CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

TOWNSHIP ESTABLISHMENT FOR TSES EXTENSIONS 1, 2, 3 AND SOUTPUT NORTH AND SOUTPUT SOUTH

TSES VILLAGE, //KARAS REGION

FEBRUARY 2024

URBAN Green cc

Town and Regional Planning Consultants

Environmental Management Consultants

Water and Wastewater Treatment Consultants

PROJECT INFORMATION

Project Title:	**TOWNSHIP ESTABLISHMENT FOR TSES EXTENSIONS 1, 2, 3 AND SOUTPUT NORTH AND SOUTPUT SOUTH, TSES VILLAGE, //KARAS REGION**
Type of Project:	**ENVIRONMENTAL SCOPING ASSESSMENT**
Project Location:	**PORTIONS OF THE FARM TSES TOWNLANDS NO. 425, TSES VILLAGE – //KARAS REGION (NAMIBIA)**
Project Number:	**APP-002106**
Competent Authority:	**MINISTRY OF URBAN AND RURAL DEVELOPMENT** **NAMIBIA PLANNING AND ADVISORY BOARD/TOWNSHIPS BOARD** **PRIVATE BAG 13289** **WINDHOEK** **NAMIBIA**
Approving Authority	**DIRECTORATE OF ENVIRONMENTAL AFFAIRS** **MINISTRY OF ENVIRONMENT AND TOURISM** **PRIVATE BAG 13306** **WINDHOEK**
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EMP REVISION STATUS

Version	Date Approved	Revision Details
V1 – Original EMP	Feb 2024	
V2		
	-	-

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GLOSSARY

The definitions given below are for explanatory purposes only.

Activity:	The physical work that a proponent proposes to construct, operate, modify, decommission or abandon or an activity that a proponent proposes to undertake.
Alien Species:	It refers to a non-indigenous plant, animal or micro-organism; or an indigenous plant, animal or micro-organism, translocated or intended to be translocated to a place outside its natural range of nature, that does not normally interbreed with individuals of another kind, including any subspecies cultivar, variety, geographic race, strain, hybrid or geographically separate population.
Assessment:	The process of identifying, predicting and evaluating the significant effects of activities on the environment; and the risks and consequences of activities and their alternatives and options for mitigation with a view to minimise the effects of activities on the environment.
Audit:	Regular inspection and verification of construction activities for implementation of the CEMP.
Batch Plant:	Machinery used on site for the mixing and production of concrete and associated equipment and materials.
Bund:	An enclosure designed to hold at least 120% of the contents of a liquid storage vessel, tank or drums to contain any spillage.
Construction Activity:	A construction activity is any action taken by the Contractor, his subcontractors, suppliers or personnel during the construction process.
Construction Environmental Management Plan (CEMP):	A plan that describes how activities that may have significant environments effects on the environment are to be mitigated controlled and monitored.
Contaminated Water:	Water contaminated by the Contractor's activities, e.g. concrete water and runoff from plant/personnel wash areas.
Contractor:	The principal person or company, including all subcontractors, undertaking the construction of the development as appointed by the Proponent.
Construction Camp:	Refers to all storage stockpiles sites, site offices, container sites, other areas required to undertake construction and rest areas for construction staff or management.
Independent Environmental	A suitably qualified professional independent from the Proponent and Contractor who oversees the construction phase and ensure that all environmental specifications and

Officer (IEO):	CEMP obligations are met during the phase. The IEO will be responsible for the monitoring, reviewing and verifying of compliance with the CEMP by the Contractor.
Environmental Site Manager (ESM):	It is a suitably qualified environmental officer appointed by the Contractor who oversees the on-site daily environmental responsibilities of the Contractor.
Emergency Situation	An incident, which potentially has the ability to significantly impact on the environment, and which, could cause irreparable damage to sensitive environmental features. Typical situations entail amongst others the: • Spill of petroleum products and lubricants into the aquatic system; • Potential damage, erosion and slumping of unstable river embankments or drainage channels; • Potential event of impeding the continuous flow of water to downstream water users dependant on the flow; and • Dangerous situation where livestock and children can be injured by any activity emanating from the construction or rehabilitation of the project implementation.
Environment:	The complex of natural and anthropogenic factors and elements that are mutually interrelated and affect the ecological equilibrium and the quality of life, including : (a) The natural environment that is the land, water and air, all organic and inorganic material and all living organisms; and (b) The human environment that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values.
Environmental Impact Assessment (EIA):	The process of examining the environmental effects of a development as prescribed by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012) for activities listed as List of Activities which may not be undertaken without an Environmental Clearance Certificate from the Environmental Commissioner (GN. No. 29 of 2012).
Hazardous Substance:	A substance that, in the reasonable opinion of the Engineer and/or ECO, can have a harmful effect on the environment.
Listed Activity:	An activity listed in terms of section 27(2) of the Environmental Management Act and the List of Activities which may not be undertaken without an Environmental Clearance Certificate from the Environmental Commissioner (GN. No. 29 of 2012).
Monitoring:	Regular inspection and verification of construction activities for degree of compliance to the CEMP.

No-Go Areas:	Areas identified as being environmentally sensitive in some manner and demarcated on plan, and on the Site with pegs or fencing and which are out of bounds to unauthorised persons. Authorisation must be obtained prior to entry.
Project Engineer:	The person(s) who represents the Proponent and are responsible for the technical and contractual implementation of the works to be undertaken by the appointed contractors.
Proponent:	The legal entity duly authorised and appointed representative, with rights to undertake the development.
Resident Engineer (RE):	A person who represents the Project Engineer on Site and is responsible for the technical and contractual implementation of the works to be undertaken.
Search and Rescue:	The location and removal of specified plant species, without unnecessary damage, and their transfer to a specified location (on-site nursery).
Solid Waste:	All solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste.
Species of Special Concern:	Those species listed in the Endangered, Threatened, Rare, Indeterminate, or Monitoring categories of the South African Red Data Books, and/or species listed in Globally Near Threatened, Nationally Threatened or Nationally Near Threatened categories (Barnes, 1998).
Specification:	A technical description of the standards of materials and workmanship that the Contractor is to use in the works to be executed, the performance of the works when completed and the manner in which payment is to be made.
Topsoil:	The top 150 mm of soil (topsoil) and root material of cleared vegetation.
Works:	The construction operations and all related and incidental works, such as search and rescue, fencing and rehabilitation, in connection with the execution and carrying to completion of the project.

PART 1: BACKGROUND INFORMATION

1.1 THE DEVELOPMENT

The Project entails the formalisation and/or proclamation of new townships within the Tses Village jurisdictional area. The development involves 5 townships, namely Tses Extensions 1, 2 & 3 as well as Soutput North and Soutput South (future Tses Extensions 4 & 5).

In 1999 Tses Proper was proclaimed as a formal township. The townships of Extensions 1 & 2 were never formally proclaimed as townships, but have a formal layout. It was occupied by people, who constructed permanent structures on surveyed erven.
During 2022, Extension 3 was planned and now requires proclamation. Soutput North and Soutput South are two informal townships that have grown to the extended requiring planning and eventually proclamation (future Tses Extensions 4 & 5).

A detailed description of the development is presented under Chapter 4 of the Scoping Report – February 2024.

1.1.1 Locality

Tses Village is located in the north-central part of the //Karas Region, 80 km north of the Region's Administrative Capital, Keetmanshoop. Refer to Appendix A for the Locality Map of Tses Village and Townlands.
Tses Extensions 1, 2 and 3 are located within Tses Village, forming part of the informal settlement developments to the south, west and north of Tses Proper. Soutput North and Soutput South is located to the western side of Tses Village beyond the B1 Main Road. Refer to Appendix B for the Locality Map of Tses Extension 1, 2 and 3 and Southput North and Soutput South within the townlands.

1.1.2 Formalisation

'Formalisation' refers to the process whereby an 'informal township', which is an un-proclaimed township is subject to a legal process of establishing a formal township. Informal townships do not provide for land tenure and is usually also not provided with municipal services, mainly because of a lack of collateral and non-legal existence.
Formalisation of an informal area entails a statutory process, which includes a planning phase being done by the town planner (i.e. designing of a formal township layout and obtaining of the statutory

approvals), a land surveying phase done by the land surveyor (i.e. registering of the townships general plan), the official proclamation of the township and lastly the registering of ownership.
After proclamation each occupier will have the opportunity to buy the erf from the Tses Village Council and the property will be transferred into the new owner's name according to the Local Authority Act No. 23 of 1992, as amended.
The other component to this process entails the physical construction of services, i.e. roads, water network, electricity network, the sewerage and wastewater network and waste removal management. It is also this component that pose the real impact, which need to be assessed and managed to ensure the least possible environmental and socio-economic impact/s.

1.1.3 Tses Extension 1, 2 and 3 Layout

The Development comprises of three extensions to Tses Proper, consisting of 95 erven in Extension 1, 24 erven in Extension 2 and 340 erven in Extension 3 respectively. These erven consist of a variety of land uses, but mainly residential. Land uses within Tses Proper consist of mainly residential, but other land uses such as business, office, industrial, institutional, private and public open spaces are also present. Refer to Appendix C for the respective township layouts and land-uses for Tses Extensions 1, 2 and 3.
Soutput North and Soutput South (future Extensions 4 and 5) still require lay-out planning in the process of formalisation and eventual proclamation.

A detailed description of the Development is presented in Chapter 4 of the Scoping Report – February 2024.

1.2 RESOURCE DEMAND AND MUNICIPAL SERVICES

The existing bulk infrastructure of Tses Proper was already expanded to Extension 1 and 2 with some informal expansion to Extension 3, Soutput North and Soutput South. No major new infrastructure developments are thus envisaged for this purpose, but only extensions of existing infrastructure to accommodate the additional development.
Refer to Appendix D for the bulk infrastructure lay-out of the development.

1.2.1 Road Infrastructure & Access

Tses can be reached via the B1 main road connecting Windhoek with Keetmanshoop and South-Africa.

The access road to Tses Proper and Tses Extension 1, 2 and 3 on the eastern side of the B1 as well as the access road to Soutput North and Soutput South on the western side of the B1 was recently constructed to move approximately 100 m to the north of the old existing access roads.
Access to the Tses Extensions 1, 2 and 3 townships will be obtained via the existing road network of the larger township. Roads within the formal townships are gravel and are such to form one larger integrated street network providing access throughout the larger Village.

1.2.2 Water Infrastructure

Water infrastructure for Tses Proper, Tses Extensions 1, 2 and 3 is already in place and pipeline extensions will be done from the NamWater pipelines that run through Tses into the formalised areas. Informal and some permanent water infrastructures are already in place to provide Soutput North and Soutput South with water.

1.2.3 Electricity Supply & Infrastructure

Provision of electricity to the Tses Village and Townlands is done by NamPower from the national grid. Electricity is supplied to Tses Substation situated on the southern edge of Tses and from here most of the network expansion into Tses Proper and Extensions 1, 2 and 3 as well as into Soutput North and South was already completed.
In line with the Electricity Act No. 4 of 2007, proposed township layout should accommodate existing electrical networks and servitudes should be designed to accommodate already developed infrastructure. Should the existing electrical networks be altered or moved, the cost implications should be considered in the project budget.

1.2.4 Household Waste System

The types of waste that will be generated in the townships are mostly of a household nature (i.e. residential activities), as well as that associated with businesses. A variety of dry- (i.e. paper, plastic, tins and glass) and organic waste (i.e. kitchen waste) will be generated.
Hazardous waste, defined as ‘those substances which may cause injury or ill-health to or death of human beings’ will be limited to that of a residential nature in terms of type (i.e. cleaning liquids) and volume.
Waste removal from the formal townships will be the responsibility of the Tses Village Council. The Village Council should collect household waste from each erf on a weekly basis and dispose at the Council`s dump site.

1.2.5 Sewerage

Sewer services in the form of a water born sewer systems are in place for Tses Proper and it is envisaged that the existing sewer network will be extended to which the developed erven can be connected.

Tses Extensions 1, 2 and part of Extension 3 have already been connected to the water born sewer system and in other areas of Extension 3 french drains are provided for.

Long drops are still used in Soutput North and Soutput South and a sewer network system must still be put in place for these erven.

During the interim development period, sewerage from Tses Extensions will have to be pumped by the Local Authority when needed on an ad hoc basis. Sewerage is disposed of at the existing oxidation ponds west of Tses Proper.

1.2.6 Stormwater

No prominent rivers run through Tses Proper or Tses Extension 1, 2 or 3 on the eastern side of the B1 and only small ephemeral drainage channels passes around this area during heavy rains to combine in a prominent drainage line towards the Fish River. This drainage line runs westwards from Tses and passes between Soutput North and Soutput South. These two extensions thus lie on both sides of this drainage channel to the Fish River. Refer to the Scoping Report, Chapter 5, Section 5.2.4 and Figure 5.4 in for a view of the drainage of the area.

Due to the area's dry climate and topography and drainage being effective and efficient, no flooding is expected in Tses Proper, Tses Extension 1, 2 or 3, apart from a few puddles that might remain after heavy rains. Consequently, stormwater infrastructure would be limited to stormwater culverts next to the tar road and ducts next to the gravel roads.

In Soutput North and Soutput South precaution must be taken to take the flood line of the drainage line into consideration if further construction is envisaged here.

1.2.7 Telecommunications

Telecommunication is available either by way of fixed lines (Telecom Namibia/Partatus) and/or mobile network (MTC/Paratus).

1.3 THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

1.3.1 Purpose of the CEMP

The purpose of the CEMP is to provide specifications for "good environmental practice" for application during construction.

As such, the CEMP provides specifications that the Proponent and his nominated Contractors must adhere to in order to minimise adverse environmental impacts associated with the construction activities. The Proponent to which authorisation was granted, is ultimately responsible for overall environmental performance.

The guidelines for the execution of an EMP include the following:

- Responsibilities for the environmental performance of the proposed development are communicated to the construction staff;
- Communications channels to report on environmental performance, problems and priorities are in place;
- A monitoring schedule is established to identify potential negative environmental impacts associated with the construction of the proposed development;
- Method Statements (mitigation measures) are implemented to avoid or minimise the identified negative environmental impacts (rehabilitation of eroded areas; bush clearings; complaints from the public) as well as to enhance the positive impact on the environment (employment; support of conservation efforts); and
- Monitoring programme or schedule is developed to track the plans that have been implemented so as to ensure the effectiveness of the plan.

1.3.2 Scope of the CEMP

In order to ensure a holistic approach to the management of environmental impacts during the construction works, this CEMP sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved, and monitored by the Independent Environmental Officer (IEO) and Resident Engineer (RE).

This CEMP intends to guide and manage the construction activities on each construction site and surrounding areas as they relate to the natural environment. It describes mitigation measures and is prescriptive in identifying specific people or organisations to undertake specific tasks. This document must further be seen as open-ended, requiring regular review and updating via the correct channels in order for it to effectively guide environmental management of this project.

The provisions of this CEMP are binding on the Proponent until such time that ownership is transferred to the community or any other stakeholder, if it is the case. Any third party appointed

by the Proponent in terms of the design and construction must comply with the conditions of this CEMP.

This CEMP has been designed to suite the particular construction activities and needs of the proposed development, and incorporates the following:

- General civil construction mitigation measures;
- Specific project mitigation measures;
- Construction activities that could impact on the environment;
- Specifications with which the Contractor shall comply in order to protect the environment from the identified impacts; and
- Actions that shall be taken in the event of non-compliance.

The CEMP is a dynamic document subject to similar influences and changes as are created by variations to the provisions of the project specification. Any substantial changes shall require the approval from the Independent Environmental Officer (IEO).

1.3.3 Format of the CEMP

The CEMP is designed to fit with the engineering contract documentations. The CEMP consists of three parts:

- **Part 1** contains the **Background Information** providing a brief description of the CEMP, information on the development and the environmental process followed;
- **Part 2** explains the **Administration and Regulation of Environmental Obligations** stipulating the general requirements, responsibilities of the different role players, financing of environmental control, dispute resolution, and requirements for monitoring; and
- **Part 3** details with the **Environmental Specifications** that set out the environmental objectives and targets with which the Contractor/s shall comply.

1.3.4 Amendments to the CEMP

Any party involved with the Project can suggest changes to the CEMP via the IEO and Engineer. Approved changes will be recorded and drafted into this existing CEMP in the form of an appendix or amendments. This should be clearly stipulate in the CEMP to avoid confusion (see EMP Revision).

PART 2: ADMINISTRATION AND REGULATION OF ENVIRONMENTAL OBLIGATIONS (COMPLIANCE MONITORING)

2.1 MANAGEMENT STRUCTURE

Details of the management structure are presented in Fig. 2.1. All official communication and reporting lines including instructions, directives and information shall be channelled according to the organisational structure presented below.

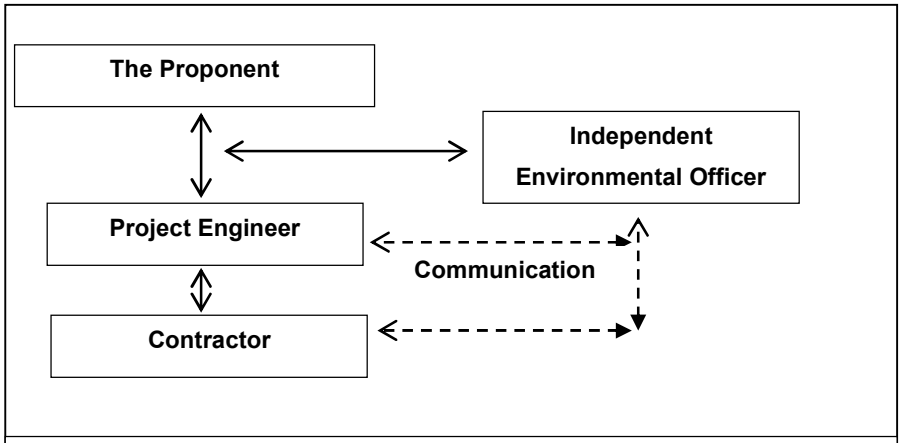

Figure 2.1 – CEMP Implementation Organisational Structure

2.2 ROLES AND RESPONSIBILITIES

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

2.2.1 Proponent (TsesVillage Council)

The Proponent is ultimately responsible for the implementation of the CEMP and the financial cost of all environmental control measures. The Proponent must ensure that any person acting on their behalf complies with the conditions/specifications contained in this CEMP. The Proponent is also responsible for the appointment of a Project Engineer (PE), Contractor and Independent Environmental Officer (IEO) to the development.

The Proponent shall address any site problems pertaining to the environment at the request of the Project Engineer and/or the IEO.

2.2.2 Project Engineer

The Project Engineer is responsible for the engineering design of the development and management of the on-site construction activities from the side of the appointed contractors.

The Project Engineer shall as part of his duties address any site problems pertaining to the environment at the request of the Proponent and/or the IEO. The Project Engineer shall have the responsibility to ensure that the Proponent's responsibilities are executed in compliance with the CEMP and/or any other documentation proposed from the Proponent and/or IEO. Any on-site decisions with the appointed contractors having relevance to environmental matters are ultimately the responsibility of the Project Engineer. The Project Engineer shall assist the IEO where necessary and shall have the following responsibilities in terms of the implementation of this CEMP:

- The Engineer, along with the IEO and RE, must obtain, examine and approve Method Statements.
- Promptly issue instructions requested by the IEO and Resident Engineer to the Contractor/s.
- Deduct environmental penalties from certificate payments as agreed and instructed by the IEO.
- Assisting the IEO in making decisions and finding solutions to environmental problems that may arise during the construction phase.
- Oversee the responsibilities of the Resident Engineer and Contractor/s, and assist in all required matters.
- Monitor and verify that the CEMP are adhered to at all times and take action if specifications are not followed.
- Order the removal of person(s) and/or equipment not complying with the CEMP specifications.
- Provide input into the IEO's on-going internal review of the CEMP.
- Communicate environmental issues to the IEO.

2.2.3 Independent Environmental Officer (IEO)

The Independent Environmental Officer (IEO) is acting on behalf of the Proponent and shall communicate directly with the Project Engineer and/or Proponent. The IEO shall be responsible for monitoring, reviewing and verifying the Contractor's compliance with the CEMP during the construction phase. The IEO shall have the right to investigate the site at any time during the project phases and unexpected visits will be allowed.

The IEO duties shall include, *inter alia*, the following:

- The IEO shall make recommendations independent of the Engineer; take immediate action on Site when (i) prescriptive conditions are violated, or in danger of being violated, and to inform the Engineer, Resident Engineer/s and Contractor/s immediately of the occurrence and to take

action, e.g. issuing of penalties; and (ii) where clearly defined and agreed 'no go' areas are violated, or in danger of being violated, and to inform the Engineer, Resident Engineer/s and Contractor/s of the occurrence and action taken.

- Advise the Contractor and/or the Project Engineer on environmental issues within the defined construction areas.
- Undertake regular site visits to ensure compliance with the CEMP and verify that environmental impacts are kept to a minimum throughout the construction phase (i.e. construction monitoring).
- Keep a photographic record of progress on site from an environmental perspective.
- Assist the Contractor and/or the Project Engineer in finding environmentally acceptable solutions to construction problems as and if any arise.
- Recommend additional environmental protection measures should this become necessary.
- Keep a register of complaints and dealing with any community issues or comments.
- Report any incidents to the Proponent and Engineer that may or have caused damage to the environment or which is in breach of the CEMP.
- Prepare an environmental audit report at the conclusion of the construction phase.
- The IEO, along with the Engineer and RE, must obtain, examine and approve Method Statements.
- Ordering the removal of, or issuing penalties for person/s and/or equipment not complying with the specifications of the CEMP.
- Involve specialists to advise on environmental management issues as they emerge during the construction phase.

The IEO must have:

- a good working knowledge of all relevant environmental policies, legislation, guidelines and standards;
- the ability to conduct inspections and audits and to produce thorough and informative reports;
- the ability to manage public communication and complaints;
- the ability to think holistically about the structure, functioning and performance of environmental systems; and
- proven competence in the application of the following integrated environmental management tools:
    - EIAs.
    - EMPs.
    - Environmental auditing.

- Mitigation and optimisation of impacts.
- Monitoring and evaluation of impacts.

2.2.4 Contractor/s (to be Appointed)

The Contractors shall have the following responsibilities:

- Appoint an Environmental Site Manager to manage that all provisions of the CEMP are adhered to onsite at all times.
- Implement CEMP and monitoring all provisions at all times and taking action if specifications are not followed. If the Contractor encounters difficulties with the specifications, he/she must discuss alternative approaches with the IEO and/or the Project Engineer prior to proceeding.
- Monitor and verify that the environmental impacts are kept to a minimum and mitigations proposed are applied throughout the construction phase.
- Through the onsite Environmental Manager, make and keep construction personnel aware of environmental issues and to ensure they show adequate consideration to the environmental sensitivities.
- Report any incidents of non-compliance with the CEMP to the Project Engineer and/or the IEO.
- Keep a register of complaints on-site and record community comments and issues, and the actions taken in response to these complaints.
- Rehabilitate any sensitive environments damaged due to his/her negligence. This shall be done in accordance with the IEO and Project Engineer's specifications and instructions.
- The Contractor shall ensure that no damage whatsoever is caused as a result of his operations or otherwise by his workmen in the areas adjacent to the construction sites.
- The Contractor shall ensure that his workmen are properly instructed and carry out the requirements of this CEMP.
- The Contractor will be held liable for all unauthorised damage caused by him or any of his workmen or Sub-Contractors.

Failure to comply with the CEMP from the side of the contractor may result in penalties (Appendix E) and reported non-compliance may result in the suspension of work or termination of the contract by the Project Engineer on instruction from the Proponent.

2.3 DISPUTES AND DISAGREEMENTS

Any disputes or disagreements between role players on Site (with regard to environmental management) will be referred to the Directorate of Environmental Affairs (Ministry of

Environment and Tourism). If no resolution on the matter is possible it must be presented to an outside party agreed by all parties involved.

2.4 CEMP MONITORING RESPONSIBILITIES

The day-to-day monitoring and verification that the CEMP is being adhered to shall be undertaken by the appointed Contractor.

The IEO shall visit and inspect the site at least once a month to ensure that correct operational procedures are being implemented and that the Contractor is complying with the environmental specifications of the CEMP.

Additional site inspections by the IEO may be required during the initial and final stages of the construction phase. The IEO shall address any queries to the Project Engineer. If the queries cannot be resolved at this level, they shall be referred to the Proponent, if necessary.

The IEO will carry the responsibility of monitoring the implementation of the CEMP on Site, assisted by the Project Engineer. In this regard, the IEO will submit a monthly monitoring report to the DEA until after all rehabilitation work has been completed. A pro-forma monitoring report is contained in Appendix F.

Regular meetings will be held between the Project Engineer, RE and the IEO. The purposes of the meetings shall be:

- To establish the suitability of the Contractor's methods and machinery in an effort to lower the risk involved for the environment.
- To discuss possible non-conformance to CEMP guidelines or environmental legislation.
- To assess the general state of the environment on site and discuss any environmental problems which may have materialised.
- To accommodate the local community in the decision-making process regarding social and environmental issues on site.

Any non-compliance with the agreed procedures of the CEMP is a transgression of the various statutes and laws that define the manner by which the environment is managed. Non-conformance identified during monitoring must be recorded. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor and could stand as evidence should legal action be required. If possible photographs should also be included as evidence to substantiate the report. This report will also suggest mitigation measures to correct the non-conformance (if necessary) and contemplate revisions to any of the strategies used in the construction phase, whether they pertain to monitoring or to construction methods used on site. The non-conformance shall be documented and reported as part of the Monitoring Report.

2.5 POST-CONSTRUCTION ENVIRONMENTAL AUDIT

A post-construction environmental audit must be carried out in order to fulfil conditions of this CEMP.

2.6 NON COMPLIANCE AND PENALTIES

The IEO shall issue the Contractor a notice of non-compliance whenever transgressions are observed. The contractor/s shall act immediately when such notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken.

The Contractor is deemed not to have complied with the CEMP if, inter alia:

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

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

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

- Where environmental damage is caused or a pollution incident, and/or failure to comply with any of the environmental specifications contained in the CEMP, the Contractor shall be liable.

The following violations, and any others determined during the course of work, should also be penalised:

- Hazardous chemical/oil spill and/or dumping in non-approved sites.
- Damage to sensitive environments.
- Damage to cultural and historical sites.
- Unauthorised removal/damage to indigenous trees and other vegetation, particularly in identified sensitive areas.
- Uncontrolled/unmanaged erosion.
- Unauthorised blasting activities (if applicable).
- Pollution of water sources.
- Unnecessary removal or damage to trees.

A system of penalties shall be implemented to ensure compliance with the CEMP (see Appendix E). Where the Contractor inflicts irreparable damage upon the environment or fails to comply with any of the environmental specifications of the CEMP (within 10 days) this would constitute a breach of Contract for which the Contractor may be liable to pay a penalty.

The system of penalties shall be implemented in the following way:

- Penalties shall be issued per incident and individual at the discretion of the IEO;
- Penalties shall be issued in addition to any remedial costs incurred as a result of non-compliance with the environmental specifications;
- The IEO shall not collect the penalties from individuals, but shall inform the Project Engineer and Contractor of the contravention, the individual's identity and the amount of the penalties; and
- Penalties, including but not limited to those activities presented in Appendix E, shall be imposed by the Project Engineer on the Contractor, his staff and/or the subcontractors' staff for contravention of the environmental specifications. Where there are ranges, the amount shall depend on the severity and extent of the damage done to the environment.

Failure by any employee of the Contractor or their sub-contractors to show adequate consideration to the environmental aspects of the contract shall be considered sufficient cause for the Project Engineer to have that employee removed from the site. The IEO may, through the Project Engineer, also order the removal of equipment that is causing continual environmental damage.

2.7 ENVIRONMENTAL COMPLETION STATEMENT

An Environmental Completion Statement will be prepared by the IEO for submission to the Department of Environmental Affairs indicating completion of the project and compliance with the EMP and conditions. This statement will be prepared after the final audit after the rehabilitation phase.

2.8 EMERGENCY PREPAREDNESS

The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents that will cause environmental impacts, throughout the construction period. Such activities may include, inter alia:

- Accidental discharges to water and land.
- Accidental exposure of employees to hazardous substances.
- Accidental veld or forest fires.
- Accidental spillage of hazardous substances.
- Accidental toxic emissions into the air (e.g. at asphalt plants).
- Specific environmental and ecosystem effects from accidental releases or incidents.

These plans shall include:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel and contact details.
- Details of emergency services available (e.g. the fire department, spill clean-up services, etc.).
- Actions to be taken in the event of different types of emergencies.
- Incident recording, progress reporting and remediation measures required to be implemented.
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

2.9 ENVIRONMENTAL AWARENESS TRAINING

Contractors shall ensure that its employees and any third party who carries out all or part of the Contractor's obligations are adequately trained with regard to the implementation of the CEMP, as well as regarding environmental legal requirements and obligations. Training shall be conducted by the Contractor's Health and Safety Officer where necessary.

The purpose of this environmental training is to provide a general explanation of sustainable environmental practises, but also to explain the content of the CEMP, the relevance thereof and how it will be implemented through monitoring. The environmental specifications as per Part Three of this

CEMP should clearly be explained to all the Contractors and their site staff, as well as non-compliance to it and related penalties.

Environment and health awareness training programmes should be targeted at three distinct levels of employment, i.e. the executive, middle management and labour. The Contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness and the content of the EMP. The presentation needs to be conducted in the language of the employees to ensure it is understood.

The environmental training shall, as a minimum, include the following:

- The mitigation measures required to be implemented when carrying out their work activities.
- Environmental legal requirements and obligations.
- Details regarding floral/faunal species of special concern and protected species, and the procedures to be followed should these be encountered during the construction of the bridge, main access roads, approach roads or construction camps.
- The importance of not littering.
- The importance of using supplied toilet facilities.
- The need to use water sparingly.
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible.
- Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should these be encountered.

2.10 INFORMATION BOARD(S)

The Contractor shall be responsible for erecting information boards on site. The number and locations of these boards shall be agreed by the Project Engineer and IEO.

Information boards should be placed at conspicuous locations at the entrances to Tses Extensions 1, 2 and 3 as well as to the entrance to Soutput North and Soutput South. The contents of the information board shall be provided by the Project Engineer and will essentially be to advise the public of the construction operation and the prohibition on entering certain areas. The information board shall apart from the details of the contractor also provide the name and contact number of the Project Engineer to ensure that the public has access to the Engineer to ask for information and/or to lodge any complaints.

2.11 METHOD STATEMENTS

Method statements from the Contractor will be required for specific sensitive actions on request of the authorities or IEO. A method statement forms the baseline information on which sensitive area work takes place and is thus considered a “live document” in that modifications can be negotiated between the Contractor and IEO if or as required. The Contractor (and, where relevant, any subcontractors) must also sign the Method Statement, thereby indicating that the works will be carried out according to the approved methodology. Changes in the methodology must be reflected by amendments to the original approved Method Statement. Amendments must be signed by both the IEO and RE, denoting that the change is environmentally acceptable. The Contractor must also sign the amended Method Statement.

All method statements will form part of the CEMP documentation and are subject to all terms and conditions contained within the CEMP main document. The Method Statement shall cover applicable details with regard to (see Appendix G):

- Construction procedures;
- Materials and equipment to be used;
- How and where materials will be stored;
- The containment of accidental leaks or spills;
- Timing and location of activities; and
- Any other information deemed necessary by the IEO.

A method statement describes the scope of the intended work in a step-by-step description in order for the IEO or Engineer to understand the Contractor’s intentions. This will enable them to assist in devising any mitigation measures, which would minimise environmental impact during these tasks. The method statement should also clearly stipulate mitigation methods of the intended works, against which the contractor’s performance will be measured. For each instance wherein it is requested that the Contractor submit a method statement to the satisfaction of the IEO and Engineer, the format should clearly indicate the following:-

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

The Contractor must submit the method statement two weeks before any particular construction activity is due to start, especially with respect to impacts on sensitive ecosystems. Work may not commence until the method statement has been accepted by the IEO and Engineer, and clearly

communicated to the workforce. The Contractor shall, except in the case of emergency activities, allow 14 days for consideration and approval of the Method Statement. The RE or IEO may require changes to a Method Statement if the proposal does not comply with the specifications or if, in the reasonable opinion of the RE or IEO, the proposal may result in damage to the environment in excess of that permitted by the specifications. Approved Method Statements shall be communicated to all relevant personnel.

All Method Statements listed below, shall be provided by the Contractor before the activity commences:

- Bunding
    - Method of bunding for static plant and bulk fuel storage.
    - Camp establishment and fencing
- Location and layout of the Contractor's Camp.
    - Method of installing fences required for working areas and Contractor's Camp.
- Concrete batching
    - Location, layout and preparation of concrete batching facilities, including the methods employed for mixing of concrete including the management of runoff water from such areas.
- Bulk earthworks
    - Location, layout, silt/sediment management and the management of runoff from bulk earthworks areas.
- Demolition
    - Proposed method of demolition, including handling and disposal of materials.
- Dust
    - Dust control protocol.
- Fire and hazardous substances
    - Handling and storage of hazardous wastes.
    - Emergency spillage procedures and compounds to be used.
    - Emergency procedures for accidental fire.
    - Methods for the disposal of hazardous materials.

  - Fuels and fuel spills.
  - Methods of refuelling vehicles.
  - Details of methods for fuel spills and clean-up operations.
- Protection of archaeological resources
  - Methods for dealing with archaeological resources in the event that any are found.
- Protection of environmentally sensitive resources (fauna and flora)
  - Methods for dealing with conservation areas or areas identified as environmentally sensitive requiring protection.
  - Locality and preparation of onsite nursery to house vegetation relocated from construction areas or propagated locally for replanting purposes.
  - Details of methods dealing with the identification, transportation and transplanting of flora species of conservation value.
  - Details of methods dealing with the identification, capture and relocation of fauna species of conservation value.
- Rehabilitation
  - Rehabilitation of disturbed areas after construction is complete.
  - Settlement ponds and sumps.
  - Layout and preparation of settlement ponds and sumps.
- Solid waste management
  - Solid waste control and removal of waste from Site.
  - Sources of materials
  - Details of materials imported to the Site (where applicable).
- Topsoil handling and stockpiling
  - Details on stripping, handling and stockpiling of topsoil.
- Wash areas
  - Location, layout, preparation and operation of all wash areas.
- Storm water management

- Details of how storm water is to be handled on Site.

See Appendix G for more information on the Method Statement and Pro-forma Method Statement.

2.12 RECORD KEEPING

All records related to the implementation of this management plan (e.g. site instruction book, HSE Officers daily diary, induction records, method statements) must be kept together in an office where it is safe and can be retrieved easily. All relevant records should be kept for a minimum of two years after construction and should at any time be available for scrutiny by any relevant authority or stakeholder.

It is recommended that photographs (fixed point photographs for better comparisons before/during/after) are taken of the site prior to, during and immediately after construction as a visual reference. These photographs should be stored with related documents and other records related to this EMP.

A list of other reports to be kept on site is -

- Final design documents and diagrams issued to and by the Contractor.
- All communications detailing changes of design/scope that may have environmental implications.
- Occupational Health and Safety reports.
- Complaints register.
- Incident and accident reports.
- Emergency preparedness and response plans.
- Crisis communication manual.
- Site meeting minutes during construction.
- All relevant permits.
- All method statements from the Contractor.

PART 3 - ENVIRONMENTAL SPECIFICATIONS

3.1 SCOPE

These specifications cover the requirements for controlling the impact of construction activities on the natural and social environment.

3.2 CONSTRUCTION

3.2.1 Site Division

- The IEO and Resident Engineer shall be advised of the area that the Contractor intend using for his site establishment. The Contractor's Camp shall occupy as small an area as possible, and no site establishment shall be allowed within 200m of any watercourse unless otherwise approved by the IEO.
- The Contractor shall restrict all his activities, materials, equipment and personnel to within the specified area. A Method Statement detailing the location, layout and method of establishment of the Contractor's Camp (including all buildings, offices, lay down yards, plant wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project) shall be provided.

(i) Contractors Camp

- The Contractor shall submit a Method Statement, indicating the layout and preparation of the Contractor's Camp (this shall include the positioning of any fuels/hazardous materials stores). The extent and location of the Contractor's Camp shall be indicated on the site plans to be approved by the Engineer and IEO.
- The planning and design for the Construction Camp must ensure that there is minimal impact on the environment. The following should apply –
    - The Construction Camp will be placed within an existing disturbed area as far as possible.
    - The Contractor's Camp shall be located in an area of low environmental and social sensitivity.
    - The construction camp must preferably be located away from the B1 (Windhoek - Keetmanshoop Road) to minimise visual impact.
    - Its final location shall be identified in consultation with the Engineer and Environmental Site Manager.

- With the decommissioning of the structures all compacted platforms and slab foundations must be ripped up and be removed.

(ii) Vehicle Parking Area

All vehicles will be allocated a dedicated parking area in the construction camps.

The position of which will be agreed by the Project Engineer and IEO. No storage of vehicles will be allowed outside of the designated areas.

3.2.2 Aesthetics

The Contractor shall take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area.

3.2.3 Cement and Concrete Batching

(i) Location

- It is recommended that bulk cement storage be kept at the main construction camp.
- The concrete batching activity shall be located in dedicated areas of low environmental sensitivity to be identified and approved by the RE and IEO.
- The permitted location of a batching plant (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the site layout plan and approved by the Engineer and IEO. A Method Statement indicating the layout and preparation of this facility is required in this regard.

(ii) Maintenance

- Cement should be covered entirely by impervious sheeting or placed in a contained and closed off area. It is recommended that bulk cement storage be kept at the main construction camp.
- All wastewater resulting from batching of concrete shall be disposed of via the wastewater management system.
- The concrete batching works shall be kept neat and clean at all times. No batching activities shall occur on unprotected substratum of any kind.
- All runoff from batching areas shall be strictly controlled, and cement-contaminated water shall be collected, stored and disposed of at a site approved by the Engineer and IEO. Dagga boards, mixing trays and impermeable sumps shall be used at all mixing and supply points.
- Contaminated water storage facilities shall not be allowed to overflow and appropriate protection from rain and flooding shall be implemented.
- Contaminated water treatment on site shall require a Method Statement.

- Unused cement bags are to be stored so as not to be effected by rain or runoff events.
- Used cement bags shall be stored in weatherproof containers to prevent windblown cement dust and water contamination. Used bags shall be disposed of on a regular basis via the solid waste management system, and shall not be used for any other purpose.
- Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment: Care shall be taken to collect contaminated wash water from cleaning activities and dispose of it in a manner approved by the RE and IEO.
- Suitable screening and containment shall be in place to prevent wind-blown contamination associated with bulk cement silos, loading and batching.
- With respect to exposed aggregate finishes, the Contractor shall collect all contaminated water and fine material, and store it in sumps for disposal at an approved waste-disposal site.
- All visible remains of excess concrete shall be removed on completion of the plaster or concrete pour work and disposed of. All excess aggregate shall also be removed.

3.2.4 Earthworks

All earthworks shall be undertaken in such a manner so as to minimise the extent of any impacts caused by such activities. The Contractor/s shall take all reasonable measures to limit dust generation as a result of earthworks. Earthworks are to be phased so that no areas are left exposed for longer than is necessary. This is especially important during the rainy season where runoff causes siltation downstream & overall erosion and loss of topsoil, etc.

(i) Trenching

- Trenching for services shall be undertaken in accordance with the engineering specifications with the following environmental amplifications, where applicable:
    - Soil shall be excavated and used for refilling trenches i.e. soil from the first trench shall be excavated and stockpiled, thereafter soil from the second excavated trench length shall be used to backfill the trench behind it once the services have been laid. The last trench shall be filled using the soil stockpiled from the first trench.
    - Trench lengths shall be kept as short as practically possible before backfilling and compacting.
    - Trenches shall be re-filled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimise erosion.

(ii) Drilling and Jackhammering

- The Contractor/s shall ensure that no pollution results from drilling operations, either as a result of oil and fuel drips, or from drilling fluid. The Contractor/s shall take all reasonable measures to limit dust generation and noise as a result of drilling operations.

- Any areas or structures damaged by the drilling and associated activities shall be rehabilitated by the Contractor/s to the satisfaction of the IEO and Resident Engineer.
- The Contractor shall submit a Method Statement detailing his proposals to prevent pollution during drilling operations.

(iii) Borrow Pits

- If borrow pits are required, the Engineer need to obtain approval from the DEA.
- A Method Statement shall be required in this regard.

3.2.5 Fencing

- It is important that works be conducted within a limited area to facilitate control and to minimise impacts on the surrounding environment. The purpose of the fenced areas is to control construction and personnel activity within the designated areas, and limit unauthorised access.
- Where deemed necessary by the IEO or RE, sensitive areas shall be fenced off by the Contractor. Fencing shall be enclosed with hessian or natural colour netting of at least 2m high, as to blend in with the surrounding environment.
- Fences will be constructed around Heritage resources (should these be present) to prevent access into such areas during construction.
- No unauthorised pedestrian or vehicular access shall be allowed into fenced, off-limit areas.
- If fencing is removed temporarily for the execution of work, the Contractor shall reinstate it as soon as practicable. Until re-instatement, the contractor shall demarcate the working area by surrounding it with danger-tape marking.
- Breaches in the fencing must be repaired immediately.
- The Contractor to the satisfaction of the RE and IEO shall erect and maintain all fencing. Such fences shall be erected before the start of any construction works.

3.2.6 Access Routes

- The movement of plant and workmen shall be restricted to the construction areas and essential access routes. The choice of access routes, which shall need the approval of the IEO and Project Engineer shall where possible, be existing routes. The Contractor/s shall control the movement of all vehicles and plant machinery so that they remain on designated/demarcated routes.
- Only if absolutely necessary will new routes (temporary or permanent) be allowed, but should be planned in consultation with the IEO and Project Engineer, constructed and maintained in such manner not to cause any harm or damage to the natural environment or be of any

nuisance to the affected community. Temporary roads should be rehabilitated soon after their purpose has expired and should be done in a manner as approved by the IEO.

- Special care should be taken to prevent spillages on the roads. Vehicles should be equipped with drip trays to prevent oil and fuel spillages. In the event of spillages, it should be reported to the IEO and Resident Engineer immediately and cleaned as soon as possible.
- The speed limit for light vehicles is 40 km/h and for heavy vehicles 20 km/h. No vehicles are to leave or reverse off designated access roads unless at areas previously agreed to with the Project Engineer or ECO.
- Notices should be placed on visible locations in the vicinity of the construction site to warn public of construction activities and indicating that heavy vehicles may be using the road. Failure to maintain road signs, warning signs or flicker lights, etc., in a good condition shall constitute ample reason for the Project Engineer to suspend the work until the road signs, etc., have been remedied to his satisfaction.
- During construction of roads the Contractor/s shall protect all areas susceptible to erosion by installing all necessary temporary and permanent drainage works as soon as possible.

3.2.7 Clearing and Grubbing for Construction Purpose

Clearing should first be discussed with the IEO, ESO and RE before commencement. Within the site the Contractor shall take steps to protect all property, landscaping, vegetation and soil not directly affected by the works and shall ensure that no avoidable damage or disturbance is caused, and that no erosion is allowed to occur. The ESO shall identity and confirm with the IEO certain areas within the vicinity that are to be protected.

(i) Plant Location and Rescue

- The location and rescue of endemic plants, and their transfer to a specified location shall be conducted by a suitably qualified ecologist prior to the onset of any site clearing operations. Important plant species in terms of their conservation status are attached in Appendix H.
- Where possible direct transplantation of rescued plant material, into areas earmarked and prepared for revegetation, shall occur. Transplantation shall only occur in areas of similar habitat and soil type from which rescued plant material originates.
- Where direct transplantation is not feasible, plant material shall be moved to a nursery for transplantation once the permanent revegetation areas become available.
- Rescued plants, which are to be stockpiled at a nursery, shall be stored under damp shade cloth/hessian until they are transported to these sites. They shall be watered and bagged in the topsoil from the area.

(ii) Vegetation Clearance

- All cleared areas shall be stabilised as soon as possible. Areas that are, in the opinion of the IEO, less stable, shall be stabilised immediately following vegetation clearance.
- All alien vegetation species (see attached Appendix I) situated within the footprint of the proposed project should be removed. Vegetation not to be removed (i.e. indigenous and protected species - see attached Appendix H) shall be identified and marked by a suitably qualified ecologist.
- Vegetation should preferably be cleared manually making use of labourers. Care shall be taken to minimise the disturbance to topsoil during this process. The use of herbicides is prohibited unless approved by the IEO.
- The Contractor shall ensure that the clearance of vegetation is restricted to that required to facilitate the execution of the construction works.
- The disposal of vegetation by burying or burning is prohibited. Stockpiling of cut vegetation shall only be permitted in areas indicated by the Project Engineer and/or the IEO.
- The Contractor shall stabilise soil in unstable areas in order to control wind-blown dust and erosion.

(iii) Conservation of Topsoil

- Where necessary topsoil (an approximately 300mm layer) shall be removed from areas to be disturbed during construction and stockpiled for rehabilitation purposes.
- The Contractor shall at all times carefully consider what machinery is appropriate for the task while minimising the extent of environmental damage.
- Topsoil is to be handled twice only – once during clearing and stockpiling & once during rehabilitation.
- Topsoil stockpiles shall not be subject to compaction greater than 1500 kg/m² and shall not be pushed by a bulldozer for more than 50m. Stockpiles shall be monitored regularly to identify any alien plants (see attached Appendix I), which shall be removed when they germinate to prevent contamination of the seed bank.
- Appropriate measures, as agreed with the Project Engineer, shall be taken to protect topsoil stockpiles from erosion by wind or water by providing suitable storm water and cut off drains, containment using hessian or similar material and/or by establishing suitable temporary vegetation. Stockpiles shall not be covered with materials such as plastic that may cause it to compost or would kill the seed bank.
- No vehicles shall be allowed access onto the stockpiles after they have been placed.
- The Contractor shall be held responsible for the replacement, at his/her own cost, for any unnecessary loss of topsoil due to his failure to work according to the requirements of this CEMP.

3.2.8 Stockpiling

- The ECO will identify suitable sites for stockpiling.
- Stockpiles shall be convex in shape, shall be no higher than 2m and shall be located so as to cause minimal disturbance. Stockpiles shall be so placed to occupy minimum width compatible with the natural angle of repose of 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 is itself washed away.
- Top material stockpiles shall not be covered with any material (e.g. plastic) that may kill seeds or cause it to compost. If the stockpiles start to erode significantly or cause dust problems, they shall be covered with hessian. Where practical, top material shall not be left for longer than eight months before being used for rehabilitation. If stored for longer than eight months, the top material shall be analysed and, if necessary, upgraded before placement.

3.2.9 No-Go Areas

- All areas outside the demarcated working areas and construction camps as well as areas on the site identified as sensitive by the ECO, are ‘no go’ areas.
- No unauthorised entry, stockpiling, dumping or storage of equipment or material shall be allowed outside the demarcated work areas and contractor camps.

3.2.10 Protection of Natural Features

- The Contractor shall not deface, paint, damage or mark any natural features situated in or around the sites for survey or other purposes unless agreed beforehand with the IEO.
- Any features affected by the Contractor in contravention of this clause shall be restored/ rehabilitated to the satisfaction of the IEO.

3.2.11 Protection of Indigenous Fauna and Flora

- Flora shall not be removed, damaged or disturbed nor shall any vegetation be planted without authorisation.
- No herbicides, pesticides and other poisonous substances are allowed to be used and/or stored on-site.
- The Contractor shall ensure that no hunting, trapping, shooting, poisoning or otherwise disturbance of any fauna takes place.
- The feeding of any wild animals is prohibited.

- Collecting of wood and/or killing trees in the area for the purpose of fire wood is prohibited.
- No removing of birds' nests or eggs allowed.
- No collection of fruit or seeds allowed.
- The protected species of trees situated around the sites and within and along any river bank (within 100m from river) shall also be deemed as off limits for all staff.
- Important plant species in terms of their conservation status are attached in Appendix H.

3.2.12 Erosion and Sedimentation Control

- During construction works, the Contractor shall protect all areas susceptible to erosion and siltation by installing the necessary drainage or retaining works and by taking other measures necessary to prevent the surface water from being concentrated in streams and from scouring the stream banks and depositing silt outside the demarcated work areas.
- Any runnels or erosion channels developed during construction or during the defects liability period shall be backfilled and compacted, and the areas restored. Stabilisation of cleared areas to prevent and control erosion shall be actively managed. Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised areas shall be repaired and maintained to the satisfaction of the Engineer.
- Anti-erosion compounds shall consist of an organic or inorganic material to bind soil particles together and shall be a proven product able to suppress dust and erosion. The method of stabilisation shall be determined in consultation with the Engineer and IEO. Consideration shall be made to make use of mechanical covers or packing structures, e.g. gabions and mattresses, geofabric, hessian cover, armourflex, log/pole fencing and retaining walls.

3.2.13 Landscaping and Rehabilitation

- On completion of the construction phase, the Contractor shall ensure that all structures, equipment, materials, waste, rubble, notice boards and temporary fences used during the construction operation are removed with minimum damage to the immediate and surrounding area. The Contractor shall clean and clear the site to the satisfaction of the IEO.
- Any areas that the IEO believes may have been impacted upon or disturbed shall be rehabilitated to his/her satisfaction, which includes all areas where top material has been stripped (this excludes the permanent WWTPs and associated ablution facilities). The area/s to be rehabilitated shall first be landscaped to match the topography of the surrounding area as it was prior to construction. The composition of vegetation to be used for any rehabilitation shall be as per the specifications from a suitably qualified Ecologist.
- All rehabilitated areas shall be considered "no go" areas and the Contractor shall ensure that none of his staff or equipment enters these areas. The Contractor shall undertake to remove

all alien vegetation re-establishing on the area and shall implement the necessary temporary or permanent measures to combat soil erosion.

- For all rehabilitation work, only plants approved by a suitably qualified Ecologist may be used. No declared invasive alien species may be used (refer to Appendix I).

3.2.14 Protection of Archaeological and Paleontological Remains

- Archaeological sites are protected by the National Heritage Act No 27 of 2004. It is an offence to disturb, destroy or remove from its original site any archaeological material, or excavate any such site without permission.
- The Contractor shall take reasonable precautions to prevent any person from removing or damaging any fossils, coins, articles of value or antiquity and structures and other remains of archaeological interest discovered on the Site, immediately upon discovery thereof and before removal.
- If an archaeological site or remains (i.e. fossils, coins, articles of value or antiquity) is discovered during any construction activity, the work is to be halted and the "chance finds" procedure are to be followed.
- The "chance finds" procedure covers the actions to be taken from the discovery of a heritage site or item, to its investigation and assessment by a trained archaeologist or other appropriately qualified person. This process involves the following:
    - Procedure:
      Action by person identifying archaeological or heritage material:
      a) If operating machinery or equipment stop work;
      b) Identify the site with flag tape;
      c) Determine GPS position if possible;
      d) Report findings to ESM.

    - Responsibility:

Contractor	To exercise due caution if archaeological remains are found.
ESM	To secure site and advise management timeously.
RE	To determine safe working boundary and request inspection.
Archaeologist	To inspect, identify, advise management, and recover remains.

- The Project Engineer and IEO should be notified immediately, who shall contact the Namibian Heritage Council. Only after the site has been inspected by an Archaeologist other appropriately qualified person will the Contractor be allowed to continue.
- The Contractor will be required to abide by the specifications as set out by the Namibian Heritage Council or the heritage specialist appointed to investigate the find. The Contractor may not, without a permit issued by the relevant heritage resources authority, destroy damage, excavate, alter, deface or otherwise disturb archaeological material.

- The Project Engineer and IEO are to be kept informed of all developments in the event where modifications are made to the clearing or earthworks schedule.

+3.2.15 Safety

- Relevant occupational Health and Safety requirements shall be adhered to. Telephone numbers of emergency services, including the fire safety officer, shall be displayed conspicuously in the Contractor's office near a telephone. No firearms are permitted.
- Staff must be made aware of their responsibilities to ensure that impacts such as fire, safety and pollution are taken care of. This must form part of the Environmental Education. The movement of construction workers must be controlled and access to adjacent properties must be prohibited.
- The contractor’s personnel must be adequately trained and informed in the tasks that they are expected to perform. This is required for their own safety as well as the safety of colleagues and other interested and/or affected parties.
- All excavated areas and/or holes should be clearly demarcated.

3.2.16 Fire Control

- No fires may be lit except if approved by the Project Engineer or ECO, and in properly prepared facilities approved by the ECO. Fires shall be kept small and appropriate to their function.
- The Contractor shall ensure that the fire risk on and near the site is reduced to a minimum and shall take immediate and effective steps to extinguish any fire that may break out.
- All costs relating to damage by fire caused by the Contractor will be for the Contractor’s cost. No collection of firewood allowed.
- Smoking is only permitted in designated smoking areas. .Appropriate signage shall be erected in these areas. A container filled with sand and a dedicated fire extinguisher must be available at the smoking area.
- In terms of the Atmospheric Pollution Prevention Act (No. 45 of 1965), burning is not permitted as a disposal method.
- The Contractor shall take all reasonable steps to prevent the accidental occurrence or spread of fire. The Contractor shall appoint a fire officer who shall be responsible for ensuring immediate and appropriate action in the event of a fire. The Contractor shall ensure that all site personnel are aware of the procedure to be followed in the event of a fire. The appointed fire officer shall notify the Engineer and IEO in the event of a fire and shall not delay doing so until such time as the fire is beyond his/her control.
- The Contractor shall ensure that there is basic fire-fighting equipment on site at all times. This

equipment shall include fire buckets, fire extinguishers and fire beaters.

3.2.17 Emergency Procedures

The Contractor's procedures for the following emergencies shall include:

(i) Fire

- The Contractor shall inform all relevant parties of a fire as soon as one starts and shall not wait until it can no longer be controlled.
- The Contractor shall ensure that his employees are aware of the procedure to be followed in the event of a fire.

(ii) Accidental Leaks and Spillages

- The Contractor shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the IEO and Resident Engineer.
- The Contractor shall ensure that the necessary materials (e.g. chemcap, spill-sorb, drizzat pads, enretech and peat moss) and equipment for dealing with spills and leaks are available on Site at all times.
- The source of the spillage shall be isolated. The Contractor shall contain the spillage using sand berms, sandbags, pre-made booms, saw dust or absorbent materials. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the IEO and Resident Engineer.

3.2.18 Community Relations

- The Contractor shall erect and maintain information boards in the position, quantity, design and dimensions specified. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the Engineer.
- The Contractor shall also keep a "Complaints Register" on Site. The Register shall contain all contact details of the person who made the complaint, and information regarding the complaint itself.

3.2.19 Construction Personnel Information Posters

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 the specifications. Such posters shall be erected at the eating areas, 'no go' areas and any other locations specified by the Resident Engineer and/or IEO.

3.2.20 Temporary Site Closure

If any of the sites are closed for a period exceeding one week, the following checklist procedure shall be carried out by the Contractor in consultation with the IEO and Resident Engineer. Contractor's Safety Officers (in terms of the relevant Occupational Health and Safety Act) to check the Site and report.

(i) Fuels/flammables/hazardous materials stores

- Ensure fuel stores as low in volume as possible.
- No leaks.
- Outlet secure/locked.
- Bund empty (where applicable).
- Fire extinguishers serviced and accessible.
- Secure area from accidental damage, e.g. plant collision.
- Emergency and contact numbers to be available and displayed.
- Adequate ventilation.

(ii) Safety

- All trenches and manholes secured.
- Fencing and barriers in place as per the relevant Occupational Health and Safety Act.
- Notice boards applicable and secured.
- Emergency and management contact details displayed.
- Security persons briefed and have facility for contact.
- Fire hazards identified.
- Scaffolds secure.
- Inspection schedule and log by security staff.

(iii) Erosion and Siltation

- Wind and dust mitigation in place.
- Stockpiles at stable angle.
- Erosion protection measures in place.

(iv) Water Contamination and Pollution

- Fuels hazardous stores secure.

- Cement and materials stores secured.
- Toilets empty and secured.
- Refuse bins empty and secured (lids).
- Bunding clean and treated.
- Drip trays empty and secure (where possible).
- Structures vulnerable to high winds secure.

3.3 MATERIALS

3.3.1 Hazardous Substances

Petroleum, chemicals, harmful and hazardous waste shall be stored in an enclosed and bunded area at the main construction camp. This area shall be subject to the approval of the Project Engineer and IEO. The waste shall be disposed of at a Hazardous Waste Disposal Site.

3.3.2 Handling, Use and Storage of Construction Materials

- The Contractor shall ensure that delivery personnel are informed of all procedures and restrictions (including 'no go' areas) required to comply with the Specifications. The Contractor shall ensure that delivery personnel are supervised during offloading by someone with an adequate understanding of the requirements of the Specifications.
- Materials shall be appropriately secured to ensure safe passage between destinations.
- Loads including, but not limited to sand, stone chip, cement and refuse, shall have appropriate cover to prevent them spilling during transit.
- The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.
- All manufactured and/or imported material shall be stored within the contractor's camps, and, if so required, out of the rain. All lay down areas outside of the contractor's camps shall be subject to the IEO's approval, which shall not unreasonably be withheld.

(i) Importation of Fill/Soil/Sand Materials

- Imported materials shall be free of weeds, seeds, litter and contaminants.
- Sources of imported material shall be listed and approved by the Resident Engineer.
- Stockpile areas will be identified by the Resident Engineer and agreed upon by the IEO before any stockpiling commences.

(ii) Topsoil

- The top 300mm of topsoil must be stripped before any grading or bulk earthworks begin and stockpiled separately for use in rehabilitation. Topsoil may not be compacted or covered in any way during stockpiling.
- Topsoil shall be stockpiled in the area where it was removed and should be used again in the vicinity where it was removed.

(iii) Spoil Material

- The location of spoil stockpiles shall be identified by the Resident Engineer and agreed upon by the IEO prior to any stockpiling.
- No spoil material shall be dumped outside the defined site unless it is being removed from the site, as approved by the IEO and Resident Engineer.
- Spoil stockpiles shall be convex and should not exceed 2m in height. The Contractor shall ensure that the spoil material does not blow or wash away. If it is in danger of being washed or blown away, the Contractor shall cover it with a suitable material, such as hessian or plastic.

3.4 CONSTRUCTION PLANT

3.4.1 Fuel and Oil

If so required, fuel should be stored at the main construction camp in a depot complying with the requirements listed below. Where reasonably practical, construction vehicles and equipment shall be refuelled at the depot or at the workshop as applicable. The surface under the refuelling area shall be protected (bunded) against pollution to the satisfaction of the Resident Engineer and IEO prior to any refuelling activities.

Should it be the intention to use the existing fuel depot at the Property for this purpose, the conditions of the underground tanks should first be inspected and signed-off as complying with National Standards and Requirements, before it is used.

The Contractor shall ensure that there is always a supply of absorbent material (e.g. chemcap, spill-sorb, drizzat pads, enretech and peat moss) readily available to neutralise and where possible be designed to encapsulate minor spillage. The quantity of such materials shall be able to handle a minimum of 200L of liquid spill.

(i) Fuel Storage Areas

- The IEO and Resident Engineer shall be advised of the area that the Contractor intend using for the storage of fuel. Fuels shall be stored at a suitable location inside the main construction camp.

- Fuel shall be stored in steel tank/s supplied and maintained by the fuel suppliers. Tank/s shall be adequately bunded capable of holding 120% of the volume of the tank/s and sloped towards a sump to contain any spillages of substances. The floor and wall of the bund area shall be impervious concrete to prevent infiltration of any spilled and/or leaked fuel, oil or hazardous substance into the soil.
- The bund shall be inspected and emptied daily, and serviced when necessary. The bund shall be closely monitored during rain events to ensure that it does not overflow.
- The fuel storage area must not be located near (i.e. less than 250m) any water resource, including a river, stream or surface water body, or borehole.
- The Contractor shall keep fuel under lock and key at all times. No smoking shall be allowed in the vicinity (30m) of fuel tanks.
- The Contractor shall educate workers on the appropriate methods for workshop maintenance and fuel points to prevent fuel and oil being washed out of containment areas.
- Only empty and externally clean tanks may be stored on the bare ground. All empty and externally dirty tanks shall be sealed and stored on an area where the ground has been protected. In addition, if fuel is dispensed from 200L drums, 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 storage tank shall be stored in a waterproof container when not in use.
- Symbolic safety signs depicting “No Smoking”, “No Naked Lights” and “Danger” are to be provided, and are to conform to the requirement of SABS 1186.
- The product contained within the tank shall be clearly identified; using the emergency information system detailed in SABS 0232 part 1.
- Any electrical or petrol-driven pump shall be equipped and positioned, so as not to cause any danger of ignition of the product.
- Areas for storage of fuels and other flammable materials shall comply with standard fire safety regulations and may require the approval of the fire safety officer.
- The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel stores and that staff are adequately trained to use this equipment.

(ii) Fuel Storage Tanks

Temporary above ground storage tanks may be permitted at the discretion of the IEO and Resident Engineer based on the merit of the situation, provided that the following requirements are met:

- All such tanks are to be designed and constructed in accordance with a recognised Act and code (Petroleum Product and Energy Act, No. 13 of 1990, as amended).
- The rated capacity of such a tank shall provide sufficient capacity to permit expansion of the

product contained therein by the rise in temperature during storage.

- The tank shall be erected at least 3.5m from buildings, boundaries and any other combustible or flammable materials.
- Adequate precautions shall be provided to prevent spillage during the filling of any tank.
- Soil contaminated by oil, fuel or chemicals shall be removed and disposed of at a registered Hazardous Waste Disposal Site or rehabilitated in-situ.
- If larger capacity tanks are required then an acceptable rational design based on a relevant national or international code or standard shall be submitted to the Directorate Energy, Petroleum and Downstream (Ministry of Mines and Energy).

3.4.2 Ablution Facilities

Washing, whether of the person or of personal effects and acts of excretion and urination are strictly prohibited other than at the designated facilities provided. The Contractor shall provide suitable sanitary arrangements within the boundaries of the construction camps or within walking distance (±200m) from where construction activities are taking place.

The exact location of the facilities shall be approved by the IEO and Resident Engineer prior to establishment. All temporary portable toilets shall be secured to the ground to prevent them toppling due to wind or any other cause.

Toilets supplied by the Contractor for the workers shall occur at a maximum ratio of 1 toilet per 15 workers and be within walking distance of the staff. These facilities shall be maintained in a hygienic state and serviced regularly. Toilet paper shall be provided. The Contractor shall ensure that toilets are emptied regularly, as well as before the builders' holidays. The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from Site. Discharge of waste from toilets into the environment is prohibited.

3.4.3 Eating Area

Eating areas should be within the boundaries of the construction camp as agreed with by the IEO. Temporary eating areas (i.e. outside the construction camp) would require very strict requirements and control and would only be allowed once approved by the IEO.

The Contractor shall provide adequate refuse bins at the eating area (i.e. permanent or temporary eating areas) to the satisfaction of the IEO and shall ensure that all eating areas are cleaned on a daily basis. Collected waste shall be stored in a central waste area at the main construction camp and disposed of at the local solid waste site on a regular basis. Waste receipts in this regards should be kept on site.

Waste bins at the eating areas should have scavenger proof lids and not left overnight, but removed to the main construction camp on a daily basis.

Cooking of food shall be done using gas cookers only and within the main construction camp only. Cooking with wood is strictly prohibited. No fires may be lit except if approved by the Engineer or IEO, and in properly prepared facilities approved by the Engineer.

3.4.4 Solid Waste Management

No burying or dumping of any waste materials, rubble or refuse shall occur on Site. The Contractor shall set up a solid waste control and removal system at the main construction camp and waste shall be disposed of at the local solid waste site on a regular basis. Waste receipts in this regards should be kept on site.

Waste bins at the eating areas should not be left overnight, but removed to the solid waste control and removal system at the main construction camp on a daily basis.

The accumulation of construction waste materials must be avoided as far as possible. The system shall comply with the following detailed requirements:

(i) Dumping

- Receipts for hazardous waste disposal shall be copied to the IEO and Engineer.
- Refuse must be disposed of at an authorised municipal landfill site.
- The Contractor shall make provision for workers to clean up the camps and working areas on a daily basis.

(ii) Recycling

- Wherever possible, materials used or generated by construction shall be recycled.
- Containers for glass, paper, metals and plastics (a four bin recycling system) shall be provided at the main construction camp.
- Where possible and practical, such as at stores and offices, waste shall be sorted for recycling purposes.

3.4.5 Waste Water Management

The Contractor shall set up a contaminated water management system, which shall include collection facilities to be used to prevent pollution, as well as suitable methods of disposal of contaminated water to fit into the larger wastewater management system. The Contractor shall prevent the discharge of water contaminated with any pollutants, such as soaps, detergent, cements, concrete, lime, chemicals, glues, solvents, paints and fuels, into the environment. The Contractor shall notify the IEO and Resident Engineer immediately of any pollution incidents on Site.

Water from kitchens, showers, sinks, etc. shall be discharged into a conservancy tank for removal from Site. Runoff from fuel depots/workshops/truck washing areas and concrete swills shall be

directed into a conservancy tank and disposed of at an approved municipal hazardous waste site.

Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. This includes, but is not limited to; concrete batching areas, vehicle washing, workshop wash bays, paint wash and cleaning. Wash areas for domestic use at the main construction camp shall ensure that the disposal of contaminated water is sanctioned by the IEO.

3.4.6 Workshop, Equipment Maintenance and Storage

Where practical, all maintenance of plant and equipment on Site shall be performed in the workshop situated at the main construction camp. If it is necessary to do maintenance outside of the workshop area, the Contractor shall obtain the approval of the IEO prior to commencing activities.

All plant and equipment shall be kept in good working order and serviced regularly. Equipment shall be removed immediately from the Site and repaired. When the Contractor carries out emergency plant maintenance, it is essential that there is no pollution to the environment. This will be overseen by the IEO and Resident Engineer.

The workshop shall have a smooth impermeable concrete floor, which is bunded and sloped towards an oil trap to contain any spillages. When servicing equipment, drip trays shall be used to collect the waste oil and other lubricants. The floor shall be bunded and sloped towards an oil trap or sump to contain any spillages of substances (e.g. oil). Drip trays shall also be provided in construction areas for stationary plant (such as compressors and generators) and for "parked" plant (such as scrapers, loaders, vehicles). 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.

All washing shall be restricted to a minimum. If essential, washing must be undertaken in the workshop or maintenance areas. The use of detergents for washing shall be restricted to low phosphate and nitrate containing and biodegradable-type detergents. Runoff should be collected, contained and disposed of at an approved municipal hazardous waste site.

(i) Drip Trays and Bunding

- All plant or machinery, which includes but is not limited to generators, pumps, compressors, drill rigs, static plant, shall have drip trays strategically placed to catch incidental spills.
- Drip trays shall be inspected and emptied daily, and serviced when necessary. Drip trays shall be closely monitored during rain events to ensure that they do not overflow.
- All repairs done on machinery using hydrocarbons as fuels or lubricants shall have a drip tray placed strategically to avoid incidental spillage.
- All static plant (stationary >6 months) shall be located within a bunded area.

3.4.7 Noise

Construction activities can cause environmental noise pollution. A disturbing noise is one that exceeds the zone sound level or the ambient sound level by 7 dB or more. A noise nuisance is defined as meaning “any sound that disturbs or impairs or may disturb or impair the convenience or peace of persons”. This includes the use of power tools, movement of vehicles, etc.

The Contractor shall limit noise levels (e.g. install and maintain silencers on machinery). Appropriate directional and intensity settings are to be maintained on all hooters and sirens. No amplified music shall be allowed on Site. The use of radios, compact disc players and television sets shall not be permitted unless the volume is kept sufficiently low.

Where excess noise generation is unavoidable, the Contractor shall, by means of barriers, effectively isolate the source of any such noise in order to comply with the said regulations.

The Contractor shall not use sound amplification equipment on Site unless in emergency situations.

Limit construction times to the following hours:

- 07:00 to 18:00 during the week (Monday to Friday);
- 08:00 to 17:00 on Saturdays, and
- No noisy activities on a Sunday.

Should blasting be required during the construction phase, the necessary permits must be obtained from the local authority and any other relevant authority.

The contractor must comply with all applicable occupational health and safety requirements.

Blasting times must be limited to the hours from 08:00 to 17:00 during weekdays only.

3.4.8 Dust

The Contractor shall take all reasonable measures to minimise the generation of dust as a result of construction activities to the satisfaction of the Engineer and IEO.

The Contractor’s dust management planning shall, as a minimum, take cognisance of the following:

- Speed limits for vehicles on unpaved roads and minimisation of haul distances. The speed limit for light vehicles is 40 km/h and for heavy vehicles 20 km/h.
- Measures to ensure that material loads are properly covered during transportation.
- Minimisation of the areas disturbed at any one time and protection of exposed soil against wind erosion.
- Location and treatment of material stockpiles taking into consideration prevailing wind directions and location of sensitive receptors.

- Controlled blasting techniques to minimise dust and fly rock during blasting.
- Reporting mechanism and action plan in case of excessive wind and dust conditions.
- Removal of any vegetation shall be avoided as far as possible, while handling and transport of erodible materials shall be avoided under high wind conditions.
- During high wind conditions, the IEO or Resident Engineer will evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level. Where possible, stockpiles shall be located in sheltered areas. Where erosion of stockpiles becomes a problem, erosion control measures shall be implemented at the discretion of the IEO and Resident Engineer.
- Appropriate dust suppression measures shall be used when dust generation is unavoidable.

3.4.9 Lights

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 the surrounding community or other users of the area.

3.4.10 Site Structures

All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on users of the area and the size of area disturbed. The type and colour of roofing and cladding materials to the Contractor's temporary structures shall be selected to reduce reflection.

3.4.11 Groundwater

The abstraction of groundwater for use during the construction phase should precede an approval from Water Affairs with the Ministry of Agriculture, Water and Forestry and NamWater.

3.5 POST CONSTRUCTION

3.5.1 Ripping of Compacted Soil

All areas where soil has been compacted due to construction activities must be ripped in two perpendicular directions to a depth of 0.15m.

3.5.2 Site Rehabilitation

The site must be cleared of all construction equipment, waste and associated materials by the end of the construction phase of the project.

Areas that were cleared for construction purposes such as the contractor's camp should be restored to its original condition.

Stockpiled topsoil and indigenous vegetation should be used for all rehabilitation purposes. The rehabilitation plan must ensure that erosion by runoff water does not occur.

3.6 MEASUREMENT AND PAYMENT

No separate measurement and payment will be made to cover the costs of complying with the CEMP 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.

3.7 MITIGATION MEASURES AND PROPOSED MANAGEMENT PROGRAMME

The table below outlines those specific mitigation measures required in order to fulfil the recommendations. These measures must be implemented during the construction phase (including future construction). The responsibility for these measures is included in Column IV.

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
PLANNING & DESIGN				
Contractor Requirements	Ensure that the Contractor is aware of his/her responsibility.	Provide the contractor with the EMP.	Proponent	
Environmental Site Manager (ESM)	Ensure that activities on site are compliant with the requirements of the EMP.	Appoint an independent Environmental Site Manager to oversee environmental aspects of the development.	Proponent	
Visuals & Aesthetics	Ensure that the visual aspects of construction are taken into consideration to lessen impacts on neighbouring activities. Refer to Section 7.4.1.4 of the Scoping Report for mitigation measures to be implemented.	Keep natural vegetation for screening of construction site and activities. Restrict structures and their height on site to a maximum of 3 meters. Structures should be painted in natural colours. Keep the construction site tidy and clean. Limit construction vehicle movement and use designated pre-demarcated routes.	Proponent Contractor	
Waste Management	Ensure the effective and efficient separation, storage and removal of waste from the site. Refer to Section 7.4.1.2 of the Scoping Report for mitigation measures to be implemented.	Develop a Waste Management Plan for the Construction Phase which will detail: - Appropriate waste containers. - Schedules for collection - Responsible parties for collection - Details regarding waste separation	Proponent Engineer	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
		(hazardous vs. general) - Provision of facilities for the separation and storage of waste - Details regarding the disposal of the waste (hazardous and general) - Assigns responsibilities for these activities		
Loss of habitat/eco-systems	Conserve indigenous vegetation, especially trees along the drainage line towards the Fish River. Refer to Section 7.4.1.3 of the Scoping Report for mitigation measures to be implemented.	Pre-construction Vegetation Survey must be undertaken. Construction Site locality and lay-out must be well planned and ESM must be involved. Avoid removal of indigenous/protected vegetation species. Refer to Appendix H. Incorporate indigenous/protected species in township lay-out. A Permit is required for the removal of Protected plant species. Construction vehicle movement must be restricted. A Rehabilitation Plan should address all aspects of the natural environment.	Contractor Environmental Site Manager	
SITE ESTABLISHMENT				
Construction	Ensure that there is no unnecessary disturbance to	A layout plan for construction activities needs to be developed and approved by	Engineer	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
activities	areas on the site and that construction activities take environmental considerations into account.	the Environmental Site Manager.	Contractor	
Contractor's Camp	Ensure that the contractor's camp does not pollute the environment and is not located on a sensitive site.	Staff facilities, ablutions, chemical toilets, potable water must be provided for the staff.	Contractor	
	Ensure that camp does not infringe on adjacent property owners.	Locate the camp away from immediately adjacent property owners.	Contractor	
Soil	Ensure preservation of the top soil.	Top soil stockpiles must be established in disturbed zones.	Contractor	
	Ensure that erosion impacts and siltation is kept under control.	Areas scheduled for construction should be cleared only 1 week prior to construction.	Contractor	
Training	Improve the awareness of all construction personnel with regard to environmental matters.	Develop and implement a training programme to address environmental issues and responsibilities.	Contractor Environmental Site Manager	
CONSTRUCTION				
Environmental Site Manager	The Contractor must appoint an Environmental Site Manager to ensure implementation of the CEMP and that there is	The Environmental Site Manager must manage all aspects of the CEMP during the construction phase.	Contractor Environmental Site Manager Independent	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
	compliance with the it on site.		Environmental Officer	
Archaeological Evidence	Ensure the protection of archaeological sites. Refer to Section 7.4.1.6 of the Scoping Report for mitigation measures to be implemented.	Caution should be exercised during the construction phase in the event that archaeological / heritage remains are discovered during the excavations. The Environmental Site Manager should receive training by a suitably qualified archaeologist with respect to the identification of archaeological / heritage remains and the procedures to follow in the event that such remains are discovered. Any archaeological materials find should be reported to the Environmental Site Manager and the National Monuments Council, and all on-site activities stopped immediately. A professional archaeologist should be consulted if any archaeological remains are uncovered. Details with regards to the Chance Find Procedure must be followed.	Contractor Environmental Site Manager Archaeologist	
Borrow Pits	Ensure that the soil resources are not over exploited.	No borrow pit may be excavated from any sensitive or open space areas.	Contractor &	
Blasting	If blasting should take place, ensure blasting does not pose a	Authorisation to undertake blasting activities must be obtained from the	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
	danger to workers, staff or neighbouring residences.	relevant authority.		
		All conditions relating to blasting and the Occupational Health & Safety Act must be complied to.	Contractor	
Cleaning of equipment	Ensure that no contamination of ground- or surface water takes place. Refer to Section 7.4.1.2 of the Scoping Report for mitigation measures to be implemented.	Ensure that oil/ fuel spillages from construction vehicles and machinery are appropriately dealt with. Drip trays must be placed underneath construction vehicles when not in use. Fuel tanks must be bunded to 120% of the capacity of the tank. Washing of personnel or any equipment are not allowed on site. Should it be necessary to wash construction equipment these should be done at an area properly suited and prepared to receive and contain polluted waters. These polluted waters should be transported and disposed at a waste site for hazardous materials..	Contractor	
Communication	Ensure that interested and affected parties are provided with a medium through which to lay complaints with regard to	The IEO needs to be informed of all complaints and corrective action must be taken where required. A complaints register should be kept in	Contractor Environmental Site Manager	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
	activities on site.	the site office.	IEO	
Contaminated Soil	Ensure that soils that are contaminated do not pollute the environment. Refer to Section 7.4.1.2 of the Scoping Report for mitigation measures to be implemented.	All soils that have been contaminated by fuel spills, paints spills, etc. must be appropriately removed from the site to an approved and appropriately classified waste disposal site.	Contractor	
Contractor's camp	Ensure that the contractor's camp is secure.	All materials and equipment that can be moved must be stored overnight in the contractor's camp.	Contractor	
Dust	Ensure dust does not cause nuisance to neighbouring activities. Refer to Section 7.4.1.5 .1 of the Scoping Report for mitigation measures to be implemented.	Regular dust suppression, if required, during times of strong winds, should minimise dust impacts mainly with respect to the contractor's staff. Dust suppression by means of wetting should only be done with treated wastewaters. Removal of vegetation should be restricted to the minimum. Construction activities during high winds should be limited to those activities not generating dust. Handling and transport of erodible materials should be avoided under high wind conditions. Where possible, topsoil stockpiles should	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
		be located in sheltered areas and covered. Appropriate dust suppression measures should be used when dust generation is unavoidable particularly during prolonged dry periods in summer. Such measures shall also include the use of temporary stabilising measures. The contractor's personnel are to be provided with access to dust masks		
Ground Water	Prevent the contamination of groundwater resources. Refer to Section 7.4.1.2 of the Scoping Report for mitigation measures to be implemented.	Storage of any material or substance that may cause pollution to water sources should be safely handled and stored in accordance with appropriate legislation. Contractor should submit a Method Statement for the purpose of handling and storage of hazardous materials on-site. A Storm Water Management Plan should be drafted to be maintained for the duration of the construction time frame. Ensure proper maintenance of all construction vehicles and equipment, and conduct continues maintenance and check-ups. Draft and implement a Detailed Preparedness and Emergency Plan for all construction related spillages.	Contractor Environmental Site Manager	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
		Ensure that oil/ fuel spillages from construction vehicles and machinery are minimised and that where these occur, that they are appropriately dealt with. Drip trays must be placed underneath construction vehicles when not in use to contain all oil that might be leaking from these vehicles. All fuel tanks must be bunded to 120% of the capacity of the tank in order to contain any spillages that might take place. Washing of personnel or any equipment should not be allowed on site. Should it be necessary to wash construction equipment these should be done at an area properly suited and prepared to receive and contain polluted waters. These polluted waters should be transported and disposed at a waste site for hazardous materials. Proper training of construction personnel would reduce the possibility of the impact occurring.		
Loss of surrounding habitat and sensitive species	Prevent the destruction of protected, medicinal or sensitive plant species.	During the planning phase of the construction period, the appointed contractor should identify areas for lay down and construction vehicle sites within	Contractor Environmental Site Manager	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
	Refer to Section 7.4.1.3 of the Scoping Report for mitigation measures to be implemented.	areas that are already cleared or disturbed. Direct involvement of the Environmental Site Manager is a prerequisite in determining the locality of the construction site and final alignment. Construction activities should be subject to well-coordinated planning to avoid unnecessary removal of vegetation particularly protected plant species. Protected, medicinal and/or sensitive plants that are likely to be destroyed or affected by construction activities should be relocated to more suitable areas. Restrict construction vehicle movement to the site and restrict movement into the No-Go areas or beyond the construction site boundaries. Only prominent gravel tracks should be utilised during the construction phase. Off-road driving should be strictly prohibited. Unnecessary destruction of habitats within the footprint of the construction site and along the pipeline route alignment should be avoided. Conduct a Pre-construction Vegetation		

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
		Survey to establish protected/endangered species to be marked and incorporated into the Development. Identify and mark trees or other vegetation that should be protected and that should not be removed during construction. Avoid clear felling i.e. removal of indigenous trees/shrubs and grasses of the area prior to development. If required to remove indigenous trees introduce a policy of re-establishing (i.e. planting) 5 indigenous tree species for each indigenous species removed. Permits should be obtained for protected plant species that unavoidably need to be removed. Incorporate the protected species as well as some of the other bigger tree/shrub specimens in the overall final landscaping of the area. A Rehabilitation Plan should address all aspects of the natural environment on completion of construction and prior to operation. Eradicate and remove the invasive alien species, especially *Prosopis* and *Cactus*		

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
		species. No hunting, trapping, setting of snares or any other disturbance of any fauna species.		
Installation of Services	Implement adequate mitigating measures to curtail any erosion impacts. Refer to Section 7.4.1.1 of the Scoping Report for mitigation measures to be implemented.	Apply acceptable engineering standards and design, or Best Management Practices (BMP). Plan the timing of construction to avoid clearing and grading during erosive high rainfall months of the year. Avoid unnecessary and excessive vegetation clearance and disturbance of top soil. Ensure that all points for water provision are regularly inspected for erosion impacts. Contractor should draft a Rehabilitation Plan and re-vegetate exposed areas once construction at the particular area ceased. The Rehabilitation Plan should provide for a phased approached ensuring that no large area is exposed to natural elements (e.g. wind, water).	Contractor	
Installation of Services	Ensure that water used to wash machinery and any other “grey” water does not pollute the site.	Provide a wash bay with an impermeable floor to contain such water.	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
Litter	Ensure that the site remains clean and clear of litter.	All litter must be collected into rubbish bins located on the site. These bins must be regularly (i.e. weekly) collected and transported to a registered waste disposal facility.	Contractor	
Noise	Ensure that nuisance noise from construction activities does not disrupt the surrounding in residents / landowners. Refer to Section 7.4.1.5.2 of the Scoping Report for mitigation measures to be implemented.	Limit construction time to the following hours: 07:00 to 18:00 during week; 08:00 to 15:00 on Saturdays, and no noisy activities on Sundays.	Contractor	
		Jack hammering and blasting, if required, must take place between the hours of 08:00 and 17:00 during the week only.	Contractor	
		No heavy vehicles may be permitted to move on site on Sundays. Appropriate directional and intensity settings are to be maintained on all hooters and sirens. No amplified music should be allowed on Site. Inform immediate neighbours of construction activities to commence and provide for continues communication between the neighbours and Residents Engineer.	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
		The Contractor shall not use sound amplification equipment on Site unless in emergency situations. Screen construction activities from residential, social and business entities as far as reasonably possible. The World Health Organization (WHO) guideline limits noise levels to an average of 70 db over a 24 hour period with maximum noise levels not exceeding 110db during the period. All construction vehicles and machinery should be kept in good working condition. If any noise-related complaints are registered the applicable construction vehicles and machinery should be fitted with noise reduction devices. Personnel working in noisy environments must be issued with hearing protectors		
Road Works and Traffic	Ensure that soil does not erode from culverts or similar structures.	All culverts or similar structures must be stabilised with gabions and/or indigenous grasses.	Contractor	
	Ensure that local residents are not inconvenienced by the movement of construction vehicles off-site. Refer to Section 7.4.1.5.3 of the	The movement of heavy vehicles from the site must occur outside of peak traffic hours (after 08h30 and before 16h30).	Contractor	
		Spillages on the roads should be avoided. When these occur, they should be	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
	Scoping Report for mitigation measures to be implemented.	cleaned immediately.		
		Contractor's personnel should adhere to speed limits. Notices should be placed on the access roads during the construction period indicating that heavy vehicles are using the road. Drivers of construction vehicles should have valid driver's licenses with experience on proper road usage. Construction vehicles' need to be in a road worthy condition and maintained throughout the construction phase. Provide traffic signals and road markings where necessary to ensure safe traffic movement.	Contractor	
Safety & Security	Ensure the safety and security of staff and the public. Refer to Section 7.4.1.5.4 of the Scoping Report for mitigation measures to be implemented.	All local authority by-laws must be adhered to.	Contractor	
		All contractors must take cognisance of and abide by the Occupational Health and Safety Act.	Contractor	
		Trenches to a depth greater than 1.5 m must be supported or appropriate warning must be provided.	Contractor	
		Provided fencing needs to be checked	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
		and maintained.		
		The movement of construction workers through the neighbouring area should be restricted wherever possible. Ensure that all construction personnel are properly trained depending on the nature of their work. Provide for a first aid kit and properly trained person to apply first aid when necessary. A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases. Restrict unauthorised access to the site and implement access control measures. Clearly demarcated the construction site boundaries along with signage of no unauthorised access. Clearly demarcate dangerous areas and no go areas on site. Staff and visitors to the site must be fully aware of all health safety measures and emergency procedures. The contractor must comply with all applicable occupational health and safety	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
		requirements. The workforce should be provided with all necessary Personal Protective Equipment including earplugs. All affected inhabitants should be notified at least one month in advance who the appointed contractor is and provided with details about the proposed construction activities / timeline.		
Soil	Ensure that storm water cannot erode the top soil stockpile.	Construct and maintain a berm around top soil stockpiles.	Contractor	
Storage Facilities	Ensure that hazardous materials are stored according to legislative requirements.	Specifically designed storage facilities need to be provided and used for hazardous materials.	Contractor	
	Ensure that fuel stored on site does not pose a pollution and fire hazard.	All fuel tanks must be bunded to 120% of the capacity of the tank in order to contain any spillages that might take place..	Contractor	
		The fuel storage area must not be located less than 250m from any water resource.	Contractor	
Storm Water Run-off	Ensure that run-off does not contribute to erosion & siltation.	Construct and maintain berms on the site to contain storm water run-off or establish riffle beds or retention ponds, as appropriate.	Contractor	
Vehicle repairs	Ensure that spillages are minimised and that where these	Ensure proper maintenance of all construction vehicles and equipment, and	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
	occur, that they are appropriately managed.	conduct continues maintenance and check-ups. Minor vehicle repairs on an appropriate work surface may only take place within the provided area in the contractors camp		
Waste	Ensure the adequate management and removal of solid waste.	Draft and implement a Construction Waste Management Plan to be maintained for the duration of the construction phase. Waste should be stored in appropriate containers in an appropriately constructed area protected against exposure to high intensity rainfall and scavengers (baboons, dogs, rodents, etc.). The Contractor shall remove all wastes (hazardous or general) from the working areas, from Site at least once a week or depending on necessity and dispose of at an authorised landfill acceptable to the DEA. Contractor should submit a Method Statement for the purpose of handling and storage of hazardous materials on-site. No waste should be burnt on site.	Contractor	
Monitoring of the EMP	Monitor that the CEMP is enforced on all Contractors at all	Each contractor and subcontractor must be notified on the content of this CEMP.	Engineer	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
	times.	All contractors and subcontractors must be bound by the content and requirements in this CEMP.	IEO Contractor Environmental Site Manager	
POST CONSTRUCTION				
Site Rehabilitation	Ensure the site is left clean, orderly and free of rubble after construction activities.	Remove all rubble, rubbish, litter, unused building equipment, contaminated soils or any other relevant articles from the site following the end of the construction phase.	Contractor	
Soil	Promote the rehabilitation of the site back to its original condition as far as possible.	Soil that has been compacted during construction activities must be ripped in two perpendicular directions.	Contractor	
Soil	Ensure the re-use of top soil for rehabilitation.	Top soil that is stockpiled on site must be used to rehabilitate the disturbed areas.	Contractor	
MONITORING				
Audit Reports	Ensure adequate reporting of progress with the development	Regular reports, monthly and construction end are proposed, and should be forwarded to the DEA.	Environmental Site Manager	
Monitoring	Ensure compliance with the requirements of the EMP.	Undertake monitoring activities on a monthly basis.	Environmental Site Manager	

APPENDIXES

APPENDIX A

LOCALITY MAP
OF TSES VILLAGE AND TOWNLANDS

APPENDIX B

LOCALITY MAP OF
TSES EXTENSION 1, 2 AND 3
AND SOUTPUT NORTH AND SOUTPUT SOUTH

APPENDIX C

LAYOUT OF
TSES EXTENSION 1, 2 AND 3

APPENDIX D

BULK INFRASTRUCTURE

APPENDIX E

NON-COMPLIANCE PENALTIES

SCHEDULE OF PENALTIES FOR ENVIRONMENTAL DAMAGE OR CEMP TRANSGRESSIONS Note: The maximum penalty for any environmental damage will never be less than the cost of applicable environmental rehabilitation.		
CEMP TRANSGRESSION OR RESULTANT ENVIRONMENTAL DAMAGE	MIN (N$)	MAX (N$)
Failure to report environmental damage or CEMP transgressions to the ECO or Engineer.	2,500.00	5,000.00
Failure to carry out instructions of the ECO or Engineer regarding the environment or the CEMP.	2,500.00	5,000.00
Failure to comply with prescriptions for securing of loads to ensure safe passage of delivery vehicles.	2,500.00	5,000.00
Failure to comply with prescriptions for the storage of imported materials within a designated contractor's yard.	2,500.00	5,000.00
Failure to comply with prescribed administration, storage or handling of hazardous substances.	5,000.00	10,000.00
Failure to comply with fuel storage, refuelling, or clean-up prescriptions.	5,000.00	10,000.00
Failure to comply with prescriptions for the use of ablution facilities.	2,500.00	5,000.00
Failure to comply with prescriptions for the use of designated eating areas, heating source for cooking or presence of fire extinguishers	2,500.00	5,000.00
Failure to comply with prescriptions regarding water provision.	2,500.00	5,000.00
Failure to comply with prescriptions regarding fire control.	2,500.00	5,000.00
Failure to comply with prescriptions for waste management (incl. paint chips, cement and concrete).	2,500.00	5,000.00
Failure to comply with prescriptions to prevent water	5,000.00	10,000.00

pollution.		
Failure to comply with prescriptions regarding workshop equipment maintenance and storage.	2,500.00	5,000.00
CEMP TRANSGRESSION OR RESULTANT ENVIRONMENTAL DAMAGE	MIN (N$)	MAX (N$)
Failure to comply with prescriptions regarding noise levels of construction activities.	2,500.00	5,000.00
Failure to comply with prescriptions regarding working hours.	2,500.00	5,000.00
Failure to comply with prescriptions regarding lighting and aesthetics.	2,500.00	5,000.00
Failure to comply with prescriptions regarding silt, debris and other obstruction removal.	2,500.00	5,000.00
Failure to comply with prescriptions regarding water diversion and drainage.	2,500.00	5,000.00
Failure to comply with prescriptions regarding erosion and scour protection.	2,500.00	5,000.00
Failure to comply with prescriptions regarding traffic accommodation.	2,500.00	5,000.00
Failure to comply with prescriptions regarding tree and vegetation removal/damage.	5,000.00	20,000.00
Failure to comply with prescriptions regarding site demarcation and erection of fences.	2,500.00	5,000.00
Failure to comply with prescriptions regarding demarcation and enforcement of ‘no go’ areas.	2,500.00	5,000.00
Failure to comply with prescriptions regarding control of vehicles and plant on access routes.	2,500.00	5,000.00
Failure to comply with prescriptions regarding information posters	2,500.00	5,000.00

Failure to comply with prescriptions regarding procedures for emergencies.	2,500.00	5,000.00
Failure to comply with prescriptions regarding information boards or a complaints register.	2,500.00	5,000.00
Failure to comply with prescriptions regarding protection of natural features.	5,000.00	20,000.00
CEMP TRANSGRESSION OR RESULTANT ENVIRONMENTAL DAMAGE	MIN (N$)	MAX (N$)
Failure to comply with prescriptions regarding erosion and sedimentation control.	2,500.00	5,000.00
Failure to comply with prescriptions regarding protected areas.	5,000.00	20,000.00

For each subsequent similar offence committed by the Contractor, the penalty shall be doubled in value to a maximum value of N$ 50,000.00.

APPENDIX F

PRO-FORMA ENVIRONMENTAL MONITORING REPORT

ESM ENVIRONMENTAL MONITORING REPORT

Report No:..... **Date:.....**

Method Statements	Contractor:	Date received:

Environmental Education	Contractor:	Date undertaken:

ISSUE	Observation	Remedial action	Compliance
1 Construction			
1.1 All plant, personnel, etc. restricted to works area?			
1.2 Contractor's Camp located in area of low environmental sensitivity as indicated by the Engineer?			
1.3 Where needed, sensitive			

areas adequately fenced off?			
1.4 Fencing well maintained?			
ISSUE	**Observation**	**Remedial action**	**Compliance**
1.5 No unauthorised entry, stockpiling, etc. outside work areas?			
1.6 All vehicles and plant remain on designated routes?			
1.7 Information posters put up and maintained where needed?			
1.8 No smoking in hazardous areas?			
1.9 Basic fire fighting equipment available on Site?			
1.10 No burning of wastes as a means of disposal?			
1.11 Staff aware of procedures in the event of			

spills/leaks?			
ISSUE	**Observation**	**Remedial action**	**Compliance**
1.12 Materials for dealing with spills/leaks available?			
1.13 Emergency contact numbers displayed at Contractor's office?			
1.14 Complaints Register up to date?			
1.15 Archaeological material found on Site mitigated?			
1.16 No animals trapped or harmed?			
1.17 No flora removed or damaged outside work areas?			
1.18 Adequate drainage and retaining works in place to control erosion/siltation?			

1.19 Restricted traffic over stabilised areas?			
ISSUE	**Observation**	**Remedial action**	**Compliance**
1.20 No concrete mixing on bare ground?			
1.21 Concrete batching restricted to area of low environmental sensitivity?			
1.22 All wastewater from concrete mixing area disposed of via wastewater management system?			
1.23 Concrete mixing area kept neat and clean?			
1.24 Suitable screening and containment of cement silos?			
1.25 All visible remains of excess concrete removed on completion of concrete work?			
1.26 No pollution from drilling			

operations?			
ISSUE	**Observation**	**Remedial action**	**Compliance**
1.27 Location and rescue of plants undertaken by suitably qualified contractor?			
1.28 Rescued plants moved to nursery if direct transplantation not possible?			
1.29 After vegetation clearance, all unstable areas are properly stabilised?			
1.30 Cleared vegetation properly disposed of?			
1.31 All wastes removed from cleared area and disposed of?			
1.32 Mulched vegetation stored in bags?			
1.33 Fertilisers containing phosphates not used?			

ISSUE	Observation	Remedial action	Compliance
1.34 No planting undertaken where construction works have not yet been finished?			
1.35 No unauthorised traffic on revegetated areas?			
2 Materials			
2.1 Construction materials adequately secured to ensure safe deliveries?			
2.2 All materials being stored inside Contractor's Camp?			
2.3 All imported materials free of weeds, litter, etc.?			
2.4 Stockpile areas approved?			
2.5 Topsoil stripped and stockpiled at a suitable site prior to earthworks?			

ISSUE	Observation	Remedial action	Compliance
2.6 No spoil stockpiled outside agreed areas?			
2.7 Spoil stockpiles correctly shaped and protected?			
2.8 All plants used for landscaping/rehabilitation listed in the approved plant list?			
2.9 Plants adequately protected during transit and at storage facilities?			
2.10 Plants healthy and free from diseases and pests?			
3 Plant			
3.1 Fuel/oil storage facilities adequately secured and protected against leakage?			
3.2 Safety signage provided at fuel storage areas?			

ISSUE	Observation	Remedial action	Compliance
3.3 All electrical/petrol pumps suitably equipped and placed not cause any danger of ignition?			
3.4 Fuel storage areas comply with fire safety regulations?			
3.5 Necessary authorisations obtained for temporary above ground fuel tanks?			
3.6 Capacity of a fuel tank does not exceed 9000 ℓ?			
3.7 Fuel tanks erected at least 3.5 m away from buildings, boundaries or other flammable materials?			
3.8 Adequate toilet facilities provided for staff (min. 1 toilet per 30 workers)?			

ISSUE	Observation	Remedial action	Compliance
3.9 Toilets adequately maintained?			
3.10 All workers use toilets?			
3.11 Scavenger-proof bins with lids provided at eating areas?			
3.12 Waste temporarily stored inside Contractor's Camp in weather- and scavenger-proof bins?			
3.13 No burying or dumping of wastes on site?			
3.14 Waste management system in place?			
3.15 Refuse disposed of at licensed landfill?			
3.16 Adequate waste-water management system in place?			

ISSUE	Observation	Remedial action	Compliance
3.17 Approval for discharge of contaminated water into municipal sewer system?			
3.18 Runoff from workshops, fuel depots, etc. directed into conservancy tanks for disposal at approved site?			
3.19 Wash areas placed and built in such a way that does not cause any pollution?			
3.20 All maintenance of plant and equipment takes place in workshop?			
3.21 All plant is well maintained (no leaking)?			
3.22 Workshop has a bunded, impermeable floor sloping towards oil trap?			
3.23 Contractor's Camp tidy?			

ISSUE	Observation	Remedial action	Compliance
3.24 All plant and machinery have drip trays, which are checked and emptied daily?			
3.25 All repairs on machinery using fuels or lubricants done over a drip tray?			
3.26 Static plant located within a bunded area?			
3.27 Measures in place to minimise dust generation?			
3.28 No handling/transport of erodible materials under high wind conditions?			

EMP Transgressions	Contractor:	Date:	Fine issued:

Complaints	Date received:	Action taken:

Other issues	

APPENDIX G

PRO-FORMA METHOD STATEMENT

METHOD STATEMENT

CONTRACT: ..... **DATE**: .....

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 works)

START AND END DATE OF 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 sketches and plans where possible) *Note: please attach extra pages if more space is required.

APPENDIX H

LIST OF APPROVED PLANT SPECIES

All the indigenous trees occurring in the proposed development area could / should be used in the landscaping of the area as this would:

i) not detract from the overall ambiance of the area,
ii) be ecologically prudent & sound,
iii) best suited to the local environment,
iv) require least water and maintenance,
v) require the least financial input.

The following table indicates the indigenous trees/shrubs that could/should be used in the landscaping as they make outstanding features.

Species: Scientific name	**Status**	**Sensitivity**
Acacia erioloba	Protected (F)	High
Acacia reficiens		Low
Acacia tortilis		Low
Adenia pechuelii		High
Adenium boehmianum		High
Albizia anthelmintica	Protected (F)	High
Aloe litoralis	NC, C2	High
Antiphiona fragrans		
Boscia albitrunca	Protected (F)	High
Boscia foetida		Low
Catophractes alexandri		Low
Ceraria longipenduculata		High
Colophospermum mopane		Low
Combretum apiculatum		Low
Combretum imberbe	Protected (F)	High

Commiphora africana		Low
Commiphora crenato-serrata		Low
Commiphora glandulosa		Low
Commiphora glaucescens		Low
Commiphora multijuga		Low
Commiphora pyracanthoides		Low
Commiphora saxicola		
Commiphora tenuipetiolata		Low
Commiphora virgata		
Croton gratissimus		Low
Euclea pseudebenus		Low
Euphorbia guerichiana	C2	Medium
Euphorbia virosa	C2	Medium
Faidherbia albida	Protected (F)	High
Grevia bicolor		Low
Grevia flava		
Grevia flavescens		Low
Grevia tenax		Low
Gymnposporia senegalensis		Low
Kirkia acuminata		Low
Maerua schinzii	Protected (F)	High
Moringa ovalifolia	NC	High

Mundulea sericea		Low
Pachypodium lealii	Protected (F)	High
Parkinsonia africana	Protected (F)	High
Salvadora persica		Low
Steganotaenia araliacea		Low
Sterculia africana	Protected (F)	High
Sterculia quinqueloba	Protected (F)	High
Tamarix usneoides		Low
Terminalia prunioides		Low
Ziziphus mucronata	Protected (F)	High

There are a variety of other tree species indigenous to southern Africa (including other parts of Namibia) that could be used as ornamental plants in the landscaping although not found in the immediate area and include:

- *Acacia* species – e.g. *A. galpinii*, *A. nigrescens*, *A. sieberiana*, *A. xanthophloea*
- *Adansonia digitata*
- *Albizia* species – e.g. *Albizia versicolor*
- *Bauhenia* species – e.g. *B. galpini*
- *Combretum* species – e.g. *C. erythrophyllum*
- *Diospyros mespiliformis*
- *Hyphaene petersiana*
- *Kigelia africana*
- *Peltophorum africanum*
- *Phoenix reclinata*
- *Philenoptera nelsii*
- *Schinziophyton rautanenii*
- *Sclerocarya birrea*
- *Securidaca longependunculata*

APPENDIX I

DECLARED INVASIVE ALIEN SPECIES

No known or potential invasive alien tree / shrub / grasses, although even in cases naturalized species, should be used in the landscaping. The threats they pose are unacceptable and using these species in landscaping would compromise the environmental commitment that should be shown to this project.

The following list – although not comprehensive and exclusively so – is some of the more problematic invasive alien species found in Namibia and that should not be incorporated in the landscaping.

Scientific name	Common name
Caesalpinia gilliesii	Yellow Bird of Paradise
Schinus mole	Brazilian Peppertree
Datura sp.	Stink weed
Dodonaea viscose & *D. angustifolia*	Purple Hop-bush/Hopseed bush
Eucalyptus sp.	Blue gum species
Euphorbia tirucalli	Pencil Euphorbia
Jatropha curcas	Physic nut
Lucena leucocephala	Lucena
Lantana camara	Lantana or Spanish Flag
Melia azedarach	Chinaberry tree
Nicotiana glauca	Brazilian Tree Tobacco
Opuntia sp.	Prickly Pear sp.
Parkensonia aculeatea	Jerusalem Thorn
Pennisetum setaceum	Fountain Grass
Pinus sp.	Pine tree sp.
Prosopis sp.	Mesquite sp.
Ricinus communis	Castor oil plant
Tecoma stans	Yellow Trumpetbush

Source: Cunningham (2008), Cunningham, Joubert & Adank (2004), Curtis & Mannheimer (2005), Joubert & Cunningham (2002), Shipaka, Joubert & Cunningham (2008)