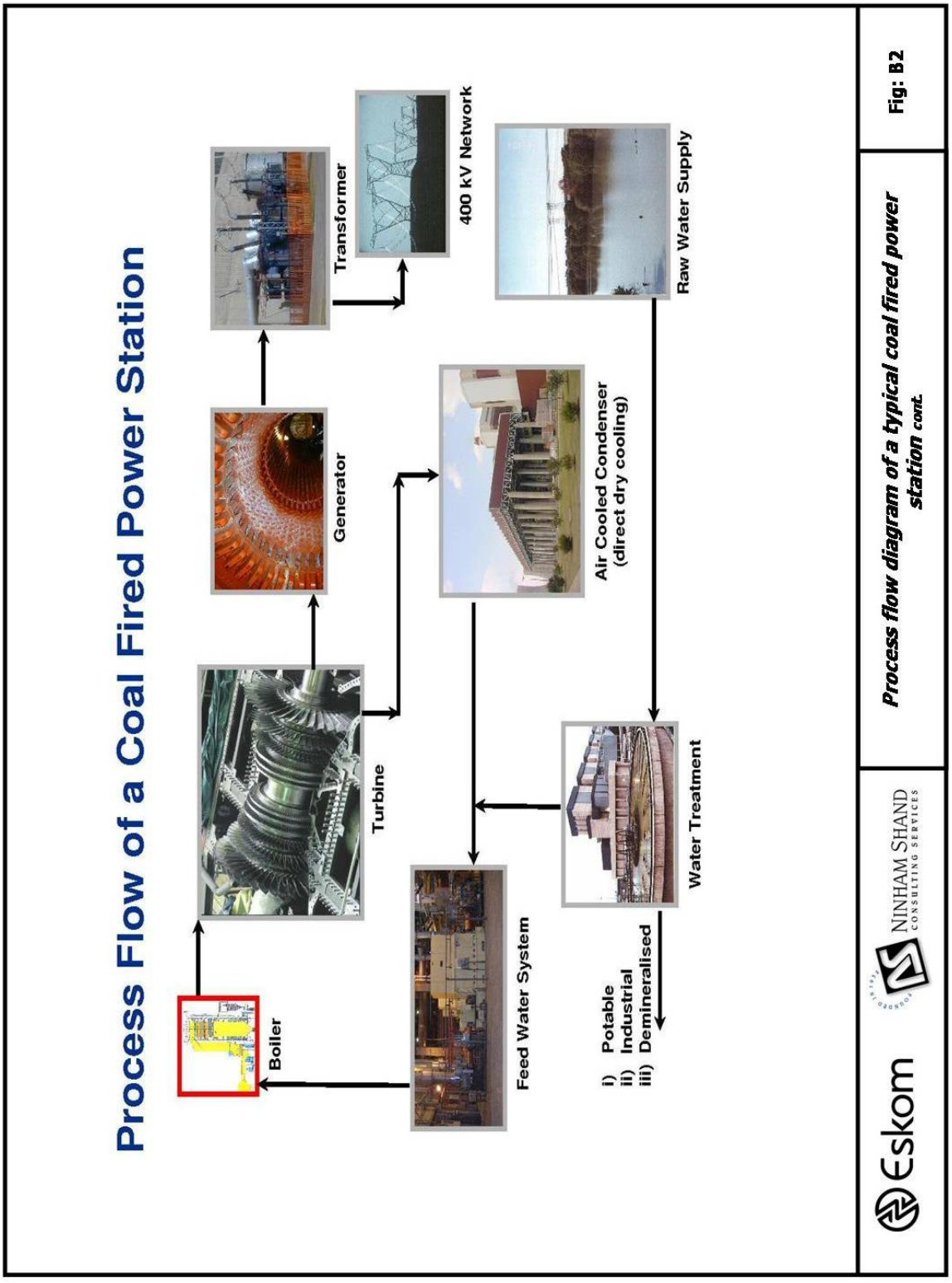
The flow diagrams below (**Figures B1 and B2**) illustrate the process by which electricity is produced in a coal-fired power station.

[7] The station capacity rating is dependant on the selected technology based on various Original Equipment Manufacturer (OEM) proposals, which would be acquired during the technical and commercial evaluation process.
[8] *i.e.* not for bulk supply.

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The power station would be fuelled by coal, supplied from a new colliery in the vicinity of the proposed power station. Coal is transported via conveyor belts from the colliery to the coal stockyard, where would be stockpiled. The stockpile is divided into strategic, seasonal and live stockpile areas. Coal from the stockpile is fed to the power station by means of a stacker/reclaimer and conveyor belts. The coal is pulverised in a milling plant to form 'pulverised fuel' and, with a combination of air, blown into the boiler where would be combusted.

Heat released from burning the pulverised fuel is used to heat water to produce steam within a network of boiler tubing. The final superheated steam exiting the boiler is used to drive turbines coupled to generators, which generate electricity via electromagnets that spin within large copper coils. The generated electricity is then transformed from 22 kV to 400 kV and fed via the high-voltage yard into the transmission network. Once the steam's energy has been exhausted, it is condensed and the water is returned to the boiler to start the process again. The cooling system can use either wet or dry cooling, the dry cooling option being either direct or indirect.

The ash produced through the combustion of the coal is removed from the bottom of the boiler (boiler bottom ash) and fly ash is removed from the top of the boiler together with the flue gas (via electrostatic precipitators or bag filters) and sent to an ash-dumping facility.

4.2 INTEGRATION OF ENVIRONMENTAL CONSIDERATIONS INTO PROJECT DESIGN

Various alternatives were considered during the EIA process for Project Bravo. This section contains a summary of the key recommendations emanating from the Final EIR, particularly as it relates to the final design of the power station. Eskom have taken cognisance of these recommendations and agreed to their incorporation within the project design.

4.2.1 Site

Two alternatives sites were identified for the proposed site of Project Bravo, *viz.* sites X and Y. Although the environmental impacts associated with the two sites were regarded as very similar, Site X emerged as the marginally preferred environmental site for the following reasons:

- The geology on Site X is such that it is unlikely to allow the rapid distribution of pollutants through the groundwater, specifically related to the disposal of ash, while at Site Y the ash dump is more likely to pollute the groundwater rapidly;
- Site X supports a smaller area of high integrity wetlands and offers less wetland services than Site Y;
- There are fewer sensitive noise receptors that are likely to be affected by a direct dry cooled power station at Site X than at Site Y;
- There is less land that is cultivated on Site X than on Site Y, especially with respect to irrigated land; and
- The net income per hectare at Site X is in excess of 20% lower than the net income per hectare on Site Y.

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While the differences are marginal, the establishment of a coal-fired power station on Site X is likely to have fewer negative impacts on the biophysical and socio-economic environments.

4.2.2 Site layouts

The specific location of the power station, coal stockyard and aboveground ash dump as initially identified on Site X have been refined, to avoid impacting on high integrity wetlands. **Figure B3** illustrates the recommended layout. Note that the proposed coal stockyard will receive coal directly from the mine workings, *i.e.* there will not be a separate coal stockyard within the mine precinct.

4.2.3 Cooling technology alternatives

Indirect dry cooling, which utilises cooling towers, greatly increases the disturbance footprint and visual prominence of the power station, making it a more imposing structure. However, direct dry cooling, utilising the bank of fans for each boiler unit, increases the ambient noise levels significantly, which only reduce to the requisite limits 6 km from the power station precinct. Given the potential mitigation measures for noise impacts, such as noise abatement technology, insulation, and increasing the buffer zone between the power station and adjacent farmers, direct dry cooling is recommended as the most environmentally acceptable option, despite the increased noise impact.

4.2.4 Air emission abatement technology

Eskom has made a firm commitment to the implementation of Flue Gas Desulphurisation (FGD) with at least 90% removal efficiency for the proposed new coal-fired power station in the Witbank area. Without FGD in place, exceedances of the SO_2 standards increase significantly and a large number of additional people are likely to be exposed to SO_2 levels that are detrimental to human health.

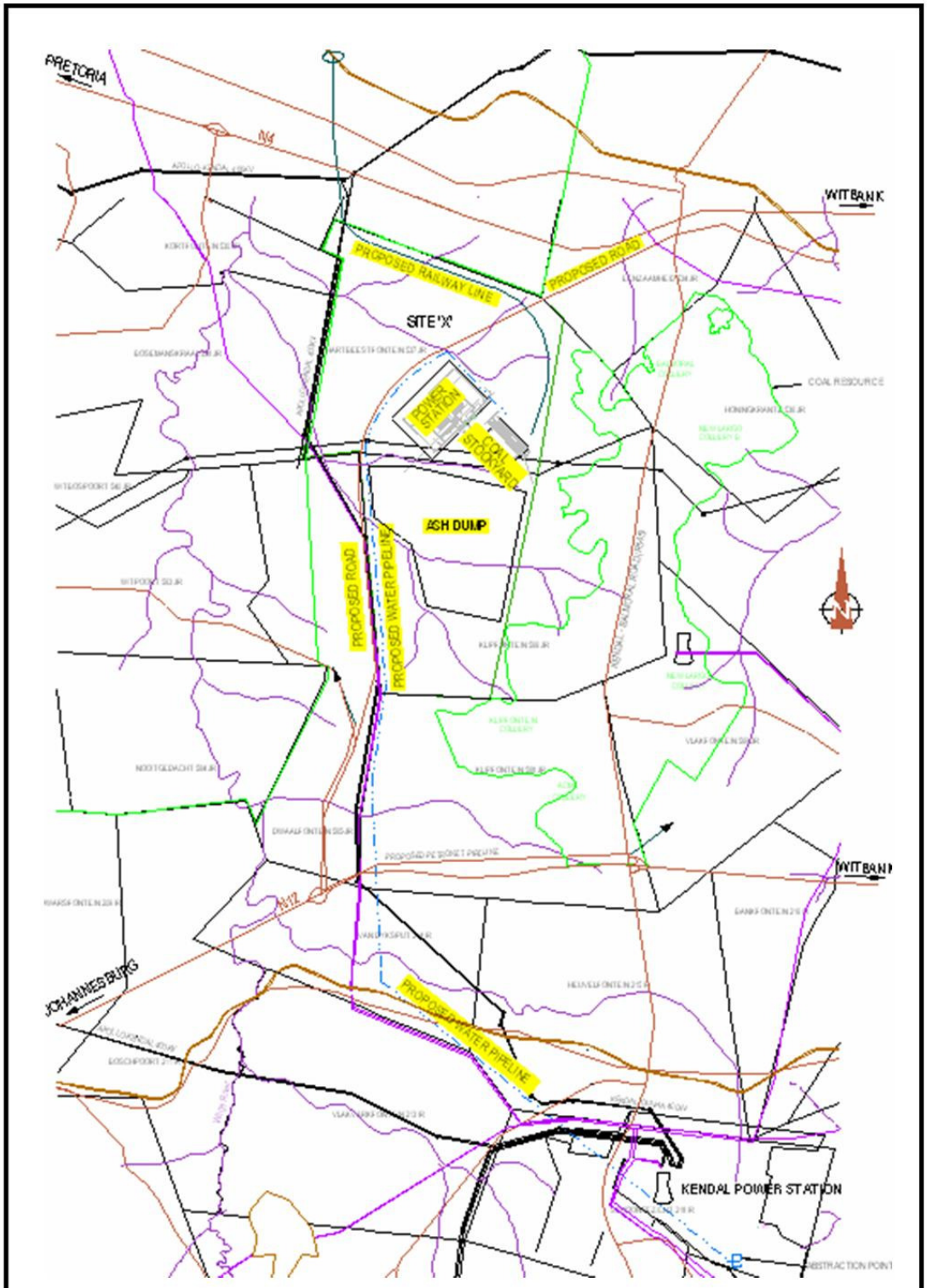
The implementation of FGD with at least 90% removal efficiency is recommended for the proposed project. Bag filters or electrostatic precipitators are recommended for the control of particulate matter. Low NO_X burners are recommended for the control of NO_X emissions.

Eskom has indicated that *wet* FGD technology will be applied, which will result in the concomitant benefits of a shorter transport distance, less transport energy consumption and fewer transport emissions, as well as a greater removal efficiency than semi-dry FGD technology.

4.2.5 Ash disposal methods

Aboveground ashing would, over the project lifespan, result in an extensive area of disturbance. The impacts with respect to particulate matter and groundwater contamination are however manageable, and it is therefore considered an acceptable means of ash disposal.

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For comparative purposes, back-ashing and in-pit ashing were considered, and require the ash to be conveyed off-site and may result in groundwater contamination, which is possibly less manageable. Further investigation regarding sub-surface ash disposal are required should Eskom wish to pursue this option.

4.2.6 Access and transport routes

Access and transport corridors to provide for water supply, vehicles access, coal conveyance and sorbent supply were assessed by the relevant specialists and applicable recommendations were made. **Figure B3** provides an illustration of the recommended routes for such linear infrastructure, as follows:

- An access road that links the power station to both the N4 to the north-east and the N12 to the south-west, the former requiring a new section of road to the vicinity of the N4/R545 intersection and the latter requiring the upgrading of a section of the D960 to its intersection with the N12;
- A railway line from the north for the importing of sorbent that connects with the Crown Douglas siding on the Pretoria - Witbank main line, and that would require crossings over the N4 and under the Apollo – Kendal 400 kV transmission line;
- A water supply pipeline from the existing Kendal power station, running due north-west to a point in the vicinity of the N12/D969 intersection, turning north parallel to the Kendal – Duvha 400 kV transmission line and then proceeding along the western boundary of Site X before turning to the east towards the proposed power station. Several crossings of a railway line, roads and the proposed Petronet multi-products pipeline would be necessary; and
- A short section of coal conveyor from the coal stockyard to the proposed power station, immediately to the east of the envisaged site.

4.2.7 Summary of recommended alternatives

The key recommendations emanating from the Final EIR, and which will be acted upon by Eskom, both in terms of the RoD requirements and in the interests of promoting sustainable development (refer to Section 7), are summarised below:

Alternative	Recommendation	Reference in Final EIR
Site	Site X	Sections 1.2.5 & 6.2.1
Site layout	Refined as per **Figure B3**	Sections 2.2.2 & 6.2.2
Cooling technology	Direct dry cooling	Sections 2.2.1.b) & 6.2.3
Air emission abatement	• Wet FGD for SOx • Bag filters or electrostatic precipitators for particulates • Low NO_X burners for NO_X	Sections 2.2.1.c) & 6.2.4

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Alternative	Recommendation	Reference in Final EIR
Ash disposal	• Above ground (subsurface ashing to be investigated with the mining house in the future)	Sections 2.2.1.d) & 6.2.5
Access & transport routes	Refined as per **Figure B3**	Sections 2.2.2 & 6.2.6

5 OBJECTIVES OF THE CEMP

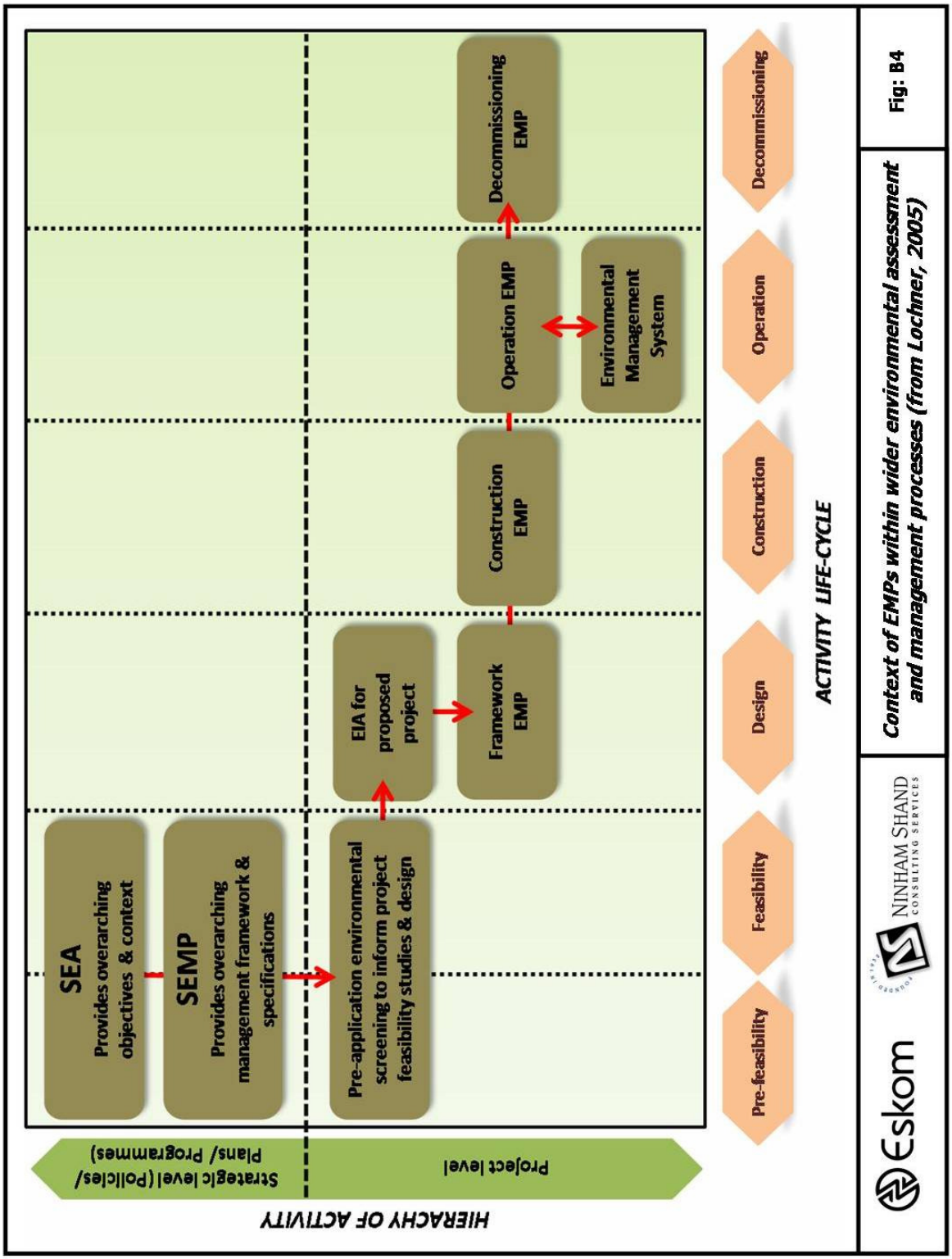
Environmental management does not end with obtaining the requisite environmental authorisations. Rather there is a need to ensure that the remedial requirements identified during the environmental process are effectively realized during project implementation, and this is where EMPs have a key role to play. **Figure B4** contextualises EMPs within the broader environmental assessment and management processes.

An EMP is defined as "*an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented, and that the positive benefits of the projects are enhanced*"[9]. As the name suggests, the CEMP provides specific environmental guidance for the construction phase of a project, and is intended to manage and mitigate construction activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (site clearing, erection of the construction camp) through those incurred during the construction activities themselves (erosion, pollution of watercourses, noise, dust) to those incurred during site remediation (soil stabilisation, revegetation). Specifically, the objectives of the CEMP can be articulated as follows:

- To give effect to the construction-related requirements articulated in the environmental authorisation and associated reporting;
- To give effect to the environmental commitments articulated in Eskom's corporate policies and commitments;
- 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 EMP-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 formation and administration of the Environmental Monitoring Committee (EMC), through the roles and responsibilities of the key project participants to the auditing and reporting of compliance;

[9] Lochner (2005) *Guideline for Environmental Management Plans*. CSIR Report No ENV-S-C 2005-053 H. Republic of South Africa, Provincial Government Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.

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- 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 Project Bravo does not result in undue or reasonably avoidable adverse environmental impacts, and that any potential environmental benefits are enhanced.

6 SCOPE OF THE CEMP

The scope of the CEMP must ensure that the objectives outlined in Section 5 will be addressed, and is principally determined by the key documentation related to the EIA process, notably the EIR, the Framework EMP and the RoD. A brief overview of the key issues raised in each of these documents is provided below.

6.1 ENVIRONMENTAL IMPACT REPORT

In terms of the Final EIR (February 2007), various construction-related environmental impacts were identified, including:

- Disturbance of flora and fauna;
- Impacts on water resources (sedimentation and water quality);
- Increase in traffic volumes in the vicinity of the construction site;
- Noise pollution;
- Impact on existing infrastructure;
- Socio-economic impacts;
- Windblown dust;
- Litter/ waste pollution;
- Interruption of road services;
- Storage and utilisation of hazardous substances on site;
- Risk of fire;
- Disturbance to sense of place, visual aesthetics;
- Security risks;
- Health issues; and
- Light pollution.

None of the construction phase impacts were deemed to have a highly significant impact on the environment, given their relatively short duration and localised extent. Many of the construction phase impacts where, however, assessed as being of medium significance and requiring specific mitigation interventions in order to avoid and minimise impacts on the biophysical and especially the human environment. In this regard, the EIR emphasised that a comprehensive CEMP should be developed and implemented to protect sensitive onsite and offsite features through controlling construction activities that could have a detrimental effect on the environment, and avoiding or minimising potential impacts.

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6.2 FRAMEWORK EMP

A Framework EMP (refer to Annexure B), which broadly outlined the type and range of mitigation measures that could be implemented during the pre-construction, construction, operational and decommissioning phases of the project, was included in the Final EIR. The intention was that this would form the outline for the subsequent development of detailed construction, operational and decommissioning EMP documentation once the project had been authorised. Key recommendations emanating from the Framework EMP of relevance to the CEMP include the following:

- Environmental input into tender drafting and adjudication:
    - Incorporate relevant environmental management specifications into the tender and contract documentation;
    - Incorporate relevant payment items into the schedule of quantities; and
    - Assess ability of tenderers to adequately manage the environmental issues;
- Environmental management of the construction phase:
    - Monitoring and enforcement of specified environmental management requirements:
        - Appoint an Environmental Control Officer is (either independent or in-house);
        - Develop and implement an environmental auditing system for the construction phase;
        - Audit the Contractors compliance with the requirements of the environmental specification contained within the relevant Contract Document; and
        - Produce regular (monthly) environmental audit reports for submission to DEAT and the EMC (if one is appointed);
    - Communication with Contractor and his staff:
        - Include environmental considerations as an item on the agenda of the monthly site meetings for each Contractor;
        - Include environmental considerations in the Contractors programme (where relevant);
        - Appoint a senior manager on the Contractors staff as the designated Environmental Officer, empowered to independently managed compliance with the environmental requirements on behalf of the Contractor;
        - Compile and implement the necessary Method Statements; and
        - Undertake environmental awareness training of all site staff during the commencement of each Contract, with regular refreshers for the duration of the Contract;
    - Communication with public:
        - Provide a contact number of someone responsible for the site on the site signage;

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- Maintain a complaints register on site to allow public complaints to be recorded. Complaints should be noted and signed off at site meetings; and
- Hold meetings with EMC at agreed frequencies;

- Site establishment ~ *Access*:

  - Secure Site in an appropriate manner;
  - Where necessary to control access, fence and secure Contractor's camp; and
  - Provide alternative access/ detours for public/ landowners;

- Site establishment ~ *Site structures*:

  - Locate key site infrastructure in environmentally acceptable area and limit its extent;
  - Position site infrastructure so as to limit visual intrusion on neighbours or the greater environment;
  - Select materials for site infrastructure that limit reflection and blend in with the environment; and
  - Accommodate temporary services underground and within the same trench where possible;

- Site establishment ~ *Protection of topsoil and sensitive areas/ artefacts*:

  - Locate key site infrastructure in environmentally acceptable area and limit its extent;
  - Remove topsoil approximately 150 mm deep from establishment, working area and stockpile areas, and stockpile for later use;
  - Protect topsoil stockpiles against erosion and contamination;
  - Provide containment and settlement facilities for effluents from concrete mixing facilities;
  - Provide spill containment facilities for hazardous materials like fuel and oil;
  - Minimise the extent of areas cleared;
  - Identify sensitive areas or artefacts and demarcate these as no-go areas; and
  - Develop contingency plans to address heritage resource discoveries during construction;

- Site establishment ~ *Surface and groundwater*:

  - Establish contaminated water management system;
  - Provide suitable and sufficient ablution facilities that are serviced regularly;
  - Provide containment and settlement facilities for effluents from concrete mixing facilities; and
  - Provide spill containment facilities for hazardous materials like fuel and oil;

- Site establishment ~ *Solid waste*:

  - Demarcate, and enforce use of, a designated eating area;
  - Provide adequate waste bins;

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- Set up system for regular waste removal to approved facility;
- Minimise waste by sorting wastes into recyclable and non recyclable wastes; and
- Prohibit burying or burning of waste on Site;

- Site establishment ~ *Fire*:

  - Provide adequate cooking and heating facilities for staff ;
  - Prohibit open fires;
  - Develop emergency protocols for dealing with fires, which may include a Fire Management Plan in accordance with the National Veld and Forest Fire Act (No 101 of 1998); and
  - Ensure adequate fire-fighting equipment is available on site, particularly near "hot" works;

- Site management ~ *Materials*:

  - Inform delivery drivers re requirements of the specifications;
  - Secure materials during transport;
  - Identify appropriate storage areas for stockpiling of materials, storage of hydrocarbons and storage of hazardous substances and ensure that these areas are appropriately prepared for their purpose;
  - Dispose of hazardous substances in terms of the relevant legal requirements;
  - Limit spillage of hazardous substances or substances with the potential to cause contamination of the environment;
  - Develop emergency protocols for dealing with spillages particularly where these pose a pollution risk or involve hazardous substances;
  - Compile and implement the necessary Method Statements ; and
  - Undertake environmental awareness training of all site staff;

- Site management ~ *Equipment maintenance and storage*:

  - Ensure that all plant is in good working order;
  - Undertake maintenance within specified area (workshop); and
  - Use drip trays for all stationary or parked plant and when servicing equipment away from designated areas;

- Site management ~ *Surface water and/or existing stormwater systems*:

  - Identify predetermined stockpile areas for topsoil, construction materials and excavated material;
  - Dispose of waste excavated material at appropriate waste disposal sites;
  - Rehabilitate site to prevent soil erosion, including temporary revegetation of areas that will remain exposed for extended periods;
  - Undertake concrete mixing away from sensitive areas and on impermeable surfaces;
  - Store fuels in storage area that is appropriately bunded and drains to a sump;

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- Ensure that substances that pose a risk of water contamination are appropriately stored and disposed of; and
- Develop and implement water monitoring programme where work abuts aquatic systems;

- Site management ~ *Dust*:

  - Implement dust suppression measures e.g. regular watering;
  - Undertake concrete mixing away from sensitive areas; and
  - Develop and implement dust monitoring programme;

- Site management ~ *Noise*:

  - Limit working hours for noisy equipment to daylight hours;
  - Fit silencers appropriate to equipment; and
  - Develop and implement noise monitoring programme;

- Site management ~ *Public health and safety*:

  - Ensure adequate signage for landowners/ public about the work, particularly where work abuts major public thoroughfares or use areas;
  - Erect and maintain fencing and gated access to restricted areas;
  - Implement requisite traffic safety measures at abutting roads;
  - Implement requisite safety measures where there are abutting public use areas; and
  - Ensure adequate accessibility to landowners/ public where required for safe access;

- Closure ~ *Environmental integrity*:

  - Remove all temporary facilities and waste materials; and
  - Replace stockpiled topsoil.

6.3 RECORD OF DECISION

The DEAT RoD (refer to Annexure A) sets specific conditions that are relevant to the development and implementation of a CEMP, specifically:

- All unavoidable construction within wetland areas must be done so as to minimise disturbance of pedology;
- A revised layout must be submitted to indicate how the proposed corridors for the pipelines, roads, railways and coal conveyors have taken the wetland into consideration;
- The existing vegetation cover must be retained by selective clearing;
- Community forums and communication channels between the local communities, contractors and Eskom must be established and maintained;
- Assistance must be provided to the inhabitants on site though skills development and job opportunities. Information confirming compliance with this must be included in the Environmental Control Officers (ECO) compliance report;

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- Eskom must establish an Environmental Monitoring Committee with clear terms of reference. These terms of reference must address logistic arrangements, administration and financial arrangements;
- The EMC shall include the following members, amongst others:

    - A chairperson;
    - An ecologist;
    - Representatives from the public;
    - The ECO;
    - A senior site manager from the Contractor; and
    - An air specialist;

- The EMC must appoint an independent chairperson with appropriate people and project management skills
- The EMC must meet on a bi-monthly[10] basis from the inception of the project, although the EMC may revise this frequency should the need arise;
- The EMC must report to DEAT on a bi-monthly[10] basis in terms of their core functions, viz.:

    - To monitor and audit compliance with the RoD, environmental legislation and environmental reporting (EIR and EMP); and
    - To make recommendation to DEAT in terms of monitoring and auditing of the project;

- All costs for the EMC must be borne by Eskom;
- Eskom must submit a site-specific CEMP for acceptance before commencement of any activities. The EMP must include the following:

    - Rehabilitation of all areas disturbed during construction, including areas where permanent structures are erected;
    - Siting and management of construction camps, sanitation, ablution and housing facilities as well as material storage areas used by the Contractor. All work areas must be supplied with proper sanitation facilities;
    - Management and rehabilitation of temporary access roads to construction areas. Any new roads constructed for any purpose not covered as part of this RoD, must comply with the relevant SANS codes and must first be authorised by DEAT;
    - Waste avoidance and minimisation and disposal of waste at an appropriate facility;
    - Protection of any heritage sites identified during the project design or implementation;
    - Provisions for harvesting of any medicinal plants that may occur on site, prior to site clearance;
    - Protection of indigenous vegetation where such is not affected by the physical footprint of the infrastructure or the construction activities;
    - Provision for search and rescue of protected or endangered plant species, prior to the commencement of any construction related activities;

[10] Within this context bi-monthly is interpreted to mean every second month.

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- Management of traffic during the construction phase of the development, where the site access roads and other transportation networks intersect;
- Measurement, monitoring and management of noise and dust pollution levels during the construction phase;
- A fire control management plan for implementation on site;
- Implementation of site specific erosion, sediment and dust control measures during the construction phase; and
- All recommendations and mitigation measures proposed in the Final EIR dated February 2007;

- Once accepted by DEAT, the revised CEMP will become a dynamic document. Any changes to the CEMP must be submitted to DEAT for acceptance prior to implementation. Such submission to DEAT must be accompanied by the recommendations of the EMC;
- Compliance with the accepted CEMP must form part of all tender documentation for all Contractors working on the project and must be endorsed contractually;
- Eskom must appoint a suitable qualified ECO to monitor compliance with the conditions of the RoD, requirements of the CEMP and environmental legislation on a daily basis on behalf of the EMC. The costs of the ECO must be borne by Eskom;
- The ECO must be appointed at least a month before the onset of construction activities and DEAT must be notified to facilitate communication;
- The ECO shall ensure that periodic environmental performance audits are undertaken on the project implementation;
- The ECO shall submit a written environmental compliance report to DEAT, copied to MDALA, on a two-monthly[11] basis;
- The ECO shall maintain the following on site:

  - A site diary;
  - A non-conformance register;
  - A public complaints register; and
  - A register of audits;

- The ECO shall remain employed until all required rehabilitation measures are completed and the site is handed over to Eskom for operation;
- The ECO shall report to and be accountable to the EMC;
- Records relating to monitoring and auditing for the proposed development must be available for inspection by any relevant authority;
- An effective monitoring system must be put in place during construction to ensure safety and to detect any leakage or spillage of coolants from all oil containing equipment during their transportation, handling and installation;
- No exotic plant species may be used for rehabilitation purposes. Only indigenous plants may be used;

[11] Within this context two-monthly is assumed to be equivalent to "bi-monthly" and is interpreted to mean every second month, in keeping with the frequency for the EMC meetings.

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- Measures aimed at controlling invasive plants species and weeds must be implemented and must form part of the relevant EMP;
- No disturbance of the land at any stream, rivers edge or wetland is allowed unless such disturbance compliance with the legislation and conforms to strict design criteria;
- Archaeological remains, artificial features and structures older than 60 years are protected by the National Heritage Resources Act (No 25 of 1999). Should any archaeological artefacts be exposed during excavation for the laying of foundations, construction near the find must be stopped. An archaeologist must be called to the site for inspection. Under no circumstances shall any artefacts be destroyed or removed from the site without SAHRA's approval. SAHRA's recommendations should be included in the CEMP and adhered to;
- All provisions of the Occupational Health and Safety Act (No 85 of 1993), and any other applicable legislation must be adhered to by the holder of this authorisation;
- A copy of the RoD shall be available on site during construction and all staff, Contractors and Sub-contractors shall be familiar with or be made aware of its contents;
- Compliance/ non-compliance records must be kept and shall be made available on request from the authorities, within five days of receipt of the request;
- Any complaint from the public during construction must be attended as soon as possible to the satisfaction of the parties concerned. A complaints register must be kept up to date and shall be produced upon request; and
- Department officials shall be given access to the properties earmarked for construction activities for the purposes of assessing and/ or monitoring compliance with the conditions contained in this document at all reasonable times.

7 ESKOM'S ENVIRONMENTAL MANAGEMENT POLICIES AND COMMITMENTS

Irrespective of the legal obligations attached to any environmental authorisation, the success of environmental management and mitigation measures is inextricably linked to the proponent's commitment to ensure that these are adequately developed and implemented. For large developments, like Project Bravo, it is expected that this commitment would be developed as a coherent environmental philosophy that is demonstrably integrated into the proponent's corporate culture[12]. Accordingly, this section provides a brief overview of Eskom's corporate environmental management policies and commitments[13].

7.1 VISION

"*Together building the powerbase for sustainable growth and development.*"

Together: One Eskom, unified, working together in partnership with others

[12] The same expectation would hold true for the Contractor(s), hence the reason that the environmental specifications require each Contractor to provide their environmental policy and commitments.
[13] The information presented in this section has either been taken of the Eskom website or obtained directly from Eskom.

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Building: Planning for the future, building South Africa's economy

Powerbase: Providing the electricity foundation for positive sustainable development

Sustainable: Ensuring continued delivery on economic, environmental and social outcomes

Growth: Empowering South Africa, its people and the economy

Development: Securing a brighter future for all and integrating the first and second economy

The principles of social equity and environmental sustainability are clearly articulated within the Eskom Vision. This vision was developed to align Eskom with the capacity expansion era and was born of Eskom's recognition that, given the major role it plays in accelerating growth in the South African economy, it has a responsibility to ensure that sustainable development becomes a reality.

7.2 ENVIRONMENTAL MANAGEMENT SYSTEM

One of Eskom's environmental strategies is the development and implementation of an environmental management system (EMS). Linked to this is a requirement for the development and implementation of Environmental Management Programmes (EMProgs) for its projects. In terms of the EMProg guideline (copy included in Annexure C1), EMProg's must be developed and implemented, in terms of the relevant line division EMS, for (1) existing and future Eskom land (site, servitude); and (2) projects for which an EIA or screening was undertaken. Moreover, Eskom's environmental land policy requires that all Eskom land be continually managed, through the control of operations and activities that take place on it, to ensure the sustainable utilisation of the asset. It also requires that all Eskom land be managed, operated, and maintained in terms of an established EMProg.

In terms of the requirements of the EMProg guideline, an EMProg would need to be developed for Project Bravo as a plan of action that sets out a required environmental end state and outlines how activities that could have a negative impact on the environment will be managed and monitored, and how impacted areas will be rehabilitated.

7.3 2006 ANNUAL REPORT

The Eskom Director's Annual Report for 2006 has, *inter alia*, the following to say about their Environmental Management System:

"*The Eskom occupational hygiene, safety and environmental policy commits the business to the implementation of appropriate management systems to address environment, safety and occupational hygiene issues to minimise risk and ensure continual improvement. Certification to the ISO 14001 Standard continues to be implemented in Eskom, with the following divisions and subsidiaries now certified:*

- *Corporate divisions;*
- *Corporate sustainability;*
- *Corporate technical audit;*

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- *Transmission division;*
- *Rotek Engineering (Pty) Limited; and*
- *Roshcon (Pty) Limited.*

Where environmental risks have been identified in other parts of Eskom, selfevaluation audits and management reviews are undertaken to determine whether the environmental management system conforms to planned arrangements and has been implemented and maintained in terms of ISO 14001. As an example, the Generation division maintained compliance with the standard in 2005 through external audits.

Policy principles of Eskom's occupational hygiene, safety and environmental policy include:

- *This policy will apply wherever Eskom operations exist;*
- *Eskom will ensure that no operating condition, or urgency of service, can justify endangering the life of anyone or causing injury and will strive to prevent illness;*
- *Eskom will work with selected suppliers, customers and contractors to integrate safety, health and environment issues into their operations; and*
- *Contractors working under the supervision of Eskom or on Eskom premises will comply with this policy.*

Eskom, as a provider of energy and associated services, will:

- *Establish appropriate management systems to address environment, safety and occupational health issues to minimise risk and ensure continual improvement. This will include preventing pollution and environmental degradation, where economically viable and sustainable;*
- *Comply with all legislative and policy requirements and, in the absence of appropriate principles, set standards to meet the objectives of this policy;*
- *Promote open communication on safety, health and environment issues with employees and other stakeholders;*
- *Educate, train, motivate and develop employees on occupational health, safety and environment issues;*
- *Provide and maintain a healthy and safe work environment and protect individuals against risk to occupational health and safety arising out of Eskom's business; and*
- *Contribute to sustainable development through efficient resource use, and efficient production, distribution and use of energy.*"

In support of these statements, a copy of Eskom's Safety, Health and Environment (SHE) Policy, signed by the CEO and Directors, has been included as Annexure C2.

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7.4 UNITED NATIONS GLOBAL COMPACT

The United Nations (UN) Global Compact requests companies to embrace, support and enact nine universal principles in the areas of human rights, labour standards and the environment. Eskom, a signatory to the compact, continues to support the UN Global Compact through its sustainable practices. Eskom is committed to aligning itself with international sustainability reporting initiatives.

Practical examples of how Eskom has implemented these principles are detailed in the table over the page.

UN Global Compact Principles	Eskom's main activities in support of principles
Human rights	
Principle 1 *Businesses should support and respect the protection of internationally proclaimed human rights within their sphere of influence.* Principle 2 *Make sure that they are not complicit in human rights abuses.*	• Eskom is a member of the International Labour Organisation and has programmes including: o Employment equity, including gender and disability equity; o Electrification; o BEE; and o SMMEs development and training. • Eskom has incorporated issues surrounding human rights into decision-making, and engaged in extensive public consultation and community involvement through various projects and initiatives such as the electrification programme and assisting in ensuring affordability through energy efficient lighting programmes. • The procurement practices in Eskom support SMMEs and large black businesses for the supply of goods and services. • Eskom's policies and procedures are developed to ensure compliance with South African legislation, including the Constitution, which specifically provides for the protection of human rights.
Labour standards	
Principle 3 *Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining.* Principle 4 *The elimination of all forms of forced and compulsory labour.* Principle 5 *The effective abolition of child labour.* Principle 6 *Eliminate discrimination in respect of employment and occupation.*	• Eskom practises freedom of association and recognises the right to collective bargaining, as set out in the South African Labour Relations Act. • The impact of HIV/AIDS is managed through education and awareness programmes, voluntary counselling and testing, and care and support for infected and affected employees. Eskom has taken a corporate leadership and sponsorship role in the research for the development of a vaccine against HIV/AIDS. • Eskom continues to maintain transparency and worker consultation in decision-making through forums and agreements with employees and unions. • Eskom supports the involvement of labour at the highest levels of governance. • Employment equity policies have been implemented that are inclusive of race, gender and people with disabilities to ensure that Eskom builds an organisation that is representative of all the people of South Africa. • Eskom has continued to demonstrate commitment to development and transformation by investing in educating and training workers, both internal and external to Eskom. • Eskom has an established home ownership and rental subsidy

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UN Global Compact Principles	Eskom's main activities in support of principles
	scheme for employees, to enable them to have access to accommodation.

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UN Global Compact Principles	Eskom's main activities in support of principles
Environment	
Principle 7 *Businesses should support a precautionary approach to environmental challenges.* Principle 8 *Undertake initiatives to promote greater environmental responsibility.* Principle 9 *Encourage the development and diffusion of environmentally friendly technologies.*	• The Board Sustainability Committee addresses economic, environmental and social issues and is responsible for the approval and the presentation of recommendations to the Board regarding policies, strategies and guidelines in particular for safety, health, environment and nuclear issues. • The Chief Executive is responsible for Eskom's overall sustainability and environmental performance. Environmental performance measures are integrated into the business units and relevant performance contracts. The overall assessment and measurement of environmental performance is managed through the operational sustainability index and the reporting on additional key environmental indicators and issues to the Sustainability Sub-committee of EXCO. • Environmental award presentations have been held on an annual basis to reward superior performance in the organisation. • Continual improvement in environmental performance is achieved through the development and implementation of environmental management systems based on ISO14001. Many parts of Eskom have received ISO 14001 certification, while the remainder of the organisation demonstrated compliance through third party audits. • Research, development and demonstration focuses on supporting sustainable development.

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PART C: ENVIRONMENTAL SPECIFICATIONS

Part C provides an introduction to the environmental specifications, presents an overview of the structure and application of the specification and highlights the key environmental considerations that should inform the tender adjudication process.

8 INTEGRATION OF THE CEMP INTO THE CONTRACT

As alluded in Section 2, this CEMP has been written in a form and language that is consistent with the tender/ contract documentation used for engineering contracts i.e. the CEMP takes the form of a set of environmental specifications that can be integration in the civil, mechanical and electrical tender/ contract documentation. Beyond meeting the RoD requirement that "*compliance with the accepted* [CEMP] *must form part of all tender documentation … and must be endorsed contractually*", there are various advantages to this approach:

- The Contractor is made aware of the CEMP at the tender stage;
- The Contractor is able to cost for compliance with the CEMP;
- The CEMP is presented to the Contractor in the language and terminology with which he is familiar, and unnecessary duplication and contradiction is eliminated;
- Inclusion of the CEMP within the contract ensures that the CEMP becomes a legally binding document within a well-developed legal framework; and
- The standardised form and structure of the environmental specifications ensures that with time and each new contract, the Contractor becomes increasingly familiar with, and thus more accepting of, the CEMP and implements it with the same diligence as any other set of specifications contained within the contract.

Ultimately, by measuring compliance against an explicit set of environmental controls that are well located within a robust legal framework, the approach has been proven to enhance success in the implementation and enforcement of the CEMP significantly.

9 SPECIFICATION STRUCTURE AND APPLICATION

9.1 OVERVIEW

For the Project Bravo power station, the proposed construction activities would be distributed across a range of civil, mechanical and electrical contracts, and thus environmental specifications would need to be inserted into each individual contract package. However, at the time of compiling this CEMP, very little project detail was available to inform the environmental specifications, which negated the possibility of developing a tailored set of environmental specifications for each Contract. To addresses this, the following approach was adopted:

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- The primary environmental controls have been provided for in the form of a generic suite of environmental specifications, referred to as the Standard Environmental Specification (SES). The SES is common to all Contracts, and would be inserted unmodified into each Contract Document (refer to Annexure D for a copy of the SES).
- A list of unresolved or "*residual*" environmental issues, as well as the actions required to address these issues, has been developed and included in this CEMP (refer to Section 10). Where the resolution of these outstanding issues will have implications for the manner in which the Contractors undertake their activities, the specific environmental controls would need to be incorporated into the relevant tender documents as a set of Project Environmental Specifications (PES's). The PES's, which are specific to a particular Contract, would add to and amend the SES (as required). Obviously, each set of the PES's would only be developed as and when each of the residual environmental issues is resolved and the relevant Tender Document is being compiled. Accordingly, rather than burden DEAT with an iterative process of PES review, it is recommended that the EMC be tasked with reviewing and endorsing any PES's developed for he Project Bravo, which would then be finalised for inclusion in the relevant Tender Document.

9.2 OTHER CONTRACT REQUIREMENTS WITH ENVIRONMENTAL OBLIGATIONS

The contract documentation for Project Bravo will be compiled in terms of the International Federation of Consulting Engineers Conditions of Contract for Construction (FIDIC CCC). The FIDIC CCC already specifies several requirements that have environmental bearing. To avoid repetition and the risk of contradiction, these requirements are not reiterated in the environmental specification. Accordingly, the environmental specification must be read in concert with the FIDIC CCC, and specifically the requirements of the following clauses:

- Subclause 3.2: Delegation by the Engineer (for the appointment of the Environmental Monitor);
- Subclause 4.14: Avoidance of Interference;
- Subclause 4.15: Access Route;
- Subclause 4.18: Protection of the Environment;
- Subclause 4.23: Contractor's Operations on Site;
- Subclause 4.24: Fossils;
- Subclause 6.6: Facilities for Staff and Labour;
- Subclause 6.9: Contractor's Personnel;
- Subclause 6.11: Disorderly Conduct;
- Subclause 8.8: Suspension of Work; and
- Subclause 11.11: Clearance of Site.

These requirements are highlighted in Subclause 1.3.1 of the SES to ensure that the Contractor is aware of these additional environmental obligations.

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9.3 METHOD STATEMENTS

Environmental practitioners are not specialists with regard to construction techniques. Therefore, so as not to hinder construction activities by stipulating elaborate, costly and/ or ineffective mitigation measures, the environmental specification is underpinned by a series of Method Statements, within which the Contractor is required to outline how they proposes to mitigate any identified environmental risk. For example if the specification states that "*cement contaminated water shall not be allowed to contaminate the soil or adjacent watercourse*", the Method Statement compiled by the Contractor would be required to outline describes how he or she intends to achieve this requirement.

In terms of the environmental specifications for Project Bravo (specifically Subclause 3.5), the Contractors must submit various written Method Statements to the Engineer[14], as requested in the Specification or as directed by the ER. For the purposes of the environmental specifications, a Method Statement is defined as "*a written submission by the Contractor to the Engineer in response to the Specification or a request by the Engineer, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting the Method Statement, in such detail that the Engineer is enabled to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications*". The Method Statement must cover applicable details with regard to:

- Construction procedures,
- Materials and equipment to be used,
- Getting the equipment to and from site,
- How the equipment/ material will be moved while on site,
- How and where material will be stored,
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
- Timing and location of activities,
- Compliance/ non-compliance with the Specifications, and
- Any other information deemed necessary by the Engineer.

The environmental specifications set very stringent requirements in terms of the provision of Method Statements and the commencement of the activities they cover:

- Any Method Statement required by the Engineer or the specification must be produced within the timeframes specified by the Engineer or the specification (typically two weeks);

[14] The environmental specifications do not make reference to the ECO. This is to conform to the structure and terminology used for Contract Documents compiled in terms of the Federation of Consulting Engineers Conditions of Contract for Construction (FIDIC CCC). In all cases the responsibility for monitoring compliance with the various specifications is vested with the Engineer. However, in terms of FIDIC CCC Subclause 3.2, the Engineer may delegate his responsibilities in terms of the Contract. Typically these responsibilities are delegated to the Engineers Representative (ER), for technical considerations, and to the ECO, for environmental considerations.

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- The Contractor may not commence the activity covered by the Method Statement until it has been approved, except in the case of emergency activities and then only with the consent of the Engineer;
- The Engineer may require changes to a Method Statement if the proposal does not comply with the specification or if the proposed methodology carries an unreasonable risk of excessive damage to the environment;
- Approved Method Statements must be readily available on the site and must be communicated to all relevant personnel;
- The Contractor is required to carry out the activities covered by the Method Statement in accordance with the proposed approach; and
- Approval of the Method Statement does not absolve the Contractor from their obligations or responsibilities in terms of the Contract.

Annexure E explains Method Statements and provides a pro forma Method Statement sheet as a guide for the compilation of the requisite Method Statements. Method Statements may be applied not only for environmental purposes but for health and safety purposes as well.

9.4 PROVISIONS FOR ADDRESSING NON-COMPLIANCE

Ultimately, the key to effective environmental management during the construction phase is ensuring that the requirements of the CEMP are adequately and appropriately implemented on site. Accordingly, monitoring performance and addressing non-compliance are key attributes of any construction phase environmental interventions. Part D addresses the actual process for identifying and addressing non-compliance, whilst this section provides an overview of the provision made for this in the environmental specification.

Broadly, the mechanisms for addressing non-compliance that are provided for in the environmental specifications and associated contract documentation can be divided into the following categories:

- Controlling performance via the certification of payments;
- Requiring the Contractor to "*make good*", at their own cost, any unjustifiable environmental degradation;
- Implementing a system of penalties to dissuade environmentally risky behaviours; and
- Removing environmentally non-complaint staff/ plant from site, or suspending part or all of the activities on Site.

Provision is made for the imposition of these punitive measures, either through the environmental specification or the broader conditions of contract. Section 15.2 provides an overview of how these various measures should be used to address non-compliance, whilst this section simply provides an overview of the mechanism(s) enabling this course of action.

9.4.1 Certification of payment

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As outlined previously, one of the main aims of translating the CEMP into a set of environmental specifications is to provide the Contractor with a reasonable opportunity to cost for compliance with the environmental obligations. Accordingly, the environmental specifications for Project Bravo include a series of Measurement and Payment clauses, and compliance with the environmental requirements is assessed as part of the certification of each Payment Certificate. Where the Contractor has failed to comply with specific obligations emanating from the environmental specifications, payment for the specific items to which their non-compliance relates would be withheld. Where the Contractor fails entirely to provide or fulfil for a period of time all or part of the services and obligations required of them in respect of the specification, the Engineer could decide to reduce the Contract Price, either by the full value of the relevant item or by an appropriate proportion of that value.

To provide an effective incentive for compliance, the Measurement and Payment clauses are divided into fixed and time-related costs. Payment for fixed costs is based on proof of compliance with the specified requirement. For time-related costs, the value for that item is divided by the duration of the Contract (in months), and payment is certified on a monthly basis, based on proof of compliance with that item. Time-related costs are only reimbursed once the relevant fixed cost has been certified. Time-related costs are forfeited on a *pro rata* basis for each month during which the Contractor fails to show compliance with the requirements of the relevant item.

To prevent the Contractor circumventing his liabilities by "*zero-rating*" the various items scheduled in terms of the environmental specifications, the SES includes the following subclause (Subclause 11.1); "*The Contractor shall tender a rate or sum against each scheduled item and shall not price any item as nil or "0-00" and shall not indicate that the cost of any of the items listed in this schedule as being included elsewhere. In the event that the Contractor fails to provide a rate or sum, prices an item as nil or "0-00", or indicates an item as being included elsewhere, the Engineer shall assign what he believes to be reasonable price to each of these items and the Tendered Sum shall not be adjusted to accommodate any additional costs*."

9.4.2 Making good on environmental damage

The requirement to make good any environmental damage stems from the following provisions:

- By entering into a Contract with Eskom, the Contractor has agreed to comply with the various obligations attached to that Contract, which include the environmental responsibilities detailed in the relevant SES and PES.
- In terms of Subclause 4.18 of the FIDIC CCC, entitled "*Protection of the Environments*", "*The Contractor shall take all reasonable steps to protect the environment (both on and off Site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations*."

In light of these considerations, the Contract is expected to meet their environmental commitments, failing which it is reasonable to expect them to make good on any environmental degradation, at their own cost. To give emphatic weight to this requirement, Subclause 10.2 of the SES notes; "*Where environmental damage occurs as a result of the failure of the Contractor*

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to comply with the requirements of this Specification, the requisite remediation shall be effected to the satisfaction of the Project Manager and at the cost of the Contractor."

9.4.3 Penalties

Subclause 10.3 of the SES provides a list of environmental transgressions for which the Engineer can impose penalties upon the Contractor, and the magnitude of these penalties. These essential represents a "*stick*" with which to force compliance and punish negligence by the Contractor.

Penalties are issued per incident at the discretion of the Engineer, and are issued in addition to any remedial costs incurred because of non-compliance with the environmental specifications. The Engineer would inform the Contractor of the contravention and the amount of the penalty, and would deduct the amount from the next Payment Certificate. For each subsequent similar offence, the penalty would be doubled in value, up to a specified maximum amount (*viz.* R 250 000, Subclause 10.3).

9.4.4 Removal from site and suspension of works

In terms of the provisions of the FIDIC CCC Subclause 6.11, the Engineer has the power to remove from site, any person who is guilty of misconduct, or is incompetent, negligent or constitutes an undesirable presence on Site. Failure to comply with the requirements of the environmental specifications could suffice in this regard. Similarly, Subclause 5.2 of the SES requires that all Plant is in good working order, and accordingly the Engineer could order any Plant that does not meet this requirement to be removed from Site.

In terms of the provisions of Subclause 8.8 of the FIDIC CCC, where the Engineer deems the Contractor to be in breach of any of the requirements of the Contract he may order the Contractor to suspend the progress of the Works or any part thereof. Failure to comply with the requirements of the environmental specifications would constitute such a breach.

10 RESIDUAL ENVIRONMENTAL ISSUES

Various environmental issues raised as part of the EIA process could not been addressed at the time of compiling this CEMP, specifically since inadequate technical information was available to enable these issues to be finalised and incorporated into the environmental specifications. These issues will need to be addressed by Eskom as the implementation of Project Bravo proceeds. Whilst some of the issues relate specifically to design or organisational considerations, others will have bearing on the manner in which the Contractor undertakes the Execution of the works, and accordingly will need to be incorporated into the relevant contracts as PES's.

Annexure F contains a table listing the various residual environmental issues and highlighting the actions required to resolve them. The summary table also indicates who is responsible for addressing the specific residual issue as well as the documentation and program implications.

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11 ENVIRONMENTAL CONSIDERATIONS IN ADJUDICATION OF TENDER

In terms of the RoD, Eskom has an obligation to ensure compliance by various parties with a suite of environmental requirements related to the construction phase. The compilation of the CEMP, and its integration into the Tender Document as a suite of environmental specifications, forms part of meeting this obligation. However, to ensure that these obligations continue to be fulfilling during the actual construction process, it behoves Eskom to ensure that the appointed Contractors possess the requisite environmental management experience and expertise. Accordingly, it would be prudent for Eskom to ensure that environmental considerations form part of the tender adjudication process. Key considerations in this regard would be as follows:

- To request as part of the tender process that the Contractor provide his environmental policy and indicate how this will influence the way the construction process is approached and managed on Site. Subclause 1.2 of the SES requires the Contractor to prepare an "*Environmental Protection Policy*" (EPP) for the specific project. At the tender stage the Contractor would merely be asked to provide the overarching environmental policy for the Company or Joint Venture and not the project-specific EPP;
- To request as part of the tender process a list of the Contractor's previous experience in terms of the on Site implementation and management of environmental requirements;
- To request as part of the tender process an indication of the proposed organisational structure for the Contract, and specifically for the Contractor to indicate which staff would be acting in the capacity of Environmental Officer (EO) and which senior staff member would have overall responsibility for ensuring compliance by the Contractor with the specified environmental requirements; and
- To confirm, upon receipt of the Tender, that the Contractor has made sufficient allowance in his Tender Price for meeting the various environmental requirements outlined in the relevant SES and PES.

During the tender adjudication process for each Contract, each Contractor should be scored in terms of the aforementioned considerations and allocated an environmental competency score. This score should form a key consideration in the final decision-making regarding the award of the various contracts.

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PART D: ON-SITE IMPLEMENTATION

Part D provides guidance in terms of the on-site implementation of the CEMP, highlighting the organisation structure and various roles and responsibilities, emphasising the importance of environmental induction, summarising the requisite approach to monitoring and auditing and addressing the requirement for review and amendment of the environmental specifications.

12 ORGANISATIONAL STRUCTURE

The organisational structure identifies and defines the responsibilities and authority of the various role-players (individuals and organisations) involved in the project. All instructions and official communications regarding environmental matters shall follow the organisational structure shown in **Figure D1**.

The organisational structure reflected in **Figure D1** has been developed to ensure that:

- There are clear channels of communication;
- There is an explicit organisational hierarchy for Project Bravo; and
- Potential conflicting or contradictory instructions are avoided.

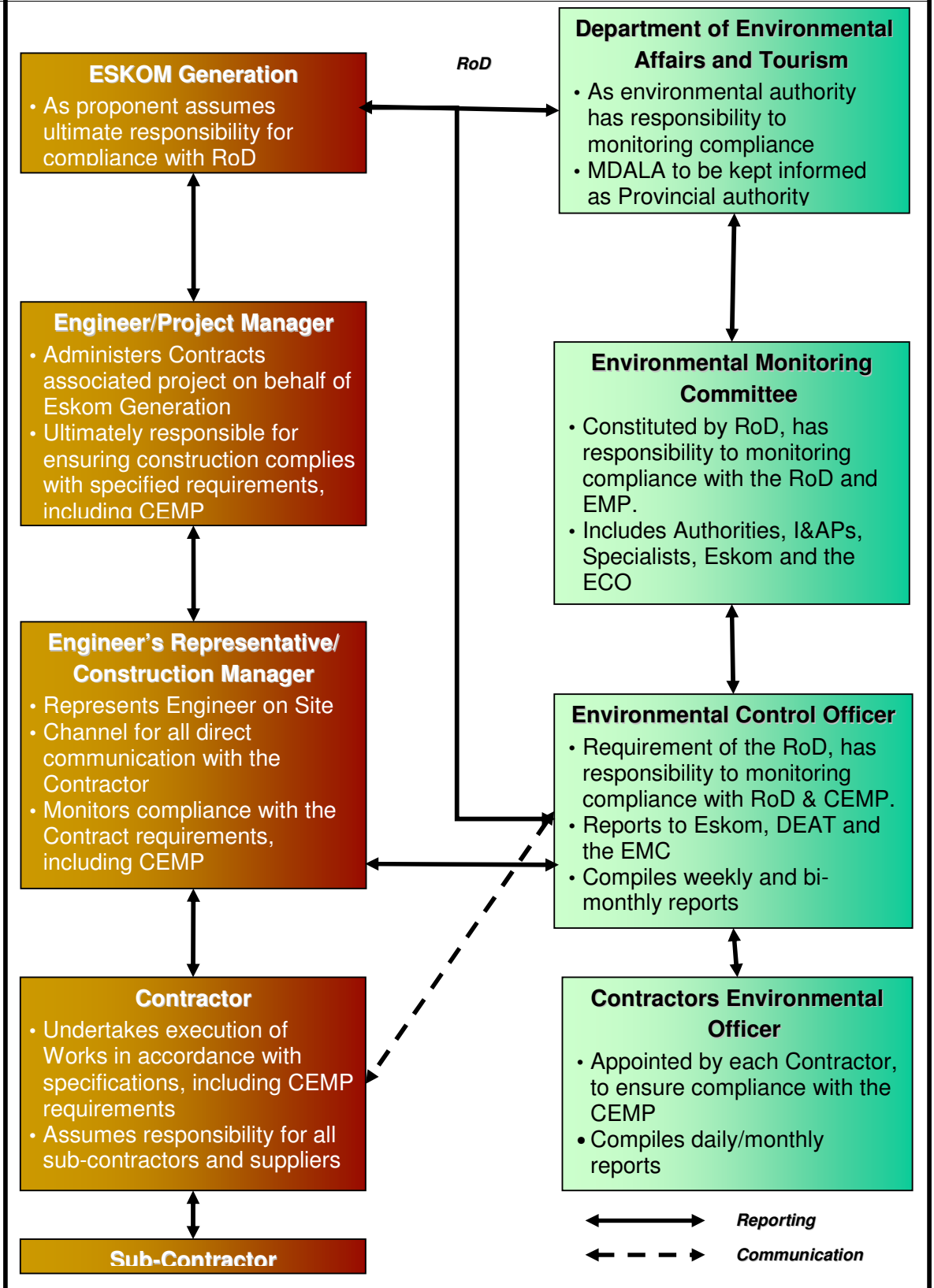
In terms of the defined organisational structure reflected in **Figure D1**, all instructions that relate to environmental matters will be communicated to the Contractor via the Engineers Representative. The only exception to this rule would be in an emergency (defined as a situation requiring immediate action and where failure to intervene timeously would, in the reasonable opinion of the ECO, result in unacceptable environmental degradation), where instructions may be given directly to the Contractor[15]. The detailed roles and responsibilities of the various role-players identified in the organisational structure are outlined in Section 12.

13 ENVIRONMENTAL ROLES AND RESPONSIBILITIES

As is evident from **Figure D1**, the key-role-players for Project Bravo are DEAT, the EMC, Eskom and the Contractor. The detailed roles and responsibilities of each of these organisations are outlined below.

[15] It should be noted that there is likely to be a considerable amount of informal communication between the ECO and the Contractors environmental representatives. However, where such communication (1) represents an instruction, (2) could lead to liability on the part of the Employer or Engineer or (3) could have financial implications, this must be address through the formal channels of communication defined in the organizational structure.

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Eskom NINHAM SHAND CONSULTING SERVICES

Organisational Structure: Construction Phase: Project Bravo

Fig D1

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13.1 DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM

As the competent environmental authority, DEAT has the responsibility to ensure that the proponent, *viz.* Eskom, complies with the conditions attached to the Project Bravo RoD as well as the requirements of the broader environmental legislation, specifically NEMA and the ECA. Compliance would be confirmed via the following mechanisms:

- Receipt and review of the environmental reporting required in terms of the RoD, *i.e.* the periodic environmental performance audits and bi-monthly environmental compliance reports compiled by the ECO;
- Attendance at the bi-monthly EMC meetings; and
- *Ad hoc* and planned site inspection by the DEAT Compliance and Enforcement Directorate.

DEAT would be assisted in this compliance monitoring function by MDALA.

13.2 ENVIRONMENTAL MONITORING COMMITTEE

The requirement for an EMC emanates as a specific Condition of Approval in the Project Bravo RoD. In terms of subclauses contained under Condition 3.2.11 of the RoD, Eskom must establish an EMC and this EMC must be comprised of the following representatives, as a minimum:

- An independent chairperson appointed by the EMC membership;
- An appropriately experienced ecologist;
- Representatives from the public (at least two people);
- The ECO;
- Contractors' EOs, when and where relevant;
- A senior representative from the main contractor[16]; and
- An air quality specialist.

In addition to this representation, it is anticipated that DEAT and Eskom would be represented on the EMC.

The EMC would meet on a bi-monthly basis[17], and in terms of Subclause 3.2.11.6 of the RoD, its roles and responsibilities would be to:

- Monitor and audit compliance with the RoD, environmental legislation and environmental reporting (EIR and EMPs); and

[16] Since the approach to the construction of Project bravo would mean that there are likely to be several main contractors, each with independent responsibilities for compliance with the environmental requirements attached to their specific appointments, it would probably be more appropriate for the Eskom Engineer or Engineers Representative to be present rather than the contractors.
[17] Although the RoD specifies bi-monthly meetings, it also empowers the EMC to review the prescribed frequency.

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- Make recommendation to DEAT in terms of monitoring and auditing of the project.

A requirement of Subclause 3.2.11.1, is that Eskom must provide the EMC with a clear Terms of Reference (ToR). Accordingly, a Draft ToR has been compiled and is included in Annexure G of this CEMP. It is intended that DEAT would approve the Draft ToR as part of the process of approving the CEMP. Once the EMC has been constituted, the Draft ToR would be distributed to the EMC members for review and ratification.

13.3 ESKOM

As the Proponent, Eskom must ensure that the implementation of Project Bravo complies with the requirements of the DEAT RoD, as well as any obligations emanating from other relevant environmental legislation. Although part of this obligation is being met by the development of the CEMP, and its integration into the contract documentation, the constitution of the EMC and the appointment of the ECO, Eskom cannot delegate out of this responsibility *in toto*. Accordingly, Eskom retains various key roles and responsibilities during the construction of the power station. These are outlined below.

Eskom, as an organisation must ensure that adequate funding is made available for the implementation and monitoring of the environmental controls emanating out of the EIR, RoD, CEMP and applicable environmental legislation. This would include the appointment of the ECO and the financial requirements for the running of the EMC, as these are explicit requirements of the RoD.

The Engineer (≈ Eskom's Project Manager) must:

- Be fully conversant with the EIA reporting for the project, the conditions of the RoD, the CEMP and all relevant environmental legislation.
- Ensure that all the specifications, legal constraints and Eskom standards and procedures pertaining to the project, specifically with regards to environment management, are highlighted to Eskom and its Contractor(s) so that they are aware of these; and
- Ensure that the environmental specifications are correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.

The Engineers Representative (≈ Eskom's Construction Manager) must:

- Be fully knowledgeable with the contents of the EIA Reporting;
- Be fully knowledgeable with the contents and conditions of the RoD;
- Be fully knowledgeable with the contents of the CEMP, specifically as articulated into the environmental specifications attached to each Contract;
- Be fully knowledgeable with the contents of all relevant environmental legislation and Eskom environmental policies and procedures, and ensure compliance with these;
- Have overall responsibility of the environmental specifications and their proper implementation;

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- Ensure that regular audits are conducted to confirm compliance with the environmental specifications;
- Ensure there is communication with the Engineer or his delegate, the ECO and the relevant Site Engineers on matters concerning the environment;
- Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.

13.4 ENVIRONMENTAL CONTROL OFFICER

In terms of the requirements of Condition 3.2.13 of the RoD Eskom must appoint a suitable qualified ECO to monitor compliance with the conditions of the RoD, requirements of the CEMP and the environmental legislation on a daily basis on behalf of the EMC. To fulfil these requirements, the ECO would need to have relevant on site experience and would need to be permanently based on site for the duration of the construction phase. It should be noted, since the RoD has no specific requirement for an independent ECO, the ECO could be an Eskom employee, as long as they had the requisite environmental training and experience.

The ECO will be responsible for monitoring, reviewing and verifying compliance by the Contractor with the environmental specification. Accordingly, the ECO would be required to:

The Environmental Control Officer (ECO) must:

- Be fully knowledgeable with the contents of the EIA Reporting;
- Be fully knowledgeable with the contents and conditions of the RoD;
- Be fully knowledgeable with the contents of the CEMP, specifically as articulated into the environmental specifications attached to each Contract;
- Be fully knowledgeable with the contents of all relevant environmental legislation and Eskom environmental policies and procedures, and ensure compliance with these;
- Ensure that compliance with the conditions of the RoD and environmental specification are monitored and verified through regular and comprehensive inspections of the site and surrounding areas, and that the results of these inspections are reduced to writing;
- Ensure that if the environmental specifications are not followed then appropriate measures are undertaken to address this;
- Report to the EMC and DEAT every two months regarding compliance with the requirements of the RoD, CEMP and environmental legislation; and

In meeting the aforementioned obligations, the ECO's specific duties would include the following:

- Assisting the Engineer in ensuring necessary environmental authorizations and permits have been obtained;
- Confirming that activities on Site comply with legislation;
- Monitoring and verifying that the conditions of the RoD and environmental specifications are adhered to at all times and requiring the Contractor to take action if these are not followed;
- Monitoring and verifying that environmental impacts are kept to a minimum;

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- Reviewing and approving construction Method Statements together with the Engineer;
- Giving a report back on the environmental issues at the monthly site meetings and other meetings that may be called regarding environmental matters;
- Inspecting the Site and surrounding areas regularly with regard to compliance with the environmental specifications;
- Ensuring that a register of complaints is kept by the Contractor and that all complaints are appropriately recorded and addressed;
- Ensuring that the requisite environmental induction occurs for all new personnel coming onto site;
- Assisting the Engineer in certifying payment for items related to the environmental specification;
- Recommending the issuing of penalties for contraventions of the environmental specifications;
- Advising on the removal of person(s) and/or equipment, not complying with the specifications, from site;
- Completing the requisite environmental reporting, which should include a daily site diary entry, weekly audit checklists, a bi-monthly (*viz.* every second month) environmental compliance report for submission to the EMC and incident reports;
- Keeping a photographic record of progress on Site from an environmental perspective; and
- Attending the EMC meetings to report on environmental compliance, as stipulated in the EMC ToR (Annexure G).

As outlined previously, all instruction issued by the ECO would go through the Engineer's Representative, who will then convey these to the Contractor.

13.5 CONTRACTORS

By virtue of the environmental obligations delegate to the Contractor through the Contract Document, all contractors (including subcontractors and staff) and service providers appointed for Project Bravo would be responsible for:

- Ensuring adherence to the environmental specifications;
- Ensuring that Methods Statements are submitted to the ECO for approval before any work is undertaken. Any lack of adherence to this will be considered as non-compliance to the specifications ;
- Ensuring that any instructions issued by the Engineer, on the advice of the ECO, are adhered to;
- Ensuring that there must be communication tabled in the form of a report at each site meeting, which will document all incidents that have occurred during the period before the site meeting;
- Ensuring that a register is kept in the site office, which lists all the transgressions issued by the ECO;
- Ensuring that a register of all public complaints is maintained.

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- Ensure that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute to wards the successful implementation of the environmental requirements of the Contract.

The most important actions by the Contractor to ensure compliance with the environmental requirements, relates to the establishment of an adequate and appropriate organisational structure for ensuring the implementation and monitoring of the requisite environmental controls. In terms of these requirements, the SES (Subclause 3.2) specifies, "*A suitably qualified senior staff member employed full time on site by the Contractor shall be responsible for environmental monitoring and control. This position shall be designated as the Environmental Officer (EO). The EO shall be a person with adequate environmental knowledge to understand and implement these Specifications, as determined by the Engineer. As a minimum requirement the EO should poses a tertiary qualification in a relevant field and two years of experience in environmental monitoring and control*". It is vital that the EO is appointed prior to the commencement of a contract; a four week period should be allowed.

The EO's specific duties relate to the implementation of the environmental controls contained within the environmental specification, and which are audited by the ECO. Accordingly, the EO's duties include:

- Ensuring that activities on Site comply with legislation;
- Monitoring and verifying that the environmental specifications are adhered to at all times and taking action if the specifications are not followed;
- Monitoring and verifying that environmental impacts are kept to a minimum and taking action to address any environmental degradation;
- Compiling the requisite Method Statements for review by the ECO and Engineer;
- Proactively developing environmentally responsible solutions to problems, in consultation with the EO where necessary;
- Giving a report back on the environmental issues at the monthly site meetings and other meetings that may be called regarding environmental matters;
- Keeping records of all activities / incidents concerning the environment on Site;
- Inspecting the Site and surrounding areas regularly with regard to compliance with the environmental specifications;
- Maintaining a register of complaints, ensuring that all complaints are appropriately recorded and addressed and notifying the ECO of each complaint and how it was resolved;
- Undertaking the requisite environmental induction for all new personnel coming onto site, as well as any refresher or *ad hoc* induction that might be required during the Contract;
- Completing the requisite environmental reporting, namely a daily compliance checklist, a record of staff induction and incidence reports, for submission to the ECO;
- Keeping a photographic record of progress on Site from an environmental perspective.

14 INDUCTION OF SITE STAFF

The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that

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employees are adequately experienced and properly trained in order to execute the Works in a manner that will minimise environmental impacts. The Contractors obligations in this regard include the following:

- Ensuring that a copy of the environmental specifications is readily available on site, and that all site staff are aware of the location and have access to the document. It is particularly important that the EO have access to the environmental specifications in order for them to fulfil the roles and responsibilities outlined in Section 12.5.
- Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training course. The Environmental Awareness Training course would be conducted by the EO, who must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented. All new staff coming onto site after the commencement of construction activities must also attend the Environmental Awareness Training course, and refresher courses should be undertaken on a quarterly basis. A detailed record of all training sessions, including a list of attendees must be compiled by the Contractor and submitted to the Engineer on a regular basis. Although the responsibility for the compilation of an appropriate and adequate Environmental Awareness Training course rests with the Contractor, a generic example has been included in Annexure H to assist in this regard.
- Ensuring that all site staff are aware of the requirements of any approved Method Statements that have bearing on their activities, and, where necessary, that any specialised training required to ensure compliance with the approved Method Statements, has been provided.
- Ensuring that regular *ad hoc* training is provided, both as part of the daily toolbox talks as well as to address specific environmental concerns or areas of non-compliance.
- Ensuring that employee information posters, outlining the environmental “do’s” and “don’ts” (as per the environmental awareness training course) are erected at prominent locations throughout the Site (an example of a generic information poster is included in Annexure I).

It has become common practice for the environmental induction requirements to be addressed as part of the standard worker Health and Safety induction programme that accompanies the recruitment of new staff. Although this approach is supported, the Contractor must ensure that the environmental considerations are adequately covered during this induction process. If, in the reasonable opinion of the ECO, the Health and Safety indication training is not adequately addressing environmental aspects, he/ she may require the Contractor to develop a stand-alone environmental induction programme.

15 CONFIRMING COMPLIANCE

Ultimately, the key to effective environmental management during the construction phase is ensuring that the requirements of the CEMP, and specifically the environmental specifications, are adequately and appropriately implemented on site. Accordingly, monitoring performance and addressing non-compliance are key attributes of any construction phase environmental interventions. The following sections provide an overview of how this should be achieved for the current project.

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15.1 MONITORING AND REPORTING

As alluded to in the preceding sections, four levels of compliance monitoring are provided for in terms of the Project Bravo construction phase, namely:

- DEAT;
- The EMC;
- The ECO; and
- The EO.

The key party in this monitoring hierarchy is the ECO, as his reporting will form the basis for satisfying DEAT and the EMC[18] regarding Eskom's compliance with the requirements of the EIR, RoD and other relevant legislation. The EO's role will be to ensure that the Contractor meets the various environmental obligations attached to the environmental specifications, and to maintain a record that confirms such compliance.

The aim of the monitoring and auditing process would be to check the implementation of the environmental specifications routinely, in order to:

- Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications;
- Ensure adequate and appropriate interventions to address non-compliance;
- Ensure adequate and appropriate interventions to address environmental degradation;
- Provide a mechanism for the lodging and resolution of public complaints;
- Ensure appropriate and adequate record keeping related to environmental compliance;
- Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site; and
- Aid communication and feedback to the EMC and authorities.

As per the requirements of the RoD (Subclause 3.2.13.1), monitoring would be undertaken daily (i.e. continuous monitoring) by both the EO and ECO, although the reporting frequency would vary. In addition to any incident reporting:

- The EO would be required to complete a daily audit checklist and monthly report, and submit these to the ECO;
- The ECO would be required to complete a weekly audit checklist, and compile a bi-monthly (*viz.* every second month) environmental compliance report for submission to the EMC. It would also be prudent for the ECO to maintain a daily Environmental Site Diary as an independent record of compliance/ incidents.

[18] It is recognized that DEAT/ the EMC would augment this via their own sites visits.

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The accurate capturing and reporting of monitoring results is critical to ensure that the degree of compliance, and nature of any non-compliances/ incidents, is unambiguously communicated to all role-players, from the Contractor through the Engineer to the EMC and DEAT. Accordingly, routine monitoring would be undertaken using audit checklists, which would be compiled by the EO (daily checklist) and ECO (weekly checklist) prior to the commencement of the construction activities. The course of all incidents, from occurrence through to resolution, would also need to be recorded in the form of an incident report. To assist the ECO and EO in the development of the requisite monitoring documentation, examples of daily and weekly checklists, as well as of an incident report, have been included in Annexure J. It is important that these only represent examples, and checklists tailored for the specific Project Bravo requirements would need to be developed by the EO/ ECO.

As outlined in Section 13.4, one of the key responsibilities of the ECO would be the compilation of a bi-monthly (*viz.* every second month) environmental compliance report for submission to the EMC and DEAT. Although this reporting would be informed by the daily, weekly and incident reporting, the bi-monthly environmental reporting would need to provide a more substantial assessment of compliance with the requirements of the RoD (Eskom) and the SES (various contractors). Annexure J4 provides an example of an auditing protocol that could be considered for this purpose[19]. This protocol provides a quantitative assessment of compliance with each of the key RoD and EMP requirements and enables a compliance rating to be determined for each Contractor. Not only does the proposed approach provide an accessible summary of the project environmental performance, and its management, but it also enables the level of compliance by a Contractor to be tracked on a bi-monthly basis, and for any deterioration in the degree of compliance to be readily identified and addressed. As for the daily, weekly and incident reporting examples, this protocol would need to be tailored by the ECO for the specific Project Bravo requirements.

15.2 ADDRESSING NON-COMPLIANCE

15.2.1 Mechanisms

As outlined in Section 9.3, four avenues exist for addressing non-compliance by the Contractor, and are provided for either in the environmental specifications or in the broader contract requirements, *viz*.:

- Controlling performance via the certification of payments;
- Requiring the Contract to "*make good*", at their own cost, any unjustifiable environmental degradation;
- Implementing a system of penalties to dissuade environmentally risky behaviours; and
- Removing environmentally non-complaint staff/ plant from site, or suspending part or all of the activities on Site.

[19] The auditing methodology presented here was used for auditing compliance for the Phase 1B expansion to the Saldanha Bay Iron Ore Terminal, and accordingly would need to be extensively revised to make it relevant to Project Bravo.

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The type and extent of the corrective measures required to address non-compliance would depend on the nature of the transgression and the Contractor's history in terms of compliance with their environmental obligations. When deciding on the nature of any punitive actions, however, it is important to recognise that the effective implementation of the environmental specification is highly dependant on the quality of the working relationships that develop between the key role-players, specifically between the Engineer, the Contractor and the ECO. Accordingly, an excessive response to non-compliance, particularly for a minor or unintentional transgression, may cause significant environmental degradation in the long term due to its effect in eroding the Contractor commitment to meeting their environmental responsibilities. Moreover, other mechanisms, like an expanded environmental induction programme, may prove more effective than purely punitive measures in controlling non-compliance in the long-term. This is an important consideration that must be borne in mind by the ECO, EMC and authorities when responding to non-compliance.

The certification of payment and the expectation for the Contractor to "make good" any environmental degradation represent the most elementary mechanisms for forcing compliance. Ultimately, the Contractor should want to comply so that he can be paid for meeting his/ her environmental obligations, and thus environmental inputs into the certification of payments becomes a fundamental part of the enforcement process. This said, the nature of the activities associated with Project Bravo is such that, even with the best of intentions, environmental degradation can and invariably will occur. The costs of having to make good on such environmental degradation is usually sufficient punishment without the need to look to other punitive measures.

Penalties represent the next tier in castigatory measures, followed by removal from site, with suspension of work representing the apex of potential remedies. As alluded to previously, the implementation of these measures requires careful considered:

- Penalties would typically be warranted by persistent negligence on the part of the Contractor or failure to respond adequately to environmental considerations;
- Removal from site would typically be warranted where a particularly staff member or piece of equipment is the cause of persistent environmental damage.
- Suspension of the Work would only be warranted under rare circumstances, and then only with the Employers approval, where the Contractors actions have caused or are likely to cause significant environmental degradation.

15.2.2 Procedure

Should there be any incident on site affecting the environment, irrespective of whether it is the result of non-compliance or not, the following lines of communication should be implemented:

- All incidents must to be reported to the Engineer and ECO immediately;
- Depending on the severity of the incident, the Engineer and/or ECO are to notify Eskom, the relevant authorities, the EMC and emergency services (if required), regarding the incident. Although all incidents must be recorded in the site reporting, the decision regarding the need

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to notify other parties (*i.e.* Eskom, relevant authorities, the EMC and emergency services) will be at the discretion of the Engineer and ECO;

- All issues of non-compliance must be reflected in the environmental reporting (including the daily and weekly checklists), and an incident report must be completed for all environmental incidents (*i.e.* any environmental degradation resulting from the construction activities, irrespective of whether it is the result of non-compliance or not). Environmental Incident reports must address the following aspects[20]:

    - Description of the incident;
    - Remedial action required, including the deadline for such action;
    - Relevant/ supporting documentation: i.e. providing evidence of the incident and the cause of the incident;
    - Relevant diagrams to support the description of the incident and/ or the remedial action to be taken;
    - Provision for dates and signatures of both the ECO and Engineer at issuing of the report, as well as completion and verification of the remedial action, as specified in the report.

16 SPECIFICATION REVIEW AND AMENDMENT

Owing to the lack of information available at this stage and the changing nature of projects of this scale, it is no plausible to develop an infallible specification at this stage. Amendment is likely to be necessary as more information becomes available and as lessons are learned during the construction process. Recognising this, Subclause 3.2.1.2 of the RoD specifically notes that the approved CEMP must be regarded as a dynamic document. Accordingly, as outlined previously, one of the key roles of monitoring compliance will be to determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes. Where revision is warrant, the ECO would be required to draft such amendments and submit it to the EMC for comment prior to submission to DEAT for approval.

17 COMPLIANCE WITH OTHER LEGISLATION

Apart from the requirements of the EIR and RoD, Eskom and its Contractors will be required to comply with the full suite of South African Legislation concerning the natural environment, pollution and the built environment. This legislation includes but is not limited to:

- National Environmental Management Air Quality Act (No 39 of 2004);
- Minerals and Petroleum Resources Development Act (No 28 of 2002);
- National Heritage Resources Act (No 25 of 1999);
- National Water Act (No 36 of 1998);

[20] Annexure H contains and example of an incident report.

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- Environment Conservation Act (No. 73 of 1989), including the noise regulations and litter controls promulgated thereunder;
- National Environmental Management Act (No 107 of 1998);
- National Veld and Forest Fire Act (No 101 of 1998);
- National Forest Act (No 84 of 1998);
- National Road Traffic Act (No 93 of 1996)
- Occupational Health and Safety Act (No 85 of 1993), including the Major Hazard Installation Regulations promulgated thereunder;
- Conservation of Agricultural Resources Act (No 43 of 1983) and the regulations dealing with declared weeds and invader plants as amended from time to time;
- National Building Regulations and Building Standards Act (No 103 of 1977);
- Health Act (No 63 of 1977); and
- Hazardous Substances Act (No 15 of 1973).

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ANNEXURE A: RECORD OF DECISION

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ANNEXURE B: FRAMEWORK EMP

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FRAMEWORK EMP (fEMP) FOR A COAL-FIRED POWER STATION, AND ASSOCIATED INFRASTRUCTURE, IN THE WITBANK AREA

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
1. COMPLIANCE WITH ENVIRONMENTAL LEGISLATION								
All Activities (power station and all associated structures and infrastructure, including the coal stockyard, conveyers, water pipelines, water reservoirs/ dams and ash dump)	Compliance with Regulation 1182 and 1183 of Environment Conservation Act	Delay in onset of activity Suspension of construction & operational phases Prosecution	**Objective:** To ensure that requisite EIA authorisation has been received **Mechanism:** 1) Complete the statutory EIA[i] process	RoD[ii] (and appeal adjudication if relevant) received from DEAT[iii]	EIA Consultant	EIA process and documentation	Prior to site establishment	ESKOM
	Compliance with Sections 34, 35, 36 and 38 of National Heritage Resources Act.	Delay in issuing of ECA[iv] RoD Delay in onset of activity Suspension of construction phase Prosecution	**Objective:** To ensure that the requisite heritage inputs have been integrated into the EIA process **Mechanism:** 1) Solicit comment from Gauteng/ Mpumalanga Heritage Agency or SAHRA[v] as part of the EIA consultation process 2) Complete permit application process if required	Comment from HWC/ SAHRA as input into the DEAT RoD Permit(s) to destroy identified resources (if required) received from Responsible Heritage Authority	EIA Consultant Heritage Specialist	EIA process and documentation NHRA[vi] permit application	Prior to submission of EIA (for comment) Prior to site establishment (for any permits)	ESKOM
Power station, coal yard, conveyers and ash dump	Compliance with NEM[vii] Air Quality Act and Air Pollution Prevention Act	Delay in onset of activity Suspension of operational Prosecution	**Objective:** To ensure that requisite authorisation has been received **Mechanism:** 1) Complete permit application process.	Permit received from DEAT: Air Quality Control	ESKOM Air Quality Specialist (to provide input)	EIA process and documentation APPA[viii]/ NEMAQA[ix] permit Applications	Prior to site establishment	ESKOM
Water source and conveyance Effluent treatment and disposal	Compliance with Sections 21 & 22 of National Water Act	Delay in issuing of the ECA RoD Delay in onset of activity Suspension of construction & operational phases Prosecution	**Objective:** To ensure that the requisite authorisation has been received **Mechanism:** 1) Solicit comment from DWAF[x] as part of the EIA consultation process 2) Complete water use licence application if required	Comment from DWAF as input into the DEAT RoD Requisite water use licences (if required) received from DWAF	ESKOM EIA Consultant (to provide input)	EIA process and documentation Water use licence application	Prior to submission of EIA (for comment) Prior to site establishment (for any permits)	ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
2. ENVIRONMENTAL INPUT INTO TENDER DRAFTING AND ADJUDICATION								
All Activities (power station and all associated structures and infrastructure, including the coal stockyard, conveyers, water pipelines, water reservoirs/ dams and ash dump)	Compilation of tender documentation and Specifications	Negative impacts on environment during construction	**Objective:** To ensure acceptable management of environmental issues during construction **Mechanism:** 1) Incorporate relevant environmental management specifications into the Tender and Contract documentation[xi] 2) Incorporate relevant payment items into the Schedule of Quantities	Tender documentation and Contract Documentation include environmental management requirements	Engineering Design Consultant/ ESKOM Environmental Consultant/ ESKOM	EIA documentation Specialist studies Framework EMP In-house EMPs (where relevant and available)	Tender Design & Design Review Stage	Review by ESKOM
	Tender Adjudication	Negative impacts on environment during construction	**Objective:** To ensure acceptable management of environmental issues during construction **Mechanism:** 1) Assess ability of Tenderers to adequately manage the environmental issues	Tender evaluation report contain reference to environmental ability of tenderers Successful Contractor shows clear commitment to and capacity for meeting the environmental management obligations	Engineering Design Consultant/ ESKOM Environmental Consultant/ ESKOM	Completed Tender Documentation In-house Environmental Agreement and Tenderer Questionnaire (where applicable)	Tender Adjudication Stage	Review by ESKOM
3. ENVIRONMENTAL INPUT INTO DESIGN								
All Activities (power station and all associated structures and infrastructure, including the coal stockyard, conveyers, water pipelines, water reservoirs/ dams and ash dump)	Detailed design of infrastructure	Design fails to respond optimally to the environmental considerations	**Objective:** To ensure that the design responds to the identified environmental constraints and opportunities **Mechanism:** 1) Consider design level mitigation measures recommended by the specialists, especially with respect to visual aesthetics, noise, air quality, flora, aquatic ecology, hydrogeology, heritage and risk 2) Balance technical and financial considerations against environmental constraints and opportunities in finalising the design of key elements 3) Incorporate in-house procedures, where relevant and available	Design meets objectives and does not degrade the environment Design and layouts etc respond to the mitigation measures and recommendations in the EIR	Engineering Design Consultant/ ESKOM Environmental Consultant/ ESKOM	EIA documentation Specialist studies Framework EMP In-house procedures (were relevant and available)	Tender Design & Design Review Stage	ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Negotiation with landowners	Landowners unfairly prejudiced by proposed siting of power station, coal yard and ash dump or routing of conveyers and pipelines	**Objective:** To ensure adequate regard has been taken of landowner concerns and that these are appropriately addressed **Mechanism:** 1) Initiate negotiations with landowners timeously 2) Address reasonable expectations/ requests where possible 3) In event of impasse follow legal expropriation route, but ensure that extent of expropriation is minimised, restrictions on land use are minimised and reasonable costs are paid	Location of infrastructure does not prejudice any landowners Location and layout responds to issues recorded in the Issues Trail Ideally, landowners should be satisfied with outcome of negotiations process. In event of impasse requiring expropriation, landowners should be afforded reasonable and appropriate rights/ access	ESKOM	EIA process In-house procedures for landowner negotiations and expropriation	Ideally initiated together with submission of final EIA (which indicates preferred options) Finalised prior to site establishment	ESKOM
Conveyors for coal (mine to coal stockyard and coal stockyard to power station)	Selection of preferred route	Route that degrades environment unnecessarily and poses heightened health and safety risk	**Objective:** To ensure selection of BPEO[xii] for the conveyer route **Mechanism:** 1) Select route that curtails environmental impacts and enhances environmental benefits, whilst being technically feasible and affordable 2) In adjudicating the preferred routing, careful consideration must be given to, in particular, the risks associated with the conveyer (e.g. dust and noise).	Routing meets objective. Selected route minimises any negative environmental impacts, maximises any benefits and minimise health and safety risks	ESKOM/mining house (due to schedule)	EIA documentation Specialist studies Framework EMP	Prior to submission of EIA	ESKOM
Access road to power station	Selection of preferred route	Route that degrades environment unnecessarily, particularly with respect to visual aesthetics and loss of indigenous flora	**Objective:** To ensure selection of BPEO for alignment for the access road **Mechanism:** 1) Select alignment that curtails environmental impacts and enhances environmental benefits, whilst being technical feasible and affordable	Alignment meets objective. Selected alignment minimises any negative environmental impacts and maximises any benefits	ESKOM (due to schedule)	EIA documentation Specialist studies Framework EMP	Prior to submission of EIA	ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
Water source and conveyance	Finalisation of conveyance type and route[xiii]	Route that degrades environment unnecessarily and does not guarantee surety of supply	**Objective:** To ensure selection of BPEO for water conveyance type and routing **Mechanism:** 1) Select route that curtails environmental impacts and enhances environmental benefits, whilst being technical feasible and affordable	Alignment meets objective. Selected alignment minimises any negative environmental impacts, maximises any benefits and ensures a reliable supply of water to the power station in the long-term	ESKOM (due to schedule)	EIA documentation Specialist studies Framework EMP	Prior to submission of EIA	ESKOM
4. ENVIRONMENTAL MANAGEMENT OF THE CONSTRUCTION PHASE[xiv]								
All Activities (power station and all associated structures and infrastructure, including the coal stockyard, conveyers, water pipelines, water reservoirs/ dams and ash dump)	Monitoring and enforcement of specified environmental management requirements	Negative impacts on environment during construction of power station and associated structures/ infrastructure	**Objective:** To ensure that the construction of the power station and associated structures/ infrastructure does not result in avoidable impacts on the environment, and that any impacts that do occur are anticipated and managed **Mechanism:** 1) Appoint an Environmental Control Officer is (either independent or in-house) 2) Develop and implement an environmental auditing system for the construction phase 3) Audit the Contractors compliance with the requirements of the environmental specification contained within the relevant Contract Document 4) Produce regular (monthly) environmental audit reports for submission to DEAT and the ELC (if one is appointed)	Environmental impacts effectively monitored and managed during the construction phase with no residual impacts on the environment Comprehensive record of compliance and remedial actions available to ESKOM and the authorities	Site Engineer Environmental consultant ESKOM	Contract Document	During Construction Phase (from site establishment to Contract Completion)	ESKOM DEAT/ MDALA[xv]/ GDACEL[xvi]

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Communication with Contractor and his staff	Inability to communicate effectively with the Contractor regarding their environmental obligations, resulting in unnecessary environmental degradation	**Objective:** To ensure that there is effective communication with the Contractor on environmental issues **Mechanism:** 1) Include environmental considerations as an item on the agenda of the monthly site meetings for each Contractor 2) Include environmental considerations in the Contractors programme (where relevant) 3) Appoint a senior manager on the Contractors staff as the designated Environmental Officer, empowered to managed compliance with the environmental requirements on behalf of the Contractor 4) Compile and implement the necessary Method Statements 5) Undertake environmental awareness training of all site staff during the commencement of each Contract, with regular refreshers for the duration of the Contract	Environmental management requirements are proactively communicated with the Contractor and reflected in a more responsible approach to construction	Contractor Site Engineer Environmental consultant/ ESKOM	Contract Document Programme Meetings [Note: costs of awareness training covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM in-house technical & environmental staff
	Communication with public	Inability to deal with public queries and complaints	**Objective:** To ensure that the public has a mechanism to contact a responsible individual in order to obtain information or report complaints **Mechanism** 1) Provide a contact number of someone responsible for the site on the site signage 2) Maintain a complaints register on site to allow public complaints to be recorded. Complaints should be noted and signed off at site meetings 3) Hold meetings with ELC at agreed frequencies	Public are able to communicate effectively with the relevant members of the project team either to obtain information or lodge complaints	Contractor	Contract Document [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM
	Site establishment ~ *Access*	Hazards to landowners and public, and security of materials	**Objective:** To secure the Site against unauthorised entry and to protect members of the public/ landowners **Mechanism:** 1) Secure Site in an appropriate manner 2) Where necessary to control access,	Site is secure and there is no unauthorised entry No members of the public/ landowners injured	Contractor	Contract Document [Note: costs covered within contract price]	Erection ~ during site establishment Maintenance ~ for duration of Contract	Site Engineer Environmental Consultant ESKOM in-house technical & environmental

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
			fence and secure Contractor's camp 3) Provide alternative access/ detours for public/ landowners					staff
	Site establishment ~ *Site structures*	Site infrastructure that degrades the visual aesthetics of the area, unnecessarily exacerbates environmental consequences of construction and leads to public complaint	**Objective:** To minimise the environmental consequences associated with the establishment of the site infrastructure **Mechanism:** 1) Locate key site infrastructure in environmentally acceptable area and limit its extent 2) Position site infrastructure so as to limit visual intrusion on neighbours or the greater environment 3) Select materials for site infrastructure that limit reflection and blend in with the environment 4) Accommodate temporary services underground and within the same trench where possible	Site infrastructure has limited impact on the visual aesthetics of the area and does not result in unnecessary environmental degradation	Contractor	Contract Document [Note: costs covered within contract price]	During site establishment	Site Engineer Environmental Consultant ESKOM
	Site establishment ~ *Protection of topsoil and sensitive areas/ artefacts*	Destruction of loss of topsoil, and sensitive areas/ artefacts (which could include indigenous vegetation, fauna, aquatic ecosystems or heritage resources)	**Objective:** To retain topsoil for later use in closure and to ensure that disturbance to sensitive areas or artefacts is minimised **Mechanism:** 1) Locate key site infrastructure in environmentally acceptable area and limit its extent 2) Remove topsoil approximately 150 mm deep from establishment, working area and stockpile areas, and stockpile for later use 3) Protect topsoil stockpiles against erosion and contamination 4) Provide containment and settlement facilities for effluents from concrete mixing facilities 5) Provide spill containment facilities for hazardous materials like fuel and oil 6) Minimise the extent of areas cleared 7) Identify sensitive areas or artefacts and demarcate these as no-go areas 8) Develop contingency plans to address heritage resource discoveries during construction	Limited extent of vegetation destroyed during construction activities Sufficient topsoil for closure available No topsoil contaminated with cement materials, fuel, oil or other undesirable compounds Limited damage to sensitive aquatic ecosystems identified on the site No sensitive sites or artefacts damaged or destroyed	Contractor	Contract Document [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Site establishment ~ *Surface and groundwater*	Pollution of water resources by effluents	**Objective:** To avoid pollution of water resources **Mechanism:** 1) Establish contaminated water management system 2) Provide suitable and sufficient ablution facilities that are serviced regularly 3) Provide containment and settlement facilities for effluents from concrete mixing facilities 4) Provide spill containment facilities for hazardous materials like fuel and oil	Effluents managed effectively No pollution of water resources	Contractor	Contract Document [Note: costs covered within contract price]	During site establishment	Site Engineer Environmental Consultant ESKOM
	Site establishment ~ *Solid waste*	Pollution of environment with solid waste materials	**Objective:** To avoid pollution of environment with solid waste materials **Mechanism:** 1) Demarcate, and enforce use of, a designated eating area 2) Provide adequate waste bins 3) Set up system for regular waste removal to approved facility 4) Minimise waste by sorting wastes into recyclable and non recyclable wastes 5) Prohibit burying or burning of waste on Site	Appropriate management of solid wastes No complaints from public	Contractor	Contract Document [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM
	Site establishment ~ *Fire*	Increased fire risk to surrounding areas	**Objective:** To decrease fire risk **Mechanism:** 1) Provide adequate cooking and heating facilities for staff 2) Prohibit open fires 3) Develop emergency protocols for dealing with fires 4) Ensure adequate fire-fighting equipment is available on site, particularly near “hot” works	No occurrence of fires on site or on surrounding areas	Contractor	Contract Document [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Site management ~ *Materials*	Risk of environmental contamination or safety hazard to public/ site staff resulting from inappropriate treatment of materials	**Objective:** To ensure that materials are handled, used and stored in a manner that limits the risk of environmental contamination or a safety hazard **Mechanism:** 1) Inform delivery drivers re requirements of the specifications 2) Secure materials during transport 3) Identify appropriate storage areas for stockpiling of materials, storage of hydrocarbons and storage of hazardous substances and ensure that these areas are appropriately prepared for their purpose 4) Dispose of hazardous substances in terms of the relevant legal requirements 5) Limit spillage of hazardous substances or substances with the potential to cause contamination of the environment 6) Develop emergency protocols for dealing with spillages particularly where these pose a pollution risk or involve hazardous substances 7) Compile and implement the necessary Method Statements 8) Undertake environmental awareness training of all site staff	Correct handling, use and storage of materials, including hazardous materials No incidents of environmental contamination No accidents or incidents related to the handling of materials No public complaints	Contractor	Contract Document [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM
	Site management ~ *Equipment maintenance and storage*	Presence of plant on site which exacerbates environmental impact including pollution and nuisance	**Objective:** Ensure that all plant on site is well maintained and serviced in the appropriate manner **Mechanism:** 1) Ensure that all plant is in good working order 2) Undertake maintenance within specified area (workshop) 3) Use drip trays for all stationary or parked plant and when servicing equipment away from designated areas	All plant in good working order Maintenance of plant does not result in environmental degradation No public complaints	Contractor	Contract Document [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Site management ~ *Surface water and/or existing stormwater systems*	Contamination of stormwater runoff with suspended solids	**Objective:** Contain soils and materials within defined areas and prevent contamination of stormwater runoff **Mechanism:** 1) Identify predetermined stockpile areas for topsoil, construction materials and excavated material 2) Dispose of waste excavated material at appropriate waste disposal sites 3) Rehabilitate site to prevent soil erosion, including temporary revegetation of areas that will remain exposed for extended periods 4) Undertake concrete mixing away from sensitive areas and on impermeable surfaces 5) Store fuels in storage area that is appropriately bunded and drains to a sump 6) Ensure that substances that pose a risk of water contamination are appropriately stored and disposed of 7) Develop and implement water monitoring programme where work abuts aquatic systems	Correct stockpiling of excavated material on site No waste material left on site No erosion on site No pollution of water resources	Contractor	Contract Document [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM
	Site management ~ *Dust*	Dust nuisance from the excavated and stockpiled materials	**Objective:** To avoid dust nuisance from excavated materials or construction materials **Mechanism:** 1) Implement dust suppression measures e.g. regular watering 2) Undertake concrete mixing away from sensitive areas 3) Develop and implement dust monitoring programme	Appropriate management of dust No complaints from public No complaints from site staff	Contractor	Contract Document [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM
	Site management ~ *Noise*	Noise nuisance from construction equipment	**Objective:** To avoid noise nuisance from construction equipment **Mechanism:** 1) Limit working hours for noisy equipment to daylight hours 2) Fit silencers appropriate to equipment 3) Develop and implement noise monitoring programme	Appropriate management of noisy activities No complaints from public No complaints from site staff	Contractor	Contract Document [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Site management ~ *Public health and safety*	Hazardous conditions to landowners and members of the public	**Objective:** Provide adequate warning to landowners/ public regarding potential hazards and ensure safe access where required **Mechanism:** 1) Ensure adequate signage for landowners/ public about the work, particularly where work abuts major public thoroughfares or use areas 2) Erect and maintain fencing and gated access to restricted areas 3) Implement requisite traffic safety measures at abutting roads 4) Implement requisite safety measures where there are abutting public use areas 5) Ensure adequate accessibility to landowners/ public where required for safe access	Safe conditions for public No members of the public/ landowners injured Signboards put up before construction commences Provision of safe access routes for landowners/ public, which are clearly demarcated and visible	Contractor	Contract Document [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM
	Closure ~ *Environmental integrity*	Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention	**Objective:** To ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts are remediated or curtailed **Mechanism:** 1) Remove all temporary facilities and waste materials 2) Replace stockpiled topsoil 3) Install necessary drainage works and anti-erosion measures 4) Landscape and revegetate disturbed areas with appropriate vegetation 5) Ensure that the Contractor is required to maintain revegetated areas until an acceptable cover has been achieved	All portions of site, including construction camp and working areas, cleared of equipment and temporary facilities Topsoil replaced on all areas, and stabilised Disturbed areas rehabilitated Acceptable cover achieved on closed site Closed site free of erosion and alien invasive plants	Contractor	Contract Document [Note: costs covered within contract price]	Following execution of the works	Site Engineer Environmental consultant ESKOM DEAT/ MDALA/ GDACEL

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
5. ENVIRONMENTAL MANAGEMENT OF THE OPERATIONAL AND DECOMMISSIONING[xvii] PHASES								
All Activities (power station and all associated structures and infrastructure, including the coal stockyard, conveyers, water pipelines, water reservoirs/ dams and ash dump)	Environmental management documentation and procedures	No framework within which to locate the management of the operational and decom. phases No procedures against which to assess environmental performance during the operational and decom. phases and thus no measure of compliance	**Objective:** To develop environmental management documentation and procedures which are consistent with the existing Environmental Management Procedures and will ensure the effective and proactive management of the operational and decom. phases **Mechanism:** 1) Use the existing Generation Business Unit Environmental Management Procedure as the basis to develop site specific environmental documentation and procedures for the power station, including its associated structures and infrastructure 2) Ensure that Environmental Management Procedures provide site specific environmental policies and management plans that comply with ESKOM's EMS 3) Ensure that the procedures are practical and implementable on the site	Environmental Management Procedure for the power station and associated infrastructure which is consistent with the Business Unit's existing documents, complies with ESKOM's EMS requirements and will ensure effective management of the operational and decommissionning. phases	Environmental Consultant ESKOM	EIA documentation Specialist studies Framework EMP In-house procedures (were relevant and available) ESKOM EMS	Prior to the onset of operation	ESKOM
	Environmental management of the operational phase	Negative impacts on environment during operation	**Objective:** To ensure that the operation of the power station and associated structures/ infrastructure does not result in avoidable impacts on the environment, and that any impacts that do occur are anticipated and managed **Mechanism:** 1) Implement the operational phase management procedures outlined in the Environmental Management Procedure 2) Comply with all requirements of all permits, authorisations and/ or licenses received	Environmental impacts effectively monitored and managed during the operational phase with no residual impacts on the environment Comprehensive record of compliance and remedial actions available to ESKOM and the authorities	ESKOM (in-house environmental staff)	Environmental Management Procedure ESKOM EMS	During operation	ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Environmental management of the decom.	Negative impacts on environment during decom.	**Objective:** To ensure that the decom. of the power station and associated structures/ infrastructure does not result in avoidable impacts on the environment, and that any impacts that do occur are anticipated and managed **Mechanism:** 1) Implement the decom. phase management procedures outlined in the Environmental Management Procedure	Environmental impacts effectively monitored and managed during the decom. phase with no residual impacts on the environment Comprehensive record of compliance and remedial actions available to ESKOM and the authorities	ESKOM	Environmental Management Procedure ESKOM EMS	During decom.	ESKOM

[i] EIA = Environmental Impact Assessment
[ii] RoD = Record of Decision
[iii] DEAT = Department of Environmental Affairs and Tourism
[iv] ECA = Environmental Conservation Act
[v] SAHRA = South African Heritage Resources Agency
[vi] NHRA = National Heritage Resources Act
[vii] NEM = National Environmental Management (as is National Environmental Management Act, the umbrella Act under which the Air Quality Act is promulgated)
[viii] APPA = Air Pollution Prevention Act
[ix] NEMAQA = National Environmental Management Air Quality Act
[x] DWAF = Department of Water Affairs and Forestry
[xi] The in-house EMPs may need to be augmented with project specific "project specifications" to ensure that the environmental issues are comprehensively addressed in the Tender Document.
[xii] Within this context BPEO, or Best Practicable Environmental Option, is defined as "for a given set of objectives, the option that provides the most benefits or least damage to the environment as a whole, at acceptable cost, in the long term as well as in the short term" (Royal Commission on Environmental Pollution, 1988). Here environment includes both the social and biophysical components.
[xiii] It is assumed that the source of water would have been resolved as part of the EIA process as highlighted under Section 1 of the fEMP
[xiv] It is understood that effect will be given to the requirements listed here by ensuring that they are integrated as specifications (where appropriate) into the Tender Document, as highlighted under Section 2.
[xv] MDALA = Mpumalanga Department of Agriculture and Land Affairs
[xvi] GDACEL = Gauteng Department of Agriculture, Conservation, Environment and Land Affairs
[xvii] Abbreviated to decom.

ANNEXURE C: ESKOM CORPORATE DOCUMENTATION

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C1: Safety, Health and Environment

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Safety, Health and Environment (SHE) Policy

Guiding principles by which we operate

- We are committed to safety, health and environmental excellence and will conduct business with respect and care for people and the environment and, in so doing, will ensure that adequate resources are available for SHE management.

- We will ensure that SHE is an integral part of our operations and that no operating condition, or urgency of service, can justify endangering the life of anyone or cause injury or damage to the environment.

Compliance to this policy and applicable regulations shall be the responsibility of every employee and contractor.

Thulani S Gcabashe
Chief Executive

Ehud Matya
Managing Director
Generation

Duncan Mbonyana
Managing Director
Corporate

Jacob Maroga
Managing Director
Transmission

Mongezi Ntsokolo
Managing Director
Distribution

Johnny Dladla
Managing Director
Key Sales & Customer Service

Steve Lennon
Managing Director
Resources & Strategy

Bongani Nqwababa
Finance Director

Brian Dames
Managing Director
Enterprises

Mpho Letlape
Managing Director
Human Resources

Eskom

With Energy, Anything is Possible

C2: Environmental Management Programme Guidelines

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Eskom	Guideline	

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Environmental Management Programme

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COMPILED BY	FUNCTIONAL RESP	SUPPORTED BY	AUTHORISED BY
pp ELC EIA Task Team	Dave Lucas Chair ELC	Wendy Poulton General Manager Corporate Sustainability	Dr Steve Lennon Managing director (Corporate Services Division)

Note: This document has been seen and accepted by the ELC and duly supported by the General Manager Corporate Sustainability and authorised by Managing Director Resources and Strategy.

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1 Introduction

One of Eskom's environmental strategies is the development and implementation of an environmental management system (EMS). Linked to this is a requirement for the development and implementation of environmental management programmes (EMPs). Furthermore, Eskom's environmental land policy requires that all Eskom land be continually managed, through the control of operations and activities that take place on it, to ensure the sustainable utilisation of the asset. It also requires that all Eskom land be managed, operated, and maintained in terms of an established EMP.

An EMP is a plan of action that sets out a required environmental end state and sets out how activities that could have a negative impact on the environment will be managed and monitored and how impacted areas will be rehabilitated.

The main Eskom Environmental Procedure, EPC 32-96, should be consulted for all elements relating to the scope, normative references, etc.

2 Document Content - Requirements

2.1 General

2.1.1 An EMP shall be developed and implemented, in terms of the relevant line division EMS for:

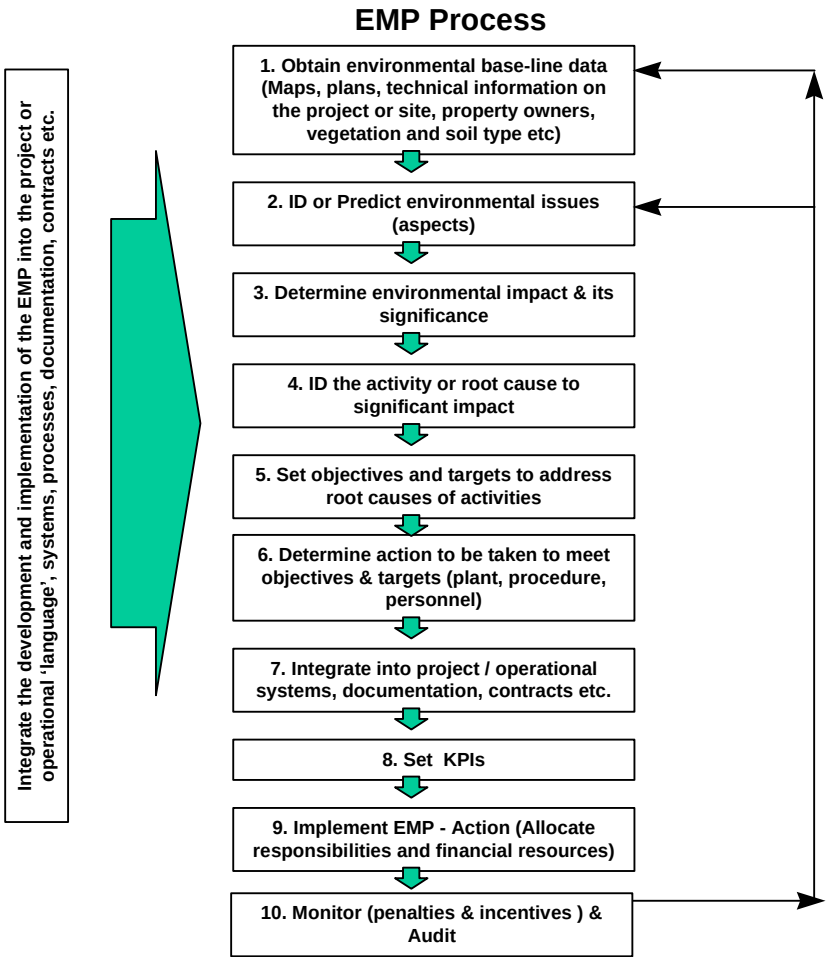
a) Existing and future Eskom land (site, servitude); and

b) Projects for which an environmental impact assessment (EIA) or screening was undertaken.

Applicable significant environmental issues are to be included in an EMP (see 2.12 for general environmental aspect). In the development and implementation of an EMP for existing Eskom land (site/servitude) or for a proposed project, the procedures in 2.2 to 2.11 should be followed to ensure compliance with Eskom's Environmental Land Policy and national environmental legislation.

2.1.2 Each Eskom division and subsidiary should establish key performance indicators (KPIs)/EMS for the development and implementation of EMPs. These indicators and actual performance figures should be reported for inclusion in Eskom's Annual Report where appropriate.

2.1.3 The line business unit (BU) managers shall be accountable for the co-ordinated development and implementation of the environmental management programmes in their respective areas in line with the set KPIs/EMS.



2.2 Collect environmental baseline data

a) This step involves the collection of baseline data or background information on:

1) the proposed project (technical and project management programme);

2) the existing land (site/servitude) and operations (technical and operational practices); and

3) the environment (and surrounding environment) of the proposed project of existing land (site/servitude) and operation.

b) Collection of data should start with obtaining existing information from:

1) past EIAs;

2) operational and maintenance records (including inspection reports);

3) incident investigation and audit reports;

4) geographical information systems (GIS); and

5) landowners and government departments.

c) Thereafter, gaps in data would have to be filled through specialist studies and field sampling. For a power line route, this could involve a specialist on vegetation, bird interactions with power lines, soil types, and national heritage sites. For a site, specialist studies would be needed for soil types, vegetation control, and technical aspects of the site (that is, maintenance practices, oil traps, etc.).

d) This information should be collated in a format that will allow it to be stored and utilised in a convenient manner.

e) If an EIA had already been undertaken for the route or site, much of this baseline information can be obtained from that EIA report.

f) See Annex B for a generic list of baseline information required for specific sites.

g) Background information on the environment (land, air, water, local communities, and other interested and affected parties) should include issues that are applicable to the project or the existing site, and associated environmental impacts. It should cover the physical, biological, and social environments that could be or are adversely affected by the development or operation, respectively.

h) This baseline information is required to identify changes, through monitoring, as a result of the project or operational impacts. Baseline information studies will provide the "control" records against which all monitoring can be measured. The information will also be used in the development of EMP actions to avoid impacts or to restore areas.

2.3 Identify and/or predict the environmental aspects (Aspects Register)

2.3.1 Identify the environmental aspect (waste, oil spills, soil erosion, air and water emissions, vegetation control, landowner requirements, etc.) that need to be addressed, managed, controlled, or avoided through the adequate control of that activity resulting in the aspect.

2.3.2 For new developments and projects requiring an EIA, relevant statutory requirements shall be adhered to.

2.3.3 For an existing operation or site, the assessment to identify environmental issues could be from:

a) incident investigations and past experience (maintenance records, investigation reports, etc.);

b) a life-cycle assessment (LCA);

c) an EIA (for upgrades or changes to plant);

d) routine maintenance inspections/audits;

e) environmental due diligence;

f) an environmental risk assessment (ERA); and

g) an audit of the plant, site, or route.

2.3.4 A checklist, matrix, or some other assessment tool should be used to record the issues that were identified (see Annex C).

2.3.5 For both new projects and existing sites, a process of public participation should be undertaken to ensure that the concerns of interested and affected parties are taken into consideration when compiling and implementing the EMP.

2.4 Determine the environmental impacts and their significance

2.4.1 The environmental impacts associated with each identified environmental aspect should be determined (that is, an oil spill is an environmental aspect, and its impact is the contamination of soil and water). Significance involves a value judgement by society concerning the importance of the effects of human activities. The primary concerns of the public are human health and safety. Thereafter, it is the concern for potential losses of important commercial species or commercially viable production and a high priority on species and areas of major recreational or aesthetic importance.

2.4.2 The significance of each impact that is predicted or identified should be quantified. The significance should be rated as high, medium, or low. In the determination of what is significant, techniques should be adopted that remove the subjectivity from the determination.

2.4.3 Significance can be determined with regard to:

a) the **nature** of the proposed or existing activity with regard to the causes of the effect;

b) the **extent** of the activity regarding whether the impact will be or is local or regional;

c) the **duration** of the activity's impact (short, medium, long, or even permanent);

d) the **intensity** of the activity's impact, classified in terms of the following: **low** − natural or social functions and processes are not affected; **medium** − the environment is altered, but the natural and social functions are able to continue in a modified way; and **high** − natural or social functions or processes are altered to such an extent that they will temporarily or permanently stop; and

e) the **probability** that the impact will actually occur in terms of the following: **improbability** − due to design or historical experience, the chance of impact occurring is very low; **probable** − where there is the possibility that the impact could occur; **highly probable** − in the case where it is more than likely that the impact will occur; and **definite** − here the impact will occur regardless of any preventative measures being implemented.

2.4.4 The criteria for significance should include the level of public concern and legal implications and impact on image should the impact occur.

2.4.5 The significance of the environmental impact could be to use it in conjunction with the cost benefit analysis (CBA) approach, which seeks to express impacts in monetary terms.

2.5 Identify the activity or root cause associated with the significant impact

2.5.1 Once all the significant environmental aspects have been identified based on the significance of their impacts, the activity that causes them should be identified. This is, in a sense, determining the root cause of the problem, and it is the root cause that one needs to manage and control to ensure that corrective and preventative measures are implemented through the EMP.

2.5.2 An impact is the result of a failure of plant/procedures/personnel to perform as expected (that is, no bund wall, wrong use of herbicides, uncontrolled management of storm water, ash and slurry plant inefficiency, personnel not trained, no operational procedure in place, etc.)

2.6 Set objectives and targets to address root cause

2.6.1 After identifying, determining, and quantifying the environmental aspects and their associated activities (the root causes) that need to be addressed in the EMP, translates them into specific management objectives and specific measurable targets.

2.6.2 When these objectives and targets have been set, ensure that they conform to statutory requirements.

2.6.3 The objectives and targets set should be based on a combination of the legal requirements, the significance of the identified environmental aspect and its impacts, technological options, alternatives, financial limitations, business requirements, and the views of interested and affected parties.

2.6.4 The objectives should be specific and the targets measurable. These objectives and targets should address the identified root cause as identified in 2.5.

2.6.5 When objectives and targets are set, they should be linked to measurable environmental key performance indicators (KPIs) for measuring, monitoring, and auditing purposes.

2.7 Determine actions to be taken to meet objectives and targets – project or operational actions

2.7.1 The action required to achieve the set objective and targets in order to address the root cause should be established. Solutions to problem areas should be quantified, that is, Eskom procedures or standards, specialists' reports and recommendations, and past successful solutions. The project actions could be one of the following:

a) **Plant:** that is, waste disposal site, storm water system, hazardous material store, rehabilitation of soil erosion areas, water treatment equipment, an oil trap, storm water berms, waste collection and separation site, new plant, screening vegetation and other forms of landscaping, etc. (This should include the actual location of plant and construction and operational procedures.)

b) **Procedures:** that is, the development of specific operational procedures for the carrying out of certain activities: to preserve archaeological sites, bush clearing, herbicide application, waste minimisation, water conservation, dust suppression, noise minimisation, etc. (The procedure should include responsibilities, reporting, monitoring, and conformance with permit requirements.)

c) **Personnel:** that is, training and skills development, awareness, incentives, penalties, etc.

2.7.2 The project actions are the key aspect of the EMP in that they are the actions taken that will achieve the required end state.

2.8 Integrate into project/operational systems, documentation, contracts

2.8.1 The actions in 2.7 should be integrated into applicable existing processes, systems, and documentation that are part of either the project for the development or of the existing operation.

2.8.1.1 for new development projects: e EMP action requirements should be integrated into the scope of work or work description as part of tender documents and subsequent contracts. A register (see Annex D) should be maintained identifying the EMP requirements and where they can be located within the contract documentation, that is, design specifications, procedures, work instructions, etc.

2.8.1.2 for existing sites: the EMP action requirements should become individual projects or specific responsibilities of an individual or team. For projects, the EMP shall be integrated into the scope of work or work description as part of the tender documents and subsequent contracts. A register (see Annex D) should be maintained identifying the EMP requirements and where they can be located within the operation.

2.8.2 In some cases, an EMP could be represented in a single document, but for full effectiveness, it should be integrated into the appropriate project or operational systems and documentation.

2.9 KPIs

2.9.1 Link performance of the EMP to existing business performance measures and reporting practices.

2.10 Implement EMP action

2.10.1 Once the EMP has been formulated, accountabilities set, and resources made available, the EMP should be implemented. This may, for a new project, be in terms of a single contract, or many contracts with contractors and subcontractors.

2.10.2 For an existing site, it may be action undertaken by the responsible BU or individuals. It may also be in the awarding of contracts to undertake a specific project or part of operational and maintenance practices.

2.11 Monitoring and audit

2.11.1 Monitoring: the EMP will only be effective if there are mechanisms to measure and report on the KPIs. Together with the KPIs, there should be a monitoring programme in place to, not only measure the EMP requirements, but also the environmental variables − that is, to measure not only conformance, but also environmental aspects and impacts that have not been accounted for in the EMP that are, or could result in significant environmental impacts for which corrective action is required.

2.11.2 The monitoring should include evaluation of compliance with statutory and other legal (contract) requirements. The results of monitoring should be analysed and used to identify areas of good performance as well as those requiring corrective and preventive action.

2.11.3 Audit: to ensure the undertaking and conformance with the EMP requirements, an audit should be undertaken to close the EMP cycle. The audit can be used to identify non-conformances for which corrective action should be taken. The audit can also be used to identify findings that can be used to improve other EMPs.

2.11.4 Audit findings should result in updating baseline information and the assessment techniques used in the identification of environmental issues and impacts.

2.12 General environmental aspects to be addressed in an EMP

(Refer to respective division or Eskom subsidiary needs for specific aspects.)

2.12.1 Air quality

2.12.1.1 The negotiated CAPCO registration certificate requirements for power stations shall be adhered to.

2.12.1.2 The regulations issued in terms of the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983), section 6 (j) in respect of burning veld shall be adhered to.

2.12.1.3 In situations where firebreaks must be constructed to prevent fires spreading from the site, as well as fires entering the site from adjacent land, these shall be constructed in accordance with the National Veld and Forest Fires Act, Act No 101 of 1998.

2.12.1.4 Vehicle drivers shall drive at moderate speed on site access roads to minimise or eliminate dust pollution. In urban areas, access roads shall be treated to reduce dust pollution (tar, concrete, chipstone, etc.).

2.12.1.5 Fumes (black smoke) emitted from vehicles and equipment/appliances shall be monitored and action taken to avoid causing a nuisance to the public.

2.12.1.6 Burning of waste material such as vegetation and old cleaning materials resulting from maintenance activities at a site is strictly prohibited.

2.12.1.7 Ash disposal areas shall be managed (re-habilitated) to minimise their potential for dust pollution.

2.12.2 Water quality

2.12.2.1 In accordance with the requirements of the Water Act, surface or groundwater shall not be polluted (oil, petrol, cleaning materials, herbicides, power station "dirty water" and ash, etc.) under any circumstances. Storm water shall be managed to ensure that it does not become polluted.

2.12.2.2 An adequate sewage facility (big enough capacity, no leaks, and emptied regularly in the case of a septic tank) shall be established, and the permit requirements of treatment equipment shall be adhered to.

2.12.2.3 Proper toilet facilities (possibly portable) shall be provided for field staff.

2.12.2.4 All hazardous substances at the site shall be adequately stored and accurately identified, recorded, and labelled (that is, polychlorinated biphenyls − PCB/Askarel). All waste to be disposed of at an appropriate waste facility.

2.12.3 Land management

2.12.3.1 The boundaries of the Eskom site shall be clearly identified and demarcated to ensure that the whole site is addressed in the EMP (the site usually extends far beyond the security fence).

2.12.3.2 The site's title deed or deed of servitude shall be obtained, and the conditions contained therein shall be adhered to.

2.12.3.3 All bush clearing shall be undertaken in terms of an EMP and in conformance with legislation and Eskom policy and standard requirements.

2.12.3.4 Protected or endangered plant and animal species occurring on Eskom sites and servitudes shall be identified and protected from Eskom's activities or plant. Permits shall be obtained from the relevant authority for the clearing of protected trees (see Environmental Procedure − Land − Procedure for vegetation clearance and maintenance within overhead power line servitudes and on Eskom-owned land).

2.12.3.5 Eskom shall adhere to the legal requirements in terms of herbicide usage.

2.12.3.6 Fences and gates of property owners shall not be damaged when gaining access to the site. The condition of Eskom gates and locks shall be regularly monitored to ensure that they are secure (that is, to prevent animals getting in or out as well as to prevent access to the site by unauthorised personnel). Gates shall always be kept closed.

2.12.3.7 Access roads and site ground shall be monitored for deterioration and possible erosion. Soil erosion shall be prevented at all times. Proactive measures shall be implemented to curb erosion and to rehabilitate eroded areas.

2.12.3.8 During construction of new sites/power lines, concrete dumping/washing is to be done on the piles of ground removed from the foundation excavations, which shall then be placed back into the foundation excavations.

2.12.3.9 Weeds shall not be allowed to grow or spread. Invasive plants and weeds shall be identified and controlled to prevent their spreading.

2.12.3.10 All animal fatalities due to the site infrastructure such as bird collisions and small mammal electrocutions shall be identified, and appropriate action shall be implemented to minimise or eliminate the problem. Wildlife interactions shall be reported, recorded, and investigated in compliance with BU procedure, and after action has been implemented to solve the problem, they shall be followed up to assess the effectiveness of the remedial measures taken.

2.12.3.11 No fires shall be made for waste destruction. Firebreaks shall be constructed to prevent fires from spreading from or into the site. Regulations in respect of veld burning issued under the Conservation of Agricultural Resources Act, Act No 43 of 1983, section 6 (j) shall be adhered to. These shall align with the Forest Act, Act No 122 of 1984 and the National Veld and Forest Fires Act, No 101 of 1998.

2.12.3.12 A plan/programme for the landscaping of the site shall be considered. This shall cover the aesthetics of the site (screening of site using embankments, walls, and/or vegetation) and rehabilitation.

2.12.4 Community issues

2.12.4.1 A list of the neighbouring properties, property owners' names, addresses, and telephone numbers, and land use shall be drawn up.

2.12.4.2 A plan of action shall be concluded with the neighbouring property owners and the relevant authorities in the case of an emergency (veld fire, oil spillage, water contamination, etc.). Eskom contact names and telephone numbers shall be given to all neighbours, and vice versa.

2.12.4.3 Property owners and local residents shall be treated with respect and courtesy at all times.

2.12.4.4 The culture and lifestyles of the communities living in close proximity to the site and work sites shall be respected.

2.12.4.5 Removal (pilfering) of agricultural products (sugar cane, fruit, vegetables, stock, fire wood, etc.) and poaching are prohibited. Receipts shall be obtained for any merchandise purchased or received from landowners.

2.12.4.6 Environmental clauses shall be included in contract documents for all contractors (the services of contractors with proven track records of sound environmental performance shall be used).

2.12.4.7 Graves, archaeological sites, and sites of historical interest (as defined in the National Heritage Resources Act, Act No 25 of 1999) in close proximity to an Eskom site or other work sites shall be protected and treated with respect.

2.12.4.8 All complaints shall be reported, recorded, and investigated in compliance with the BU/procedure.

2.12.4.9 Eskom sites shall be evaluated in terms of their contribution to noise pollution, and actions shall be implemented to ensure conformance with legal requirements and taking into consideration the views of adjacent land users/landowners.

3 Supporting clauses

Index of Supporting Clauses

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3.1 Scope

3.1.1 Purpose

The purpose of this document is to ensure that:

a) there is a process to identify existing negative environmental impacts or to predict potential negative environmental impacts;

b) objectives and targets are set to ensure that negative impacts are mitigated and existing impacts rehabilitated;

c) resources and responsibilities are allocated to each target;

d) actions are implemented to mitigate the identified negative environmental impacts; and

e) monitoring programmes are developed to track the actions that have been implemented to ensure the effectiveness of the actions.

3.1.2 Applicability

This procedure is applicable to Eskom Holdings Limited and its divisions and wholly owned subsidiaries.

3.2 Normative/Informative References

3.2.1 Normative references

The following documents contain provisions that, through reference in the text, constitute requirements of this procedure. Latest versions apply.

At the time of publication, the editions indicated were valid. All controlled documents are subject to revision, and parties to agreements based on this guideline are encouraged to investigate the possibility of applying the most recent edition of the documents listed below.

Information on currently valid national and international standards and specifications can be obtained from the Information Centre and Eskom Documentation Centre at Megawatt Park.

SANS ISO 14015, *Environmental management − Environmental assessment of sites and organisations (EASO)*

3.2.2 Informative

Not applicable

3.3 Definitions

For general definitions, refer to the Environmental Procedure. Definitions specific to this document are repeated below

3.3.1 Environmental management programme: A programme that seeks to achieve a required environmental end state and describes how activities that could have a negative impact on the environment will be managed and monitored and impacted areas rehabilitated

3.4 Abbreviations

3.4.1 BU: Business unit

3.4.2 CAPCO: Chief Air Pollution Control Officer

3.4.3 CBA: cost benefit analysis

3.4.4 EASO: Environmental assessment of sites and organisations

3.4.5 EIA: Environmental impact assessment

3.4.6 ELC: Environmental Liaison Committee

3.4.7 EMP: environmental management programme

3.4.8 EMS: Environmental Management System

3.4.9 ERA: environmental risk assessment

3.4.10 GIS: geographical information systems

3.4.11 KPIs: key performance indicators

3.4.12 LCA: life-cycle assessment

3.4.13 NEMA: National Environmental Management

3.4.14 PCB: polychlorinated biphenyls

3.4.15 SHE: Safety, Health, and Environment

3.5 Roles and Responsibilities

Not applicable

3.6 Implementation date

The implementation date will be August 2007.

3.5 Process for monitoring

Reporting on EMP implementation is included in Eskom's Annual Report. This information is subject to internal and external audit.

3.8 Related documents

Environmental Land Policy EPL 32-97

Environmental Procedure – Land − Procedure for vegetation clearance and maintenance within overhead power line servitudes and on Eskom-owned land EPC 32-247

Note: This document should be read in conjunction with the Eskom Environmental Procedure, EPC 32-96.

3.7 Authorisations

This document has been seen and accepted by:

Name	Designation
PJ Maroga	Chief Executive
B Nqwababa	Finance Director
ME Letlape	Managing Director (Human Resources Division)
EN Matya	Managing Director (Generation & Generation Primary Energy)
E Johnson	Managing Director (Systems Operations & Planning)
MM Ntsokolo	Managing Director (Transmission Division)
JA Dladla	Managing Director (in the office of the Chief Executive)
Dr SJ Lennon	Managing Director (Corporate Services Division)
BA Dames	Managing Director (Enterprises Division)
A Noah	Managing Director (Distribution Division)

5 Revisions

Date	Rev.	Remarks
Dec 2005	2	Revised totally in terms of policy review process
August 2007	0	EDC ISO new document number issued, formatted and processed

6 Development team

- Dave Lucas - Compiler

Annex A
(informative)

EMP Development

There are three main categories of documentation that one should have access to for EMP development. These three sets of documents provide the link between Eskom's activities and the legal requirements that have to be complied with.

- Eskom Legal Register that links Eskom activities to the relevant legal requirements
- Specific pieces of legislation as made mention of in the Legal Register above
- The relevant Eskom control documentation that is based on ensuring compliance with legislation through controlling how activities need to take place

The link to relevant Eskom environmental documentation and legislation can be found at the following link: http://teknowrep/cs/.

A.1 Eskom-controlled documentation

Many of the standards and procedures are being combined into an overall Control Document for the Environmental Procedure. It contains all supporting documentation and clauses required for environmental procedures in Eskom and should be referenced in all documentation forming part of the procedure. All requirements and clauses shall apply to all supporting documentation unless specifically mentioned.

Access to the relevant environmental documentation can be gained through the following link: http://teknowrep/cs/.

Eskom environmental documentation

- SHE Policy
- Environmental Liaison Committee (ELC) Reporting Procedure
- ELC Terms of Reference
- Air Quality Management Policy
- Water Management Policy
- Climate Change Policy
- Environmental Land Policy
- Environmental Procedure, containing sections on the following:
  - Environmental management system
  - Environmental management programme
  - Waste management
  - Land management
  - Electro and magnetic fields
  - Due diligence
  - Reporting on environmental expenditure

Annex A
(continued)

A.2 Environmental statutory requirements

Eskom Environmental Legal Register

These environmental legal registers have been developed based on the activities of Eskom and, in particular, those activities that have an impact on the environment. They are based on the relevant divisional aspect registers, which identify the aspects of the division's activities that have a significant impact on the environment.

The registers have been developed by Imbewu Legal Consultants to fulfil the ISO 14001 Environmental Management System Standard requirements for all divisions in Eskom.

The Eskom environmental legal registers can be found at http://teknowrep/cs/legal/.

The Eskom Environmental Legal Register consists of the following:

- Eskom Group Environmental Legal Register
- Corporate Sustainability (SHE) Legal Register
- Generation Environmental Legal Register
- Distribution Environmental Legal Register
- Finance Environmental Legal Register
- Transmission Environmental Legal Register
- Abbreviation Index and the Environmental Legal Commentary

All of these may be accessed directly from this main index or from the index of each of the registers.

The legal registers cover all South African national legislation and regulations and also refer to relevant international conventions, which are discussed in further detail in the Eskom Environmental Legal Commentary. Relevant Eskom policy documents have been referred to in the tables. It is important to note that the register covers generic legal obligations and that each facility will need to investigate its own site-specific legal requirements, for example, provincial legislation, local by-laws, permits, contracts, etc., to ensure that all legal obligations that are applicable to the particular facility are covered.

At the beginning of each aspect table, the generally applicable legal requirements that apply to that aspect are set out, for example, the requirements that are applicable to air emissions generally. Legal obligations relevant to particular components of the aspect, for example, carbon dioxide or dust emissions, are then dealt with separately.

The best way to access the applicable legal obligations is to select the aspect that one wishes to investigate by first going to the index of aspects in the Environmental Register, double-clicking on that aspect, and then perusing the legal obligations and guidelines set out in the table relating to that aspect. All of the phrases underlined in the tables on legal obligations (that is, the main source of the legal obligation, set out in abbreviated form, for example, NEMA for National Environmental Management Act) indicate that the text has been linked by Eskom to the relevant section of the particular Act or regulation included in the Eskom environmental legislation database.

A brief description of the essence of the legal provision and its relevance to Eskom is provided. Where further information has been included in the Legal Commentary on the particular obligation listed in the table, a link  is provided under the obligation directly to that point in the Legal Commentary.

Annex A
(concluded)

The Legal Commentary should be read in conjunction with the tables summarising the applicable legal obligations. It is important to note that although hard copies of the Legal Register have been provided for ease of reference, the register has been specifically compiled for electronic use and so that the legal obligations could be directly linked to the actual legislation contained in the Eskom environmental database.

The legislation database is updated on a regular basis, depending on the nature and extent of changes in relevant legislation. The legal registers have been prepared to assist Eskom with compliance with generally applicable legal obligations and are intended as a guideline only. The legal registers are not a substitute for detailed legal advice on specific issues and do not cover all legal obligations. Should you require more detailed legal advice or have any queries in regard to the content or application of the registers, kindly contact Catherine Warburton at IMBEWU Enviro-Legal Specialists (Propriety) Limited on (011) 325-4928.

Environmental legislation

Eskom has access to a legal database (http://teknowrep/cs/legal/) to access relevant environmental legislation. This database only covers national legislation, provincial legislation, and some local legislation. Please consult your local authority to get by-laws applicable to your business unit.

Relevant external legal links

ECOLEX: Gateway to Environmental Law	A gateway to environmental law, (international site by UNEP, looking at international treaties, national legislation, court decisions, and literature)	This site has a good search engine.
SA Government	Official government documents	Sometimes difficult to find specific document.
Acts Online	Access to South African Acts	Simple to access specific acts; not sure how up to date the site is.

Annex B
(normative)

Power Line

B.1 Checklist for required power line baseline data

Power line name: ……...

Responsible person/BU: ……..

Assessor's name: …….. Unique no: ……

Assessment date: ……..

No	Item	Yes	No	Reference/location	Action
1	1:50,000 map with annotated power lines and towers				
2	Spanning plans/profiles				
3	Vegetation types				
4	Soil types				
5	General climate				
6	Vegetation control procedures/standards				
7	Herbicide procedures/standards				
8	Herbicide Register				
9	Bird Interaction Register				
10	Sections of power line fitted with bird markers/protectors/shields/guards				
11	Vegetation control contracts in place				
12	Affected landowners' property details, names, addresses, telephone numbers, and land use				
13	Lightning frequency				
14	Sensitive environmental areas				
15	Complaints/Communication Register				
16	Archaeological/historical sites				
17	Technical data on the power line				
18	Line slope analysis (slope and soil type and rainfall)				
19	Schedule of landowners' "special conditions"				
20					
21					
22					
23					
24					

Annex B
(continued)

B.2 Checklist for baseline data required for land, substation, and radio repeater sites

Site name: ……

Responsible person: ……..

Assessor's name: …… Unique no: ……

Assessment date: ……

No	Item	Yes	No	Reference/location	Action
1	Map showing extent of Eskom property (servitude or property diagram)				
2	Layout map showing site layout on Eskom property				
3	Plans showing water supply, sewage discharge, oil traps/bund walls/canals/ holding dams, storm water drains, fire hydrants				
4	Register of All Hazardous Substances and their hazardous data sheets				
5	Waste Register (domestic, medical, hazardous, garden, building rubble)				
6	Herbicide Register				
7	Register of Legal Requirements				
8	Register of Operational Policies, Standards, Procedures, and Work Instructions				
9	Register of All Operations Taking Place on the Site				
10	Register of All Contracts in Place				
11	Soil type				
12	Problematic vegetation				
13	Adjacent property descriptions, landowners' names, addresses, telephone numbers, and land use				
14	Environmental emergency plan				
15	Title deeds of property				
16	Special conditions in terms of land use zoning and landowners' "special agreements"				
17	Firebreak statutory requirements and programme				
18					
19					
20					
21					
22					

Annex B
(continued)

B.3 Checklist for baseline data required for power station sites

Site name: ……

Responsible person: ……..

Assessor's name: …… Unique no: ……

Assessment date: ……

No	Item	Yes	No	Reference/location	Action
1	Map showing extent of Eskom properties (property diagrams)				
2	CAPCO registration certificate				
3	Water quality requirements (permits)				
4	Registration certificate of waste site				
5	Copies of title deeds of properties				
6	All lease contracts of Eskom land with third parties				
7	Special conditions in terms of land use zoning and landowners' "special agreements"				
8	Layout map showing site layout on Eskom property and associated plant and activities				
9	Plans/schematic drawings showing coal stockyard, coal bunkers and mills, coal conveyors, dumping of coal discards				
10	Plans showing location and drainage at precipitators, hoppers, ash and slurry plant, ash pipelines/conveyors, ash disposal areas				
11	Plans showing location and drainage at turbine lubricating store and processing plant, transformer oil purification and processing plant, bulk oil and lighting up plant, clean and dirty oil stores				
12	Plans showing water systems, that is, potable water treatment plant, demineralisation plant, condensate polishing plant, chemical laboratories and stores, storm water drainage system, blow-downs, dirty water effluent dam/station drain dams, clean water dams, intermediate/emergency dams, storm water disposal systems, sewage plant, raw water reservoir, diversion of streams				

Annex B
(concluded)

No	Item	Yes	No	Reference/location	Action
13	Plans showing plantations, nursery yard, rehabilitated and landscaped areas, recreational areas, degraded areas				
14	Plans showing power lines, airstrip, roads, parking areas, boundary fences, security fences, firebreaks, fire station and training area, medical centre, buildings, workshops, accommodation, leased areas, surrounding land use, waste collection and disposal areas				
15	Register of All Hazardous Substances and their hazardous data sheets				
16	Waste Register (domestic, medical, hazardous, garden, building rubble, oil, metals)				
17	Herbicide Register				
18	Register of Legal Requirements				
19	Register of Operational Policies, Standards, Procedures, and Work Instructions				
20	Register of All Operations Taking Place on the Site that Affect Environmental Performance				
21	Register of All Contracts in Place				
22	Soil type				
23	Problematic vegetation				
24	Adjacent property descriptions, landowners' names, addresses, telephone numbers, and land use				
25	Environmental emergency plans				
26	Firebreak statutory requirements and programme				
27	Climate and weather				
28	All environmentally-related permits and certificates and correspondence				
29	Environmental monitoring results, reports, and performance indicators				
30					
31					
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33					
34					
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37					
38					

Annex C
(normative)

Environmental aspects and impacts

C.1 Checklist for identification of environmental aspects and impacts on power line routes

Site name:.....

Responsible person:.....

Assessor's name: ..... Unique no: .....

Assessment date: .....

From tower no: ..... To tower no: .....

(Environmental issues identified shall be marked up on a sketch or map of power line.)

Checklist for issues to be identified:

Aspect	Aspect	Aspect
Access road: • Centre line • Other	Bird interactions • Collisions • Electrocutions • Pollution • Nests • Need for remedial action	Storm water drainage • Natural • Berms • Channels • Pipes
Soil erosion • Tower position • Access road • River crossing • Other	Eskom gates • General condition • Closed and locked • Locks	Social activities under power line • Houses • Farming • Structures • Mining • Airfields • Power lines • Telephone lines • Other
Bush encroachment • Clearance • Fire risk	Construction material • Concrete • Steel works • Insulators • Conductor • General	Visual impact
Alien/invader vegetation • Access • Fire risk • Clearance • Spread		Soil type • Sandy • Clay • Rocks • Wet
Protection of natural vegetation	Fence crossings • General condition	Lightning
Archaeological/historical/ natural heritage/cultural sites	River crossings	Complaints or requests from landowners
Noise complaints	Risk to airfields and flight paths (crop spraying and game management)	Radio/TV interference

Annex C
(continued)

C.2 Field checklist to identify environmental aspect to be corrected

			Impact			
Pole no	**Aspect**	**Description**	**N/A**	**High**	**Med**	**Low**

Annex C
(continued)

C.3 Checklist for identification of environmental aspects and impacts at Eskom sites, land, substation, and radio repeater sites

Site name:.....

Responsible person:.....

Assessor's name: ..... Unique no: .....

Assessment date: .....

(Environmental aspect identified should be marked up on this sketch.)

	Aspect	**Description**	**Impact**			
			N/A	**High**	**Med**	**Low**
	Erosion • HV yard • Security fences • Storm water • Access road					
	Vegetation control • HV yard • Security fences • Outside fence area • Firebreak • Other					
	Storm water • Outlet • HV yard • Terraces					

Annex C
(continued)

			Impact			
	Aspect	**Description**	**N/A**	**High**	**Med**	**Low**
	Leaching of herbicides • Security fences • Outside Eskom property					
	Oil spills • HV yard • Oil dam • Storage area					
	Littering • General • Maintenance • Construction					
	Waste disposal • Waste separation • Bins • Site disposal • Contract for disposal					
	Water • Municipal • Storm water collection • Borehole					
	Sewerage • Municipal • Septic tank • French drain					
	Hazardous material store • Register • Data sheets • Ventilation • Storage					
	Security of oil dam • Security fence • Shade netting					
	Animal interactions • Security fence • HV yard (pollution/ nests) • Oil dam					
	PCB labelling					
	Firebreak					
	Oil trap					
	Landscaping					
	Visual impact					
	Complaints and requests by landowners					
	Noise pollution and complaints					
	Eskom fences and gates • General condition • Closed and locked • Locks					

Annex C
(continued)

C.4 Checklist for identification of environmental aspects and impacts at power station sites

Site name:.....

Responsible person:.....

Assessor's name: ..... Unique no: .....

Assessment date: .....

(Environmental aspect identified should be marked up on a site plan.)

			Impact			
	Aspect	**Description**	**N/A**	**High**	**Med**	**Low**
	Erosion • General site • Security fences • Storm water • Access roads					
	Vegetation control • General site • Security fences • Outside fence area • Firebreak • Leased land • Other					
	Storm water • Outlet • Internal pollution • Network					
	Leaching of herbicides • Security fences • Outside Eskom property					
	Oil spills • Oil and grit plant • Turbine lubricating store and processing plant • Transformer oil purification and processing plant • Bulk oil and lighting up plant • Silt traps • Oil traps • Oil storage areas • General site					

Annex C
(continued)

			Impact			
	Aspect	**Description**	**N/A**	**High**	**Med**	**Low**
	Waste disposal • Waste separation • Bins • Holding/separation site • P/S waste site • Site disposal • Contract for disposal					
	Water • Cooling towers • Cooling water pump house • Potable water treatment plant • Demineralisation plant • Condensate polishing plant • Chemical laboratory and stores • Storm water drainage system • Storm water discharge • Borehole analysis • Blow-downs • Dirty water effluent dams/station drain dams • Clean water dams • Intermediate/ emergency dams					
	Sewerage • Plant • Maintenance • Capacity • Effluent					
	Hazardous material store • Register • Data sheets • Ventilation • Storage					
	General infrastructure • Security fences • Power lines • Airstrip • Roads • Parking areas • Boundary fence • Firebreaks • Fire station and testing area • Medical centre • Buildings • Workshops • Accommodation • Leased farm land					
	Animal interactions • Security fence • Plant • Dams • Other					

Annex C
(concluded)

			Impact			
	Aspect	**Description**	**N/A**	**High**	**Med**	**Low**
	PCB labelling					
	Firebreak					
	Landscaping					
	Visual impact					
	Complaints and requests by landowners					
	Noise pollution and complaints					
	Eskom fences and gates • General condition • Closed and locked • Locks					
	Air pollution • Stacks • Coal stockyard • Coal discards • Ash disposal • Waste site					
	Coal • Coal stockyard • Coal bunkers and mills • Coal conveyors • Coal discards					
	Ash • Ash dams • Ash water return dams • Ash water canals • Precipitators & hoppers • Particulate emissions • Ash crushers					
	Waste • General littering • Bins • Collection areas • Contracts • Disposal site • Hazardous • Domestic • Building • Garden • Medical • Oil • Metals					

Annex D
(normative)

EMP Register

D.1 Environmental Management Programme Register

Site/power line: ..... Compiled by:..... Date: ..... Revision date: .....

Activity/location	Environmental aspect	Impact (Y/N)	Significance (H/M/L)	Regulatory requirement	Action to be taken	Responsible person/team	Due date	References/ remarks	Date completed

Eskom	Procedure	

Title: **Environmental Procedure: Environment Control Document**

Unique identifier:	**32-96**
Document type:	**EPC**
Revision:	**0**
Effective date:	**September 2007**
Total pages:	**11**
Revision date:	**September 2010**

COMPILED BY	FUNCTIONAL RESP	SUPPORTED BY	AUTHORISED BY
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Corporate Specialist	**Chair ELC**	**General Manager Corporate Sustainability**	**Managing Director Corporate Services Division**

This document has been seen and accepted by the ELC and duly authorised by the General Manager Corporate Sustainability.

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1 Introduction

This Control Document for the Environmental Procedure covers all requirements of, and serves as the basis for, the environmental procedure. It contains all supporting documentation and clauses required for environmental procedures in Eskom and should be referenced in all documentation forming part of the procedure. All requirements and clauses shall apply to all supporting documentation unless specifically mentioned.

2 Document content - Statement

List of all relevant environmental management procedures, with implementation date and reference numbers.

Reference	Name	Implementation date	Revision
EPC 32-96	Environmental Control Document	September 2007	0
EPC 32-245	Waste Procedure Annex A: Fluorescent Tubes and Mercury Containing Device Management Annex B: Disposal and Safe Handling of SF_6 and by-products Annex C: PCB Management Annex D: Oil Management Annex E: Asbestos Management Annex F: Health Care Risk Waste Annex G: Metals Annex H: E-waste Annex I: Solvents Annex J: Ozone Depleting Substances	September 2007	0
EPL 32-97	Land Policy	September 2007	0
EPC 32-247	Vegetation Clearance and Maintenance within Overhead Power Line Servitudes	September 2007	2
EPC 32-258	Due Diligence Procedure	September 2007	1
EPC 32-249	ELC Reporting Procedure	September 2007	6
EPC 32-246	Reporting on Environmental Expenditure Procedure	September 2007	1
EPC 32-259	ELC Terms of Reference	September 2007	6

3 Supporting clauses

All documents listed under the above statement will comply with the following supporting clauses unless otherwise stated within the document.

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3.1 Scope

3.1.1 Purpose

This procedure serves as the basis for environmental management in Eskom Holdings Limited (Eskom) inside and external to South Africa and in relevant subsidiaries and to ensure uniformity in the application thereof in all applicable operations.

3.1.2 Applicability

This policy shall apply throughout Eskom, its divisions' subsidiaries, and entities in which Eskom has a controlling interest or significant influence, including identified contractors, suppliers and service providers, and customers to Eskom and Eskom subsidiaries where significant impacts and risks may occur.

3.2 Normative/Informative References

The latest version of all documents shall apply:

Eskom Safety, Occupational Health, and Environmental Policy

ELC Terms of Reference

3.3 Definitions

These lists will serve as the definitive definition and abbreviation lists for Eskom environmental documentation.

3.3.1 **Compliance audits:** Any audit designed in such a way that it will measure/evaluate compliance with legal and Eskom requirements, including identified good practices.

3.3.2 **Contractors:** Registered business or employer to whom a contract is awarded to conduct business on behalf of Eskom.

3.3.3	**Controlling interest**:	(a) The ownership or control (directly or indirectly) of more than 50 % (fifty per cent) of the voting share capital of the relevant undertaking; (b) the ability to direct the casting of more than 50 % (fifty percent) of the votes exercisable at general meetings of the relevant undertaking on all, or substantially all, matters; or (c) the right to appoint or remove directors of the relevant undertaking holding a majority of the voting rights at meetings of the Board on all, or substantially all, matters.
3.3.4	**Emergency incident:**	"Incident" means an unexpected sudden occurrence, including a major emission, fire, or explosion leading to serious danger to the public or potentially serious pollution of, or detriment to, the environment, whether immediate or delayed.
3.3.5	**Environment:**	The surroundings within which humans exist and that are made up of: (i) the land, water, and atmosphere of the earth; (ii) micro-organisms and plant and animal life; and (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and the physical, chemical, aesthetic, and cultural properties and conditions of the foregoing that influence human health and well-being.
3.3.6	**Event:**	SHE happenings reported by business units to divisions and the ELC, including all media and occurrences and issues in contravention of legislation and within legal parameters.
3.3.7	**Hazard:**	Means a source of, or exposure to, danger.
3.3.8	**Incident:**	Undesired accidental event that results in injury, damage, or loss.
3.3.9	**Occupational health and safety:**	Includes occupational hygiene, occupational safety, occupational medicine, fire safety and public safety, and emergency preparedness.
3.3.10	**Pollution:**	Means any change in the environment caused by (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust, or heat; emitted from any activity, including the storage or treatment of waste or substances, construction, and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience, and productivity of natural or managed ecosystems or on materials useful to people, or will have such an effect in the future.
3.3.11	**Risk:**	The probability that injury or damage will occur.
3.3.12	**Safety:**	The management and control of associated risks to provide an environment that is safe for people to work in.
3.3.13	**Subsidiary:**	Eskom Enterprises and the line divisions should they become incorporated or any other company in which Eskom Holdings Limited is a holding company controlling a majority of the votes (that is, more than 50 %).
3.3.14	**Sustainability:**	The integration of sustainable development into business strategy, practices, and operations.

3.3.15 Sustainable development: "Meeting the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development is also defined as the integration and consideration of three pillars, namely, economic, social, and environmental issues.

3.3.16 Significant influence: The power to participate in the financial and operating policy decisions of an entity, but is not control over those policies.

Entities included in this definition are:

- associates where Eskom owns, directly or indirectly, more than 20 %, but not more than 50 %, of the voting power; and
- joint ventures where Eskom owns, directly or indirectly through subsidiaries, less than 50 % of the voting power, but does not have operational control.

3.3.17 Waste: Includes any substance, whether solid, liquid, or gaseous, that is:

(i) discharged, emitted, or deposited in the environment in such volume, constituency, or manner as to cause an alteration to the environment;
(ii) a surplus substance or one that is discarded, rejected, unwanted, or abandoned;
(iii) reused, recycled, reprocessed, recovered, or purified by a separate operation from that which produced the substance or that may be or is intended to be reused, recycled, reprocessed, recovered, or purified; or
(iv) identified as waste by prescribed regulation.

Ref. National Environmental Management: Waste Management Bill, for general comment. General Notice 1832 of 2007, 12 January 2007.

3.3.18 Commercial timber growers: Timber growers, both individually or as represented by the Forest Owners Association, the South African Wattle Growers Union, or the South African Timber Growers Association and their personnel (Commercial Timber Growers Guideline).

3.3.19 Plantation: Any trees planted and managed by commercial timber growers for commercial purposes (Commercial Timber Growers Guideline).

3.4 Abbreviations

Current abbreviations in use in the environmental field in Eskom:

3.4.1	**Board SC:**	Eskom Holdings Board Sustainability Committee
3.4.2	**CE:**	Chief Executive
3.4.3	**COID:**	Compensation for Occupational Injuries and Disease
3.4.4	**CS (SHE):**	Corporate Sustainability (Safety, Health, and Environment)
3.4.5	**CS:**	Corporate Sustainability
3.4.6	**GMCS:**	General Manager Corporate Sustainability
3.4.7	**CTAD:**	Corporate Technical Audit Division
3.4.8	**CTADM:**	Corporate Technical Audit Division Manager
3.4.9	**Dx:**	Distribution Division
3.4.10	**EA:**	Environmental Audit
3.4.11	**EDTT:**	Environmental Documentation Task Team

3.4.12	**Ex:**	Enterprises Division
3.4.13	**EHB:**	Eskom Holdings Board
3.4.14	**ELC:**	Environmental Liaison Committee
3.4.15	**EMP:**	Environmental Management Programme
3.4.16	**EMS:**	Environmental Management System
3.4.17	**ESPI**	Eskom Sustainability Performance Index
3.4.18	**EXCO:**	Executive Management Committee
3.4.19	**EXCO S&SSC:**	Executive Management Committee Sustainability and Safety Sub-committee
3.4.20	**Fx:**	Finance Division
3.4.21	**GRI:**	Global Reporting Initiative
3.4.22	**Gx:**	Generation Division
3.4.23	**KPA:**	Key Performance Area
3.4.24	**KPI:**	Key Performance Indicator
3.4.25	**NEMA:**	National Environmental Management Act
3.4.26	**OHSA:**	Occupational Health and Safety Act
3.4.27	**OHSLC:**	Occupational Health and Safety Liaison Committee
3.4.28	**OSR:**	Operational Sustainability Report
3.4.29	**PCBs:**	Polychlorinated Biphenyls
3.4.30	**PCO:**	Pest Control Officer
3.4.31	**ppm:**	Parts Per Million
3.4.32	**SHE:**	Safety, Occupational Health, and Environment
3.4.33	**SLC**	Sustainability Liaison Committee
3.4.34	**TT**	Task Team
3.4.35	**Tx**	Transmission Division
3.4.36	**WIS**	Waste Information System (National Waste Management Strategy)

3.5 Roles and Responsibilities

Not applicable

3.6 Implementation date

The implementation date will be August 2007.

3.7 Process for Monitoring

Monitoring and measurement requirements are included in the current document, ELC Reporting Procedure, EPC 32-249.

3.8 Related documents

This is the full list of environmental documentation, current and historical, in Eskom. Documents included have Eskom-wide application (Level 1 documents). This list does not contain division-specific documentation (Level 2 documents).

Status as at September 2007:

New reference No.	Old reference No.	Name	Revision date	Status September 2007
EPL 32-94	N/A	Eskom Safety, Occupational Health, and Environmental Policy	1 January 2010	Approved November 2006
EPC 32-96	N/A	Environmental Procedure: Environmental Control Document	1 May 2010	Approved October 2006
EPL 32-157	ESKPBAAY7	Climate Change Policy	1 January 2010	Approved March 2006
EPC 32-246	ESKADABC8	Environmental Procedure: Reporting on Environmental Expenditure Directive	1 May 2010	Approved October 2006
N/A	ESKADABE9	EIA Directive	N/A	Cancelled
N/A	ESKADABD1	EMS Directive	N/A	Cancelled; issues included in SHE Policy (EPL 32-94)
N/A	ESKADAAO3	Corporate Directive for the Management of Polychlorinated Biphenyls (PCB)	N/A	Cancelled; included in Environmental Procedure: Waste Procedure (EPC 32-245)
N/A	ESKADABK1	Environmental Land Management Directive	N/A	Cancelled; replaced by Environmental Policy: Land Policy (EPL 32-97)
N/A	ESKPBAAD6	Environmental Management Policy	N/A	Cancelled; replaced by SHE Policy (EPL 32-94)
N/A	ESKPBAAM2	Environmental Education Policy	N/A	Cancelled
N/A	ESKPBAAA3	Air Quality Management Policy	N/A	Cancelled; replaced by Gx Atmospheric Emissions Management Policy (GGPP1327)
N/A	ESKPBAAA4	Ozone Depleting Compounds Management and Phase-out Policy	N/A	Cancelled; included in Environmental Procedure: Waste Procedure (EPC 32-245)

New reference No.	Old reference No.	Name	Revision date	Status September 2007
N/A	ESKPBAAB6	Policy on Power Frequency Electric and Magnetic Fields (EMF)		Under review by OHSLC
N/A	ESKPBAAD4	Herbicide Management	N/A	Cancelled; issues included in Environmental Procedure: Procedure for Vegetation Clearance and Maintenance within Overhead Power Line Servitudes and on Eskom-owned Land (EPC 32-247)
N/A	ESKPBAAJ4	Water Management	N/A	Cancelled
N/A	ESKPBAAC4	Waste Management Policy	N/A	Cancelled; included in Environmental Procedure: Waste Procedure (EPC 32-245)
N/A	ESKPBAAR4	Flue Gas Detoxification Policy	N/A	Cancelled; issues included in Gx Atmospheric Emissions Management Policy (GGPP1327)
N/A	ESKPVABW6	EMS standard	N/A	Cancelled; issues included in SHE Policy (EPL 32-94)
N/A	ESKPVACS0	Compilation and Review of Eskom Environmentally-related Documents	N/A	Cancelled
	ESKPVAAG5	Requirements for the Safe Processing, Storing, Removing, and Handling of Asbestos or Asbestos-containing Materials Procedure	N/A	Re-issued
N/A	ESKPVAAZ1	Environmental Management Plans Procedure	N/A	Cancelled; issues included in Environmental Procedure: Environmental Management Programme Guideline (EPC 32-248)

New reference No.	Old reference No.	Name	Revision date	Status September 2007
EPC 32-249	ESKPVABX8	Environmental Performance Indicator Reporting Procedure	1 May 2010	Re-issued as Environmental Procedure: Environmental Liaison Committee (ELC) Performance Indicator Reporting Procedure (EPC 32-249)
N/A	ESKASABT0	Oil Spill Clean-up and Rehabilitation Procedure	N/A	Cancelled; issues included in Environmental Procedure: Waste Procedure (EPC 32-245)
N/A	ESKASAAL0	The Safe Use of Pesticides and Herbicides (Standard)	N/A	Cancelled; issues included in Environmental Procedure: Procedure for Vegetation Clearance and Maintenance within Overhead Power Line Servitudes and on Eskom-owned Land (EPC 32-247)
N/A	ESKASAAC2	Management of PCBs (Standard)	N/A	Cancelled; issues included in Environmental Procedure: Waste Procedure (EPC 32-245)
EPC 32-247	ESKASABG3	Standard for Bush Clearance and Maintenance within Overhead Power Line Servitudes (Standard)	1 May 2010	Reissued as Environmental Procedure: Procedure for Vegetation Clearance and Maintenance within Overhead Power Line Servitudes and on Eskom-owned Land (EPC 32-247)
N/A	ESKASABT0	Oil Spill Clean-up and Rehab (Standard)	N/A	Cancelled; issues included in Environmental Procedure: Waste Procedure (EPC 32-245)

New reference No.	Old reference No.	Name	Revision date	Status September 2007
N/A	ASAAE1.PDF-	The Safe Handling of SF_6 and Its Products	August 2002	Cancelled; included in waste procedure. New NRS under development
EPC 32-259	ESKASABH0	Environmental Liaison Committee Terms of Reference	1 May 2010	Reissued as Environmental Procedure: ELC Terms of Reference (EPC 32-259)
N/A	ESKAGAAO6	Guide to Developing an EMS that Complies with SABS/ISO 14001	N/A	Cancelled; issues included in SHE Policy (EPL 32-94)
N/A	ESKAGAAJ6	Safe Handling and Disposal of Fluorescent Tubes	N/A	Cancelled; issues included in Environmental Procedure: Waste Procedure (EPC 32-245)
N/A	ESKAGAAJ6-	Guidelines for the Rehabilitation and Vegetation Management of Herbicide-treated Sites	N/A	Guideline; uncontrolled document
EPC 32-258	ESKGAAZ6	Environmental Land Due Diligence Audit Guideline	1 May 2010	Reissued as Environmental Procedure: Due Diligence (EPC 32-258)

4 Authorisations

This document has been seen and accepted by:

Name	Designation
PJ Maroga	Chief Executive
B Nqwababa	Finance Director
ME Letlape	Managing Director (Human Resources Division)
EN Matya	Managing Director (Generation & Generation Primary Energy)
E Johnson	Managing Director (Systems Operations & Planning)
MM Ntsokolo	Managing Director (Transmission Division)
JA Dladla	Managing Director (in the office of the Chief Executive)
Dr SJ Lennon	Managing Director (Corporate Services Division)
BA Dames	Managing Director (Enterprises Division)
A Noah	Managing Director (Distribution Division)

3.8 Revisions

Approved date	Revision	Activity
June 2005	0	Document development
April 2006	1	Update status of documents Update list of procedure content
August 2007	0	New document number, EDC ISO formatted

6 Development team

ELC

ANNEXURE D: STANDARD ENVIRONMENTAL SPECIFICATION

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PROJECT BRAVO POWER STATION

STANDARD ENVIRONMENTAL SPECIFICATION

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1 SCOPE AND INTERPRETATIONS

1.1 GENERAL

This section covers the requirements for controlling the impact of construction activities on the environment. Environmental management is concerned not only with the results of the Contractor's operations to carry out the Works but also, and most importantly, with the manner in which his operations are carried out. It is thus a requirement that the Contractor shall comply with the environmental requirements on an ongoing basis.

The Contractor shall take full responsibility for protecting the natural environment and eliminating or minimising the negative impacts of construction on the environment during construction. The Contractor shall prevent or limit the occurrence of accidents which may cause damage to the environment, prevent or limit the consequences of such accidents and shall return the environment to a state as close as possible to its condition prior to any such accident occurring. Nothing specified herein shall relieve the Contractor of any obligations or responsibilities in this regard.

The requirements of this Specification apply to all areas under the Contractor's control, including but not limited to the Working Area, all borrow pits, the construction camp and offices, all access/ haul routes and all labour accommodation areas.

1.2 ENVIRONMENTAL POLICY

The Contractor shall prepare and implement an Environmental Protection Policy, in line with various statutory regulations and this Specification. The Policy shall be submitted to the Engineer within 28 days after the Commencement Date. Upon the Engineer's approval, the Contractor shall immediately implement the policy and any amendments, and keep it in operation for the full duration of the Contract. The policy shall be communicated to all personnel and copies of the policy shall be prominently displayed at all places of work.

The Contractor shall keep the policy updated in accordance with his Quality Management Procedures and make amendments as required by the Engineer and the circumstances prevailing at the time. Upon such revision, the Contractor shall immediately supply the Engineer with two copies of an updated Environmental Policy, which shall clearly indicate the revisions undertaken.

1.3 INTERPRETATIONS

1.3.1 Supporting specifications

This Specification must be read in concert with the International Federation of Consulting Engineers Conditions of Contract for Construction (FIDIC CCC). In particular, the Contractor's attention is draw to the following sections of the FIDIC CCC, which are considered to form part of the environmental controls:

i) Subclause 3.2: Delegation by the Engineer (for the appointment of the Environmental Control Officer);
ii) Subclause 4.14: Avoidance of Interference;
iii) Subclause 4.15: Access Route;
iv) Subclause 4.18: Protection of the Environment;
v) Subclause 4.23: Contractor's Operations on Site;
vi) Subclause 4.24: Fossils;
vii) Subclause 6.6: Facilities for Staff and Labour;
viii) Subclause 6.9: Contractor's Personnel;

ix) Subclause 6.11: Disorderly Conduct;
x) Subclause 8.8: Suspension of Work;
xi) Subclause 11.11: Clearance of Site;

1.3.2 Application

In the event of any difference or discrepancy between the provisions of the other specifications forming part of the Tender Document and the provisions of this Specification, where such difference or discrepancy has environmental implications, the latter shall prevail.

2 DEFINITIONS

For the purposes of this Specification, the following definitions shall apply:

Borrow area means any areas within designated boundaries, approved for the purpose of obtaining borrow material.

Borrow material means any material, be it gravel, sand or soil obtained from designated areas for use as bedding material or fill. It does not include rock or stone or any material obtained from commercial sources.

Borrow pit means the excavated pit in a borrow area.

Botanical specialist, for the purposes of this Specification, means a specialist suitably qualified to deal with the type of vegetation occurring in the affected environment. This should be the specialist who undertook the botanical investigation as part of the Environmental Impact Assessment (EIA), or where he/ she is unavailable, a suitable replacement identified by the Engineer.

Clearing means the clearing and removal of vegetation, whether partially or in whole, including trees and shrubs, as specified.

Contaminated water means water contaminated by the Contractor's activities, e.g. concrete water as well as runoff from equipment, construction camps, ablution facilities and personnel wash areas.

Demolish means the demolition and complete removal and disposal of buildings, sheds, poles, concrete and any other objects and structures.

Environment means the surroundings within which humans exist and that are made up of:

i) The land, water and atmosphere of the earth;
ii) Micro-organisms, plant and animal life;
iii) Any part or combination of i) and ii) and the interrelationships among and between them; and
iv) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being (*i.e.* the social environment).

Establishment period means the period that commences from the time of actual planting or revegetation until at least six months after planting.

Flood plain means the area encompassed by the 1:100 year flood line.

Grubbing means the removal and disposal of roots and stumps of trees and vegetation already cleared.

Hazardous substance means a substance governed by the Hazardous Substances Act as well as the Hazardous Chemical and Substances Regulations. In addition, any other substance that, in the reasonable opinion of the Engineer, can have a deleterious effect on the environment will be regarded as a potentially hazardous substance.

Heritage resource, as per the provisions of the National Heritage Resources Act (No 25 of 1999), means those heritage resources that are of cultural significance or other special value for present and future generations, and which are accordingly considered part of the national estate. In this regard, the national estate includes those items identified in terms of Section 2 of the Act.

Heritage specialist, for the purposes of this Specification, means a specialist suitably qualified to deal with the type of heritage resource discovered. For example where the resource is an archaeological artefact or site, the heritage specialist would be an archaeologist and where it is a fossil the specialist would be a palaeontologist.

Invasive alien vegetation means vegetation which either does not naturally occur in the country and/or region or which under certain conditions proliferates and becomes problematic since it outgrows other plants and may represent a significant maintenance cost.

Maintenance period means the period after the establishment period up to and until the end of the defects liability period, during which the contractor shall be responsible to maintain the vegetation, and shall be one growing season.

Method Statement means a written submission by the Contractor to the Engineer in response to this Specification or a request by the Engineer, setting out the equipment, plant, materials, labour and method the Contractor proposes using to carry out an activity identified by this Specification or the Engineer when requesting the Method Statement, in such detail that the Engineer is able to assess whether the Contractor's proposal is in accordance with this Specification and/ or will produce results in accordance with this Specification.

The Method Statement shall cover applicable details with regard to:

i) Construction procedures;
ii) Plant, materials and equipment to be used;
iii) Transporting the equipment to and from site;
iv) How the plant/ material/ equipment will be moved while on site;
v) How and where the plant/ material/ equipment will be stored;
vi) The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
vii) Timing and location of activities;
viii) Compliance/ non-compliance with this Specification; and
ix) Any other information deemed necessary by the Engineer.

Natural vegetation means all existing species, indigenous or otherwise, of trees, shrubs, groundcover, grasses and all other plants found growing on the site.

Oil Separator means a trap that separates oil from the water and prevents oil from being carried from the Works into watercourses and water bodies.

Pollution Incident means any incident that may or has caused damage to or the contamination of the natural environment.

Reasonable means, unless the context indicates otherwise, reasonable in the opinion of the Engineer after he has consulted with a person, not an employee of the Employer, suitably experienced in environmental management practices.

Settlement Ponds means ponds that retain water from the Works laden with sediment, suspended solids or other matter for a sufficient period for the sediment/ suspended solids/ matter to settle.

Sensitive area means any area that is denoted as sensitive by this Specification or Engineer due to its particular attributes, which could include the presence of rare or endangered vegetation, the presence of heritage resources (*e.g.* archaeological artefact or graves), the presence of a unique natural feature, the presence of a watercourse or water body, the presence of steep slopes (in excess of 1:4) *etc*.

Slope means the inclination of a surface expressed as one unit of rise or fall for so many horizontal units.

Solid waste means all solid waste, including construction debris, chemical waste, excess cement/ concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

Spoil means excavated material which is unsuitable for use as material in the Works or is material which is surplus to the requirements of the Works.

Topsoil means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility appearance, structure, agricultural potential, fertility and composition of the soil.

Watercourse means any river, stream and natural drainage channel whether carrying water or not.

Water body means body containing any form of water and includes dams and wetlands, whether ephemeral or permanent. In this regard, wetland means any area that is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the area is covered by shallow water. Specifically, an area is classified as a "wetland" if it meets at least one of the following criteria:

i) The area predominantly supports hydrophytes, at least periodically;
ii) The substrate(soil) is predominantly undrained hydric soil; and/ or
iii) The substrate is non-soil, and is saturated with water or covered by shallow water at some time during the growing season.

Works means the Works to be executed in terms of the Contract and in accordance with this Specification.

Working Area means the land and any other place on, under, over, in or through which the Works are to be executed or carried out, and any other land or place made available by the Employer in connection with the Works. The Working Area shall include the site office, construction camp, stockpile and laydown areas, batching areas, all access routes and any additional areas to which the Engineer permits access.

3 GENERAL REQUIREMENTS

3.1 GENERAL AND LEGAL OBLIGATIONS

All construction activities shall observe and obey any relevant environmental legislation and in so doing shall be undertaken in a manner that will minimise impacts on the surrounding environment, the public and adjoining landowners. The Contractor shall absolve the Employer of any and all risk or liability in terms of compliance with all relevant statutory obligations.

The Contractor shall construct and/ or implement all the necessary environmental protection measures in each area before any production work will be allowed to proceed. The Engineer may suspend the Works at any time in terms the Conditions of Contract should the Contractor, in the Engineer's opinion, fail to implement, operate or maintain any of the environmental protection measures adequately.

3.2 ENVIRONMENTAL MONITORING

A suitably qualified senior staff member, appointed four weeks prior to contract commencement and employed full time on site by the Contractor, shall be responsible for environmental monitoring and control. This position shall be designated as the Environmental Officer (EO). The EO shall be a person with adequate environmental knowledge to understand and implement these Specifications, as determined by the Engineer. As a minimum requirement the EO should poses a tertiary qualification in a relevant field and two years of experience in environmental monitoring and control. The duties of the EO will include:

i) Liaison with the Environmental Control Officer (ECO);
ii) Monitoring of all of the Contractor's activities for compliance with the various environmental requirements contained in this Specification;
iii) Monitoring of compliance with other relevant environmental legislation;
iv) Development of requisite environmental Method Statements;
v) Instituting remedial action in the event of non-compliance;
vi) Implementation and management of environmental protection measures;
vii) Keeping a register of public complaints and recording and addressing any public comments or issues;
viii) Routine recording and reporting of environmental activities on a daily basis;
ix) Recording and reporting of environmental incidents; and
x) Environmental induction and presentation of the Environmental Awareness Training courses on a scheduled basis to the Contractor's staff.

The Contractor's attention is draw to the fact that, as a result of the statutory authorisation process in terms of the Environment Conservation Act (No 73 of 1989), an Environmental Control Officer (ECO) will be appointed by the Employer to monitoring compliance by the Contractor and his staff with the environmental requirements of this Specification. As per the provisions of Subclause 14.2 of the FIDIC CCC, the Engineer will delegate many of his functions in terms of this Specification to the ECO.

3.3 SITE MEETINGS

Compliance with this Specification will be an item on the agenda of the monthly site meetings.

3.4 ENVIRONMENTAL INDUCTION

The Contractor shall ensure that all of his employees, and those of his Sub-Contractor's, attend Environmental Awareness Training course/s. The Environmental Awareness Training course/s shall be structured to ensure that attendees:

i) Acquire a basic understanding of the key environmental features within the Working Area and its immediate environs;

ii) Become familiar with the environmental controls contained within this Specification; and
iii) Receive pertinent, written instructions regarding compliance with the relevant environmental management requirements (*viz.* environmental "do's" and "don'ts"); and
iv) Are made aware of any other environmental matters as deemed necessary by the Engineer.

The initial Environmental Awareness Training course shall be held within 14 days from the Commencement Date, and subsequent courses shall be arranged for new employees coming onto site after the initial training course. Provision shall also be made for refresher courses to be undertaken on a quarterly basis during the course of the Contract.

The Contractor shall provide a suitable venue with facilities and ensure that the specified employees attend the Environmental Awareness Training course/s. The course/s shall be held in the morning during normal working hours. No more than 20 people shall attend each course and the Contractor shall allow for sufficient sessions to train all personnel. The Contractor shall provide proof of attendance by all of his employees in the form of a signed attendance register for each session.

The Contractor shall erect and maintain information posters for the information of his employees, depicting actions to be taken to ensure compliance with aspects of this Specification.

3.5 ENVIRONMENTAL METHOD STATEMENTS

Unless indicated otherwise by the Engineer, the Contractor shall provide the following Method Statements no less that 14 days prior to the programmed Commencement Date of the subject Works or activity:

i) Logistics for the Environmental Awareness Training course/s, including the date, time and location of the course/s, the course content and provision for refresher courses;
ii) Location and layout of the construction camp in the form of a plan showing the location of key infrastructure and services, including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and laydown areas, hazardous storage areas (including fuels), the batching plant/s, designated access routes, equipment cleaning areas and the placement of any staff accommodation, cooking and ablution facilities. This Method Statement shall include the Materials Safety Data Sheets (MSDS's) for all fuels, lubricants, paints, solvents and other chemicals to be used or stored on site
iii) Location and structure of the fuel storage area, including the type and volume of storage container and the design and capacity of the bund, and procedures for the filling and dispensing of fuel both at the fuel storage area and on Site;
iv) Location, layout and preparation of concrete batching facilities including the methods employed for the mixing of concrete and the management of runoff water from such areas. An indication shall be given of how concrete spoil will be minimised and cleared;
v) Solid waste (refuse) control and removal of waste from the Site, including the number, type and location of rubbish bins, the manner and frequency with which the waste will be removed from site and a description of the identified disposal site;
vi) Contaminated water management system, including an indication of the source and volume of contaminated water and how this would be disposed of;
vii) Method for dealing with runoff, including a stormwater management plan, mechanisms for the control of erosion and sedimentation, location and layout of settlement ponds (including the treatment of sludge), approach to the treatment and

control of all contaminated return water to watercourses and approach to water quality monitoring;

viii) Drainage and stormwater planning showing procedures for the control of erosion due to stormwater on Site;

ix) Details of water abstraction, including the site of abstraction, the envisaged volume of water to be pumped and what methods would be implemented to prevent spillage/ pollution during the refuelling and operation of the abstraction pumps. The Contractor shall be responsible for obtaining the requisite permissions/ authorisations to enable abstraction and copies of these permissions/ authorisations shall be attached to the Method Statement;

x) Extent of areas to be cleared within the Working Area (including the construction camps, batching plants, access roads *etc.*), the method of clearing and the preparation for this clearing so as to ensure minimisation of exposed areas;

xi) Method of undertaking earthworks, including topsoil handling and erosion, dust and noise controls;

xii) Use of herbicides, pesticides and other poisonous substances, including means of storage;

xiii) Dust control, including methods to prevent dust generation and method to reduce dust where its generation is unavoidable;

xiv) Emergency procedures for spillages of hazardous substances, fire and serious accidents;

xv) Motivation and method for undertaking any construction related activities within a "no-go" area, including requisite emergency procedures. Unless a clearly motivated and proposed methodology exhibiting an obvious focus on environmentally sensitive construction practice is provided, no activity will be permitted within the defined "no-go" areas.

The Contractor shall not commence the activity until the Method Statement has been approved and, except in the case of emergency activities, shall allow a period of two weeks for approval of the Method Statement by the Engineer. Such approval shall not unreasonably be delayed or withheld.

The Engineer may require changes to a Method Statement if the proposal does not comply with this Specification or if, in the reasonable opinion of the Engineer, the proposal may result in, or carries a greater than reasonable risk of, damage to the environment in excess of that permitted by this Specification.

Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. Where necessary the requisite training shall be give to the personnel to facilitate compliance with the approved Method Statement. The Contractor shall carry out the Works strictly in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract.

3.6 INTERFACE WITH LANDOWNERS AND LOCAL COMMUNITIES

The Contractor shall respect the property and rights of landowners and communities at all times and shall treat all such persons with courtesy. Disruption to the communities and landowners abutting the Working Area shall be minimised. The removal of tenants and squatters currently occupying the affected properties will be undertaken by the Employer, and no communities shall be displaced by the Contractor after the Commencement Date. The Contractor shall, however, make provision for delays in his construction programme associated with the removal of the tenants/ squatters.

The Contractor shall take every effort to ensure that private property abutting the Working Area is not damaged as a result of his activities, and that access for landowners and communities residing within the area is maintained. The Contractor shall absolve the Employer of any and all risk and liability in this regard.

The Fencing Act (Act 63 of 1963) regulates matters relating to fences between properties. In terms of this legislation, it is a criminal offence to dismantle fences without the landowner's permission or to leave gates open. Accordingly, in the execution of the Works the Contractor shall:

i) Install gates (standard or game gates) on all fence crossings, subject to the requirements of the landowner, as approved by the Engineer. Provide all gates with a Contractor's lock. No work shall commence prior to the erection of the requisite gates;
ii) Use the gates provided to gain access to all parts of the defined Working Area;
iii) Ensure that all gates properties are kept locked at all times;
iv) Not drop or dismantle any fence or gate without the Engineer's permission.

Where existing fences have to be dismantled and re-erected, they shall be erected to the same design as the original, but with such modifications as may be required by the Engineer.

The Contractor shall maintain a "complaints register" that records all complaints raised by landowners, communities or the general public about construction activities. The register shall be regularly updated and shall be used to record the name of the complainant, his or her domicile and contact details, the nature of the complaint and any action taken to rectify the problem. The Contractors shall ensure that any complaints are appropriately addressed, and the complaints registered shall merely serve as a record of the complaint and its remediation. All complaints, as well as the remedial actions taken, shall be brought to the attention of the Engineer, who shall be the sole arbiter regarding the adequacy of such actions.

3.7 SAFETY OF THE PUBLIC

The Contractor shall recognise that the Site is situated close to inhabited areas and shall therefore take all reasonable measures to ensure the safety of people in the surrounding area. Where the public could be exposed to danger by any of the Works or Site activities, the Contractor shall as appropriate provide suitable flagmen, barriers and/ or warning signs in English, Afrikaans and relevant indigenous languages, all to the approval of the Engineer.

All unattended open excavations shall be adequately demarcated (fencing shall consist of a minimum of three strands of wire wrapped with danger tape). Adequate protective measures must be implemented to prevent unauthorised access to the Working Area and access/ haul routes. No firearms shall be permitted on Site without the prior approval of the Engineer.

3.8 PROTECTION OF NATURAL FEATURES AND HERITAGE RESOURCES

The Contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the Site for survey or other purposes unless agreed beforehand with the Engineer. Any features affected by the Contractor in contravention of this clause shall be restored/ rehabilitated to the satisfaction of the Engineer.

The infrastructure associated with the Project Bravo Power Station have either been sited to avoid known sites of heritage significance, or the requisite permits for the demolition/ disruption of these sites has been obtained by the Employer. The Contractor shall, however, make provision for accidental discovery of further heritage resources. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any heritage

resources (including but not limited to fossils, coins, articles of value or antiquity, graves and structures and other remains of archaeological interest) discovered on the Site, immediately upon discovery thereof and before removal. The Contractor shall inform the Engineer immediately of such a discovery and carry out the Engineer's instructions for dealing therewith. In the event that Works within the vicinity of the discovery are suspended, the area shall be cordoned off until such time as the Engineer authorises resumption of the Works in writing. The Engineer will take all necessary actions to ensure that delays are minimised.

Upon notification by the Contractor, the Engineer will contact the South African Heritage Resources Agency (SAHRA) and will arrange for the excavation to be examined by an appropriate heritage specialist as soon as practicable. Acting upon the advice of SAHRA and the heritage specialist, the Engineer will advise the Contractor of the requisite actions. A Provisional Sum has been included in the Schedule of Quantities for the appointment of a heritage specialist, together with any assistance required, to identify heritage resources and for the appropriate treatment of such resources. This sum will be under the control of the Engineer.

3.9 PROTECTION OF WATERCOURSES, WATER BODIES AND WETLANDS

The Contractor shall ensure that all watercourses and water bodies (including but not necessarily limited to those areas identified in the specialist ecological assessment undertaken by Ecosun, and any subsequent studies) are protected from contamination or degradation as a result of his activities. All watercourses and water bodies shall be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities. In the event of a spill, prompt action shall be taken to clear the polluted or affected areas, and the Engineer shall be notified immediately.

The Contractor shall not work within the flood plain or any watercourses or waterbodies without the written approval of the Engineer as required for the execution of the work. The Contractor shall not permit his employees to make use of any natural watercourse or waterbody for the purposes of swimming, personal washing and the washing of machinery or clothes.

When working in or near any watercourses, the Contractor shall be cognisant of the following environmental controls and considerations:

i) When planning work in or near watercourses the Contractor shall take into account possible river levels during the period of construction;
ii) The Contractor shall program the execution of the Works such that Construction within flowing water is minimized. All diversions shall be in place, water diverted away from the Working Area and the area sandbagged prior to excavations commencing;
iii) Construction equipment shall not ford any watercourse or operate from within the river channel unless it is essential to the execution of the Works. All works within flowing water shall be subject to prior authorisation from the Engineer;
iv) When working in flowing water, the Contractor shall ensure that downstream sedimentation is controlled by installing and maintaining the necessary temporary sedimentation barriers, e.g. geotextile silt curtains or sedimentation weirs constructed out of suitably secured straw bales. Sedimentation barriers shall be a maximum of 25 m downstream of the construction activities;
v) During the execution of the Works, the Contractor shall take appropriate measures to prevent pollution and contamination of the riverine environment e.g. including ensuring that construction equipment is well maintained, using drip trays, provision of bins, monitoring etc;

vi) Where earthwork is being undertaken in close proximity to any watercourse, slopes shall be stabilised using sandbags or geotextile fabric to prevent sand and rock from entering the channel; and

vii) Appropriate rehabilitation and revegetation measures for the riverbanks shall be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilized as soon as construction allows.

No excavation or construction shall be permitted within any wetland area, unless exceptional circumstances require that such excavation or construction cannot be avoided, in which regard the Engineer shall be the sole arbiter of whether or not such excavation or construction in a wetland area can or cannot be avoided. Where, in the opinion of the Engineer, excavation or construction within a wetland area cannot be avoided in the execution of the Works, the extent of any disturbances shall be kept to an absolute minimum. The various soil layers shall be removed and stockpiled separately. Following the completion of the construction activities, the soil layers shall be returned in the reverse order to which they were removed.

Where possible, the Contractor shall ensure that no construction equipment traverses any seasonal or permanent wetland. Where seasonally wet areas must be traversed, the Contractor shall obtain the prior approval of the Engineer and shall ensure that this only occurs during the dry season.

3.10 PROTECTION OF FLORA AND FAUNA

Except to the extent necessary for the execution of the Works, flora shall not be removed, damaged or disturbed nor shall any vegetation be planted without authorisation. At the commencement of the Contract, the Engineer will identify to the Contractor indigenous flora or any rare or endangered flora that shall be preserved. The Contractor shall thereafter demarcate such and undertake all necessary measures to ensure the protection of such flora.

In areas where needless destruction of vegetation has occurred, the Contractor shall, at his own expense, reinstate those areas to the standard specified by the Engineer. In this regard, the Engineer will arrange for the disturbed area to be examined by an appropriate botanical specialist. Acting upon the advice of the botanical specialist, the Engineer will advise the Contractor of the requisite actions. A Provisional Sum has been included in the Schedule of Quantities for the appointment of a botanical specialist, together with any assistance required, to identify sensitive vegetation and for the relocation of such vegetation. This sum will be under the control of the Engineer.

The Contractor shall protect fauna living within the Site and shall ensure that trapping, poisoning, shooting and/ or other hunting of animals is strictly prohibited, including the collection of the carcass of any domestic or wild animal. The Contractor shall ensure that no domestic pets or livestock are permitted on Site, and the keeping of pets by the Site staff shall be strictly prohibited. The requisite measures shall be put in place to ensure that domestic and native animals belonging to surrounding landowners are kept away and are safe from the unprotected Works.

The Contractor shall ensure that the Working Area is kept clean, tidy and free of rubbish that would attract animal pest species, and that no feeding of animals occurs. The Contractor's employees shall be prohibited from collecting firewood from the surrounding areas, and this shall be supplied by the Contractor from a legitimate supplier.

3.11 PREVENTION AND CONTROL OF FIRES

The Contractor shall take adequate precautions to ensure that the fire hazard on and near the Site is reduced to a minimum. A Fire Management Plan shall be instituted, in accordance with the National Veld and Forest Fire Act (No 101 of 1998).

Fires may only be lit at sites specifically prepared for the purpose and approved by the Engineer. The Contractor shall ensure that there is basic fire-fighting equipment available on Site at all times, and any fires that occur shall be reported to the Engineer immediately.

Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include the workshop and fuel storage areas, any areas where the vegetation or other material is such as to make likely the rapid spread of an initial flame and any other areas not designated as smoking areas. All eating areas shall include provision for a smoking area.

The Contractor shall not be permitted to use burning as a disposal method.

3.12 EMERGENCY PROCEDURES

Telephone numbers of emergency services, including the local fire fighting service, shall be posted conspicuously in the Contractor's office near the telephone.

The Contractor shall develop emergency procedures, including the establishment of an emergency response team, that will enable rapid and effective response to all types of environmental emergencies. The Contractor's procedures for the following emergencies shall include:

3.12.1 Fire

The Contractor shall advise the relevant authority and affected landowners of a fire as soon as one starts and shall not wait until he can no longer control it. The Contractor shall ensure that his employees are aware of the procedure to be followed in the event of a fire.

3.12.2 Accidental leaks and spillages

The Contractor shall ensure that his employees are aware of the emergency procedure(s) to be followed for dealing with spills and leaks, which shall include notifying the Engineer and the relevant authorities. The Contractor shall ensure that the necessary materials and equipment for dealing with spills and leaks is available on Site at all times. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Engineer.

In the event of a spill, the source of the spillage shall be isolated, and the spillage contained. The area shall be cordoned off and secured. The Contractor shall maintain spill kits on site at all times and shall ensure that there is always an adequate supply of absorbent material available in the spill kits to absorb/ breakdown and, where possible, be designed to encapsulate minor spillage. The quantity of such materials shall be able to handle a minimum of 200 ℓ of spillage.

3.13 TEMPORARY SITE CLOSURE

If the site is closed for a period exceeding one week, the Contractor, in consultation with the Engineer, shall carry out a checklist procedure, which should as a minimum address the following:

<u>Hazardous substances storage</u>

i) Outlet secure/ locked;
ii) Bund empty (where applicable);
iii) Fire extinguishers serviced and accessible;

iv) Secure area from accidental damage e.g. vehicle collision;
v) Emergency and contact details displayed; and
vi) Adequate ventilation.

Safety
i) Fencing and barriers in place as per the Occupational Health and Safety Act (No 85 of 1993);
ii) Emergency and Management contact details displayed;
iii) Security personnel have been briefed and have the facilities to contact or be contacted by relevant management and emergency personnel;
iv) Night hazards such as reflectors, lighting, traffic signage etc have been checked;
v) Fire hazards identified and the local authority notified of any potential threats e.g. large brush stockpiles, fuels etc;
vi) Stockpile appropriately secured; and
vii) Structures vulnerable to high winds secure.

Erosion
i) Wind and dust mitigation in place;
ii) Slopes and stockpiles at stable angle; and
iii) Revegetated areas watering schedules and supply secured.

Water contamination and pollution
i) Cement and materials stores secured;
ii) Toilets empty and secured;
iii) Refuse bins empty and secured;
iv) Drip trays empty and secure (where possible); and
v) Structures vulnerable to high winds secure.

4 PLANT AND MATERIALS

4.1 PLANT AND MATERIALS HANDLING, USE AND STORAGE

The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with this Specification. The Contractor shall ensure that these delivery drivers are supervised during off loading, by someone with an adequate understanding of the requirements of this Specification.

Plant and materials shall be appropriately secured to ensure safe passage between destinations. Loads that pose a risk of dust generation or spillage during transit, including but not limited to sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to secure transported plant and materials properly.

All manufactured and/ or imported plant and material shall be stored within the Contractor's camp. All stockpiling and laydown areas outside of the construction camp shall be subject to the Engineer's approval, which will not be unreasonably withheld.

4.2 HAZARDOUS SUBSTANCES

4.2.1 General

The storage and disposal of hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) and their waste, is regulated through other legislation, which should be complied with *i.e.* the Occupational Health and Safety Act. All hydrocarbons, including petrol, diesel, engine oil, hydraulic oil, shutter oil and curing compound, pose a risk of causing water and soil contamination and accordingly shall be regarded as potential hazardous substances from an environmental perspective. Specific requirements in this regard are outlined below.

4.2.2 Fuel (petrol and diesel)

Fuel may be stored on site in an area approved by the Engineer. The fuel storage area shall be located in a portion of the construction camp where it is unlikely to pose a significant risk in terms of water pollution or traffic safety. The Contractor shall ensure that diesel is stored in appropriate storage tanks or in bowsers. The tanks/ bowsers shall be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall). The floor of the bund shall be sloped, draining to an oil separator. Provision shall be made for refuelling at the fuel storage area, by protecting the soil with an impermeable layer, appropriate for the type of traffic.

If fuel is dispensed from 200 ℓ drums, only empty externally clean drums may be stored on the bare ground. All empty externally dirty drums shall be stored on an area where the ground has been protected. The proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism of the fuel/ oil storage drum shall be stored in a waterproof container when not in use.

The Contractor shall prevent unauthorised access into the fuel storage area. No smoking shall be allowed within the vicinity of the fuel storage area. The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel stores.

Where reasonably practical, equipment shall be refuelled at the fuel storage area or at the workshop as applicable. If it is not reasonably practical then the surface under the refuelling area shall be protected against pollution to the reasonable satisfaction of the Engineer prior to any refuelling activities. The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/ breakdown and, where possible, be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200 ℓ of hydrocarbon liquid spill. This material must be approved by the Engineer prior to any refuelling or maintenance activities.

4.2.3 Oils and curing compound

The Contractor shall ensure that engine oil, hydraulic oil, shutter oil, lubricants and curing compound containers that are in use are stored within a bunded area consisting of a smooth impermeable base (concrete or 250 µm plastic) with an earth bund. The fuel bund may be used for this purpose as long as the capacity of the bund remains 130% of all of the fuel storage tanks/ bowsers it contains. The unopened storage containers shall be inspected regularly to ensure that no leakage occurs. When oil/ curing compound is dispensed, the proper dispensing equipment shall be used, and the storage container shall not be tipped in order to dispense the oil/ curing compound. The dispensing mechanism of the oil/ curing compound storage container shall be stored in a waterproof container when not in use.

Oil/ curing compound shall be used in moderation and shall be applied under controlled conditions using appropriate equipment. The Contractor shall take all reasonable precautions to prevent accidental and incidental spillage during the application of these compounds.

In the event of an oil/ curing compound spill, the source of the spillage shall be isolated, and the spillage contained. The Contractor shall clean up the spill, either by removing the contaminated soil or by the application of absorbent material in the event of a larger spill. Treatment and remediation of the spill area shall be undertaken to the reasonable satisfaction of the Engineer.

4.2.4 Paints, solvents and other chemicals

The Contractor shall ensure that the use of oil based paints, chemical additives, cleaners and other chemicals is strictly controlled, and that no contamination of the environment, particularly of watercourses and water bodies, occurs as a result of there use.

4.2.5 Herbicides and pesticides

Where the use of herbicides, pesticides and other poisonous substances has been specified or approved by the Engineer, they shall be stored, handled and applied with due regard to their potential harmful effects and in adherence with the approved Method Statement. The Contractor shall strictly adhered to the manufacturer's specifications regarding applications rates, storage and safety precautions. Herbicides shall not be used within 50 m of any watercourse.

Unused chemicals shall not be disposed of on site, but shall be disposed of at a waste site licensed for such disposal.

5 EQUIPMENT

5.1 GENERAL

The Contractor shall be cognisance of the requirements of this Specification in the selection and operation of his equipment, to ensure than environmental degradation is kept to a minimum. To this end, the Contractor shall ensure that his equipment operators are made aware of the environmental requirements and any other reasonable controls.

In sensitive areas, wheeled equipment shall be used in preference to tracked equipment. Reasonable speeds, as specified, shall be maintained at all times, but particularly were construction activities are taking place near to populated areas.

5.2 WORKSHOP, EQUIPMENT MAINTENANCE AND STORAGE

All vehicles and equipment shall be kept in good working order. Leaking equipment shall be repaired immediately or removed from Site. Where practical, all maintenance of equipment and vehicles on Site shall be performed in the workshop. The workshop shall have a smooth impermeable (concrete) floor. The floor shall be bunded and sloped towards an oil separator to contain any spillages.

If it is necessary to do maintenance outside of the workshop area, the Contractor shall obtain the approval of the Engineer prior to commencing activities. The Contractor shall ensure that in his workshop and at other equipment maintenance facilities, including those areas where, after obtaining the Engineer's approval, the Contractor carries out emergency equipment maintenance, there is no contamination of the soil or vegetation.

When servicing equipment on Site, portable drip trays shall be used to collect the waste oil and other lubricants. Drip trays shall also be provided in construction areas for stationary equipment (such as compressors) and for "parked" equipment (such as excavators, loaders and cranes). Drip trays shall be inspected and emptied daily. Drip trays shall be closely monitored during rain events to ensure that they do not overflow. Where practical, the Contractor shall ensure that equipment is covered so that rainwater is excluded from the drip trays. Oil from the drip trays shall be stored in externally clean drums in a bunded area as required for fuel storage. These shall be removed on a regular basis to an oil-recycling centre.

The washing of equipment shall be restricted to urgent or preventative maintenance requirements only. Vehicle cleaning shall be undertaken in designated wash bays, which have an impermeable floor and are bunded to contain runoff and direct it into a sump. Oil and diesel shall be skimmed off the sump water on a monthly basis and recycled or disposed of at an appropriately licensed recycling or waste disposal site.

5.3 BATCHING PLANTS

The siting of batching plants shall take cognisance of the requirements of this Specification and shall be subject to the Engineer's approval. The Contractor's attention is specifically drawn to the requirements related to hazardous substances, dust and noise control, site demarcation, site clearing and refuse and waste control. The Contractor shall be responsible for obtaining the Engineers approval prior to the siting and establishment of any batching plants.

No batching activities shall occur directly on unprotected ground. Batching plants shall be located on a smooth impermeable surface (concrete or 250 µm plastic covered with 5 cm of sand). All wastewater resulting from batching of concrete shall be disposed of via the contaminated water management system and shall not be discharged into the environment. To this end, either the batching area shall be bunded and sloped towards a sump or diversion berms shall be installed to direct all contaminated water to a storage area. Contaminated water storage areas shall not be allowed to overflow and appropriate protection from rain and flooding shall be implemented

Empty cement bags shall be stored in weatherproof containers to prevent wind blown cement dust and water contamination. Empty cement bags shall be disposed of on a regular basis via the solid waste management system, and shall not be used for any other purpose. Unused cement bags shall be stored so as not to be affected by rain or runoff events. The Contractor shall ensure that sand, aggregate, cement or additives used during the mixing process are contained and covered to prevent contamination of the surrounding environment.

The Contractor shall take all reasonable measures to prevent the spillage of cement/ concrete during batching and construction operations. During pouring, the soil surface shall be protected using plastic and all visible remains of concrete shall be physically removed on completion of the cement/ concrete pour and appropriately disposed of. All spoiled and excess aggregate/ cement/ concrete shall be removed and disposed of via the solid waste management system.

Where "readymix" concrete or cement is used, the Contractor shall ensure that the delivery vehicles do not wash their chutes directly onto the ground, but that the chutes are washed off into a hole dug into the stockpiled subsoil from the foundation excavations. This contaminated subsoil shall be used as backfill for the foundations excavations, and covered with topsoil as part of the landscaping and rehabilitation process (Clause 8). Any spillage resulting from the "readymix" delivery shall be immediately cleared and disposed of via the solid waste management system.

5.4 PUMPING

Where dewatering is required, pumps shall be placed over a drip tray in order to contain fuel spills and leaks. The Contractor shall take all reasonable precautions to prevent spillage during the refuelling of these pumps. The Contractor shall ensure that none of the water pumped during any dewatering activities, is released into the environment without the Engineer's approval.

5.5 DUST AND EMISSIONS

5.5.1 Dust control programme

A dust control programme shall be implemented by the Contractor to maintain a safe working environment, minimise nuisance for surrounding residential areas, prevent damage to the natural vegetation of the area and protect topsoil. The Contractor's shall take all reasonable and appropriate measures to minimise the generation of dust because of his activities, and his dust control programme shall, as a minimum, address the following:

i) Schedule of spraying water on dust prone portions of the Working Area, particularly gravel access roads, paying due attention to the control of runoff. High traffic sections shall either be paved or treated via the application of suitable dust suppressing agents;
ii) Speed limits for vehicles on unpaved roads and minimisation of haul distances;
iii) Measures to ensure that material loads are properly covered during transportation;
iv) Schedule for wheel cleaning and measures to clean up public roads that may be soiled by construction vehicles;
v) Minimisation of the area disturbed at any one time and protection of exposed soil against wind erosion, e.g. dampening with water, covering with straw or applying suitable dust suppressing agents;
vi) Location and treatment of material stockpiles taking into consideration prevailing wind directions and location of sensitive receptors; and
vii) Reporting mechanism and action plan in case of excessive wind and dust conditions.

An appropriate number of water tankers shall be permanently available for the control of dust generation, and the Contractor shall ensure that the sprays do not generate excess run off. There shall be sufficient water tankers of adequate capacity to enable the dampening of all working areas and access/ haul roads as frequently as required. During high wind conditions, the Contractor shall comply with the Engineer's instructions regarding additional dust-damping measures.

5.5.2 Dust measurement

The Contractor shall provide, maintain and calibrate fall out dust collectors for the measurement of dust fallout. The directional dust collector devices shall consist of four removable dust collectors placed at right angles mounted at a height of 2 metres above ground.

Dust measurement will only be required at those portions of the Working Area were working is actively occurring. As a minimum, two dust collectors shall be positioned at each of the active borrow areas and four dust collectors shall be positioned on the perimeter of the site for each of the various structures. The exact number and location of individual collectors shall be established in consultation with the Engineer. The Engineer may from time-to-time instruct the Contractor to carry out testing of dust levels at additional locations.

The Contractor shall arrange for the collection of dust from the dust collectors on a weekly basis (or more frequently if required by the Engineer) and calculate the dust fallout according to the following formula:

$$Fallout = M \div (A \times d)$$

Where M = mass of dust sample, A = area of opening of dust collector and d = number of days over which sample was collected

Should fallout exceed 0.25 g/ m^2/ day then the Contractor shall cease with the operations that are causing the dust until such time as remedial measures have been put in place to ensure that dust levels are within the specified limit.

The Contractor shall keep records of all dust level measurements for the duration of the Contract. These records shall be submitted each month to the Engineer.

5.5.3 Vehicle emissions

All vehicles and equipment shall be kept in good working order and serviced regularly. Vehicles noticeably emitting excessive fumes will not be permitted to continue working on site.

5.6 NOISE

5.6.1 Noise control

The Contractor's attention is drawn to the requirements of the Noise Induced Hearing Loss Regulations No 307 of the Occupational Health and Safety Act of 1993**.** Appropriate directional and intensity settings are to be maintained on all hooters and sirens, and the Contractor shall provide and use suitable and effective silencing devices for pneumatic tools and other plant to reduce noise levels associated with his activities. The Contractor shall restrict any of his operations that may result in undue noise disturbance to those communities and dwellings abutting the Site to the hours of 06h00 to 18h00 on weekdays and Saturdays or as otherwise as agreed with the Engineer.

No amplified music shall be allowed on Site. The use of radios, tape recorders, compact disc players, television sets etc shall not be permitted unless the volume is kept sufficiently low as to avoid any intrusion on members of the public within range. The Contractor shall not use sound amplification equipment on site other than in emergencies.

The Contractor shall ensure that environmental awareness and training for all employees includes the need to minimise noise. The Contractor shall provide suitable ear protectors to all of his staff and others entering areas with high noise levels. Zones of risk shall be clearly identified with warning signs.

5.6.2 Noise measurement

The Contractor shall be responsible for monitoring noise levels as detailed in this specification. Noise monitoring equipment shall meet the IEC Publication 651 standard for a Class 1 integrating sound level meter. The meter shall be recalibrated at yearly intervals by an acoustics laboratory approved by the Engineer. A set of sound measuring equipment shall be made available for use by the Engineer as required.

No fixed monitoring stations are proposed for noise measurements, and an *ad hoc* approach is recommended, depending on which activities are in progress and their respective locations on the site in relation to sensitive receptors. At least 14 days prior to the onset of construction

activities various noise level readings shall be recorded throughout the Working Area to serve as controls. During construction, noise levels shall be measured at weekly intervals (or more frequently if so required by the Engineer) at the closest sensitive receptor to the Site locations agreed with the Engineer. These locations shall include the closest sensitive receptor to the; (1) construction camp, (2) batching plants; (3) active borrow areas, (4) active construction areas (particularly during the execution of noise generating activities like blasting), (5) stockpiling and laydown areas, (6) access routes and (7) additional areas identified by the Engineer

Noise recordings shall reflect typical ambient noise levels during construction and accordingly noise levels shall be recorded during normal construction operations and not during periods of reduced activity (*e.g.* lunch break, Sundays, site closure). The Contractor shall keep records of all noise level measurements for the duration of the Contract. These records shall be submitted each month to the Engineer, or on the request of the Engineer.

Noise levels measured at the aforementioned locations shall not exceed the ambient sound level measured continuously at the same measuring point by 7 dBA or more. Where noise levels exceed this standard, the Contractor shall comply with the Engineer's instructions in this regard. Such instructions may include the cessation of the operations causing the unacceptable noise level until remedial measures have been put in place.

5.7 LIGHTING

The Contractor shall ensure that any lighting installed on the site for his activities does not interfere with road traffic or cause a reasonably avoidable disturbance to indigenous fauna, surrounding communities or other users of the area.

6 SITE ESTABLISHMENT

6.1 SITE LAYOUT

The Contractor shall inform the Engineer of the intended actions and programme for site establishment and of the proposed location of the construction camp/s and provide him with a plan showing the layout of the construction camp, including the positions of all buildings, stockpile and laydown areas, vehicle wash and service areas, fuel storage areas, batching areas and other infrastructure. The Construction camp shall occupy as small an area as possible, and no site establishment shall be allowed within 100 m of any watercourse or water body unless otherwise approved by the Engineer. The site layout shall be planned to facilitate ready access for deliveries, facilitate future works and to curtail any disturbance or security implications for neighbours. The final site layout shall be subject to the Engineer's approval, which shall not be unreasonably withheld.

6.2 SITE DEMARCATION

6.2.1 General

The Contractor shall maintain in good order all demarcation fencing and barriers for the duration of construction activities, or as otherwise instructed by the Engineer.

6.2.2 Construction camp

The Contractor shall erect fencing around the construction camp and batching plants in accordance with this Specification and the Engineer's instructions. The material and erection shall be in accordance with the provisions of this Section, but the material need not necessarily be new. Where used materials are offered, they shall nevertheless be in a good condition and

approved in advance by the Engineer. When no longer required, the fencing and gates shall be dismantled and removed.

Temporary fencing shall be 1.8 m in height and comprise the following:

i) Metal or wooden standards at 20 m centres, with three wooden droppers spaced evenly between the standards;
ii) Four equally spaced strands of double strand high tensile wire, with the lowest strand being at a height of 500 mm above natural ground level and the highest being at 1.8 m;
iii) Diamond mesh or bonnix type fencing, of 1.8 m in height, secured to the wire strands and posts; and
iv) Gates to suit the width of access as required.

6.2.3 "No go" areas

Unless otherwise agreed to by the Engineer, the Contractor shall ensure that all activities are restricted to within the defined Working Area. The areas outside of the defined Working Area as well as any other areas identified by the Engineer or in this Specification shall be regarded as "no go" areas. Insofar as he has the authority, the Contractor shall ensure that no unauthorised entry, stockpiling, dumping or storage of equipment, plant or materials shall be allowed within the "no go" areas.

Unless demarcated with other fencing, the boundary of the Working Area shall be demarcated using "no go" fencing consisting of wooden posts at 3 m centres. The top 300 mm of each wooden post shall be painted with white paint and each post shall be long enough so that at least 1.5 m protrudes above the ground once it has been installed.

The Engineer may also identify patches of natural vegetation or any other natural, sensitive or special features inside the Working Area as "no go" areas. These areas shall be demarcated using "no go fencing consisting of wooden posts at 2 m centres. The top 300 mm of each wooden post shall be painted with white paint and each post shall be long enough so that at least 1.5 m protrudes above the ground once it has been installed.

Once construction within an area has been completed and the area has been rehabilitated, it shall be considered a "no go" area.

6.3 SITE CLEARING

6.3.1 Demolition and removal of existing structures

Clearing shall consist of the removal of all vegetation, crops, rubbish, fences and all other material prohibiting the execution of the Works, including the disposal of all resultant materials, subject to the requirements of this Specification and the Engineer. Any existing structures located within the Working Area, including but not limited to buildings, dams, graves and services, shall only be damaged or demolished and removed with the prior approval of the Engineer.

6.3.2 Identification and management of sensitive vegetation

6.3.2.1 General

At the commencement of the Contract, the Engineer will identify to the Contractor the areas of natural vegetation that may be disturbed during the execution of the Works as well as the areas

of natural vegetation or any rare or endangered flora that shall be preserved. The latter areas shall be designated as “no-go” areas and treated as per the requirements of Subclause 6.2.3.

Prior to the onset of construction activities within any areas occupied by natural vegetation, a search and rescue operation shall be undertaken by the Contractor, in consultation with the Engineer, to collect rare and endangered plants identified for transplanting or use in the revegetation of affected area. Search and rescue operations will occur under the direction of the botanical specialist appointed by the Employer and accordance with the requirements outlined in Subclause 6.3.2.2.

6.3.2.2 Search and rescue

When plant material is rescued, the Contractor shall accept full responsibility for maintaining the plants in good condition. The plants shall either be transplanted to the location(s) indicated by the Engineer or shall be fully maintained in an on-site nursery until they are utilised for revegetation. Maintenance of stored plants shall include regular watering, and any plant losses due to lack of maintenance, including diseases developed during the construction period and the Defects Notification Period, shall be replaced at the Contractor's expense.

Each plant shall be handled and packed in the approved manner for that species or variety, and all necessary precautions shall be taken to ensure that plants arrive at the on-site nursery or transplant location(s) in a condition for successful growth. Vehicles used for transporting plants shall be equipped with covers to protect plants from windburn. Containers shall be in a good condition.

6.3.2.3 On-site nursery

On-site nursery facilities shall be erected for the holding and maintenance of rescued plant material and the propagation of appropriate species for revegetation. The location of the nursery shall be to the approval of the Engineer. The Contractor shall provide adequate labour, shade, water and all things necessary to sustain the plants in the nursery.

A record of stock relevant to the Project that is held in the nursery shall be provided to the Engineer on a monthly basis.

6.3.3 Clearing of vegetation

The object of vegetation clearing is to trim, cut or clear the minimum number of trees and vegetation necessary for the safe construction and operation of the power station. No clearing of trees or vegetation shall occur prior to the Contractor obtaining written permission from the Engineer, who shall designate in detail the exact areas to be cleared and the time at which it shall be done.

The Contractor shall ensure that the clearance of vegetation is strictly restricted to that required to facilitate the execution of the Works. Any natural vegetation, particularly trees, within or immediately adjacent to the Working Area, which do not require removal, shall be fully protected against damage. Vegetation clearance shall be restricted to the construction camp, approved access roads, approved stockpiling and laydown areas, batching plant sites and portions of the Working Area where vegetation interferes with construction activities.

Site clearance shall occur in a planned manner, and cleared areas shall be stabilised as soon as possible. The detail of vegetation clearing shall be subject to the Principal Agent’s approval. All cleared vegetation shall either be mulched and mixed into the topsoil stockpiles or disposed of at an approved disposal site. The disposal of vegetation by burying or burning is prohibited without the requisite permit from the local authority.

Should fauna be encountered during site clearance, activities shall cease until such fauna have been safely relocated.

6.3.4 Stockpiling, removal and disposal of vegetation and trees

All cleared vegetation shall be mulched and mixed into the topsoil stockpiles, used as brush-packing (depending on the type of vegetation) or disposed of at an approved disposal site. The disposal of vegetation by burying shall be strictly prohibited.

Trees shall be cut into manageable logs (no more than 400 mm) and, where appropriate, distributed to local communities for use as firewood. Failing this, logs shall be disposed of at an appropriate landfill site. Under no circumstances shall members of the public be allowed to collect logs from the Working Area.

6.3.5 Stripping and stockpiling of topsoil

The Contractor shall strip the topsoil, which includes the top 300 mm of soil (or to the depth of the bedrock where the soil is shallower than 300 mm) and root material of cleared vegetation, for subsequent use during rehabilitation and revegetation. Topsoil shall be stripped from all areas of the Working Area where topsoil will be impacted by construction activities, including areas for temporary facilities, as directed by the Engineer. If the Contractor fails to conserve topsoil as instructed, he shall obtain suitable substitute material from other sources, approved by the Engineer, without any additional payment.

Topsoil collected from different areas shall be stockpiled separately and replaced in the same areas from which it was taken. Furthermore, topsoil shall be stockpiled separately from subsoil.

Where possible, stockpiles shall be located on previously disturbed areas or in areas were they pose the minimum risk of causing further environmental degradation. Topsoil and subsoil stockpiles shall not exceed 2 m in height and shall be so placed as to occupy the minimum width compatible with the natural angle of repose of the material, and measures shall be taken to prevent the material from being spread over too wide a surface. Where required, appropriate precautions shall be taken to prevent the erosion and limit the compaction of the stockpiles. The Contractor shall ensure that all stockpiles do not cause the damming of water or run off, or are themselves washed away. If the stockpiles start to erode significantly or cause dust problems, they shall be covered with Hessian.

Where practical, topsoil shall not be left for longer than six months before being used for rehabilitation. If stored for longer than six months, the topsoil shall be analysed and, if necessary, upgraded before placement.

6.3.6 Erosion and sedimentation control

The Contractor shall take all reasonable measures to limit erosion and sedimentation due to the construction activities and shall include in the design of the site works measures to prevent such occurrences. The Works shall be phased, and development staged so that stripped areas are kept to a minimum. The Contractor shall ensure that the stabilisation of cleared areas is actively managed in order to prevent and control erosion.

Surface stormwater shall not be allowed to be concentrated and to flow down cut or fill slopes, access roads or other areas prone to erosion without erosion protection measures being in place. Accordingly, the necessary temporary and permanent drainage works shall be installed as soon as possible. For access roads on sloping terrain, water diversion berms shall be installed immediately after the road is opened and shall be 4 m in width with a minimum

compacted height of 350 mm and outlets of 2 m in length. The spacing of the water diversion berms shall be inversely proportional to the slope of the access road, ranging from a spacing of 60 m for a 2% slope to 10 m where the slope is greater than 15%.

Erosion shall not be allowed to develop on a large scale before repairs are effected and all erosion damage shall be repaired as soon as it has been detected. In this regard, any runnels or erosion channels that develop during the construction shall immediately be backfilled and compacted and the areas restored to a proper stable condition.

The landscaping and rehabilitation of disturbed areas shall occur as soon as practically possible following the cessation of the work in a specific area. In this regard, the Contractor's Works Programme shall clearly indicate that the rehabilitation will immediately be executed, per phase, upon the completion of the works within a specific area. Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised area shall be repaired and maintained to the satisfaction of the Engineer.

6.3.6.1 Alien invasive vegetation

The Contract shall remove all alien invasive vegetation from the Working Area for the duration of the construction and maintenance period. In general, clearance of alien invasive vegetation shall be undertaken by hand, using chainsaws and hand held implements, with vegetation being cut off at ground level, and not uprooted. To prevent re-growth, cut stumps of resprouting alien invasive species, such as gums (*Eucalyptus* species), Port Jackson (*Acacia saligna*), Golden wattle (*Acacia pycnantha*) and Australian myrtle (*Leptospermum laevigatum*), shall be treated with *Chopper* herbicide, at the application rate specified by the manufacturers. The Contractor shall ensure that the person applying the herbicide is certified to do so and shall provide the Engineer with proof of such certification.

Topsoil that is contaminated with seeds of alien invasive species shall not be used for rehabilitation purposes.

6.4 TEMPORARY SERVICES AND FACILITIES

6.4.1 Site structures

All site structures shall be of a temporary nature and shall be removed at the end of the contract. All site establishment components (as well as equipment) shall be located within previously disturbed areas where possible, and shall be positioned to limit visual intrusion on neighbours and to limit the extent of the area disturbed. The type and colour of roofing and cladding materials of the Contractor's temporary structures shall be selected to reduce reflection.

6.4.2 Accommodation of site staff

With the exception of the night watchmen, none of the Contractors staff shall be accommodated on Site overnight. The Contractor shall make adequate provision for his staff to be accommodated in nearby towns.

6.4.3 Services

Temporary services, including pipelines, power lines and telephone lines, shall be located in a manner which will cause the least disturbance to the environment. In particular, care shall be taken to ensure that the route alignment for temporary services avoids identified sensitive areas. Where possible, the Contractor shall ensure that service infrastructure is accommodated within the same trench.

6.4.4 Stockpiling and stockpile areas

Plant and materials shall be stored within the demarcated construction camp or batching areas. Where this is not feasible, the Engineer will identify additional sites for stockpiling within the Working Area. Where possible, stockpiled materials shall be stored off the ground on scaffolding and care shall be taken to minimise disturbance to the vegetation and topsoil. Where this is not possible, the stockpile areas shall be treated as specified under Subclause 6.3.

Soil, sand and gravel stockpiles shall be convex in shape, shall be no higher than 2 m and shall be located so as to cause minimal disturbance. Stockpiles shall be so placed as to occupy the minimum width compatible with the natural angle of repose of the material, and measures shall be taken to prevent the material from being spread over too wide a surface. The Contractor shall ensure that all stockpiles do not cause the damming of water or run off, or are themselves washed away.

The Contractor shall ensure that material is not stockpiled within 50 m of any watercourse. Stockpiles shall be placed so that watercourses are not obstructed or polluted and shall not obstruct any stormwater or drainage paths.

6.4.5 Access roads

Only designated access roads shall be used to access the Working Area. If required, the Engineer will, together with the Contractor, negotiate access to construction camp and Working Area with the affected landowners. The access agreement will be reduced to writing. Where private roads are utilised, the Contractor shall record the condition of the road prior to its use. The Contractor shall maintain the designated access roads during the course of the Contract. Maintenance includes ensuring the provision of adequate drainage and dust control. Damage to the existing access roads because of construction activities shall be repaired to the satisfaction of the Engineer, using material similar to that used in the original construction of the infrastructure.

Where new access roads are required, these shall be subject to prior approval by the Engineer and shall be planned and constructed to ensure that as small an area as possible is disturbed (maximum width of 5 m, with splays where appropriate and required), that they avoid all “no-go” areas and, as far as possible, that they follow the natural contours. As required, access roads shall be watered to control dust nuisance to the local communities as well as possible hazards resulting from the dust. Watering shall occur on instruction of the Engineer and shall be undertaken using a water tanker at an application rate of 1.5 ℓ/m^2.

All temporary access roads shall be rehabilitated to their original (i.e. pre-construction) condition at the end of the Contract, including ripping the disturbed area parallel with the contours to a depth of 300 mm and spreading back of previously stripped topsoil. Temporary access roads across cultivated land shall be ripped to a depth of 600 mm.

All vehicle turning-areas shall be located within the Working Area and shall be subject to the prior approval of the Engineer. The Contractor shall ensure that horse and trailer vehicles transporting plant and materials only turn within the designated turning-areas, and not within cultivated lands or areas of natural vegetation.

Mud and sand deposited onto public roads by construction activities shall be cleared on a daily basis.

6.4.6 Ablution facilities

The contractor shall provide adequate ablution facilities for his staff in the construction camp. Mobile chemical toilets shall be provided at all other locations within the Working Area, as directed by the Engineer. Acts of excretion and urination are strictly prohibited other than at the facilities provided. The ratio of the available toilets to the site staff at any particular location should not exceed 1: 15 and toilet paper shall be provided in all toilets at all times.

The Contractor shall not install pit latrines or septic tanks for the ablution facilities at the Construction Camp. Where mobile chemical toilets are utilised, the Contractor shall ensure the following:

i) Toilets shall be located within 100 m from any point of work but no closer than 50 m to any watercourse or water body;
ii) Toilets shall be secured to the ground to prevent them from toppling due to wind or any other cause;
iii) Toilets situated close to the site boundaries or within sight of residential areas shall be hidden behind screens or other cover as approved by the Engineer;
iv) No spillage shall occur when the toilets are cleaned or emptied and the contents shall be properly stored and removed from Site;
v) Discharge of waste from toilets into the environment and burial of waste is strictly prohibited;
vi) Toilets shall be provided with an external closing mechanism to prevent toilet paper from being blown out; and
vii) Toilets shall be emptied before long weekends and builders' holidays, and shall be locked after working hours.

6.4.7 Eating areas

The Contractor shall designate eating areas for his staff at all location within the Working Area where work is taking place. These eating areas shall be clearly demarcated and shall be provided with bins with lids. The Contractor shall ensure his employees do not consume meals anywhere other than at these eating areas and that noise is limited. All eating areas shall include provision for a smoking area.

Any cooking on Site shall be done on well-maintained gas cookers with fire extinguishers present. No cooking shall be permitted to occur on open fires.

6.4.8 Water use

Water is a scarce resource in South Africa and water shall be conserved wherever possible. The Contractor shall minimise the use of water and shall immediately attend to any wastage.

Subject to the prior approval of the Engineer, water for construction purposes may be abstracted from either watercourses/ water bodies or agricultural sources in the surrounding area. Abstraction of water from a watercourse or water body will require a permit from the Department of Water Affairs and Forestry, and abstraction from an agricultural source will require the owner's permission. The Contractor shall be responsible for obtaining the necessary authority and landowner approvals prior to undertaking such abstraction. The Contractor shall absolve the Employer of any and all legal obligation and risk in this regard.

Where water is abstracted from a watercourse, the Contractor shall abstract the water either from a naturally occurring scour hole located upstream or downstream of the river crossings or from a temporary sump, as directed by the Engineer. During water abstraction, the Contractor shall ensure the following:

i) The vehicle abstracting water does not enter or cross the river and does not operate from within the river;
ii) No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities;
iii) All reasonable measures to limit pollution or sedimentation of the downstream watercourse are implemented e.g. construction equipment is well maintained, use of drip trays, provision of bins, monitoring of personnel and activities.

The quantity of all water abstracted from any watercourses/ water bodies or agricultural sources shall be measured by way of water meters or other devices approved by the Engineer. The total quantity of water abstracted shall be recorded on a daily basis and reported to the Engineer each week in writing.

6.4.9 Solid waste management

The management of solid waste on site shall be strictly controlled and monitored. The quantities of waste generated on site shall be minimised. Littering shall be avoided.

The Contractor shall provide sufficient weatherproof and scavenger-proof bins on Site to store the solid waste produced on a daily basis. Solid, non-hazardous waste shall be disposed of in the bins provided and no on-site burying, dumping or burning of any waste materials, vegetation, litter or refuse shall occur. Bins shall not be allowed to become overfull and shall be emptied a minimum of twice weekly. The waste may be temporarily stored on the Site in a central waste area that is weatherproof and scavenger-proof, and which the Engineer has approved.

All solid waste shall be disposed of off-site at an approved landfill site. The Contractor shall supply the Engineer with a certificate of disposal.

6.4.10 Contaminated water management

6.4.10.1 General

Pollution could result from the release, accidental or otherwise, of contaminated runoff from construction camps and batching areas, discharge of contaminated water, chemicals, paints, solvents, oils, fuels, sewage, runoff from stockpiles, solid waste, litter, etc. Accordingly, the Contractor shall establish a contaminated water management system to address the prevention of pollution as well as suitable methods for the disposal of contaminated water. In this regard:

i) Appropriate pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into watercourses or water bodies shall be designed and implemented;
ii) Runoff from the cement/ concrete batching areas shall be strictly controlled, and contaminated water shall be collected, stored and either treated or disposed of off-site, at a location approved by the Engineer. The approval of the Engineer shall be required prior to the release of treated runoff from batching areas into any watercourse;
iii) Runoff from vehicle wash bays, workshops and diesel/ fuel tank areas shall pass through oil traps. The oil sludge thus collected shall be disposed of at an approved waste disposal site, *i.e.* licensed for such material;
iv) All spillage of oil onto concrete surfaces shall be controlled by the use of an approved absorbent material;
v) Water collected during the dewatering activities shall be pumped to settlement ponds complying with the requirements of Subclause 6.4.10.2.

Natural stormwater runoff not contaminated by construction operations and clean water can be discharged directly to watercourses and water bodies, subject to the Engineer's approval. Water that has been contaminated with suspended solids, like soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in settlement ponds. The release of settled water back into the environment shall be subject to the Engineers approval.

The Contractor shall notify the Engineer immediately of any pollution incidents on Site. Verbal reports must be followed up by a written report, which shall be submitted within 24 hours of the incident.

6.4.10.2 Settlement ponds

The Contractor shall construct, operate and maintain settlement ponds at key locations within the Working Area, including at washing areas, batching areas, vehicle washing areas, areas were dewatering is occurring and any other areas where a significant volume of contaminate water is discharged from the Works. The size, location, layout and operation of the settlement ponds shall be to the satisfaction of the Engineer.

The Contractor shall ensure that settlement ponds are located outside of the floodplain and riparian vegetation zones of watercourses and that the area is rehabilitated pursuant to the cessation of the operation of the pond. Each settlement pond shall have sufficient capacity for their purpose and shall be fitted with suitable oil traps. Settlement ponds shall be constructed using suitable materials and shall be made watertight using a liner approved by the Engineer. They shall be sub-divided to enable alternative sections to be cleaned while other sections are in operation. Plant and materials used in the construction of the settlement ponds shall themselves not cause pollution or effluent of an unacceptable quality.

All natural ground water and stormwater must be prevented from flowing into the ponds, and must be diverted around the settlement ponds to ensure that accumulated sludge is not washed into natural watercourses by stormwater.

If the Engineer is not satisfied that the provisions for the settlement ponds are adequate, he may order the Contractor to carry out such additional work as is necessary in order to comply with this Specification without any additional payment.

6.4.10.3 Water quality monitoring

(a) Point source

All effluent emanating from settlement ponds, batching plants, washing areas and any other areas of effluent and water discharge shall be sampled and tested as indicated in Table 1 at point of source. Quality of water at monitoring points shall comply with the criteria given in Table 1. Monitoring points for effluents shall be determined in agreement with the Engineer when the locations of specific areas and treatment works have been established in terms of the Contractor's Method Statements. Monitoring of point source effluent disposal into the watercourse/ water body will be the final effluent at the point of discharge into the watercourse/ water body.

Table 1: *Required effluent standards/ water quality guidelines for effluent from the sedimentation ponds, batching plants, washing areas or any other areas of effluent and water discharge to be returned to the environment.*

Variable	Required Effluent Standard
COD	Not to exceed 75 mg/ℓ

Variable	Required Effluent Standard
Conductivity	Not to be increased by more than 75 mS/m above influent, and shall not exceed 250 mS/m
Fecal coliforms	No *E. coli* (0/100 ml)
Free & saline ammonia (as N)	Not to exceed 10.0 mg/ℓ
Nitrate (as $N0_3$)	Not to exceed 25.0 mg/ℓ
Nitrite	Not to exceed 1.0 mg/ℓ
pH	Between 5,5 and 9,5
Phosphate (as $P0_4$)	Not to exceed 5.0 mg/ℓ
Residual Chlorine (as Cl)	Not to exceed 0.1 mg/ℓ
Soap, oil, grease	Not to exceed 2.5 mg/ℓ
Suspended solids	Not to exceed 250 mg/ℓ
Temperature	Water discharged into a watercourse shall not raise the water temperature at a point 500 m downstream of the point of discharge by more than 2°C above the temperature of the water 500 m upstream of the point of discharge.

(b) Diffuse source

Diffuse source monitoring shall be undertaken whenever there is a disturbance to any watercourse or water body as a result of construction activities within or adjacent to said watercourse/ water body. Sampling and monitoring shall take place 50 m upstream and 50 m downstream of the area where disturbance to the river has occurred and at 4 points equidistant across the river at each location. Sampling shall occur on a daily basis and the following variables shall be measured:

i) Temperature;
ii) Conductivity;
iii) Dissolved Oxygen;
iv) pH;
v) Suspended Solids; and
vi) Hydrocarbons.

Based on a comparison of the sampling variables, the quality of the water in the watercourse downstream of the activities in the watercourse shall be no worse than the quality of the water upstream of the activities.

(c) Sampling protocol

The Contractor shall ensure that persons taking water samples are correctly trained and standard sampling techniques are followed. Depending on the variable being measured, water quality monitoring shall either be undertaken *in situ* using approved handle-held instruments or at a SANS accredited laboratory in terms of SANS 10259.

6.5 ACCESS TO SITE

The Contractor shall ensure that access to the Site and associated infrastructure and equipment is off-limits to the public at all times during construction.

6.6 ACCOMMODATION OF TRAFFIC

The Contractor shall ensure vehicle traffic safety at all times and shall implement safety measures to this end. The Contractor shall control the movement of all his vehicles and equipment including that of his suppliers so that they remain on designated routes, are distributed so as not to cause an undue concentration of traffic, are routed and operated in a manner that minimises disruption to other users and that all relevant laws are complied with. On gravel or earth roads on the Site and within 500 m of the Site, the vehicles of the Contractor and his suppliers shall not exceed a speed of 40 km/hr.

7 SURFACE EXCAVATIONS AND BLASTING

7.1 SITE PREPARATION

The Contractor shall ensure that the measures specified for site clearing (Subclause 6.3), specifically as they relate to the identification and management of sensitive vegetation, clearing of vegetation and the stripping and stockpiling of topsoil, are implemented prior to the onset of earthworks.

7.2 DUST AND NOISE

The Contractor shall ensure that the dust and noise control measures specified in Subclauses 5.5 and 5.6 of this Specification are implemented during excavation and blasting operations.

7.3 EXTENT OF DISTURBANCE

All earthworks shall be undertaken in such a manner so as to minimise the extent of any impacts caused by such activities, particularly with regards to loss of natural vegetation, erosion and dust/ noise generation. No equipment associated with earthworks shall be allowed outside of the Site and defined access routes unless expressly permitted by the Engineer. Cuts into sloping terrain shall be minimised to eliminate the potential erosion risks associated with such operations.

7.4 STABILISATION

The Contractor shall ensure that the slopes of all excavations are stable. The most effective stabilisation mechanism is the retention of existing vegetation, where possible. Accordingly, clearing of any area shall be programmed to occur immediately prior to the onset of construction activities within the subject area. Moreover, disturbed areas shall be revegetated, as per the landscaping and rehabilitation provisions outlined in Clause 9, as soon as is reasonably possible.

Excavation at all the sites shall be carried out in such a way that slopes are not made dangerously steep. In general excavated slopes should be no steeper than 1:3 (approx 18 degrees), but where this is unavoidable appropriate measures shall be undertaken to stabilise the slopes. No materials, equipment or other load shall be placed so close to any excavation that the stability of the sides of the excavation is endangered.

7.5 BLASTING

The Contractor shall take appropriate precautions to minimise damage to the surrounding environment, including persons, private property and terrestrial and aquatic flora and fauna. The Contractor shall accept responsibility for all injury or damage occasioned by any blasting operations and shall make good such damage to the satisfaction of the Engineer. The following environmental considerations shall be applicable to blasting operations:

i) Topsoil shall be stripped and stockpiled before the commencement of drilling for the setting of charges.
ii) Precautions to minimise damage to the surrounding environment shall include measures to reduce the deposition of flyrock. Flyrock greater than 150 mm in diameter that falls beyond the cleared Working Area, shall be collected and removed.
iii) Each separate blast shall be designed to break out rock with the minimum explosive force. In this regard, blasting work shall be monitored using a tri-axial particle velocity meter, and the amount of explosives that may be detonated shall not result in a ground vibration with a peak particle velocity in excess of 20 mm/sec to limit damage to the fragile root systems of plants adjacent to the areas where blasting may take place.
iv) For multiple charges, time-delay detonators shall be used to reduce the overall detonation to a series of single explosions separated by a minimum 25 milliseconds (1/1000 seconds) delay.
v) Prior to blasting, the Contractor shall notify the relevant occupants of surrounding land and address any concerns.
vi) The Contractor shall notify emergency services, in writing, a minimum of 24 hours prior to any blasting activities commencing on Site.
vii) Adequate warning must be issued to all personnel on site prior to blasting activities taking place. All legally required signals are to be clearly indicated. The Engineer shall be issued daily updates of the days intended blasting activities.

7.6 TRENCHING

Trenching shall be undertaken in accordance with the engineering specifications with the following environmental amplifications, where applicable:

viii) Soil shall be excavated and immediately used for refilling trenches i.e. soil from the first trench section shall be excavated and stockpiled, thereafter soil from the second excavated trench length shall be used to backfill the trench behind it once the infrastructure has been laid. The last trench shall be filled using the soil stockpiled from the first trench.
ix) Trench lengths shall be kept as short as practically possible before backfilling and compacting. No trench shall exceed 1 000 m in length without the prior approval of the Engineer
x) Trenches shall be re-filled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimise erosion.

7.7 TREATMENT OF SPOIL

For the purpose of this Contract the designated spoil sites shall consist of the borrow pits located at the designated borrow areas or any additional site(s) identified by the Engineer. Surplus or unsuitable material obtained from any excavations as well as rubble not required elsewhere in the Works shall be spoiled at designated spoil sites. In operating the spoil sites, the Contractor shall ensure that:

i) Topsoil that would have been buried as a result of the spoiling of material is moved to one side and either replaced over the spoil site on completion or used for rehabilitation elsewhere on the site.

ii) The spoil disposed of in the spoil sites is free of contamination, including explosive residues and detonators.
iii) The spoil sites are shaped to blend with the local topography as far as is practicable and do not have slopes with a gradient exceeding 1:3.
iv) Drainage is provided to control ground water exit gradients within the spoil dumps such that migration of fines is kept to a minimum.
v) Surface water runoff is appropriate channelled through or around the spoil sites to prevent erosion damage resulting from stormwater runoff. In this regard, perimeter drainage channels shall be provided, and lined with rock or other suitable material to prevent scour, so that runoff will be collected and conducted past the spoil dumps.
vi) The surface of the spoil dump is rehabilitated as per the landscaping and rehabilitation provisions outlined in Clause 9.

8 BORROW MATERIALS

8.1 USE OF ALTERNATIVE BORROW AREAS

Borrow materials shall only be obtained from the designated borrow areas shown on the Drawings. These sites are either on property owned by the Employer or have been approved in terms of the Minerals and Petroleum Resources Development Act (No 28 of 2002).

Should the Contractor wish to utilise alternative material sources, this shall be subject to the written approval of the Engineer and the Department of Minerals and Energy. The Contractor shall, at his own expense, institute the requisite negotiations with the landowner as well as compile and submit the requisite application to the Department of Minerals and Energy, and comply with any and all of it's requirements. The Contractor shall absolve the Employer of any and all legal obligation and risk in this regard.

Where the Contractor proposes the use of an alternative material source/s, they shall take due cognisance of the time required to obtain the required licences and permission from the relevant authorities and owners of the land for such use.

8.2 SITE DEMARCATION

As required by the Engineer, access to borrow areas shall be controlled via the erection of temporary fencing around each borrow area. Temporary fencing shall comprise the following:

vii) Fencing shall be 1.4 m in height high with 4 equally spaced strands of double strand high tensile wire;
viii) Bitumen coated Y-section iron standards installed at 20 m centres to at least 300 mm below ground level and fixed to each wire strand;
ix) Three droppers evenly spaced between standards and separately fixed to each wire strand;
x) Timber straining posts of nominal section 100 mm diameter with diagonal struts, as required, installed at 300 m centres and a changes of direction or gradient and embedded at least 500 mm below ground level in concrete foundations at least 400 mm x 400 mm in section; and
xi) Gates to suit width of access as required.

8.3 BORROW AREA INFRASTRUCTURE

The only permanent infrastructure permitted at the borrow areas shall be a crushing and screening plant (if required) and a night watchman's hut. Written permission shall be required from the Engineer prior to bringing any additional permanent infrastructure onto the site. Where the additional infrastructure conflicts with the requirements of any Department of Minerals and

Energy's approval, the Contractor shall be responsible for obtaining the necessary authorisation from the Department of Minerals and Energy.

8.4 DUST AND NOISE

Borrow material shall be excavated in a manner that will minimise any detrimental environmental impacts. The Contractor shall ensure that the dust and noise control measures specified in Subclauses 5.5 and 5.6 of this Specification are implemented during borrow operations.

8.5 ACCESS ROUTES

Only designated access routes shall be used to access the borrow areas. Where alternative access routes are identified, these shall be subject to prior approval by the Engineer. The Contractor shall, at his own expense, institute the requisite negotiations with the landowners as well as comply with the requisite statutory requirements. The Contractor shall absolve the Employer of any and all legal obligation and risk in this regard.

The Contractors attention is drawn to the requirements of Subclause 6.4.5. The Contractor shall minimize any disturbance to the environment during the construction and operation of any access routes. If so required by the Engineer, the Contractor shall fence access roads.

The Contractor shall ensure that access routes are maintained in a satisfactory condition and that appropriate steps, as detailed in this Specification, are taken to prevent air pollution and erosion. The Contractor staff, including those of his Subcontractors, shall not be permitted to use any road or track other than the established access routes.

8.6 BORROW OPERATIONS

Borrow material shall be excavated in a manner that will minimise any detrimental environmental impacts. The removal of material from the borrow areas shall be undertaken as a phased strip mining operation as follows:

i) The Contractor shall remove all large trees from the borrow areas, as directed by the Engineer.
ii) The borrow pit operations shall be undertaken in a phased manner. Blocks of 0.25 ha shall be mined, with each block being cleared, mined to depletion, topsoiled and rehabilitated prior to the next block being exposed. Directly after completion of mining of each block, the topsoil shall be smoothed over the mined area and the Contractor shall ensure that no further activities occur in that particular block.
iii) The Contractor shall remove and stockpile the upper 300 mm of topmaterial. The handling and stockpiling of topsoil shall comply with the requirements of Subclause 6.3.5.
iv) Following vegetation clearing and topsoil stockpiling operations, the mined material shall be ripped, crusher/ screened and temporarily stockpiled and/or directly loaded via an excavator into awaiting trucks. The side slopes of the excavation shall not exceed a slope of 1:3 and shall have rounded tops. The slopes shall be finished off in such a way that sharp angles are not formed and that flowing curves are formed to blend with the surrounding landscape.
v) The Contractor shall ensure that fauna is not disturbed or destroyed during the clearing and mining operations. Any animal life encountered shall be relocated safely to beyond the border of the borrow pit site.
vi) Any watercourse shall be protected during the borrow operations.
vii) Working hours shall be limited to between 06h00 and 18h00, Monday to Saturday with no operations on Sundays or public holidays unless approved by the Engineer.

viii) The Contractor shall take steps to minimize the visual intrusion of mining activities on adjacent landowners by screening the properties with appropriately located stockpiles.

8.7 FINISHING AND REHABILITATION

During the course of borrow operations, the Contractor shall plan his operations in such a way that the amount of work that will be necessary for the finishing off of borrow areas is reduced as far as possible. Indiscriminate excavation without due regard for the desired final shape of the borrow pit will not be permitted, and shall be rectified at the Contractor's expense.

Prior to the onset of rehabilitation activities, the Contractor shall ensure that the remains of site infrastructure (if any) are demolished, removed from site and appropriately disposed of. Where directed by the Engineer, access roads shall be obliterated by breaking the surface crust and erecting earth embankments to prevent erosion.

On completion of operations in a borrow area, the Contractor shall reinstate the entire area, including access routes, so that it blends with the surrounding area and is suitable for the re-establishment of vegetation. For this purpose the borrow area shall be shaped to even contours with no slopes steeper than 1: 3, except where agreed to by the Engineer. The shaping and finishing off of the borrow areas shall be done in such a manner that the borrow pit will drain properly. All material in and around the borrow area, whether spoil, excess stockpiled material, oversize material left in the borrow pit, material resulting from clearing and grubbing operations or excess overburden shall be used or disposed of as directed by the Engineer. Material not capable of supporting vegetation shall be buried and used in shaping the borrow area and be subsequently covered with at least 500 mm soft material. All available soft material shall be spread evenly to the thickness directed and where sufficient material is not available for this purpose to cover the entire area, the remaining portions shall be scarified along the contours so that undue erosion is avoided.

Borrow areas shall be topsoiled and revegetated as per the landscaping and rehabilitation provisions outlined in Clause 9. All revegetated areas shall be considered “no go” areas and the Contractor shall ensure that none of his staff or equipment enters these areas.

Fencing around the borrow areas shall be left in position to enclose the damaged area on which the natural vegetation can be expected to re-establish itself and to enclose any area which is dangerous to livestock, as directed by the Engineer.

9 LANDSCAPING AND REHABILITATION

9.1 SCOPE

All areas disturbed as a result of the construction activities, irrespective of whether they occur within the defined Working Area or not, shall be subject to the landscaping and rehabilitation requirements outlined in this Specification. This includes, but is not limited to, Construction Camps, all stockpiling and laydown areas, the batching plants, all temporary access routes and all other areas from which topsoil has been stripped.

The type and number of plant and tree species to be planted at various locations throughout the Working Area will be guided by a landscaping plan developed by others, and not included here. For the purposes of this Specification, the landscaping and rehabilitation of disturbed areas shall entail the clearing, shaping, trimming and scarification of the area, as well as the replacement of the stockpiled topsoil. For areas where plant material has been rescued and stored in the on-site nursery, landscaping and rehabilitation shall also include the replanting of the rescued plants.

9.2 TIMING OF LANDSCAPING AND REHABILITATION

Vegetation is the most effective control against surface erosion. Accordingly, taking cognisance of the fact that the optimal timing for revegetation is during the summer rainfall period (September to March), the Contractor shall programme for the landscaping and rehabilitation of disturbed areas to occur as soon as practically possible following the cessation of the work in a specific area. In this regard, the Contractor's Works Programme shall clearly indicate how rehabilitation will executed, per phase, upon the completion of the works within a specific area. The period between the cessation of activities associated with the construction a particular infrastructural component and the and the onset of landscaping and rehabilitation for the area affected by these activities shall not exceed 1 month (28 days).

9.3 DEMOLITION AND REMOVAL OF STRUCTURES

Prior to landscaping and rehabilitation, the Contractor shall demolish and remove from Site everything not forming part of the Permanent Works. This includes, but is not limited to, temporary services and facilities (including foundations), temporary fences, temporary access routes, protective works, equipment, materials (nut, bolts, washers, wire, wood, bricks, cement *etc.*) and settlement ponds. All material generated from the demolition and removal of structures from site shall be appropriately disposed off.

9.4 SHAPING

All slopes which do not form part of the Permanent Works shall be graded so that no slope exceeds a maximum gradient of 1:3 or as otherwise directed by the Engineer. Contour drains shall be provided to control erosion where required by the Engineer.

Excavation and fills for Temporary Works and spoil dumps shall be formed in such a manner that the final profile shall appear as a natural extension to the adjacent, undisturbed ground profiles.

9.5 TRIMMING

Trimming shall consist of bringing the existing or previously shaped ground to a smoothly flowing surface with the final levels generally following the original surface as directed by the Engineer. Both mechanical and hand trimming shall be undertaken.

Trimming of any areas requiring grass shall be done in such a way that, after cultivation and application of any Topsoil, the finished surface of the area shall be approximately 25mm below the top of adjacent kerbing, channelling or pavement.

9.6 SCARIFYING

Prior to the application of topsoil, the ground surface shall be scarified by hand, plough or a mechanical ripper to a depth of approximately 150 mm to breakdown soil clods.

9.7 RIPPING

Compacted soil that has become too hard to scarify, shall be ripped with a mechanical ripper to a depth of 250 mm. No section of ground shall remain undisturbed after ripping.

9.8 TOPSOILING

Before placing topsoil, the Contractor shall remove all visible weeds from the placement area and from the topsoil. The previously stockpiled topsoil (Subclause 6.3.5) shall generally be spread evenly over the prepared surface to a depth of 150 mm on flat ground or to a minimum of 75 mm on slopes. Topsoil placement shall occur concurrently with construction or as soon as construction in a given area has ceased.

Topsoil shall be placed in the same soil zone from which it was stripped. However, if there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other soil zones of similar quality, subject to the approval of the Engineer.

9.9 RE-PLANTING

As part of the landscaping and rehabilitation programme, the Contractor may be required to re-plant rescued plants stored in the on-site nursery, either at their sites of origin or at a location identified by the Engineer. The transplanting of stored small trees (1 to 1½ m in height) and stored small shrubs (less than 1 m in height) shall entail the following

i) Trees and shrubs shall only be transplanted between the months of April and September;
ii) Trees shall be planted in holes of 1 m x 1 m x 1 m and shrubs shall be transplanted in holes of 600 mm x 600 mm x 600 mm;
iii) Trees and shrubs shall be planted so that their stems or trunks are at the same depth as in their original location. The orientation of the transplanted plants must be the same as in their original location (i.e. the north-facing side of the plant must remain north-facing after it has been planted); and
iv) Transplanted plants shall be watered once directly after transplanting (the planting hole shall be filled with water) and thereafter as required for establishment.

The transplanting of succulents and bulbous plants shall entail the following:

i) Succulents and evergreen bulbous plants may be transplanted at any time of the year. Deciduous bulbous plants shall be transplanted when they are leafless;
ii) Bulbous plants shall be planted in similar soil conditions and to the same depth as they were before removal; and
iii) Transplanted bulbs shall be watered once directly after transplanting to settle the soil.

In all cases, the soil around the roots of the plants being planted shall not be disturbed. Topsoil and subsoil from the hole shall be stored nearby to be replaced to the same depth intervals from which it was originally removed. Plants shall be carefully planted into holes.

9.10 ESTABLISHMENT AND MAINTENANCE OF REVEGETATED AREAS

9.10.1 Establishing of vegetation

The establishment of vegetation on landscaped and rehabilitated areas shall include maintaining the surface to the required slopes and levels without erosion or sedimentation, watering, weeding and any other procedure consistent with good horticultural practice necessary to ensure normal, vigorous and healthy growth of the plant material on site.

Notwithstanding the fact that the method of landscaping and rehabilitation may be specified or agreed to by the Engineer, the Contractor shall be solely responsible for rescuing, storing, establishing and maintaining the replanted material.

9.10.2 Maintenance of vegetation

The Contractor's liability with regard to the maintenance of the vegetation shall commence when the vegetation has been planted over the whole of the area subject to revegetation, and shall be not less than one year.

9.10.3 Watering and weeding

All landscaped and rehabilitated areas shall be adequately watered to ensure proper growth until the vegetation has become established and thereafter as required to sustain growth. The amount and frequency of watering shall be agreed with the Engineer.

The landscaped and rehabilitated areas shall be kept free of weeds. Weeds shall be controlled by means of pulling, or any other approved means.

9.10.4 Traffic on landscaped and rehabilitated areas

The Contractor shall not undertake the landscaping and rehabilitation of any areas until all operations that may require construction material and equipment to pass over those areas has been completed. All landscaped and rehabilitated areas shall be regarded as "no go" areas (as per Subclause 6.2.3), and no equipment, other than that required for establishment and maintenance purposes, shall be allowed to operate on these areas.

10 TOLERANCES

10.1 COMPLIANCE

Environmental management is concerned not only with the final results of the Contractor's operations to carry out the Works but also with the control of how those operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operations required to complete the Works.

It is thus required that the Contractor shall comply with the environmental requirements on an ongoing basis. Moreover, the Contractor and his Subcontractors shall not direct any person to undertake any activities which would place such a person in contravention of this Specification.

10.2 COST OF NON-COMPLIANCE

Where environmental damage occurs as a result of the failure of the Contractor to comply with the requirements of this Specification, the requisite remediation shall be effected to the satisfaction of the Engineer and at the cost of the Contractor.

Compliance with this Specification will be assessed as part of the certification of each Payment Certificate. Payment for specific items related to environmental compliance will be withheld if it can be show that the Contractor has failed to comply with his obligations for said items. Should the Contractor fail entirely to provide or fulfil for a period of time all or part of the continuing services, obligations and liabilities required of him in respect of this Specification, the amount, or part of the amount for the item, which in the opinion of the Engineer fairly reflects such failure, will be omitted and the Contract Price reduced accordingly.

10.3 PENALTIES

Penalties will be issued for the various transgressions listed Table 2 below. Penalties may be issued per incident at the discretion of the Engineer. Such penalties will be issued in addition to

any remedial costs incurred as a result of non-compliance with this Specifications. The Engineer will inform the Contractor of the contravention and the amount of the penalty, and will deduct the amount from monies due under the Contract.

Table 2: *Identified transgressions and associated penalties.*

Nature of transgression	Penalty
Any employees, vehicles, plant or equipment related to the Contractor's operations operating within the designated boundaries of a "no-go" area.	R 5 000
Any vehicle driving in excess of designated speed limits.	R 5 000
Persistent and un-repaired oil leaks from machinery.	R 10 000
Persistent failure to monitor and empty drip trays timeously.	R 5 000
The use of inappropriate methods for refuelling.	R 5 000
Litter on site associated with construction activities.	R 5 000
Deliberate lighting of illegal fires on site.	R 10 000
Employees not making use of the site ablution facilities.	R 5 000
Failure to implement specified noise controls, particularly during blasting	R 10 000
Failure to empty waste bins on a regular basis.	R 5 000
Inadequate dust control.	R 10 000
A spillage, pollution, fire or any damage to the environment resulting from negligence on the part of the Contractor.	R 25 000
Any damage or degradation to a designated "no go" area	R 50 000

For each subsequent similar offence the fine shall be doubled in value to a maximum value of R 250 000

The Engineer shall be the judge as to what constitutes a transgression in terms of this clause, subject to the provisions of Clause 20.1 of the FIDIC CCC. In the event that transgressions continue the Contractor's attention is drawn to the provisions outlined in Subclause 10.4.

10.4 REMOVAL FROM SITE AND SUSPENSION OF WORKS

In terms of the provisions of FIDIC CCC, the Engineer may instruct the Contractor to remove from Site any person who in their opinion is guilty of misconduct, or is incompetent, negligent or constitutes an undesirable presence on Site. The Contractor shall ensure that within 24 hours of such instruction, the employee has no further connection with the Contract.

Subclause 5.2 of this Specification requires that all Equipment be in good working order, and accordingly the Engineer may order that any Equipment not complying with this Specification be removed from Site. As per the provisions of Subclause 8.8 of the FIDIC CCC, where the Engineer deems the Contractor to be in breach of any of the requirements of this Specification, he may order the Contractor to suspend the progress of the Works or any part thereof.

11 MEASUREMENT AND PAYMENT

11.1 BASIC PRINCIPLES

Except as noted below as scheduled items, no separate measurement and payment will be made to cover the costs of complying with the provisions of this Specification and such costs shall be deemed to be covered by the rates tendered for the items in the Schedule of Quantities completed by the Contractor when submitting his tender.

The Contractor shall tender a rate or sum against each scheduled item and shall not price any item as nil or "0-00" and shall not indicate that the cost of any of the items listed in this schedule as being included elsewhere. In the event that the Contractor fails to provide a rate or sum,

prices an item as nil or "0-00", or indicates an item as being included elsewhere, the Engineer shall assign what he believes to be reasonable price to each of these items and the Tendered Sum shall not be adjusted to accommodate any additional costs.

11.2 FIXED VERSUS TIME-RELATED CHARGES

The scheduled items below have been categorised as Fixed Charges, Time-Related Charges, Quantity-Proportional Charges or Provisional Sums:

i) A Fixed Charge is a charge for a scheduled item which is deemed to remain unaltered throughout and which is deemed to be expended and due upon the fulfilment of the requirements under the item, irrespective of any time duration or any quantity measured;
ii) A Time-Related Charge is a charge for a scheduled item which is deemed to be expended and due in linear proportion to the time expended in the execution of the work or service or obligation in relation to the total length of time duration tendered for that item;
iii) A Quantity-Proportional Charge is a charge for a scheduled item which is deemed to be expended and due in linear proportion to the volume of work executed, the quantity of material, number of articles supplied, or services rendered, etc., as defined by the unit scheduled for the item; and
iv) Where required by this Specification, Provisional Sum items have been included in the Schedule of Quantities.

The sum tendered for each Fixed Charge item will be authorised for payment in terms of the first certificate issued after the Contractor's obligations have, in the opinion of the Engineer, been discharged as far as that item is concerned.

Payment for Time-Related Charge items will be certified by way of incremental amounts (calculated by the division of the tendered sum by the tendered duration) in each of the subsequent progress certificates until the sums tendered have been fully certified.

11.3 SCHEDULED ITEMS

11.3.1 General environmental obligations (Fixed Charge)

General environmental obligations Unit: lump sum (Sum)

All facilities and equipment not measured elsewhere, associated with complying with any requirement of this Specification will be measured as a sum.

The tendered sum shall cover any fixed costs associated with complying with this Specification not measured elsewhere.

11.3.2 General environmental obligations (Time-Related Charge)

General environmental obligations Unit: lump sum (Sum)

All work not measured elsewhere, associated with complying with any requirement of this Specification will be measured as a sum.

The tendered sum shall cover any time-related costs associated with complying with this Specification not measured elsewhere. Payment will be effected only after payment of the Fixed Charge has been made, and in accordance with the provisions of Subclause 10.2.

11.3.3 Environmental monitoring equipment and facilities

Environmental monitoring facilities and equipment Unit: lump sum (Sum)

The provision of all equipment and facilities related to fulfilling the environmental monitoring requirements of this Specification will be measured as a sum.

The tendered sum shall cover the fixed costs associated with procuring, fitting, operating and maintaining all equipment and facilities associated with the noise, water quality, dust and general environmental monitoring requirements of this Specification.

11.3.4 Environmental monitoring functions

Environmental monitoring functions Unit: lump sum (Sum)

The work related to undertaking environmental monitoring requirements of this Specification, including the provision of an Environmental Officer, will be measured as a sum.

The tendered sum shall cover all time-related costs associated with the noise, water quality, dust and general environmental monitoring requirements of this Specification, as well as the management of “no go” areas and the drafting and revision of the Contractor’s Environmental Policy. Payment will be effected only after payment of the Fixed Charge has been made, and in accordance with the provisions of Subclause 10.2.

11.3.5 Environmental awareness training

Environmental awareness training Unit: lump sum (Sum)

The provision of environmental awareness training to the Contractor’s staff will be measured as a sum.

The tendered sum shall cover all costs incurred by the Contractor in providing the venue and facilities as detailed in the Specification, in preparing and presenting the initial and refresher courses and in ensuring the attendance of his staff, including site management staff, at the courses.

11.3.6 Method statements: Additional work

Method statements: Additional work Unit: lump sum (Sum)

No separate measurement and payment will be made for the provision of Method Statements but, where the Engineer requires a change on the basis of his opinion that the proposal may result in, or carries a greater than warranted risk of damage to the environment in excess of that warranted by this Specification, then any additional work required, provided it could not reasonably have been foreseen by an experienced contractor, shall be valued in accordance with FIDIC CCC Subclause 50.4.

A stated sum is provided in the Schedule of Quantities to cover payment for such additional work.

11.3.7 Dealing with public complaints

Dealing with public complaints Unit: lump sum (Sum)

The monitoring and remediation of public complaints will be measured as a sum.

The tendered sum shall cover the costs of all labour, materials, plant and equipment required to address public complaints, including maintaining a complaints register and implement the requisite measures to address public complaints, in accordance with the Specification and the instructions of the Engineer, where relevant. The tendered sum will be divided by the number of months of the tendered project duration, and payment will be made against this sum for each month

11.3.8 Dealing with heritage resources

Dealing with heritage resources Unit: provisional sum (PS)

Engaging a heritage specialist to identify heritage resources and guide the appropriate treatment of these resources, as well as the provision of any assistance to the heritage specialist, will be measured in Dayworks and paid against this Provisional Sum.

11.3.9 Dealing with watercourses, water bodies and wetlands

Dealing with watercourses, water bodies and wetlands Unit: lump sum (Sum)

The provision of the conservation and protection measures, as required by this Specification, when working within or adjacent to watercourses, water bodies and wetlands will be measured as a sum.

The tendered sum shall cover the costs of all labour, materials, plant and equipment associated with providing the requisite conservation and protection measures, as well as their subsequent removal.

11.3.10 Dealing with sensitive vegetation

Dealing with sensitive vegetation Unit: provisional sum (PS)

Engaging a botanical specialist to identify sensitive vegetation and guide the appropriate treatment of this vegetation, including assisting with the requisite rehabilitation or conservation measures, as well as the provision of any assistance to the botanical specialist, will be measured in Dayworks and paid against this Provisional Sum.

11.3.11 Fire control

Fire control Unit: lump sum (Sum)

The compliance with fire control requirements will be measured as a sum.

The tendered sum shall cover the cost of all labour, materials, equipment and any other operation or thing necessary to comply with the requirements of the Specification related to the prevention and control of fires.

11.3.12 Pollution control measures

Pollution control measures Unit: lump sum (Sum)

The provision of the requisite pollution control measures will be measured as a sum.

The tendered sum shall cover the fixed costs of materials, plant and equipment required to implement the necessary pollution control measures required by the environmental management

specification, including facilities for the storage of fuel, oils, curing compounds, herbicides and pesticides, bunding of the workshop, the provision of drip trays, the provision of absorbent materials, the provision and subsequent removal of the settlement ponds, the installation of erosion control structures and the removal and disposal of sediment, contaminated soil and contaminated water.

11.3.13 Pollution management

Pollution management Unit: lump sum (Sum)

The implementation of the requisite pollution management requirements of the Specifications will be measured as a sum.

The tendered sum shall cover all time-related costs associated with the management of pollution, including the monitoring, emptying and overall management of oil separators, sumps and drip trays, the identification and remediation of leaks and spillages, the repair or removal from site of leaking equipment, the maintenance and management of erosion control structures, the maintenance of all settlement ponds and other facilities and plant that may be required for the effective treatment of water returned to the environment and incident reporting. Payment will be effected only after payment of the Fixed Charge has been made, and in accordance with the provisions of Subclause 10.2.

11.3.14 Dust control

Dust control Unit: lump sum (Sum)

The implementation of the requisite dust control measures will be measured as a sum.

The tendered sum shall cover the costs of all labour, materials, plant and equipment required to implement the necessary measures to control dust, including watering of dust prone areas, enforcement of speed limits, securing of material loads, wheel cleaning, minimisation of disturbed areas, management of stockpile *etc.* The tendered sum will be divided by the number of months of the tendered project duration, and payment will be made against this sum for each month.

11.3.15 Noise control

Noise control Unit: lump sum (Sum)

The implementation of the requisite noise control measures will be measured as a sum.

The tendered sum shall cover the costs of all labour, materials, plant and equipment required to implement the necessary measures to control noise. The tendered sum will be divided by the number of months of the tendered project duration, and payment will be made against this sum for each month.

11.3.16 Temporary fencing

Temporary fencing Unit: linear metre (m)

The erection of temporary fencing will be measured per net length of fencing erected as specified. Where fences have been dismantled and re-erected at other locations full payment will only be due if the re-erected fence complies in all aspects with this Specification. Payment for temporary fencing shall be certified as follows:

i) 85% of the rate tendered when the fencing is erected
ii) 15% of the rate tendered when the fencing is removed from site.

The tendered rate shall cover the costs of all labour, materials, plant and equipment required for furnishing fencing materials, transporting it to the point of application, erecting the fence, and for any other work which may be necessary to establish and maintain the temporary fencing as specified. The rate tendered shall also include full compensation for removing the temporary fencing, either to be erected at some other location or removing it from site, on completion of the Works.

11.3.17 "No go" fencing

"No go" fencing Unit: number (No)

The erection of "no go" fencing will be measured per pole erected/ removed as specified. Where "no go" fences have been dismantled and re-erected at other locations full payment will only be due if the re-erected fence complies in all aspects with this Specification. Payment for "no go" fencing shall be certified as follows:

iii) 85% of the rate tendered when the fencing is erected
iv) 15% of the rate tendered when the fencing is removed from site.

The tendered rate shall cover the costs of all labour, materials, plant and equipment required for furnishing fencing materials, transporting it to the point of application, erecting the fence, and for any other work which may be necessary to establish and maintain the "no go" fencing as specified. The rate tendered shall also include full compensation for removing the "no go" fencing, either to be erected at some other location or removing it from site, on completion of the Works.

11.3.18 Plant search and rescue

Plant search and rescue Unit: provisional sum (PS)

Plant search and rescue, as guided by the botanical specialist and including the replanting of rescued plants, will be measured in Dayworks and paid against this Provisional Sum.

11.3.19 Maintenance of rescued plants

Maintenance of rescued plants Unit: lump sum (Sum)

The maintenance of rescued plants, in terms of the requirements of this Specification, will be measured as a sum.

The tendered sum shall cover the costs of all labour, materials, plant and equipment required to maintain the rescued plants until they are replanted, including establishment, maintenance and removal of the on-site nursery and watering, weeding and general maintenance of rescued plants. The tendered sum will be divided by the number of months of the tendered project duration, and payment will be made against this sum for each month.

11.3.20 Vegetation clearance

Vegetation clearance Unit: linear metre (m)

The area designated by the Engineer and cleared will be measured per line route metre.

The tendered rate shall cover the costs of all labour, materials, plant and equipment for all work necessary for the clearing of vegetation from the specified areas, including the trimming and cutting of shrubs and trees by hand, uprooting of tree stumps, the treatment of alien/ invasive species to prevent re-sprouting and the removal, transporting and disposal of all cleared vegetation.

11.3.21 Removal, stockpiling and re-spreading of topsoil

Removal, stockpiling and re-spreading of topsoil Unit: lump sum (Sum)

The removal, stockpiling and re-spreading of topsoil will be measured as a sum. Payment for removal, stockpiling, and re-spreading of topsoil shall be certified as follows:

i) 50% of the sum tendered when the topsoil is removed
ii) 50% of the sum tendered when the topsoil is replaced

The tendered sum shall cover the costs of all labour, materials, plant and equipment required for removing, loading, transporting to stockpile, stockpiling, and subsequent replacement of topsoil as well as ripping of areas prior to replacing the topsoil.

11.3.22 Maintenance of topsoil stockpiles

Maintenance of topsoil stockpiles Unit: lump sum (Sum)

The maintenance of topsoil stockpiles, in terms of the requirements of this Specification, will be measured as a sum.

The tendered sum shall cover the costs of all labour, materials, plant and equipment required to maintain the topsoil stockpiles until the topsoil is loaded for re-spreading, including separation of topsoil stockpiles form those of other materials, ensuring topsoil stockpiles are appropriately located and meet the requirement of the specification with regard to height and ensuring that the requisite erosion measures have been installed. The tendered sum will be divided by the number of months of the tendered project duration, and payment will be made against this sum for each month.

11.3.23 Solid waste management

Solid waste management Unit: lump sum (Sum)

The collection, management and disposal of solid waste will be measured as a sum.

The tendered sum shall cover the costs of all labour, materials, plant and equipment required for the collection, management and disposal of solid waste, including the provision of weatherproof and scavenger-proof bins, the collection of waste and its temporary storage and the removal of waste from site to an approved landfill. The tendered sum will be divided by the number of months of the tendered project duration, and payment will be made against this sum for each month.

11.3.24 Environmental requirements for Blasting

Environmental requirements for blasting Unit: cubic metre (m^3)

The implementation of the specified environmental requirements for blasting will be measured per cubic metre of rock removed.

The tendered sum shall cover the costs of all labour, materials, plant and equipment required for "cover blasting" or blast mats, as well as the removal of fly rock from areas beyond the Working Area. The tendered sum will be divided by the number of months of the tendered project duration, and payment will be made against this sum for each month.

11.3.25 Treatment of Spoil

Treatment of spoil Unit: lump sum (Sum)

The treatment of spoil as per the requirements of this Specification will be measured as a sum.

The tendered sum shall cover the costs of all labour, materials, plant and equipment required for loading, transporting and off-loading spoil, irrespective of haul distance, and for finishing and rehabilitating the spoil areas.

11.3.26 Shaping and trimming

Shaping and trimming Unit: lump sum (Sum)

Shaping and trimming will be measured as a sum. No payment will be made for shaping and trimming within cuts, fills and spoil areas, as this is measured elsewhere.

The tendered sum shall cover the costs of all labour, materials, plant and equipment required for trimming the areas to the specified finish, including the moving of a small amount of material which would be inherent in this process and the removal of surplus material and stones. For payment purposes, a distinction shall be made between machine trimming that can reasonably be carried out by bulldozer or motor grader and hand trimming that cannot be done by machine owing to confined space, steep slopes, difficult shapes or sensitive areas.

11.3.27 Scarifying

Scarifying Unit: lump sum

Scarifying will be measured as a sum. Payment will only be made for areas scarified on the written instructions of the Engineer.

The sum tendered shall include full compensation for scarifying, removing stones and smoothing off the surface as specified.

11.3.28 Establishment and maintenance of vegetation

Establishment and maintenance of vegetation Unit: lump sum (Sum)

The establishment and maintenance of vegetation, in terms of the requirements of this Specification, will be measured as a sum.

The tendered sum shall cover the costs of all labour, materials, plant and equipment required to establish and maintain the vegetated areas, including preventing erosion and sedimentation, watering, weeding, prevention of traffic on revegetated areas and any other procedure consistent with good horticultural practice. The maintenance period shall commence when the vegetation has been planted and shall be not less than one year. The tendered sum will be divided by the number of months of the tendered project duration, and payment will be made against this sum for each month.

ANNEXURE E: METHOD STATEMENT PRO FORMA

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INFORMATION ON METHOD STATEMENTS

Method Statements are to be completed by the person undertaking the work (i.e. the Contractor). The Method Statement will enable the potential negative environmental impacts associated with the proposed activity to be assessed.

The Method Statement can only be implemented once approved by the ECO and ER.

The Contractor (and, where relevant, any sub-contractors) must also sign the Method Statement, thereby indicating that the works will be carried out according to the methodology contained in the approved Method Statement.

The ECO will use the Method Statement to audit compliance by the Contractor with the requirements of the approved Method Statement.

Changes to the way the works are to be carried out must be reflected by amendments to the original approved Method Statement; amendments require the signature of the ECO and the ER, denoting that the changed methodology or works are necessary for the successful completion of the works, and are environmentally acceptable. The Contractor will also be required to sign the amended Method Statement thereby committing him/herself to the amended Method Statement.

This Method Statement MUST contain sufficient information and detail to enable the ER and ECO to apply their minds to the potential impacts of the works on the environment. The Contractor will also need to thoroughly understand what is required of him/her in order to undertake the works.

THE TIME TAKEN TO PROVIDE A THOROUGH, DETAILED METHOD STATEMENT IS TIME WELL SPENT. INSUFFICIENT DETAIL WILL RESULT IN DELAYS TO THE WORKS WHILE THE METHOD STATEMENT IS REWRITTEN TO THE ER'S AND ECO'S) SATISFACTION. The page overleaf provides a pro forma method statement sheet which needs to be completed for each activity requiring a method statement in terms of the EMP.

METHOD STATEMENT

CONTRACT: ..... **DATE**: .....

PROPOSED ACTIVITY (give title of method statement and reference number from the EMP):

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

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

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:	End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated maps and plans where possible, use additional pages if required):

DECLARATIONS

1) CONTRACTOR

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the ECO and Site Agent will audit my compliance with the contents of this Method Statement

_____ _____

(signed) (print name)

Dated: _____

2) ENVIRONMENTAL CONTROL OFFICER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

_____ _____

(signed) (print name)

Dated:._____

3) ENGINEER

The works described in this Method Statement are approved.

_____ _____

_____

(signed) (print name)

(designation)

Dated: _____

ANNEXURE F: RESIDUAL ENVIRONMENTAL ISSUES

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TABLE OF RESIDUAL ENVIRONMENTAL ISSUES

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

PROJECT BRAVO (COAL-FIRED POWER STATION IN THE WITBANK AREA)

Aspect	Source/ Origin	Actions	Documentation	Responsibilities	Program
All linear infrastructure, *viz*. • coal conveyer • railway line • water pipeline • access and service roads	• EIR • RoD • Project Bravo Construction Environmental Management Plan (CEMP) • SANS codes • Preliminary route design plans	• Site inspections to be undertaken by specialists • Constraints associated with finalized alignments to be identified, *viz*. wetland delineation, heritage resources • Finalisation of route alignment plans, to be submitted to DEAT • Appropriate mitigation requirements to be identified	• Specialist reporting, e.g. search and rescue of significant plant species, protection and management of heritage resources (graves, structures etc) • PESs for inclusion in Tender Document	• Eskom • Relevant specialists, *viz*. freshwater ecologist, heritage practitioner	• Appropriate season re vegetation as identified in EIR and RoD • Submission to DEAT • Prior to finalization of Tender Document
Terrace preparation and construction, including coal stockyard and ash dump, i.e. bulk earthworks	• EIR • RoD • Project Bravo CEMP • SANS codes • Preliminary site design and layout plans	• Site inspections to be undertaken by specialists • Constraints associated with finalised site design and layout plans to be identified, *viz*.	• Specialist reporting, e.g. search and rescue of significant plant species, protection and management of heritage resources (graves, structures etc)	• Eskom • Relevant specialists, *viz*. freshwater ecologist, heritage practitioner	• Appropriate season re vegetation as identified in EIR and RoD • Submission to DEAT • Prior to finalization of Tender Document

Aspect	Source/ Origin	Actions	Documentation	Responsibilities	Program
	• Terrain contour plan • Preliminary drainage structure plans	wetland delineation, heritage resources • Finalisation of site design and layout plans • Finalisation of drainage structure plans • Appropriate mitigation requirements to be identified	• PESs for inclusion in Tender Document		
Foundations	• EIR • RoD • Project Bravo CEMP • SANS codes • Preliminary site design and layout plans • Geological and substrate conditions • Preliminary foundations plans	• Constraints associated with finalised foundations plans to be identified, *viz*. geological and substrate conditions • Finalisation of site design and layout plans • Finalisation of drainage structure plans • Appropriate mitigation requirements to be identified	• Reporting on geological and substrate design requirements • PESs for inclusion in Tender Document	• Eskom • Relevant foundations design specialists	• Submission to DEAT • Prior to finalization of Tender Document
Structures	• EIR • RoD	• Confirm design response to prescribed	• Reporting on design response to prescribed	• Eskom • Relevant	• Prior to finalization of Tender Document

Aspect	Source/ Origin	Actions	Documentation	Responsibilities	Program
	• Project Bravo CEMP • SANS codes • Preliminary design plans for power block, turbine generator areas, air cooled condensers, boiler area, chimney, water treatment, air quality control, compressor buildings etc	mitigatory measures • Finalisation of design plans for structures	mitigatory measures • PESs for inclusion in Tender Document	engineering design specialists	
Site establishment	• EIR • RoD • Project Bravo CEMP • SANS codes • Preliminary site design and layout plans, defining construction facilities i.e. offices, depots, material storage and handling, first aid station, personnel facilities, security infrastructure, workshops, construction utilities,	• Site inspections to be undertaken by specialists • Constraints associated with finalised construction facilities plans, *viz*. wetland delineation, heritage resources • Finalisation of construction facilities plans • Appropriate mitigation requirements to be identified	• Specialist reporting, e.g. search and rescue of significant plant species, protection and management of heritage resources (graves, structures etc) • PESs for inclusion in Tender Document	• Eskom • Relevant specialists, *viz*. freshwater ecologist, heritage practitioner • Relevant construction facilities design specialists	• Appropriate season re vegetation as identified in EIR and RoD • Submission to DEAT • Prior to finalization of Tender Document

Aspect	Source/ Origin	Actions	Documentation	Responsibilities	Program
	communications facilities etc				
Batching plant	• EIR • RoD • Project Bravo CEMP • SANS codes • Preliminary concrete supply design and layout plans	• Site inspections to be undertaken by specialists • Constraints associated with finalised concrete supply design and layout plans • Finalisation of concrete supply design and layout plans • Appropriate mitigation requirements to be identified	• Specialist reporting, e.g. search and rescue of significant plant species, protection and management of heritage resources (graves, structures etc) • PESs for inclusion in Tender Document	• Eskom • Relevant specialists, *viz*. freshwater ecologist, heritage practitioner • Relevant concrete supply design and layout specialists	• Appropriate season re vegetation as identified in EIR and RoD • Submission to DEAT • Prior to finalization of Tender Document
Groundwater	• EIR • RoD • Project Bravo CEMP • Preliminary site design and layout plans • Geological and substrate conditions • Preliminary drainage structure plans	• Constraints associated with groundwater conditions to be identified, *viz*. borehole monitoring • Finalisation of drainage structure plans • Appropriate mitigation requirements to be identified	• Reporting on groundwater conditions • PESs for inclusion in Tender Document	• Eskom • Relevant engineering design specialists	• Submission to DEAT • Prior to finalization of Tender Document
Major Hazardous Installation	• EIR • RoD	• Site inspections to be undertaken	• Specialist reporting on hazardous installations	• Eskom • Relevant MHI	• Submission to DEAT • Prior to finalization of

Aspect	Source/ Origin	Actions	Documentation	Responsibilities	Program
(MHI)	• Project Bravo CEMP • SANS codes • Preliminary site design and layout plans • Preliminary design plans for power block, turbine generator areas, air cooled condensers, boiler area, chimney, water treatment, air quality control, compressor buildings etc	by specialists • Constraints associated with hazardous installations to be identified • Finalisation of design plans • Appropriate mitigation requirements to be identified	implications • PESs for inclusion in Tender Document	specialist • Relevant engineering design specialists	Tender Document

ANNEXURE G: TERMS OF REFERENCE FOR ENVIRONMENTAL MONITORING COMMITTEE

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PROJECT BRAVO POWER STATION
DRAFT TERMS OF REFERENCE FOR THE ENVIRONMENTAL MONITORING COMMITTEE

1. Establishment and scope of the Committee

The Environmental Monitoring Committee (Committee) is established in terms of the requirements of Subclause 3.2.11 of Record of Decision (RoD) issued by the Department of Environmental Affairs and Tourism (DEAT) for the Project Bravo Power Station. The Committee shall confine its mandate to activities directly related to Project Bravo Power Station and associated infrastructure, as indicated in:

- The Environmental Impact report (EIA, *Report No.: 4284/401281*);
- The Construction Environmental Management Plan (CEMP, *Report No.: 4446/401281*);
- The Record of Decision (RoD, DEAT Reference: R12/12/20/807); and
- The Minister's decision on the appeals (DEAT Reference: R12/12/20/???).

2. Guiding principles of the Committee

2.1 All discussions relating to the tasks and functions of the Committee shall be transparent.
2.2 All parties within the Committee shall act in an accountable and responsible manner in the deliberations of the tasks arising from the process.
2.3 All proceedings of the Committee shall be recorded and be made accessible to the public.
2.4 All parties shall have access to information relating to the work of the Committee to facilitate decision-making.
2.5 Good faith and common understanding shall underline all proceedings within the Committee.
2.6 All matters relating to the Committee shall be addressed with the necessary urgency.
2.7 Any conflict of interest/duties in terms of the role on the Committee with the development or future related developments shall be declared by members of the Committee.

3. Role, purpose and aims of the Committee

3.1 The Committee has an advisory, monitoring and '*watch-dog*' role.
3.2 The Committee will actively participate in the compliance monitoring of Eskom's adherence to the conditions specified in the RoD and implementation of the approved EMPs by reviewing audit reports (prepared by the Environmental Control Officer) and conducting site inspections.
3.3 The purpose and functions of the Committee are to monitor the development with reference to:

3.3.1 The management of the site during construction (in accordance with the EIR, CEMP, RoD, Appeal decision and any subsequent requirements specified by DEAT) to ensure minimal impact on the environment.

3.3.2 The management of the site during operation (in accordance with the Operational Environmental Management Plan) to ensure minimal impact on the environment.

3.3.3 The environmental standard of activities on the site.

3.3.4 The degree of nuisance and/or health hazard caused or likely to be caused to the neighbouring communities.

3.3.5 The degree to which the biophysical environment is impacted upon, and when necessary, propose, discuss and recommend appropriate mitigation measures.

3.3.6 The effectiveness of mitigation measures proposed in the EIR, EMPs and RoD.

3.4 To inform relevant authorities of non-compliance by Eskom with the conditions of the ROD, by submitting a report when there are non-compliances on a regular basis (as agreed to by the Committee and Eskom).

3.5 To promote environmental awareness and capacity building with regards to Project Bravo that shall strive to improve the understanding of surrounding communities and generate interest to keep abreast with future developments of the port.

3.6 To promote a sustainable social and physical environment through responsible management procedures, future rehabilitation and informed monitoring of the site.

3.7 To disseminate information to the various constituencies of the organisations present on the Committee.

3.9 To develop trust amongst the participants and interested and affected parties.

3.10 To evaluate Eskom's complaints procedure and channels of communication with the public on an ongoing basis.

4. Composition of the Committee

4.1 Members nominated to serve on the Committee must have a direct interest/ involvement in the project.

4.2 The Committee shall include the following mandated sectors:

- Proponent (Eskom, both with regard to over project management and site supervision);
- Authorities (DEAT, MDALA, DWAF, District Municipality, Local Municipality),
- Community (inclusive of NGO's, CBO's and the business sector)
- ECO; and
- Specialists (ecologist and air quality specialist).

4.2 To ensure a workable committee, the Committee shall not comprise of more than 25 representatives including authorities, the proponent, the ECO and the various specialists. Should the need arise for more representatives to be appointed, the Chairperson of the Committee has the discretion to do so in consultation with the Committee members.

4.3 Any member may appoint a *secundus* from the same organization to represent him/ her at a Committee meeting by notifying the Chairperson/Secretariat in advance.

4.4 Observer status shall be afforded to anyone wishing to attend any meeting on condition that the Chairperson/Secretariat is informed well in advance of this intention. Observers shall be given limited speaking rights.

4.5 The quorum shall be 60% of the membership of the Committee. A quorum shall require that representatives of all three sectors (Proponent, Authorities and Community) are present.

4.6 In the event of any of the Committee members or their appointed representatives not being able to attend a meeting, prior notification within a reasonable period shall be provided to the Chairperson/Secretariat in writing to allow the meeting to be postponed with a reasonable period of notification thereafter, should this be required. At that postponed meeting, those members present shall constitute the quorum.

5. Membership requirements

5.1 Members shall be nominated by their representing organization or constituency and appointed in writing by their respective organizations to serve on the Committee.

5.2 Members of the Committee shall be disqualified; if they or their appointed representatives are absent for three (3) consecutive meetings of the Committee. Should a representative no longer qualify for membership, the organization he/she represented will be invited to nominate a new representative.

5.3 A member may resign at any time from the Committee by submitting his/ her resignation in writing via to the Chairperson. Once a resignation has been accepted, the organization he/she represented will be invited to nominate a new representative.

6. Decision making procedures within the Committee

6.1 Where possible issues shall be debated until consensus is reached.

6.2 Where consensus cannot be reached, the issues of disagreement shall be recorded in writing and referred to the respective authorities who have jurisdiction over the relevant matters for consideration.

7. Meetings

7.1 The Committee shall meet once every two months or at such intervals as a majority of the members may agree, but not less than four (4) times per annum.

7.2 In the event of an unusual incident occurring (relevant to the Committee's scope), any member of the Committee may request an emergency meeting with the Chairperson, the ECO and an Eskom representative.

7.3 The Committee shall deal with the following matters at its regular meetings:

7.3.1 The report of the ECO on compliance with the RoD and CEMP.

7.3.2 Any amendments required to the EMP

7.3.3 Reports or complaints about incidents or related matters received from members of the public.

7.3.4 Issues of concern to the Committee members. Whenever possible, these issues shall be forwarded in writing to the Chairperson/ Secretariat for

inclusion on the agenda, and if answers are needed, shall also be forwarded to the relevant party / parties before the meeting, to facilitate discussion at the meeting.

7.3.5 Report back on relevant meetings held outside of the Committee.

7.3.6 Reports from Eskom about operational and other relevant matters.

8. Chairperson and deputy chairperson

8.1 At the inaugural meeting of the Committee, the Committee members will nominated an independent Chairperson, from within the ranks of the Committee. As per the requirements of the RoD, the Chairperson must posses the appropriate people and project management skills.

8.2 The Committee shall also nominate a Deputy Chairperson at its inaugural meeting, to stand in for the Chairperson should they be unavailable.

8.3 The appointment of the Chairperson may be reviewed annually, and where the there is consensus from the Committee that the Chairperson should be replaced, the existing Chairperson shall be dismissed and a new Chairperson shall be elected from within the Committees ranks. Upon dismissal, the past Chairperson shall return be being an ordinary member of the Committee.

8.4 It shall be the duty of the Chairperson to ensure the orderly conduct of meetings and to ensure that all persons present and wishing to speak are given a reasonable opportunity to do so.

8.5 The Chairperson shall be unbiased in all the deliberations of the Committee.

8.6 The Chairperson shall be the spokesperson of the Committee.

8.7 The Chairperson shall have an executive function and shall be able to call emergency meetings outside of the regular Committee meetings as and when required.

8.8 The Chairperson will approve any formal communication to be distributed from the Committee as a group to a wider audience.

8.9 The Chairperson may resign at any time from the Committee by submitting his/ her resignation in writing to the Secretariat for tabling at the next Committee meeting. Once the resignation has been accepted, a new Chairperson shall be nominated from within the ranks of the Committee.

9. Environmental Control Officer

9.1 As per the provisions of Condition 3.2.13 of the RoD, a suitably qualified Environmental Control Officer (ECO) shall be appointed by Eskom for the construction phase. The ECO's appointment shall only terminate once the final rehabilitation measures are completed and the site has been handed over to Eskom by the Contractor.

9.2 The ECO shall act on behalf of the Committee, and shall report to and be accountable to the Committee.

9.3 The ECO shall audit compliance with the RoD, environmental legislation and the CEMP.

9.4 The ECO shall conduct regular site inspections and environment audits.

9.5 The ECO shall compile an environmental compliance report every two months and distribute this to the Committee. Once ratified by the Committee, this report shall be submitted to the DEAT Director of Environmental Impact Evaluation.

9.6 The ECO shall ensure that the compliance reports prepared by him/her are circulated at least 14 days before the date of the meeting at which they are to be considered.

10. Responsibilities of the Committee members

10.1 As the Project Proponent, Eskom shall:

10.1.1 Adhere to conditions in the RoD and implement the EMPs.
10.1.2 Provide sufficient resources for the effective functioning of the Committee. In this regard, in terms of the requirements of Condition 3.2.11.7 Eskom shall bear all costs associated with the Committee
10.1.3 Ensure that all reports and/or complaints directed at it by any person and the responses thereto are recorded in writing, which shall be made available at each meeting of the Committee. Any complaints directed to the various official departments shall be recorded and tabled for discussion.
10.1.4 Fulfil all roles as set out for members of the Committee.

10.2 The authorities represented on the Committee shall:

10.2.1 Oversee that all commitments in RoD, EMP, and any other authorizations issued for the proposed project, are met by being involved in the monitoring function of Committee.
10.2.2 Provide guidance on the functioning of the Committee.
10.2.3 Evaluate all reports and correspondence received from the Chairperson.
10.2.4 Fulfil all other roles as set out for members of the Committee.

10.3 The community organization represented on the Committee shall:

10.3.1 Provide insights based on local knowledge
10.3.2 Keep constituencies informed of progress with the implementation of the EMP and compliance with the RoD
10.3.3 Inform the Committee of any issues or concerns constituencies might have with regard to the environmental impact of the project.
10.3.4 Fulfil all roles as set out for members of the Committee.

10.4 The specialists represented on the Committee shall:

10.4.1 Provide such specialist inputs/ guidance as might be requested by the Committee

11. Accountability

11.1 Members of the Committee are accountable to their constituencies, and are responsible for keeping their members informed of the Committee's proceedings.
11.2 Participation by any member of the Committee shall not be interpreted as a waiver of such a person's right to challenge any issue outside the forum of the Committee.
11.3 The Committee shall report back to the DEAT on matters pertaining to the Project Bravo Power Station and associated infrastructure. The prior mechanisms for

reporting shall be the minutes of the Committee meetings and the ECO's environmental compliance reports.

11.4 The Proponent is responsible for the management of contractors on site in accordance with the CEMP; approved Method Statements and RoD conditions.

12. Administration

12.1 The ECO shall fulfil the function of Secretariat of the Committee and shall be responsible for convening meetings, taking minutes and the dissemination thereof to members. Specifically, as the Secretariat, the ECO's duties and responsibilities shall include:

- 12.1.1 Organisation of Committee meetings in consultation with the Chairperson.
- 12.1.2 Keeping all records of the Committee.
- 12.1.3 Taking minutes at all meetings of the Committee and ensuring accurate recordings of the proceedings off all meetings.
- 12.1.4 Attending to correspondence and keeping copies thereof.
- 12.1.5 Circulating notices to convene meetings.
- 12.1.6 Preparation of documents requested by the Committee.
- 12.1.7 Ensuring that minutes are forwarded to all members timeously.
- 12.1.8 Circulate documentation for the next meeting to all Committee members at least 14 days prior to the meeting.

12.2 Eskom will be responsible for the reimbursement of costs incurred by the ECO (both in terms of their monitoring and secretarial functions) and the specialists, as well as any costs incurred by the Chairperson, over and above what would normally be anticipated for Committee members.

12.3 The respective organisations represented on the Committee shall be responsible for funding attendance of their representatives (Community and Authorities).

13. Amendments

This ToR can only be amended with the necessary prior notification and in the presence of a full quorum. This document should be read together with the Environmental Monitoring Committee guidelines compiled by DEAT in terms of their Integrated Environmental Management, Information Series (*viz.* . DEAT [2005] *Environmental Monitoring Committees, Integrated Environmental Management, Information Series 21*, DEAT, Pretoria.)

14. Dispute resolution

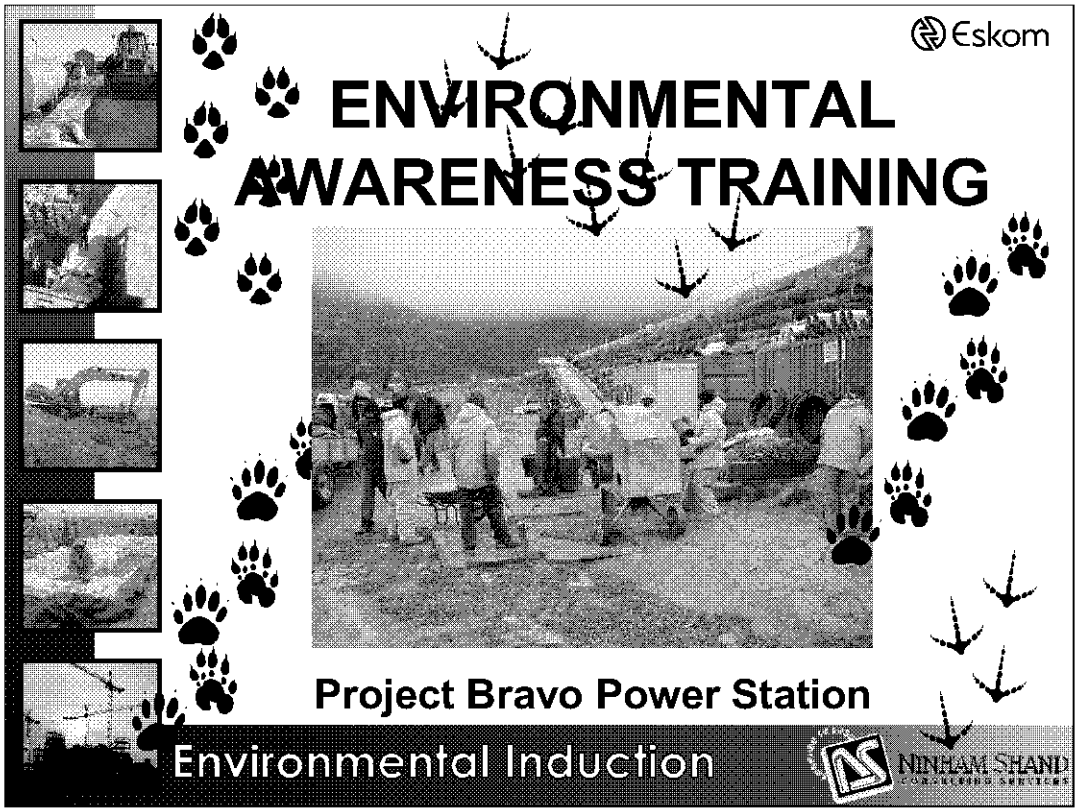
Any disputes related to the roles and responsibilities of the Committee that cannot be resolved within the Committee, should be referred to DEAT for resolution.

Abbreviations

CBO:	Community Based Organisation
CEMP:	Construction Environmental Management Plan
NGO:	Non-governmental Organisation
DEAT:	Department of Environmental Affairs and Tourism (National)
DWAF:	Department of Water Affairs and Forestry
ECO:	Environmental Control Officer
EMC:	Environmental Monitoring Committee
EMP:	Environmental Management Plan
MDALA:	Mpumalanga Department of Agriculture and Land Affairs
RoD:	Record of Decision
ToR:	Terms of Reference

ANNEXURE H: GENERIC ENVIRONMENTAL AWARENESS TRAINING COURSE

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Welcome to the Environmental Awareness Course for construction workers on site. One of the requirements of an Environmental Management Programme (EMP) is that all personnel on site are aware of the contents and requirements of the EMP. Using this course, you will be able to ensure this legal objective is reached which will help everyone on site to improve their environmental performance and prevent damage to the environment.

INSTRUCTIONS FOR THE TRAINER

Use these instructions to help you plan your awareness course.

1) Setting up

a) Choose a time in the morning when everyone will concentrate. You will need about ¾ hour to do the whole course and answer any questions.

b) It is better for the course to be conducted on site so that you can point out features to the group.

c) There should be a maximum of 20 people in a group at a time. If there are more than 20 people, you will have to give more than one training course.

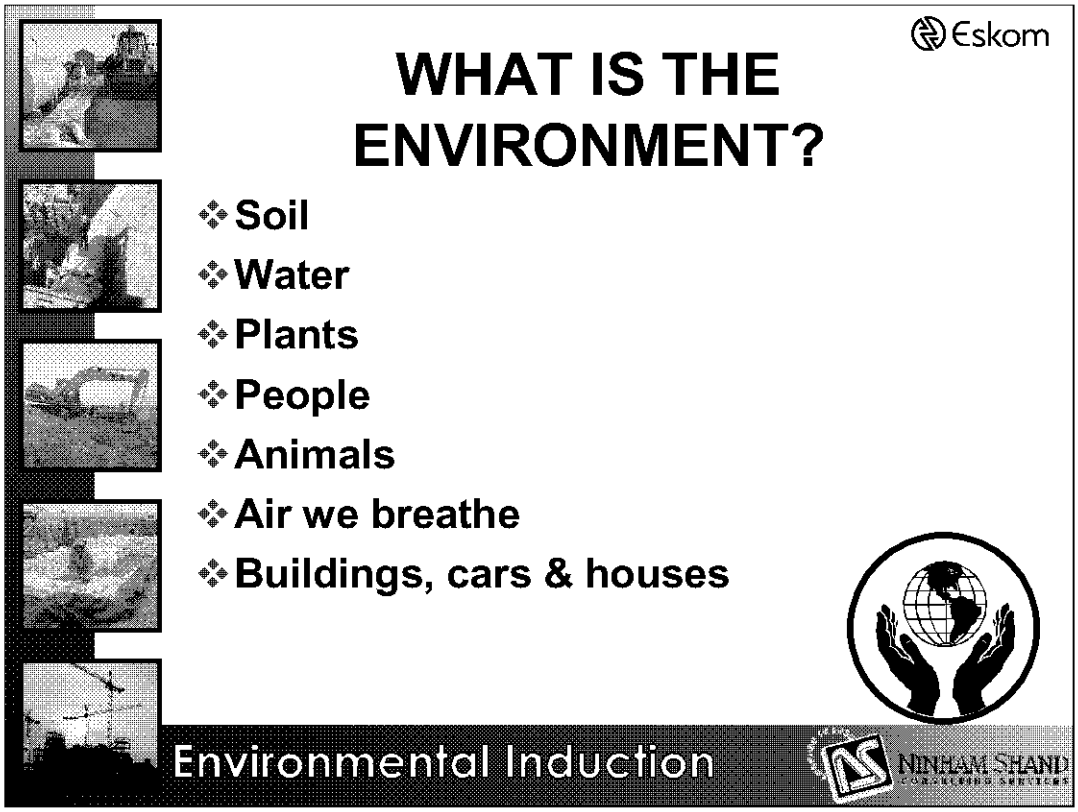
d) Choose a spot on the site which is out of the wind (so that everyone can hear you) or covered (e.g. the eating area).

e) Before doing the training, read through these notes so that you know what you are talking about. Remember you may be asked questions, so make sure you read through the notes.

f) Make sure you have all your training material with you before you start, namely:

- *This poster presentation; and*
- *The copies of the signs to put up on site.*

g) Check which languages are spoken by the group you will be speaking to. If translators are needed, you will need to arrange this..



Before showing this slide, start off by explaining that, for this project, an Environmental Management Programme (EMP) has been included in the contract. This EMP aims to protect the environment during construction and prevent damage. This document has been signed by [insert appropriate name] who have promised that the environment will be protected.

The purpose of this course, therefore, is to familiarize the workers with the contents and requirements of the EMP.

Now start off by asking the group what they think the "environment" is. You will probably get a range of answers like "Plants and animals" and "nature". It may be that no one in the group will think of people, buildings, cars or houses as being an important part of the environment.

[HINT: if you are struggling to get responses to your question from the group, ask the question directly to someone whom you know is talkative and outgoing]

Referring to the definition below, now use this poster to explain the concept of the environment to the group. Don't forget to stress that all people and their needs are an important part of the environment.

Definition: The environment comprises all living (plants, people, animals) and non-living things (soil, water, the air, buildings, cars and houses) surrounding us.

Now go to the next poster.



Use the information below to explain this poster.

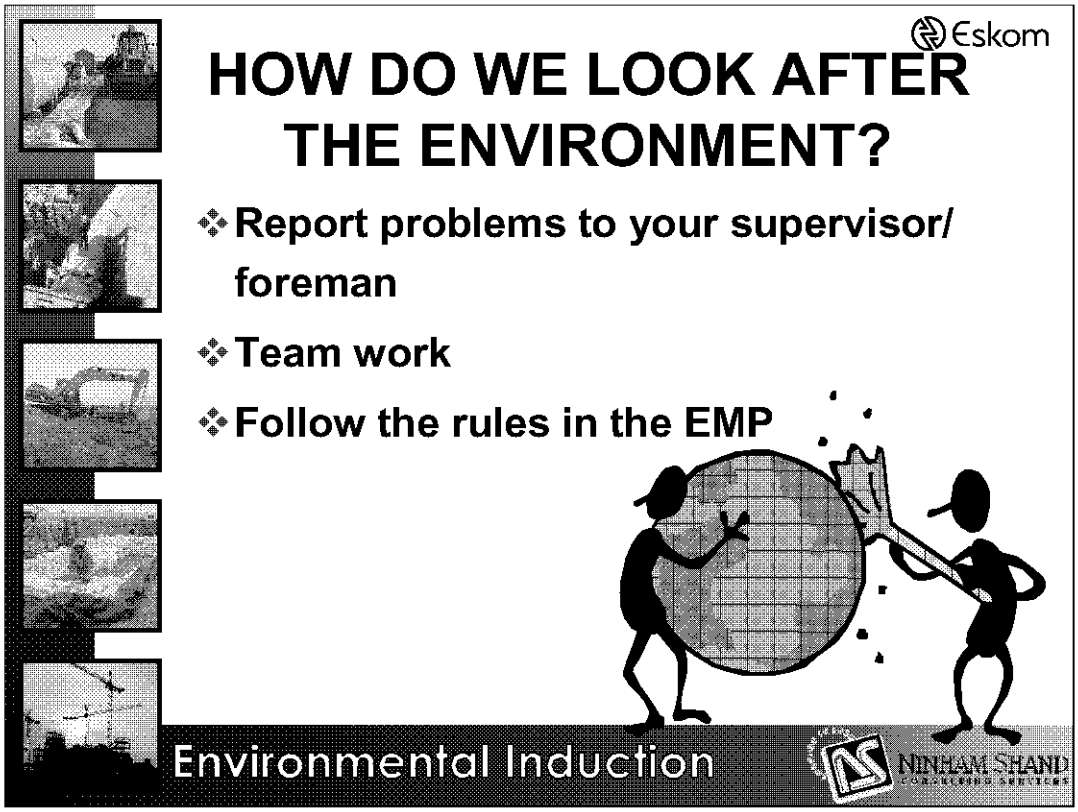
The environment provides us with what we need (for example, food, water, air and shelter) If the environment is damaged, it cannot provide us with what we need which will affect all of us and future generations as well.

The new Constitution says that all people in South Africa have the right to a healthy environment. Therefore, if we damage the environment, this will affect other people and deny them the right to a healthy environment. For example, throwing oil in a river, will affect people that use the river water for drinking, swimming or washing their clothes.

If the environment is damaged by anyone during this project, three things may happen:

- your company may be fined;
- the person may be sent off site; or
- construction may be stopped.

Now go to the next poster.



Use the information below to explain this poster.

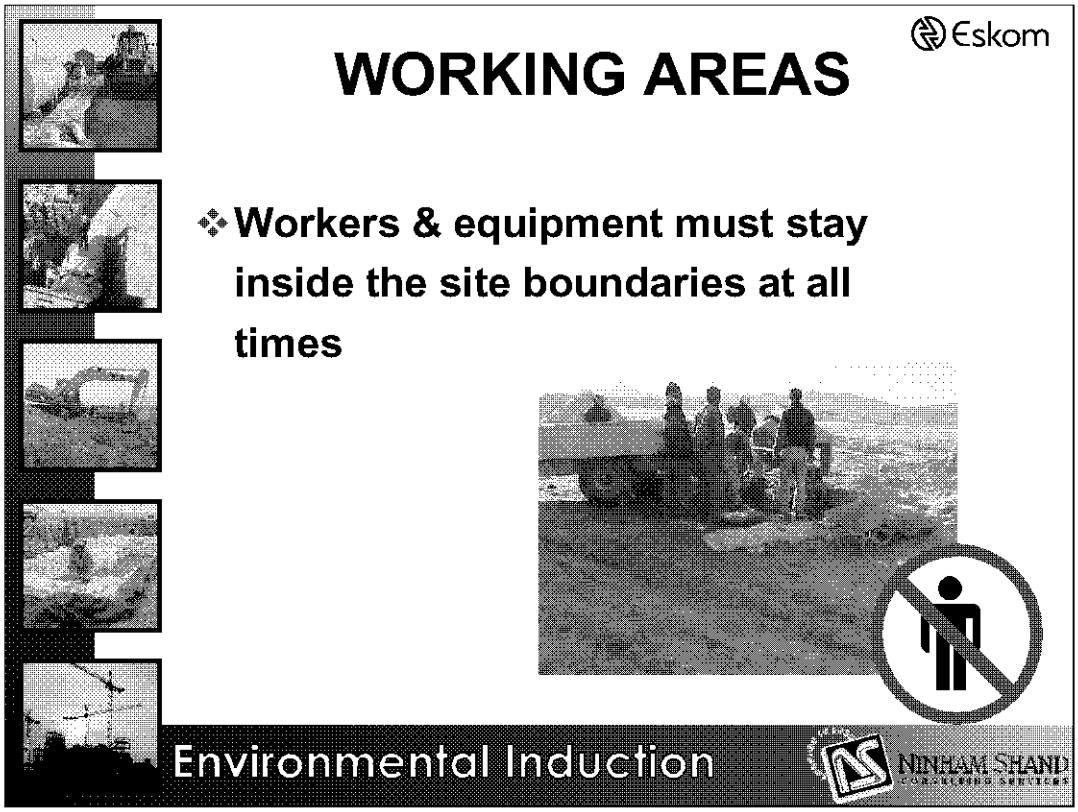
The contract has been signed and the environment must now be protected during construction on this project.

You can help protect the environment by doing the following:

- Reporting any problems (for example, a fire out of control and a leaky machine) to your supervisor or foreman immediately. Don't wait and try to fix the problem yourself.
- Team work is very important - Please inform your supervisor or foreman if you or someone else has not attended the awareness course and work together to protect the environment.
- Follow the do's and don't laid out in the EMP. These do's and don'ts will be explained to you next.

•Please ask questions if there is something you do not understand or you would like further information.

Now go to the next poster. Use the next 15 posters to explain the "do's and don'ts" laid out in the EMP.

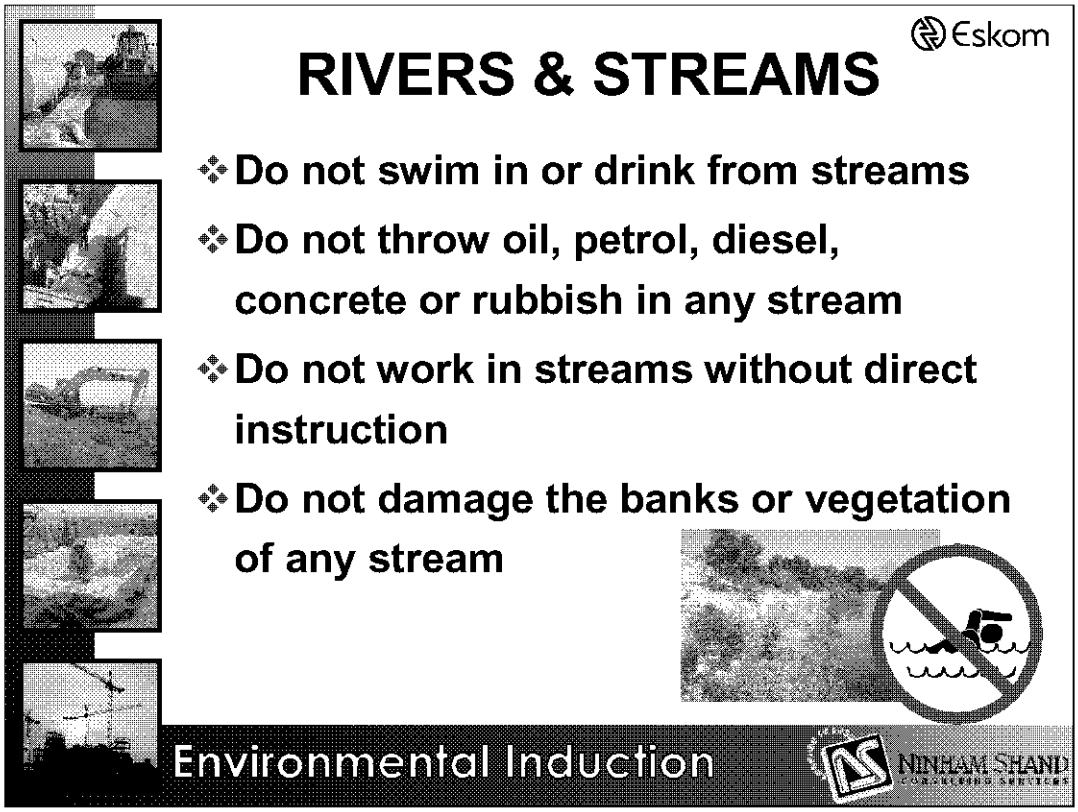


Use the information below to explain this poster.

- Workers & equipment must stay inside the site boundaries at all times. No one may enter areas marked as "no go " areas [insert a description of no-go fencing or point it out on site so that workers know which areas not to enter]

Why? Construction activities, equipment and people cause damage and disturbance to the area surrounding the site. As small an area as possible will be affected if all workers and equipment stay within the site boundaries. This is especially important if there are people who live around the site or natural areas around the site which should not be disturbed.

Now go to the next poster.



Use the information below to explain this poster.

- Do not swim in or drink from streams.

Why? The water may be polluted which will make workers sick.

- Do not throw oil, petrol, diesel, concrete or rubbish in any stream.

Why? Oil, petrol, diesel, concrete or rubbish will kill plants and animals living in the water. They may also make people who may drink the water downstream sick. Rubbish in the stream makes the area look ugly.

- Do not work in any stream without direct instruction.

Why? People and machinery working in the stream will damage it and kill plants and animals living in the stream. It may also cause erosion which is expensive to repair.

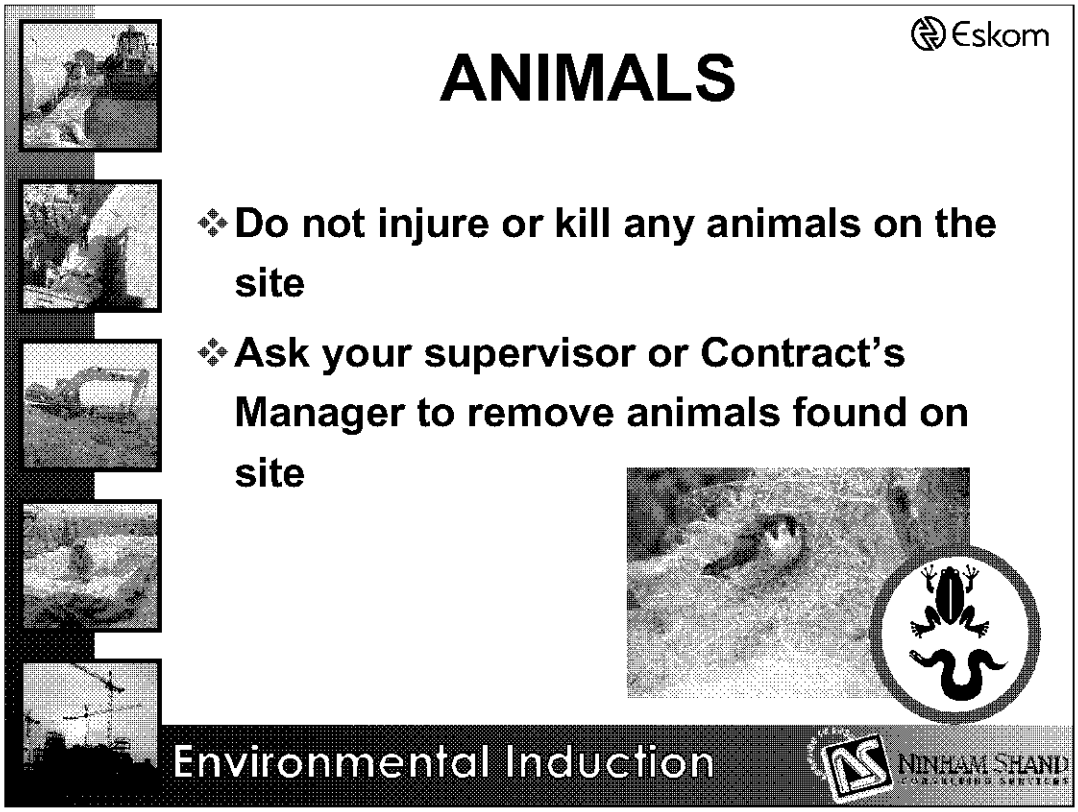
- Do not damage the banks or plants of streams.

Why? The plants on the edge of the stream bind the soil together and prevent soil from getting washed away. Soil washed into a stream may affect people using the water downstream (e.g. for irrigation).

Stay out of the "no go area" along the river and water body

Why? This is a sensitive area and you have not been authorized to work there yet.

Now go to the next poster.



Use the information below to explain this poster.

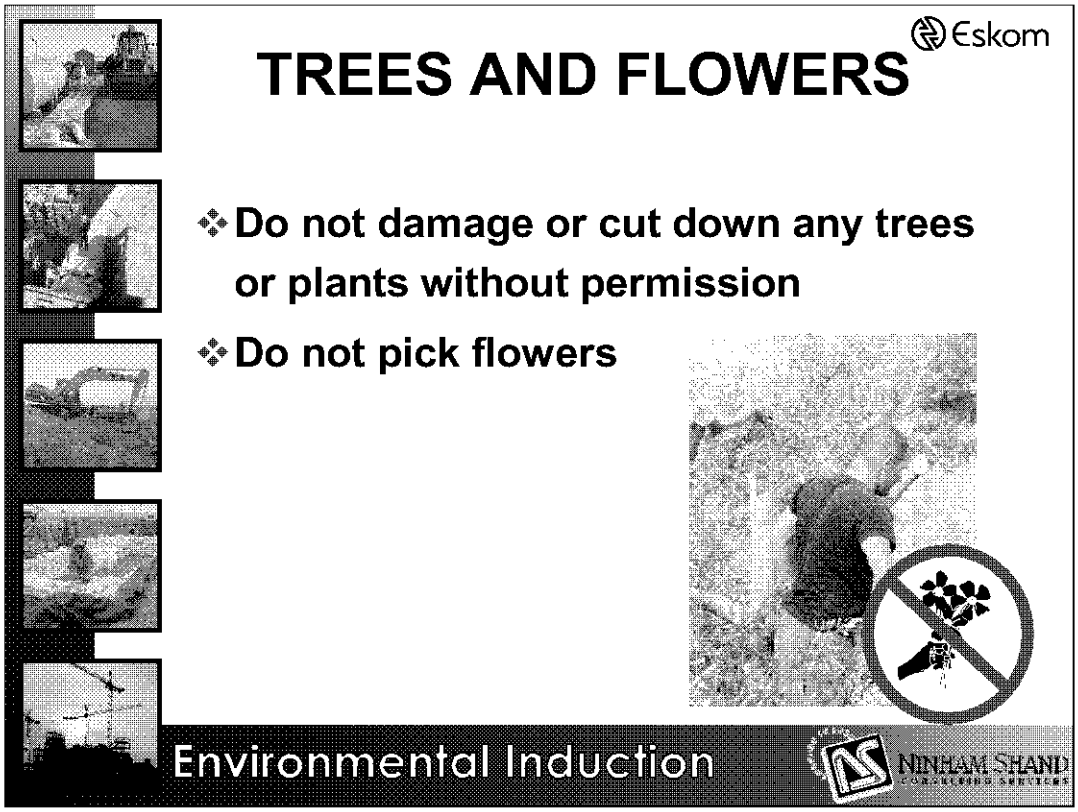
- Do not injure or kill any animals on the site.

Why? Animals are an important part of the environment. All animals have a purpose, even snakes which catch mice and rats. Other important animals are dassies, falcons, owls, chameleons and frogs. Maybe indicate where a bird's nest is and tell them to be careful etc

- Ask your supervisor or Contract's Manager to remove animals found on site.

Why? He or she will move the animal to a safe place.

Now go to the next poster.



Use the information below to explain this poster.

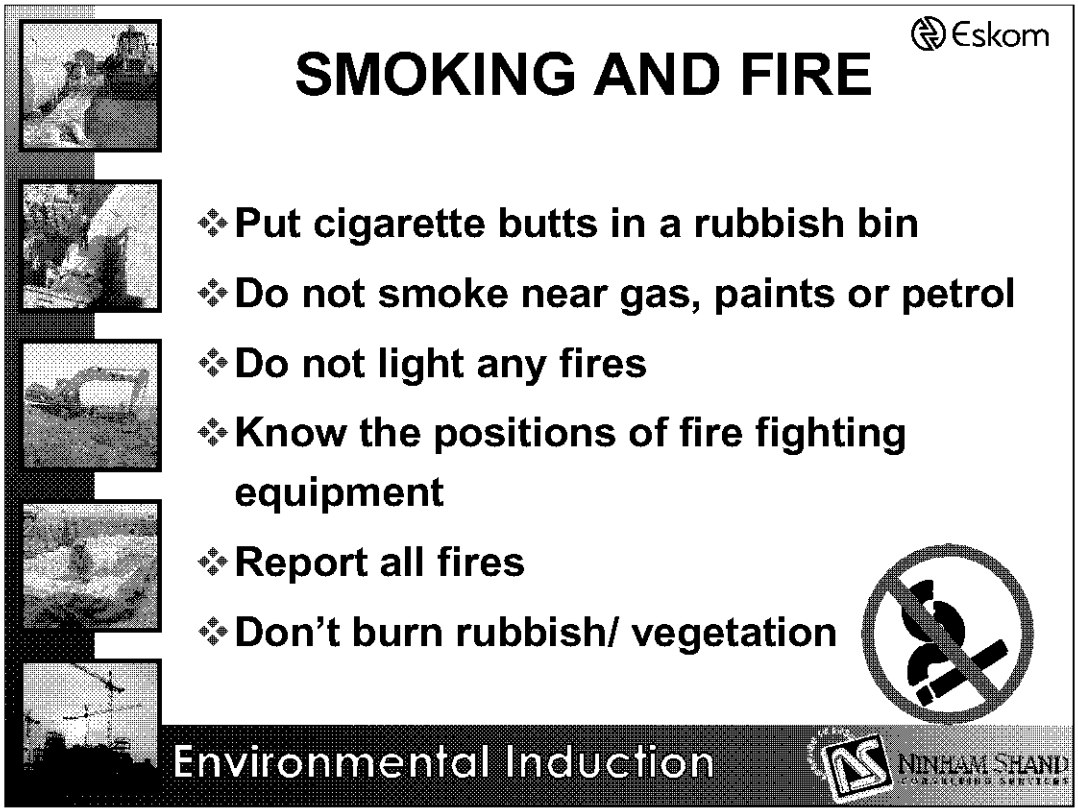
- Do not damage or cut down any trees or plants without a direct instruction.

Why? Some plants are rare and may take a long time to grow back, if at all. Plants in the "no go" areas should not be damaged.

- Do not pick flowers.

Why? Some plants will die if their flowers are picked. Rare plants may be damaged.

Now go to the next poster.



Use the information below to explain this poster.

- Put cigarette butts in a rubbish bin.

Why? Leaving a burning cigarette butt on the ground may lead to runaway fires which are dangerous to construction workers, people living around the site, equipment, houses, plants and animals.

- Do not smoke near gas, paints or petrol.

Why? This is dangerous and may cause an explosion.

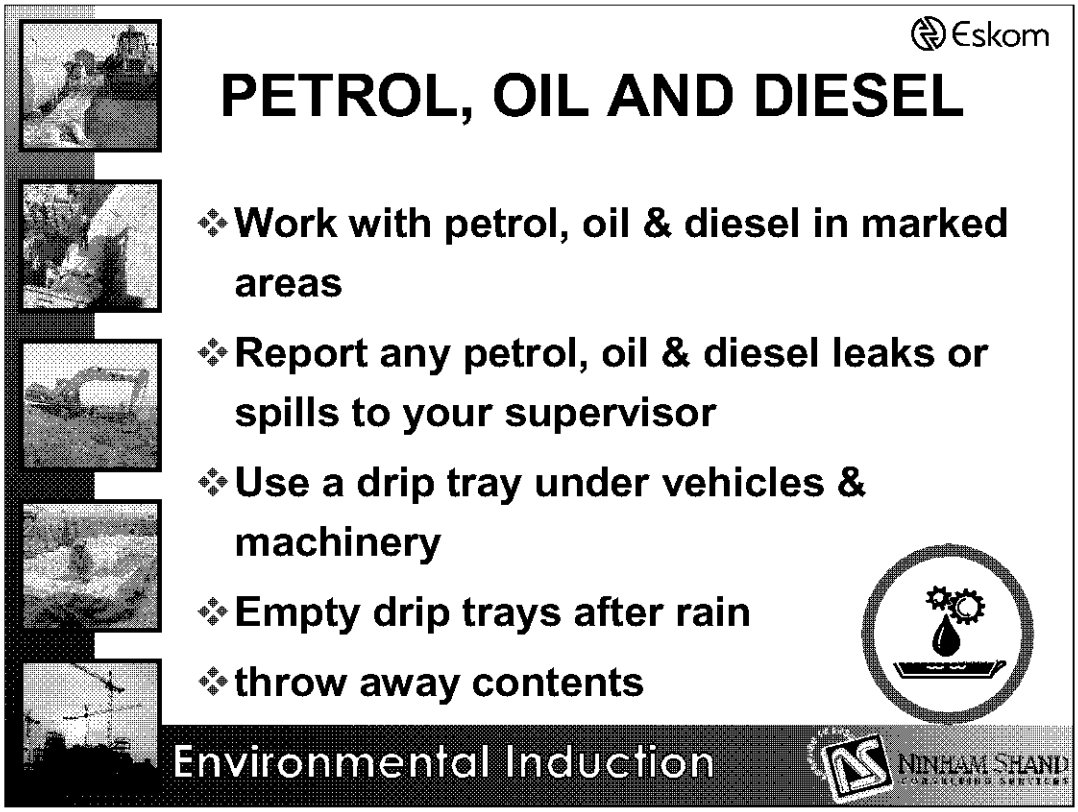
- Do not light any fires without permission.

Why? Lighting a fire without permission may cause a runaway fire (see above).

- Know the positions of firefighting equipment.

Why? Reacting quickly to fires that break out will prevent them from spreading and causing damage.

Now go to the next poster.



Use the information below to explain this poster.

- Work with petrol, oil & diesel in areas marked for this.

Why? These areas should have measures to protect against petrol, oil & diesel spills. Oil, petrol and diesel drip onto the soil and soak into it. Plants will not grow and animals will not live in dirty soil. It also looks ugly to people living around the area.

- Report any petrol, oil or diesel leaks or spills to your supervisor.

Why? (see above).

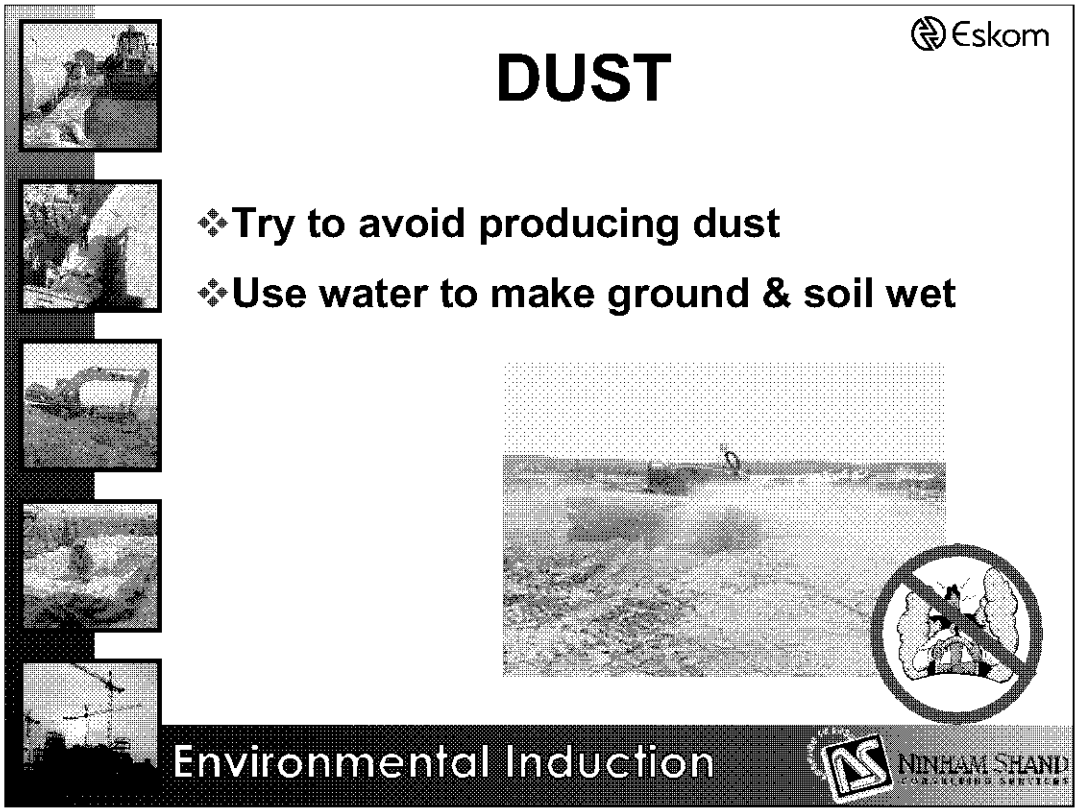
- Use a drip tray under vehicles & machinery.

Why? Drip trays will prevent oil, petrol or diesel from soaking into the soil and killing plants and animals or from going into the river and polluting the watercourse (see above).

- Empty drip trays after rain & throw away where instructed.

Why? If drip trays are not emptied they may overflow and pollute the surrounding soil. If oil, petrol or diesel are put into a stream, plants and animals living in the stream will be killed. They may also make people who may drink the water downstream sick. Ask your foreman or the ECO and/ or ER where the water may be disposed of on site [this should also be indicated during the environmental awareness course.

now go to the next poster.



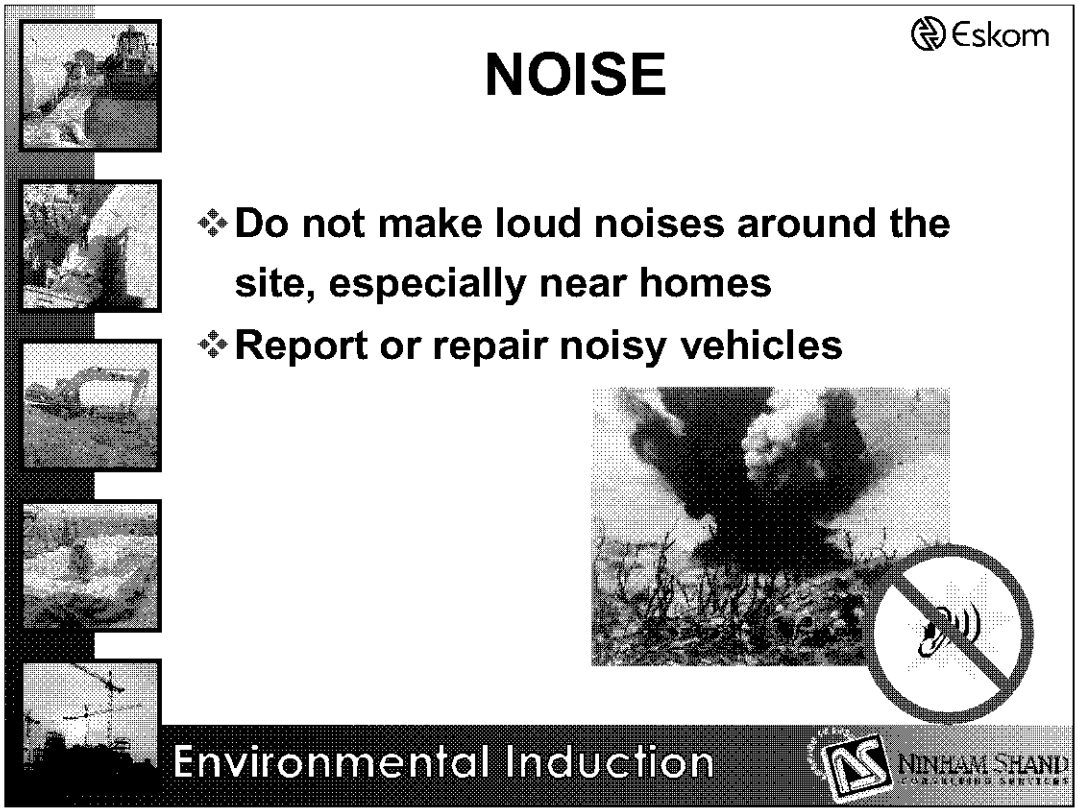
Use the information below to explain this poster.

- Try to avoid producing dust - wet dry ground & soil.

Why? Dust irritates people and reduces production on site. It can cause problems such as eye irritations and coughs. It also reduces visibility on site which can be dangerous to drivers and pedestrians, and can cause damage to the surrounding environment.

Soil should not be made too wet because that will cause safety problems and soil may be washed away.

Now go to the next poster.



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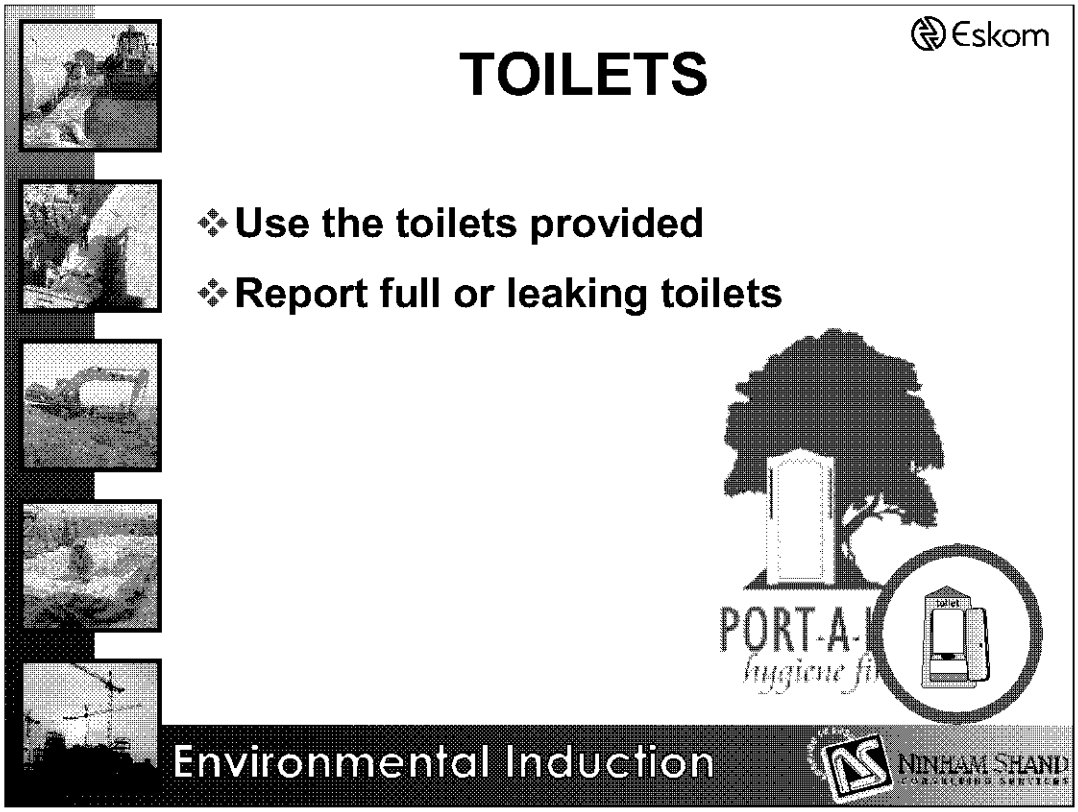
- Do not make loud noises around the site, especially near schools and homes.

Why? Loud noises are irritating to workers and people living around the site. Loud noise can also be harmful to people (especially children) and affect their hearing.

- Report or repair noisy vehicles.

Why? By keeping vehicles in good condition, loud noise can be prevented.

Now go to the next poster.



Use the information below to explain this poster.

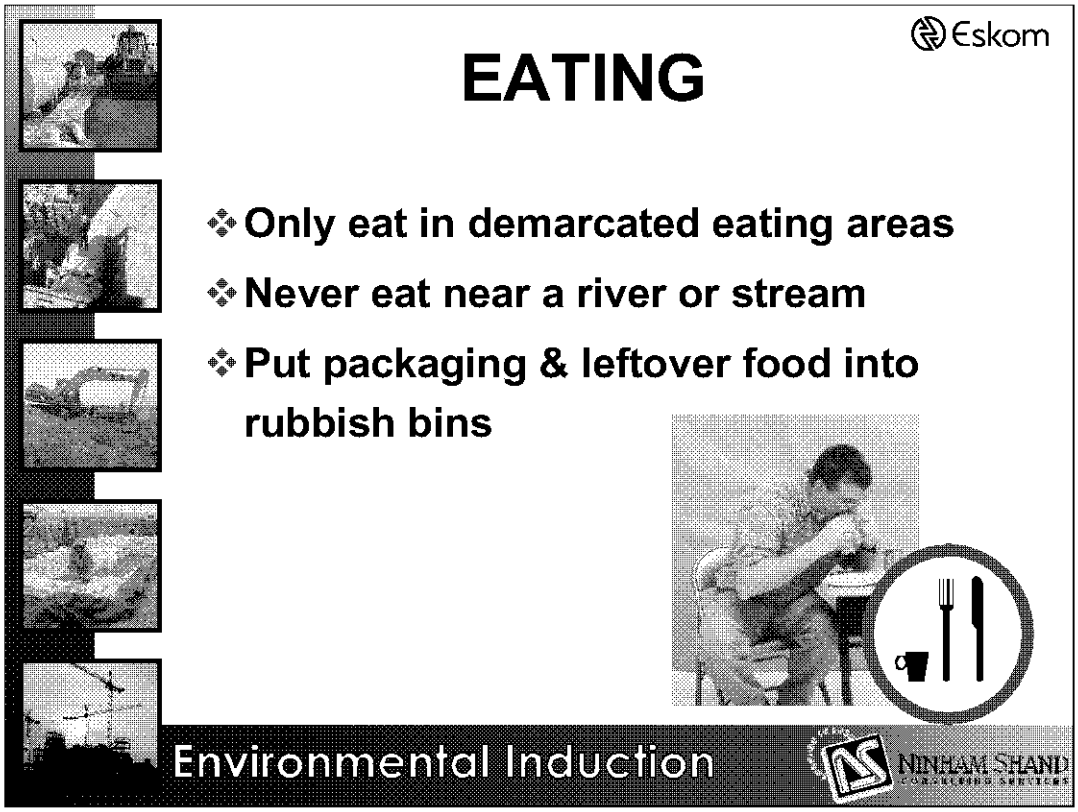
- Use the toilets provided.

Why? Sewage attracts flies and other irritating pests. If the site is near a river, sewage makes the water smell and people who swim in it or use it to wash their clothes will get sick. It also causes plants to grow too much which blocks the river which may cause flooding of houses and property.

- Report full or leaking toilets.

Why? Regular emptying of toilets is hygienic and will also prevent overflows (see above).

Now go to the next poster.



Use the information below to explain this poster.

- Only eat in demarcated eating areas.

Why? Eating areas generate a lot of rubbish and litter (e.g. bottles and packets) which will pollute the site and surrounding areas. Therefore, eating must be done near bins which are placed in the eating area (The eating area must be clearly pointed out to the labour force on site)

- Never eat near a river or stream.

Why? Rubbish in a stream looks ugly and can be harmful to people's health. It may also kill the plants and animals living in the stream.

- Put packaging & leftover food into rubbish bins.

Why? Rubbish and food left lying around will attract pests (such as rats) which are dangerous to people and cause a health hazard. Also, rubbish left laying around is ugly and unpleasant to look at.

Now go to the next poster.



Use the information below to explain this poster.

- Do not litter – put all rubbish (especially cement bags) into the bins provided and make sure the lid is put on the bin.

Why? Litter is ugly. It is also dangerous and unhealthy to adults, children and animals walking around the area. Not putting the lid back on the bin will cause rubbish to be blown away.

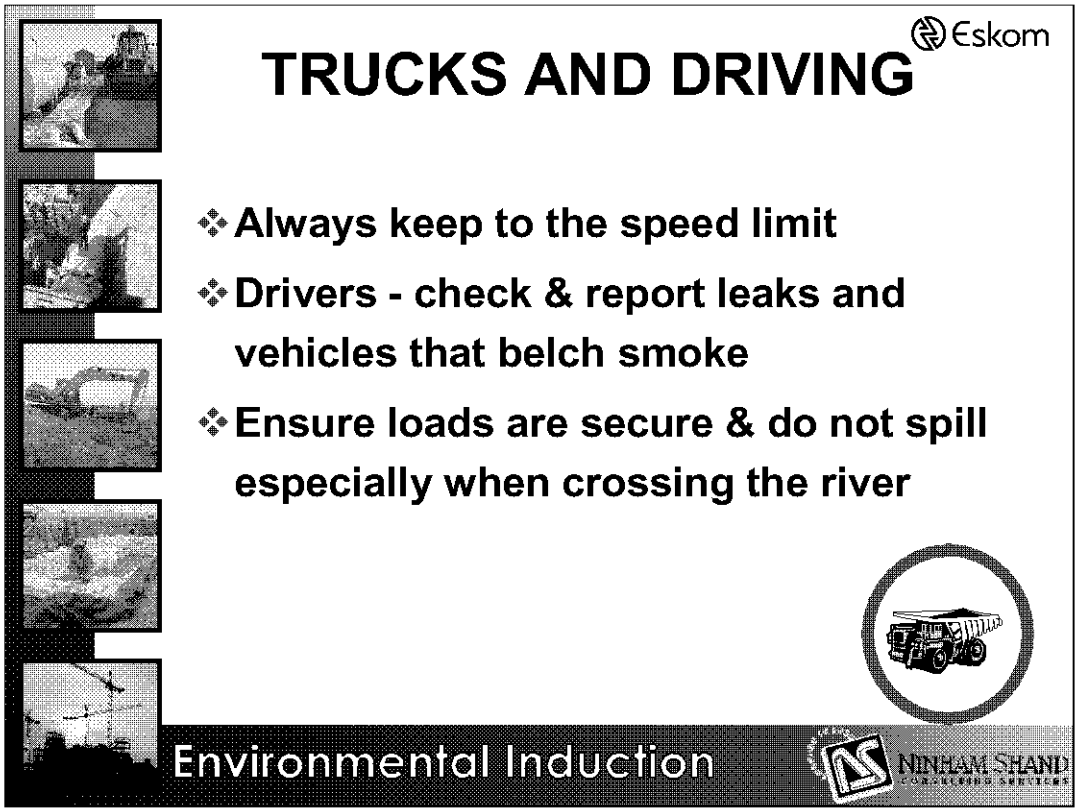
- Report full bins to your supervisor.

Why? Regularly emptying bins will prevent litter and rubbish flying around the site.

- The responsible person should empty bins regularly.

Why? (see above).

Now go to the next poster.



Use the information below to explain this poster.

- Always keep to the speed limit.

Why? Speeding is dangerous to people who live in the area, especially children. Speed kills!

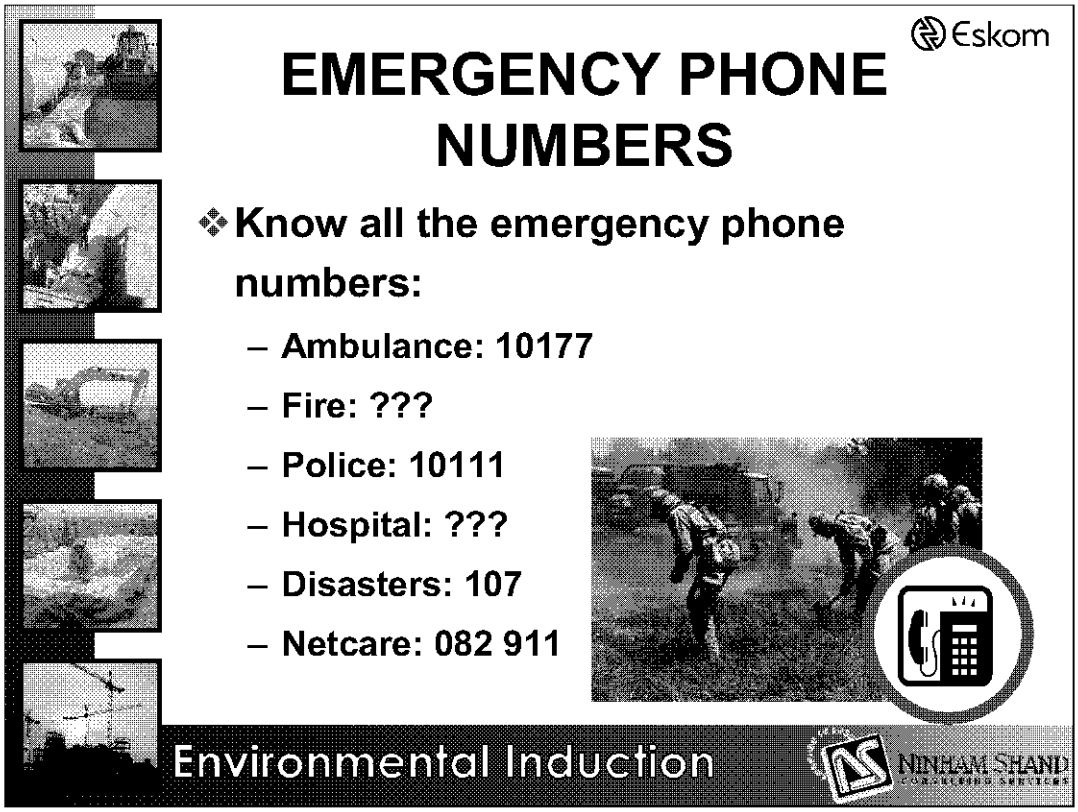
- Drivers – check and report leaks and vehicles that belch smoke.

Why? Faulty vehicles are dangerous to the driver, pedestrians and other motorists. Leaks can also pollute the ground and water and smoke from vehicles can cause health problems.

- Ensure loads are secure and do not spill.

Why? This is a potential danger to other motorists. Also, do not overload vehicles. In addition, there could be implications if your load shifts and lands in the river. This should be avoided at all costs!

Now go to the next poster.

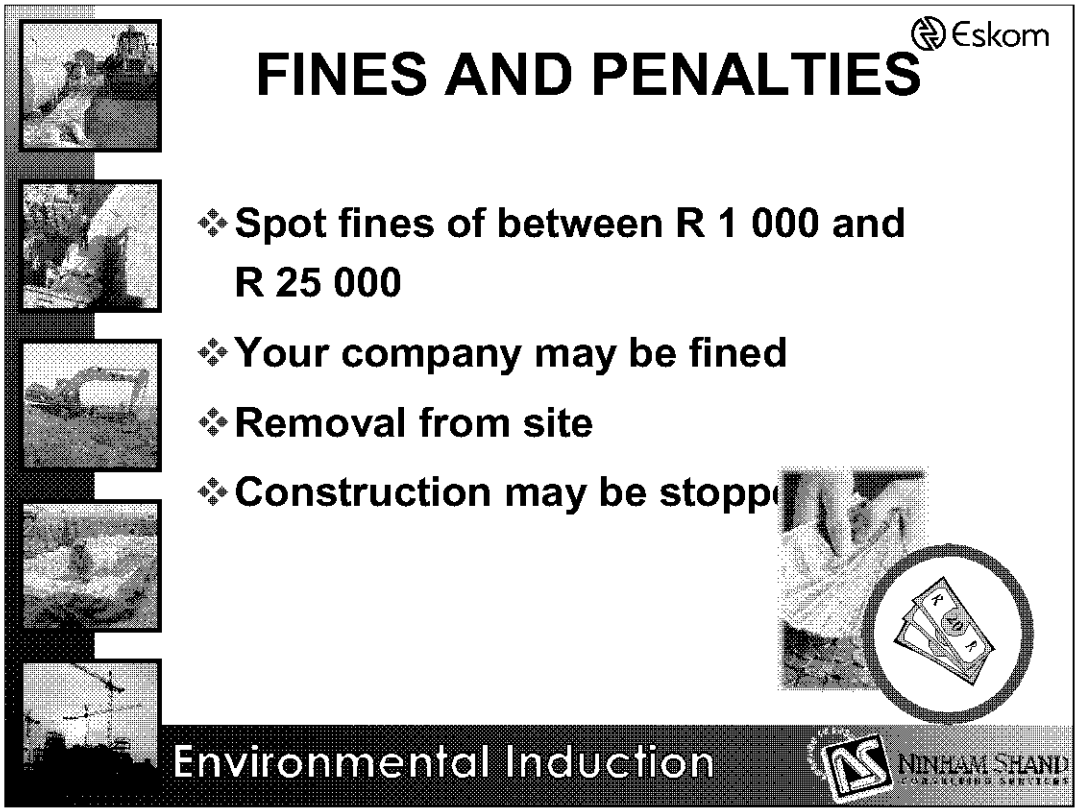


Use the information below to explain this poster.

- Know all the emergency phone numbers.

Why? Prompt reaction to an accident, fire or spill will reduce the risk of serious damage to the environment and to workers.

Now go to the next poster.



Use the information below to explain this poster.

- Spot fines of between R 1 000 and R 25 000.

Why? Failure to adhere to the EMP may result in spot fines being issued to the company. It is then the Site Agent's responsibility to collect these fines from guilty individuals and he may even deduct fines off your wages.

- Your company may be fined.

Why? The fines are meant to act as an incentive for workers to take the EMP seriously.

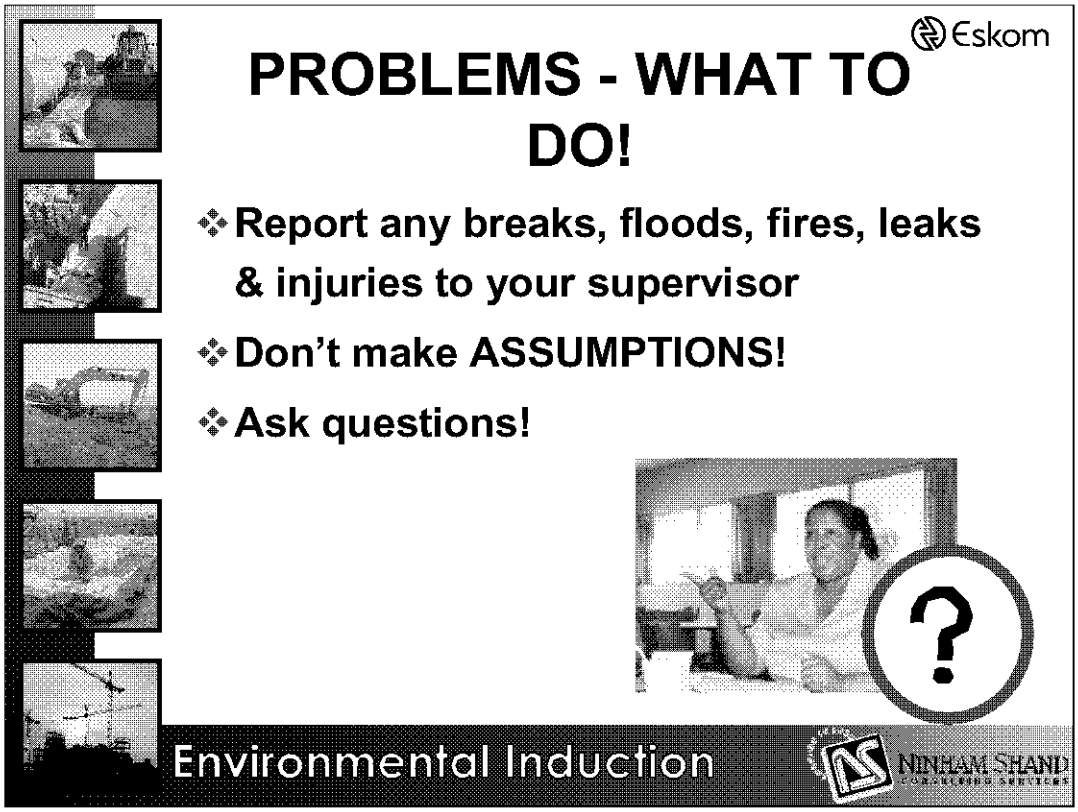
- Removal from site.

Why? A person may be removed from site if they continually disregard the specifications in the EMP.

- Construction may be stopped.

Why? If the EMP is not adhered to, construction may be stopped by the local Environmental Authority.

Now go to the next poster.



This is the last poster in the awareness course. Use this poster to emphasize that any problems should be reported immediately to the supervisor/ foreman or site agent.

Ask if there are any questions and stress that workers who are unsure of anything can ask questions at any time during the contract. If there are questions which you are unable to answer contact the Environmental Control Officer on site.

You should have taken between half and three-quarters of an hour to explain the course. Don't forget to put up copies of the signs (attached) presented in the course at a central area on site (e.g. the eating area or office) as soon as possible.

Congratulations, you have now finished the awareness course for the labour force!

ANNEXURE I: GENERIC EMPLOYEES INFORMATION POSTER

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PROTECTION OF THE ENVIRONMENT IS YOUR RESPONSIBILITY/ BESKERMING VAN DIE OMGEWING IS JOU VERANTWOORDELIKHEID



REMAIN WITHIN WORKING AREAS
BLY BINNE WERKGEBIEDE



NO SWIMMING
SWEM VERBODE





DO NOT HARM OR DAMAGE PLANTS AND ANIMALS
MOENIE PLANTE EN DIERE BESKADIG NIE



SMOKE CAUTIOUSLY
ROOK VERSIGTIG



BE AWARE OF FIRES
PASOP VIR VUUR



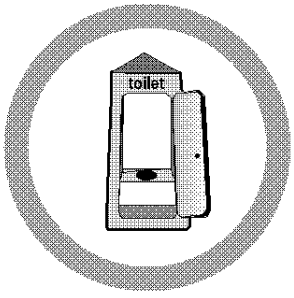
PREVENT OIL POLLUTION
VOORKOM OLIE-BESOEDELING



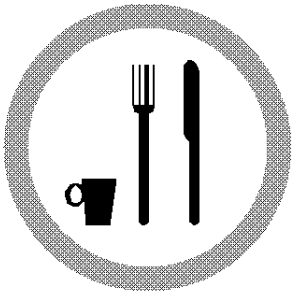
CONTROL DUST
BEHEER STOF



LIMIT NOISE
VERMINDER GERAAS



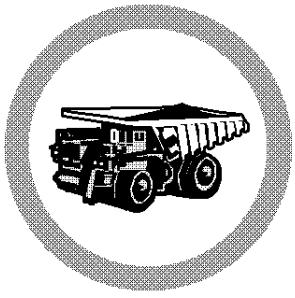
USE TOILETS
GEBRUIK DIE TOILETTE



USE THE EATING AREAS
EET BINNE DIE EETGEBIED



USE RUBBISH BINS
GEBRUIK ASBLIKKE



DON'T SPEED/ SECURE LOADS
RY STADIG/ MAAK VRAGTE VAS



KNOW THE EMERGENCY NUMBERS
KEN DIE NOOD NOMMERS



ASK QUESTIONS
VRA VRAE

NINHAM SHAND
CONSULTING SERVICES

ANNEXURE J: DOCUMENTATION AND REPORTING EXAMPLES

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J1: Daily Environmental Report Example

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NINHAM SHAND
CONSULTING SERVICES

DAILY ENVIRONMENTAL REPORT

DATE:	File Ref: .....
	Copy to: .....

SECTION 1 : SITE CONDITIONS

.....
.....
Rainfall : .....

SECTION 2 : LAYDOWN AREAS & SITE OFFICES

ITEM	DESCRIPTION	EVALUATION Not to Standard	EVALUATION To Standard	NOTES
2.1	Litter control	.....	.....	.....
2.2	Dust suppression	.....	.....	.....
2.3	Erosion control	.....	.....	.....
2.4	Storm water / Runoff control	.....	.....	.....
2.5	Sedimentation ponds	.....	.....	.....
2.6	Toilets	.....	.....	.....
2.7	Fuel & oil storage & dispensing	.....	.....	.....
2.8	Waste management			
	Domestic Waste	.....	.....	.....
	Building Rubble	.....	.....	.....
	Hazardous Waste	.....	.....	.....
2.9	Noise control	.....	.....	.....

SECTION 3 : CONSTRUCTION SITES

ITEM	DESCRIPTION	EVALUATION Not to Standard	EVALUATION To Standard	NOTES
3.1	Litter control	.....	.....	.....
3.2	Dust suppression	.....	.....	.....
3.3	Erosion control	.....	.....	.....
3.4	Sedimentation ponds	.....	.....	.....
3.5	Toilets	.....	.....	.....
3.6	Eating areas	.....	.....	.....
2.7	Waste management			
	Domestic Waste	.....	.....	.....
	Building Rubble	.....	.....	.....
	Hazardous Waste	.....	.....	.....
2.8	Noise control	.....	.....	.....

SECTION 4 :BATCHING AREAS

ITEM	DESCRIPTION	EVALUATION Not to Standard	EVALUATION To Standard	NOTES
4.1	Litter control	.....	.....	.....
4.2	Dust suppression	.....	.....	.....
4.3	Erosion control	.....	.....	.....
4.4	Storm water / Runoff control	.....	.....	.....
4.5	Waste management			
	Clean up of spoil	.....	.....	.....

SECTION 5 :ENVIRONMENTAL INCIDENTS

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P.T.O

SECTION 6 :GENERAL NOTES

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SECTION 7 :DRAWING/SKETCH:

SIGNATURE

Environmental Officer

.....

Name: .....

Date: .....

J2: Weekly Environmental Report Example

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NINHAM SHAND
CONSULTING SERVICES

WEEKLY ENVIRONMENTAL REPORT

DATES: ..... to	File Ref: .....
	Copy to: .....

SECTION 1 : SITE CONDITIONS

.....
.....
Weekly Rainfall : .....

SECTION 2 : LAYDOWN AREAS & SITE OFFICES

ITEM	DESCRIPTION	EVALUATION Not to Standard	EVALUATION To Standard	NOTES
2.1	Litter control	.....	.....	.....
2.2	Dust suppression	.....	.....	.....
2.3	Erosion control	.....	.....	.....
2.4	Storm water / Runoff control	.....	.....	.....
2.5	Sedimentation ponds	.....	.....	.....
2.6	Toilets	.....	.....	.....
2.7	Fuel & oil storage & dispensing	.....	.....	.....
2.8	Waste management			
	Domestic Waste	.....	.....	.....
	Building Rubble	.....	.....	.....
	Hazardous Waste	.....	.....	.....
2.9	Noise control	.....	.....	.....

SECTION 3 : CONSTRUCTION SITES

ITEM	DESCRIPTION	EVALUATION Not to Standard	EVALUATION To Standard	NOTES
3.1	Litter control	.....	.....	.....
3.2	Dust suppression	.....	.....	.....
3.3	Erosion control	.....	.....	.....
3.4	Sedimentation ponds	.....	.....	.....
3.5	Toilets	.....	.....	.....
3.6	Eating areas	.....	.....	.....
2.7	Waste management			
	Domestic Waste	.....	.....	.....
	Building Rubble	.....	.....	.....
	Hazardous Waste	.....	.....	.....
2.8	Noise control	.....	.....	.....

SECTION 4 :BATCHING AREAS

ITEM	DESCRIPTION	EVALUATION Not to Standard	EVALUATION To Standard	NOTES
4.1	Litter control	.....	.....	.....
4.2	Dust suppression	.....	.....	.....
4.3	Erosion control	.....	.....	.....
4.4	Storm water / Runoff control	.....	.....	.....
4.5	Waste management			
	Clean up of spoil	.....	.....	.....

SECTION 5 :ENVIRONMENTAL INCIDENTS

.....
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.....

P.T.O

SECTION 6 : INCIDENT REPORTS ISSUED AND CORRECTIVE ACTION

REPORT #	DATE	CONTRACTOR	DESCRIPTION OF FAILURE	COMPLETE
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
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SECTION 7 :GENERAL REPORT

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SIGNATURES

Environmental Control Officer:		Chief Engineers Representative:	
	.....		.....
Name:	.....	Name:	.....
Date:	.....	Date:	.....

NB: Ensure that the EO's Daily Environmental Reports for the subject week are attached.

J3: Incident Report Pro Forma

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Annex F: ELC Initial Notification of Occurrence (INO) Reporting Template

Note: all blue text should be removed from his form before submission: it is purely a guideline

The attached information is required for each event reported to the ELC for classification. This should be submitted to the secretariat in written format for record purposes and to fulfill future audit requirements. This will enable the ELC to make a decision regarding the classification of an event as a "***contravention of legislation***" a "***contravention of legislation in terms of the SI',*** or an ***"Event"***. Accurate and detailed will allow effective classification, and allow rapid resolution of the issue.

Please note that this is the initial reporting requirement, and does not replace the Tracking Certificate (Annex G) which is used to record progress in resolving the event once it is classified as a contravention of legislation.

Please submit the completed form to the Secretariat before the ELC meeting to allow duplication for ELC members. It is the responsibility of the Division Primary ELC member to submit this form and present the information to the ELC. The completed form should be submitted to the ELC secretariat by the Thursday preceding the ELC for circulation to primary members.

****

This and the following page can be copied electronically and used for submission. Please delete any Blue Text before completing the form. Alternatively this Form can be downloaded off eSDe Web, ELC page.

Event Number	Available from ELC Secretariat. The divisional reporter should phone Mapula Tshangela (8131-3613) to register the incident and obtain an incident number before submitting the form. The allocated number must be included on all documentation accompanying this note. This is not just a bureaucratic requirement but is intended to simplify event management
Reference legislation	The applicable Act with specific reference to the section of the act contravened should be included here. This data is available from Division Legal Registers. If not known, please state this.
Nature of Contravention	Full details of the event must be given
Date of Event	This refers to the date that the event occurred. If the event continued for more than one day, duration should also be recorded.
Date of reporting to Divisional office	Date the event was reported to the divisional corporate office or equivalent. Any other significant dates should also be recorded here.
Details of Communication with regulatory authority	List details of interaction with authorities. This should include dates and media used, and copies of any correspondence.
Follow-up action	Details of remediation, etc
Root Cause of Event	The basic root cause of event should be given. This can be related to People, plant or procedure. See ELC guideline for assistance if required
Actions to prevent occurrence	What reasonable action has been taken to prevent occurrence of the event?
Current Status	Current Status of the event at date of submission of this form, e.g. undergoing remediation.
Date of Resolution / Expected date of resolution	Date incident closed. It may not be possible to give at this stage, but event will not be closed until this is given. This could be included in the closure certificate.
Responsible Manager and Contact Details	Person for auditor to contact should further information be required.
Proposed SI Status	The Divisional Environmental Manager may make a recommendation as to the final classification of the event in terms of the SI, viz. Event, Legal Contravention, or Legal Contravention in terms of the SI. Any information that will aid this decision should be attached (See following Page).

Annex F (concluded)

ELC criteria for classification of legal and SI contravention's			
Element	**Yes**	**N/A**	**No**
1. Did the incident result in either: sterilising the soil, or, destroying rare, endangered or protected fauna or flora?			
2. Did the incident result in making any water resource unfit for its original purpose such as: domestic, agricultural, industrial use or reduce the water quality to such a state that human intervention is required to restore it to its original quality?			
3. Were reasonable measures taken to prevent pollution or degradation from occurring?			
4. Were measures taken to prevent pollution or degradation from continuing?			
5. Were measures taken to prevent pollution or degradation from recurring?			
6. Was the incident reported to the authorities?			
7. Were measures taken to contain and minimise the effects of the incident on the environment and to the health, safety and property of persons?			
8. Was an incident report submitted within 14 days to the authorities providing the information required i.t.o section 30(5)(a-e)?			
9. Contravention of any other environmental legislation? (List below if applicable)			
CLASSIFIED AS LEGAL CONTRAVENTION (if "Yes" for 1, 2 or 9 or "No" for any from 3-9) (Any Shaded Area Marked) This selection needs to be done at Divisional level prior to the ELC Meeting. If, however, there is doubt or any uncertainty about the decisions it may be raised at the ELC for decision. This should be indicated to the ELC Secretariat prior to the meeting.			
Legislation Contravened **Please list acts and sections, if available.**			
Previous Contraventions of Legislation **List previous contraventions at the business unit or region within the previous 24 months (Quote ELC reference only: if not known state this.)**			

If Classified as a Legal Contravention, check against following criteria. This classification will however be confirmed by the ELC

CRITERIA :	**Yes**	**No**
1. Contravention resulted in formal censure from Government		
2. Contravention reported within the Division.		
3. Contravention reported to appropriate Government department		
4. Registered on SI by ELC member in consultation with MD		
5. Contravention was addressed timeously		
SI INCIDENT (Any shaded area marked)		

Annex G: Tracking (Closure) Certificate

All information must be completed and forwarded to the ELC Secretariat to allow the Event to be closed on the Event Register .

This should be submitted within one month of the event closure.

Incident Number)	From INO
Nature of Contravention	From INO
Location	BU submitting Closure certificate
Month Reported to Divisional Office	
ELC Classification	Legal Contravention or Contravention in terms of SI
Details of further Communication with Regulatory Authority.	To Whom, when, and what reported.
Community Interaction related to event	
Follow-up action/s	Details of remediation, actions to prevent reoccurrence
Cost of remediation	
Date of Closure / Resolution	
Investigation in terms of ESKPVABN9 (if applicable)	Date of Investigation, Report Number and Date
Responsible Manager and Contact Details	If Different to INO
Closure by CTAD in case of SI incident	NA or Signed off by CTADM (This can be done at ELC)

Please attach any relevant documentation.
A copy of the full incident investigation is held by the Divisional ELC Representative.

Signed

_____ _____
BU Manager Date

Accepted as correct

_____ _____
Divisional ELC Representative Date

Authorised

_____ _____
Corporate Sustainability and Environment Manager Date

PAN 8131-2678
Feb 2006

J4: Example for Approach to Bi-monthly Environmental Compliance Reporting

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COMPLIANCE RATING PROTOCOL[1]

The basis of the environmental performance assessment is the attached audit table, which captures the following information:

- A description of the requirement/ activity, specifying the phase of construction that it relates to, where the requirement was derived and what the specific requirement entailed;
- An indication of the status of the requirement under consideration. Since the assessment of the level of compliance is in part dependent on the status of the specific activity under consideration, the status of the each activity is explicitly classified as:

    - Ongoing;
    - Work in progress;
    - Not Applicable (i.e. not applicable as yet, required later, or generic requirements not applicable to this project); or
    - Complete;

- A compliance rating for each of the specific requirements/ activities. The following protocol was developed for rating the level of compliance with the various requirements of the specifications and RoD:

Score	Compliance rating	Definition
4	Full Compliance	All (100%) activities have been addressed
3	Substantial compliance	> 75 % but < 100 % of the required activities have been addressed
2	Broad compliance	> 30% but < 75 % of the required activities have been addressed
1	Partial compliance	< 30% of the required activities have been addressed
0	Non compliance	None of the required activities have been addressed

- Explanation of the compliance rating. The allocated compliance rating is substantiated by commentary regarding the reasons for a particular assessment, the evidence that supports such an assessment and proposals regarding remedial actions.
- Response from the Proponent. To ensure that the audit reflects a current and correct understanding of the activities on site, provision was must made as part of the audit process for the Proponent to comment on the findings.

It should be noted that the level of compliance would be separately scored separately for the Proponent and each of the contractors.

[1] The auditing methodology presented here was used for auditing compliance for the Phase 1B expansion to the Saldanha Bay Iron Ore Terminal, and accordingly would need to be extensively revised to make it relevant to Project Bravo

PHASE 1B UPGRADE TO THE IRON ORE FACILITY AT THE PORT OF SALDANHA: CONSTRUCTION PHASE: ECO QUARTERLY AUDIT REPORT

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Activities prior to commencement	Notice to D:EA&DP	One week's written notice given to DEA&DP before commencement of construction activities (clause 7.3.6 of RoD).						
	EMC	EMC established prior to commencement (clause 7.2.7 of RoD).						
	ECO	ECO appointed by EMC (clause 7.2.7b of RoD).						
	Environmental Management Plan	EMP approved by DEA&DP prior to construction commencing (clause 7.2.8 of RoD).						
		Any alternations to the EMP submitted to the relevant authorities for approval (clause 7.2.8 of RoD).						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Activities prior to commencement	Environmental Management Plan	Compliance with EMP forms part of all tender documentation for all contractors working on the project and is endorsed contractually (clause 7.2.7 of RoD).						
	Declaration of understanding	Declaration of Understanding in Contractors Guideline Document signed and part of Contractors Tender Document.						
	Method statements	Relevant method statements provided by the Contractor as part of their Tender, including: • Establishment of construction lay down area • Hazardous and non hazardous solid waste management • Stormwater management • Contaminated water management • Prevention of marine pollution • Hydrocarbon spills • Diesel tanks and refuelling procedures • Dust control • Spoil dumping						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Activities prior to commencement	Method statements	• Sourcing, excavating, transport and dumping of fill material • Noise and vibration control • Removal of rare, endemic or endangered species • Rodent and pest control • Environmental awareness training • Site division • Emergency procedures for environmental incidents • Contractor's SHE officer • Closure of construction laydown area						
	Contractor's SHE Officer	SHE officer appointed by Contractor and appointment submitted to Construction Manager & EO for approval.						
	Environmental induction	All management, foreman & Workforce suppliers and visitors to site attended Induction Programme prior to commencing any work on site.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Activities prior to commencement	Environmental induction	Contractor ensuring that all new personnel undergo Induction Programme and are made aware of environmental specifications on site.						
	Removal of rare, endemic or endangered species	Where applicable, Contractor has appointed a suitably qualified specialist (approved by the Project Environmental Manager), for removal of rare, endemic or endangered species, at least 3 weeks prior to commencement of any other work on site.						
Initial 2 weeks after commencement	Demarcation of the site	Where required, a temporary fence has been erected along the site boundaries of the Site and around any no-go areas identified on the layout plans, to the satisfaction of the Construction Manager.						
	Removal or rare, endemic or endangered species	Plant search and rescue (if required) undertaken and completed prior to any site clearance or any other construction activity that may damage vegetation on site.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Initial 2 weeks after commencement	Contractor's Environmental Officer	Sufficient number of Environmental Officers appointed to assist the Contractor's SHE Officer to monitor environmental issues. These appointments, along with details of the individuals being appointed and job descriptions, sent to the Construction Manager for his approval.						
Construction phase	EMP thereof	Copies of EMP available at the site offices of the Contractor and on Site.						
		All personnel on site (including subcontractors and their staff), as well as suppliers, are familiar with and understand the specifications contained in the EMP.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Method Statements	Method statements required during construction submitted to the Engineer for approval at least 20 days prior to the commencement of proposed activity (with exception of emergency Method Statements. Activities requiring Method Statements have not commenced until approved by the Engineer.						
		Method Statement approved by Transnet Projects Environmental Officer and the Construction Manager.						
		Where applicable, Contractor has provided job-specific training on an *ad hoc* basis when workers are engaged in activities which require Method Statements.						
	Materials handling, use and storage	Contractor has ensured that any materials delivery drivers are informed of all procedures and restriction (e.g. which access roads to use, no go areas, speed limits, noise etc) required by the CEMP before they arrive at site and off load any materials.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Site establishment	Construction camp, office, workshops, staff accommodation and any other facilities on the site established in a way that does not adversely affect the environment.						
		Site layout plan, including plans of the exact location, extent and construction details of facilities and proposed impact mitigation measures, submitted to Construction Manager.						
		Site layout plan details locality and layout of waste treatment facilities for litter, kitchen refuse, sewage and workshop derived effluents.						
		Site layout plan approved by Construction Manager prior to construction commencing.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Site establishment	Site offices not sited in close proximity to steep areas.						
		Sewage and effluent infrastructure approved by Construction Manager.						
		Any soak away system not closer than 800m from any natural watercourse or water retention system.						
		Toilets and latrines easily accessible and positioned within walking distance from wherever employees are employed on the works.						
		Outside toilets have locks and doors and are secured to prevent them blowing over.						
		Toilets placed outside areas susceptible to flooding.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Site establishment	Toilets maintained in clean and sanitary condition, and emptied regularly, to the satisfaction of the Contract Manager.						
		Effluent water from the camp/office sites is disposed of in an appropriately designed and constructed system, situated as to not adversely affect water sources. Only domestic wastewater is allowed to enter this drain.						
	Waste management	Appropriate waste management plan in place.						
		General and hazardous waste stored in separate labelled containers as per system.						
		Containers inspected regularly as per waste environment management plan						
		The accumulation time for waste is tracked						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Waste management	Waste disposed of at a licensed landfill.						
		Documentary evidence of proper disposal of waste provided.						
		Recycling containers available (and labelled) for general waste on site.						
		Contractor's Hazardous Material's Management Program in place.						
		Information on each hazardous substance available to all persons on site.						
		Training and education about the proper use, handling and disposal of material provided to all workers who will be handling hazardous substances.						
		Transnet's EO informed of activities involving hazardous substances.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Vehicle and equipment refuelling: Control	No vehicles or machines serviced or refuelled on site except at designated servicing/ refuelling locations. Oil or lubricant changes made only at designated locations, or in case of breakdown or emergency repair.						
		Fuel and oil stored in secure, bunded area designed with a lined/ paved surface.						
		Details of fuel storage and fuelling facility approved by Transnet EO and complies with the relevant regulations.						
		Refuelling or use of fuel for backfilling operations undertaken within designated laydown area.						
		No refuelling undertaken along the shoreline adjacent to backfilling operations.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Vehicle and equipment refuelling: Spill control	Contractor complying with relevant regulations.						
		Approved spill response plan in place.						
		Construction personnel informed of the requisite requirements when dealing with hydrocarbons.						
		Hydrocarbon leaks repaired as soon as possible.						
		Measures to prevent spills or leaks in place.						
		Sumps receiving oil or oily water emptied before overflowing.						
		Leaking or spilled drums of oil or chemicals prevented from contaminating stormwater runoff.						
		No discharge of oil or contaminants into stormwater system.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Spray pointing and sand blasting	Method statement submitted to the Transnet EO and SHE Coordinator for approval.						
		Method statement approved before activity commenced.						
		Contractor informed Transnet EO of when and where spray painting or sandblasting would be carried out prior to commencement of work.						
		Transnet EO monitoring activities.						
		Where possible, painting done before equipment and materials brought on site.						
		Touch up painting done by hand or approved procedure.						
		Protection Plan issued for approval if area is in confined or elevated area.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Dust management	Material in transit loaded and contained within the load bin of the vehicle in such a way to prevent any spillage onto roads and the creation of dust clouds. If necessary, the load bin of vehicle covered with a tarpaulin to prevent dust.						
		Dust Control Plan submitted to Transnet EO and approved.						
		Dust-suppression measures in place.						
		Vehicle speed limits of 20km/h on unpaved roads adhered to.						
		Posted vehicle speed limits on paved roads adhered to.						
		Paved surfaces within construction area washed twice a week, or as required.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Dust management	Unsurfaced and site roads sprayed with water when required.						
		Construction materials transported by truck are suitably moistened or covered to prevent dust generation.						
		Topsoil stockpiled with mounds not exceeding 2m in height.						
		System of reporting excessive dust conditions by construction personnel being implemented.						
		Water for dust control taken from approved sources.						
		Transnet has installed covers over the conveyor systems to avoid dust emissions during high wind conditions, before operational activities commence (refer to clause 7.2.2 of RoD).						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Stormwater & dewatering management	Temporary drainage has been established on site during construction period (until permanent drainage in place).						
		Good housekeeping occurring to prevent contamination of drainage water.						
		Stagnant water cleared where necessary.						
		No contaminated surface water flowing off site as a result of Contractors operations. Silt traps constructed to ensure retention of silt on site and cut-off ditches constructed to ensure no run-off from the site except at points with silt traps.						
		Dewatering contained within site boundaries.						
		No discharge of dewatering water to off-site land or water bodies.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Stormwater & dewatering management	Erosion and Sedimentation Control Plan implemented and personnel familiar with plan.						
		Erosion and sedimentation controls checked and maintained.						
	Noise management	Noise generating equipment in good working order.						
		Potential noise sources conform to the SANS code of practice SANS Code 0103:1983.						
		Equipment and vehicles fitted with effective exhaust silencers.						
		If on site noise control is not effective, all noise–related occupational health provisions for personnel are met (ear plugs where necessary).						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Protection of heritage resources	Works in vicinity of any discovery (archaeological sites, graves and middens) stopped immediately.						
		Relevant parties (HWC, SAHRA etc) informed of any archaeological, heritage, graves and midden finds.						
		Works only resumed once clearance given by archaeologist						
	Fire prevention	Fires only allowed in specifically constructed facilities/equipment.						
		Firebreak cleared and maintained around perimeter of the camp and offices.						
	Supply of water for human use	Water for domestic use only abstracted with necessary authorisations.						
		Potable water available at site offices and at other convenient locations on site.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Protection of livestock or game and collection of firewood	No hunting (including traps) or fishing on site or surrounds.						
		No killing of any animal, reptile (including snakes) or bird on site or surrounds.						
		Energy sources available for construction and supervision personnel for heating and cooking purposes.						
	Environmental awareness training	All staff attended Environmental Awareness Training.						
		Record of all environmental related training of personnel kept on site.						
	Backfilling of reclamation area	Boundaries within which backfilling to take place clearly defined and demarcated.						
		Spatial extent of backfilling and associated spoil adhered to.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Backfilling of reclamation area	Quality of backfilling materials not causing pollution or alteration of the marine environment.						
		Fill material has low permeability and is compactable.						
		Inlet between the reclamation area and the bay open during reclamation.						
		No machinery operating below sea level, outside backfilling area.						
	Demolition of iron ore sampling plant	Waste disposed of as per Waste management plan.						
		Dust suppression measures implemented.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Sensitive coastal dunes	Areas excluded from development, including adjacent coastal dunes, important indigenous vegetation and sensitive habitats, are protected by temporary fencing (clause 7.2.3 of RoD), limiting access for vehicles, machinery and materials storage.						
		Measures taken to ensure that the adjacent coastal dune system is protected from disturbance caused by construction activities (clause 7.2.4 of RoD).						
		No disposal of waste or storage of materials allowed in or adjacent to sensitive areas.						
		Transnet EO monitoring construction activities to prevent disturbance to sensitive systems.						
		No vehicles accessing road along western edge of dunes and driving onto dunes.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Sensitive coastal dunes	Construction work confined to the construction sites(s) with no interference with indigenous plant and animal species, particularly rare & threatened species & their habitats (clause 7.2.6 of RoD).						
	Groundwater Issues	Fill material has low permeability and is compactable.						
		Site is engineered to drain storm and irrigation water to the specially constructed storm water evaporation ponds.						
		Irrigation water for dust control applied sparingly and only when necessary.						
		Accidental spills contained and cleaned up immediately and contaminated soil collected and disposed of at suitably licensed waste disposal facility.						
	Social and labour issues	Record kept by contractors and subcontractors of the % of local contractors in their workforce.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Social and labour issues	Appointments made in close consultation with the SHE Coordinator.						
		Local materials used as far as possible.						
		Preference given to employment of locals previously employed at the Oyster farm.						
		Complaints register present on site and kept up to date.						
	Visual impact	Visual impact (from lighting) being appropriately mitigated.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase	Compliance with other legislation	No excavation of borrow pits occurring without a permit from DME.						
		Construction activities in compliance with legislative requirements [National Heritage Resources Act (25 of 1999); Minerals and Petroleum Development Act (28 of 2002); Occupational Health and Safety Act (85 of 1993); National Water Act (36 of 1998)].						
	Rehabilitation	Rehabilitation and revegetation of all areas has occurred to the satisfaction of the Construction Manager.						
		Laydown areas rehabilitated once work on site complete.						
		Rehabilitation Plan submitted to Construction Manager 6 weeks before completion.						

Phase	Activity	Description of requirement as per ROD or EMP	Status	Photo	Findings/ Incidents/Complaints/Evidence	Comments/ Resolution	Compliance Rating	Transnet Management Response
Construction phase Construction phase	Environmental Closure Certificate	Site cleaned and cleared and everything not forming part of the permanent works removed from site.						
		Environmental Closure Certificate issued by SHE Coordinator and signed off by the Project Manager together with the Contract Completion Certificate.						
	Environmental inspections and audits	Contractor's EO undertaking daily inspections of all works places.						
		Transnet Projects EO conducting **weekly** inspections of **all work places** for which the Contactor is responsible, including.						
		Transnet EO conducting **monthly** inspections of the **entire construction site,** by **observation**, **document check**, **measurement** and **monitoring**.						
		Transnet Projects Project Environmental Manager sign off monthly inspection and monitoring reports from Transnet EO.						

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PROJECT NUMBER: 401281/WW/R150

REPORT TITLE: Project Bravo: Construction Environmental Management Plan

REPORT NUMBER: 4446/401821

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