<u>Final</u> Construction Environmental Management Plan

for the

OPUWO AERODROME AND ASSOCIATED INFRASTRUCTURE

<u>For submission to</u>:
Ministry of Environment, Forestry & Tourism
Department of Environmental Affairs

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APPROVAL FOR RELEASE

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

C.....Contractor
CEMP.....Construction Environmental Management Plan
D.....Developer
DEA.....Department of Environmental Affairs
EAP.....Environmental Assessment Practitioner
EMA.....Environmental Management Act, 2007 (Act 7 of 2007)
EMP.....Environmental Management Plan
ESIA.....Environmental and Social Impact Assessment
ESM.....Environmental Site Manager
I&AP.....Interested and Affected Party
MSDS.....Material Safety Data Sheet
RE.....Resident Engineer

GLOSSARY OF TERMS

- ***Alien Vegetation:*** Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to, all declared category 1, 2 and 3 listed invader species. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area.

- ***Audit:*** A systematic, documented, periodic and objective evaluation of how well the environmental management plan is being implemented and is performing with the aim of helping to safeguard the environment by: facilitating management control which would include meeting regulatory requirements. Results of the audit help the organisation to improve its environmental policies and management systems and mitigate environmental impacts.

- ***Batch Plant:*** Machinery used on site for the mixing and production of concrete and associated equipment and materials.

- ***Bund:*** Enclosure under/around a hazardous substance storage facility 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):*** This document, for managing potential environmental impacts during the construction phase of a development.

- ***Contaminated Water:*** - The addition of foreign matter to a natural system, polluting or making something impure. Water contaminated by the Contractor's activities, e.g. concrete water and runoff from plant/personnel wash areas.

- ***Contractor:*** Any legal entity or consortium contracted by the Developer (applicant) to undertake any activity associated with the construction of the proposed development.

- ***Department of Environmental Affairs (DEA):*** Namibia's Department of Environmental Affairs, the Government authority responsible for authorising activities in terms of the Environmental Management Act, No. 7 of 2007.

- ***Developer:*** The Company or its duly authorised and appointed representative, responsible for the construction activities of the project. Also see definition for Proponent.

- ***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.

- ***Engineer:*** The person(s) who represents the Ministry of Trade and Industry (the Proponent) and are responsible for the technical and contractual implementation of the works to be undertaken by the appointed contractors.

- ***Environment:*** The biosphere in which people and other organisms live. It consists of renewable and non-renewable natural resources, natural or modified ecosystems and habitats, and places of cultural significance.

- ***Environmental Aspect:*** An environmental aspect is any component of a contractor's construction activity that is likely to interact with the environment.

- ***Environmental Impact:*** An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity between the limits that define the construction site. An impact may be the direct or indirect consequence of a construction activity.

- ***Environmental Impact Assessment (EIA):*** The process of examining the environmental effects of a project. The assessment requires detailed/specialist studies of significant issues that have been identified during the environmental Assessment phase.

- ***Environmental Management Plan (EMP):*** A detailed plan of action prepared to ensure that recommendations for enhancing positive impacts and/or limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.

- ***Environmental Site Manager (ESM):*** A suitably qualified professional to be appointed by the Ministry of Trade and Industry/Namibia Development Corporation (the Proponent) who oversees the construction phase and ensure that all environmental specifications and CEMP obligations are met during the phase. The ESM will be responsible for the monitoring, reviewing and verifying of compliance with the CEMP by the Contractor.

- ***Hazardous Substance:*** A substance that, in the reasonable opinion of the Engineer and/or ESM, can have a harmful effect on the environment.

- ***Landscape Architect/Ecologist:*** The person or company responsible for the landscape architectural aspects of the development.

- ***Method Statements:*** Method Statements are written submissions to the Engineer / Project Manager by the Contractor. The Method Statements must contain the appropriate detail in order for the Resident Engineer / Project Manager to assess whether the Contractor's proposal is in accordance with the requirements of the EMP. The contractor must sign each Method Statement along with the Engineer / Project Manager to formalise the approved Method Statement.

- ***Mitigation:*** Measures designed to avoid, reduce or remedy adverse impacts on the environment due to construction activities.

- ***Monitoring:*** Regular inspection and verification of construction activities for degree of compliance to the EMP.

- ***'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.

- ***Proponent:*** The Company or its duly authorised and appointed representative, with rights to undertake the development on the Site.

- ***Resident Engineer (RE):*** A person who represents the 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).

- ***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).

- ***Site:*** The boundary and extent of development works and infrastructure, including any areas off the main site on which works are to be carried out in order to allow the development to proceed successfully.

- ***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.

- ***Specification:*** A technical descriptions 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 30cm 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.

SECTION 1: OVERVIEW

1.1 INTRODUCTION

This document represents the framework Environmental Management Plan (EMP) for the construction phase of the **Opuwo Aerodrome** project.

This Construction Environmental Management Plan (CEMP) should be read in conjunction with Section 9.1 *(Construction Related Impacts)* of the ESIA Report (March 2024).

1.2 THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

1.1.1 Environmental Management Plans

This EMP is drafted in line with the requirements of the Environmental Management Act, 2007 (Act 7 of 2007) [EMA] and the Environmental Impact Assessment Regulations (GN 30 of 2012) promulgated under the EMA.

The purpose of a CEMP is to provide specifications of "good environmental practices" for application during the construction phase of a project.

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

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 property owners) 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.

1.1.2 Scope of the CEMP

In order to ensure a holistic approach for the management of environmental impacts during the construction of the **Opuwo Aerodrome** project, this CEMP sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other

parties involved, and which in turn should be monitored by the Environmental Site Manager (ESM) and Resident Engineer (RE).

This CEMP intends to guide and manage the construction activities on the construction site and surrounding areas, as they relate to the natural environment. It describes mitigation measures which are prescriptive, where specific people or organisations are identified to undertake specific tasks. This document should however 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 and Developer, until such time that ownership is transferred to any other stakeholder. Any third party appointed by the Proponent in terms of the design and construction must comply with the conditions of this CEMP.

This EMP has been designed to suite the specific 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 EMP 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 formal approval of the Environmental Forum.

1.1.3 Format of the CEMP

The CEMP consists of four sections:

- ***Section 1*** contains the ***Overview*** providing a brief description of the CEMP, information on the development, the environmental process followed, and the Project;
- ***Section 2*** details the **Implementation of the CEMP**, highlighting such aspects as roles and responsibilities, documentation, awareness training, financing of environmental control, etc.;
- ***Section 3*** deals with ***Enforcement, Auditing & Monitoring***, stipulating the general requirements, responsibilities of the different role players, financing of environmental control, dispute resolution, and requirements for monitoring; and
- ***Section 4*** details with the ***Environmental Specifications*** that set out the environmental objectives and targets with which the Contractor/s shall comply.

1.1.4 Amendments to the CEMP

Any party involved with the Project can suggest changes to the CEMP via the ESM and

Engineer. Such suggestions will be presented to the Environmental Forum before approval and implementation. Approved changes will be minuted and drafted into this existing CEMP in the form of an appendix or amended document. This should be clearly stipulated in the CEMP to avoid any confusion (see EMP Revision).

1.3 OPUWO AERODROME AND ASSOCIATED INFRASTRUCTURE

The present Opuwo Aerodrome is an unlicensed facility owned by the State and has, over the years, increasingly become a safety and security risk due to the location of the aerodrome (being between the town and the informal settlement). This has led to people cutting through the security fence and using the area as a thoroughfare between the settlement and the town for people as well as vehicles and livestock.

Due to this and other socio-economic and environmental concerns, a feasibility study was commissioned by the Namibian Ministry of Works and Transport in 2012. The results of this feasibility study (undertaken by Windhoek Consulting Engineers) recommended that a new aerodrome locality be considered based on the availability of bulk services (power and water), the proximity of the proposed site to the bitumen surfaced Main Road 100 to Omakange, and the positive implication of the new site on its accessibility to also serve the village of Omakange (which is situated about 38km to the east of the study site).

The property on which the site is to be located is owned by the Ministry of Works and Transport. The site is located in Opuwo, approximately 5km east of the Alfa village and 4km from the bitumen surfaced Main Road between Omakange to the east, and Opuwo to the west. The centre of the runway is at the approximate coordinates: 18°07'42.5"S and 13°58'26.5"E.

Infrastructure

Buildings

The proposed project includes the construction of the following structures and infrastructure:

- Guard house with ablution facilities, water and electricity;
- Gravel access road;
- Covered veranda and rest rooms for the passengers and crew;
- Fuel storage and handling facility;
- Water, electricity and telecommunications;
- Drainage structures;
- Fencing;
- Runway marking and signage; and
- Road signs.

The existing Aerodrome will be decommissioned and the land on which it is located will be handed over to the local authority subsequent to its rehabilitation.

Water

Due to the fact that there is no water pipeline in the area from which the aerodrome can connect; a borehole will be drilled on site to provide water services to the aerodrome. Another option would be to pump water from Opuwo, which is at a distance of approximately 7 km and a height difference of about 200m.

Electricity

As with all other new developments in Namibia, the normal procedure of applying for electrical supply from Nam Power is applicable. The supply of electricity from Nam Power regarding the proposed project is still to be confirmed.

Solid Waste Management

The majority of solid waste will be recycled/reused with the rest being transported to a nearest licensed waste disposal facility.

Access, Roads and Stormwater

The project will include the construction of an 8.0m wide and 4.1km long gravel access road which will be connecting the aerodrome to the Main Road 100.

Construction

The required works for the construction of the Opuwo aerodrome is expected to include the use of light machinery for excavation, piling, landscaping, concreting, etc. for the purpose of constructing the service infrastructure (e.g. roads, reservoirs and water network, electricity infrastructure) and associated buildings and structures.

The key construction activities will include:

- The installation of a 1.2 m high razor mesh perimeter fence;
- Blading of the runway;
- Bush clearing;
- Construction of an apron;
- Installation of a wind direction indicator circle
- Foundation works for buildings, structures, etc.;
- Digging of trenches and construction of infrastructure;
- Surfacing of walkways;
- Access to and from the site by construction vehicles;
- Daily commuting of labour force and daily accommodation on site;
- Dumping of unsuitable material;
- Usage of water for daily construction activities; and
- Generation of waste water and building rubble.

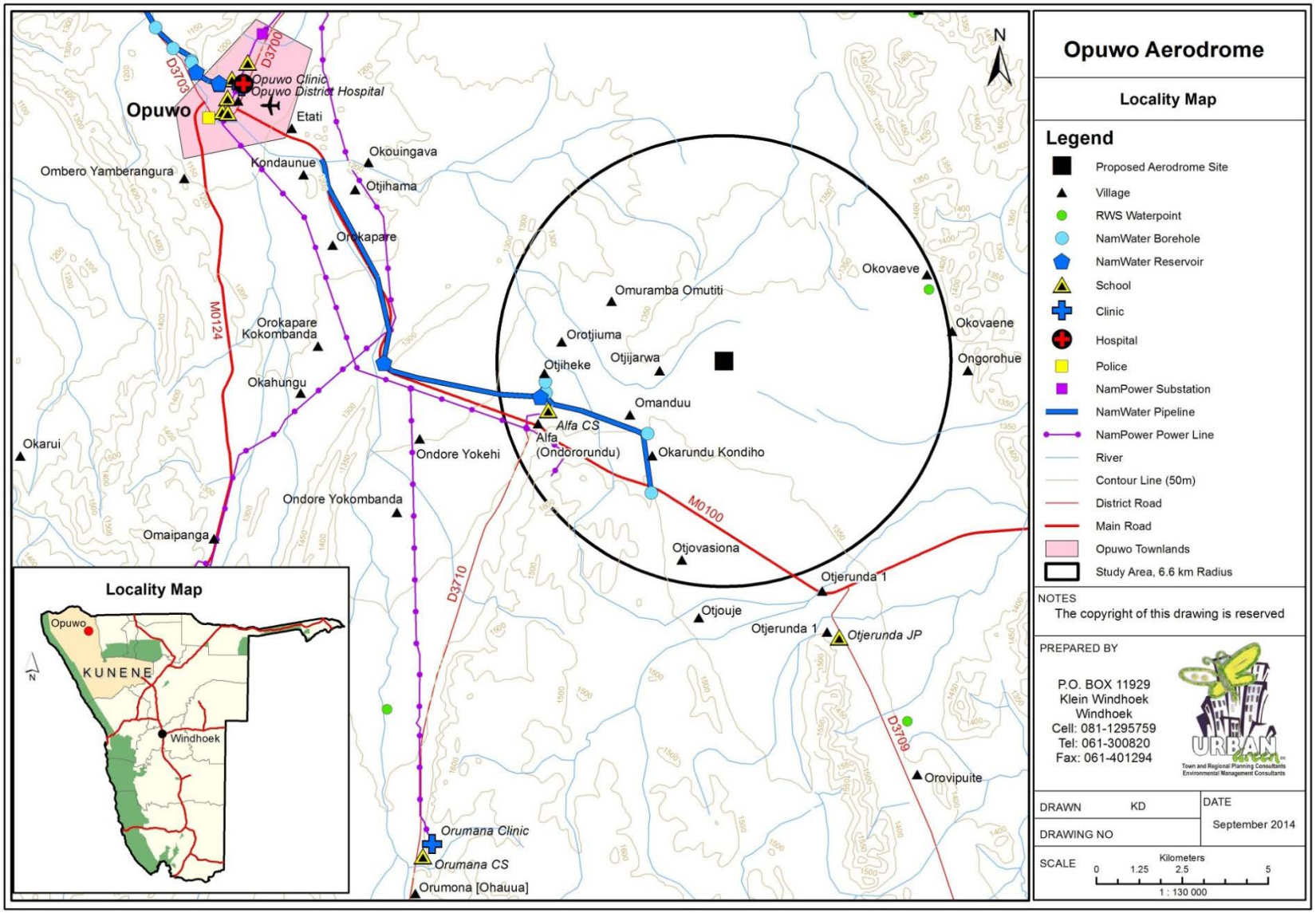

Figure 1: Locality Map (Urban Green cc, 2014)

1.4 BRIEF OVERVIEW OF THE ENVIRONMENTAL PROCESS FOLLOWED

This CEMP is a general management plan, based on the Environmental and Social Impact Assessment done for the proposed establishment of the Opuwo Aerodrome (March 2024).

Following the determination of the proposal or screening, an application for Environmental Clearance was submitted during August 2014 with the Environmental Commissioner as prescribed by Regulation 6 (Form 1 of Annexure 1) of the EIA Regulations (GN. 30 of 2012) as provided for under Section 56 of the Environmental Management Act (No 7 of 2007).

The Assessment Phase, which initially began in August 2014 and was finalized during December 2023, seeks to collect baseline information and professional/public opinion with regards to the proposed project and the receiving environment; determine the manner in which and to what extent the proposed project may affect the natural and social environment (geographical, physical, biological, social, economic and cultural aspects); establish the need and desirability of the proposed project; compare advantages and disadvantages and available alternatives; highlight the potential significant effects that are likely to be of most importance and to develop or recommend mitigation measures.

Following the Detailed Assessment, potential impacts expected and associated with the construction phase of such development include:

- Ground and surface water pollution
- Soil erosion and Sedimentation
- Increase in Traffic Volumes
- Construction Noise pollution
- Habitat destruction and loss of biodiversity
- Dust and Emissions
- Risk of emergency situation (hazardous spillage, veld fires, etc.) during construction;

The significance of many of the construction phase impacts would be curtailed by their relatively short duration and via the effective implementation of this CEMP. Details with regards to these impacts and the mitigations provided are listed in Section 9.1 *(Construction Related Impacts)* of the Environmental and Social Impact Assessment Report (March 2024).

1.5 THE PROJECT

For the purpose of this CEMP, the project involves the construction activities and management thereof; for the **Opuwo Aerodrome** project.

Details with regards to the Project are explained in the ESIA Report (March 2024).

SECTION 2: IMPLEMENTATION OF THE CEMP

2.1 ROLE PLAYERS AND THEIR RESPONSIBILITIES

Implementation of the EMP will be the responsibility of all parties involved with construction activities. In order for the CEMP to be successfully implemented, all the role players involved in the project need to understand their responsibilities. The Engineer and ESM will be central to the implementation of the EMP.

2.1.1 Environmental Forum

As stated under Section 2.1, the Proponent will be responsible for the establishment of an Environmental Forum. The core function of this Forum will be to –

- Provide feedback to stakeholders regarding the Project and the implementation of the CEMP;
- Highlight concerns received from stakeholders regarding implementation as well as to address stakeholder concerns; and
- Handle any disputes or disagreements between role players on Site (with regard to environmental management).

Regular meetings will be held by the Environmental Forum, the purposes of the meetings shall be:

- To establish the suitability of the Contractors' 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 discuss the general state of the environment on site and discuss any environmental problems which may have materialised.

This forum should ideally comprise of a representatives from the Developer, Engineer, Resident Engineer, Landscape Architect and Environmental Site Manager (ESM), or any other nominee in the event of one of the members not being able to attend.

If so desired the Environmental Consultant, Urban Green cc, can also serve on this Forum from time to time as it may become necessary.

2.1.2 Responsibilities of the ESM (to be an appointed Environmental Consultant)

Prior to the commencement of construction, a suitably qualified and experienced Environmental Site Manager (ESM) shall be appointed by the Developer to ensure that the mitigation measures and recommendations contained in the CEMP are implemented and to monitor compliance to the Environmental Specification.

The responsibilities of the ESM are:

- Liaison with the Developer, Engineer, Resident Engineer and Environmental

Authorities. The ESM will be responsible to the Developer.

- The ESM shall make recommendations independent of the Engineer; afford immediate remediation action on Site -
  - (i) when 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 fines; 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.
- The ESM must oversee the mitigation measures and monitor compliance with the conditions of approval and the CEMP.

- The ESM will be on Site at a predetermined frequency (at least once every month) and will be responsible for monitoring implementation of the EMP throughout the construction period.
- The ESM, along with the Engineer and RE, must obtain, examine and approve Method Statements.
- Ordering the removal of, or issuing spot fines 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.
- Advise the Engineer, Resident Engineer/s and Contractor/s on environmental issues within the defined work areas.
- Recommend corrective action to the Engineer, Resident Engineer/s and Contractor/s where construction activities are not in compliance with the Landscape Framework Plan.
- To take immediate action on Site where clearly defined and agreed 'no go' areas are violated, or in danger of being violated, and to inform the RE of the occurrence and action taken.
- To take immediate action on Site when prescriptive conditions are violated, or in danger of being violated, and to inform the RE immediately of the occurrence and to take action, e.g. issuing of fines.
- With assistance from the project team, to environmentally educate and raise the awareness of the Engineer, Resident Engineer/s and Contractor/s and his staff as to the sensitivity of the Site and to facilitate the spread of the correct attitude during works on Site.
- To keep a comprehensive environmental record of activities on Site.
- Review the site logbook with regard to records of site activities that may pertain to the environment.
- To be reachable by the public regarding matters of environmental concern as they relate to the development (register of complaints and actions to be kept).
- To have input into the EMP documentation and to monitor compliance by the Contractor with the prescriptive conditions.
- The ESM shall have the right to investigate the site at any time during the project and

unexpected visits will be allowed.

The ESM 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.

2.1.3 Responsibilities of the Developer

The responsibilities of the Developer can be summarised as follows:

- Attain all necessary approvals.
- Appoint the ESM.
- Liaise with the ESM and Engineer regarding environmental management and provide the ESM and Engineer with all relevant documentation and plans.
- Support and comply with the CEMP specifications.

2.1.4 Responsibility of the Engineer

The responsibilities of the Engineer can be summarised as follows:

- Assisting the ESM and Resident Engineer in ensuring that the conditions of the CEMP are being adhered to and implemented.
- The Engineer, along with the ESM and RE, must obtain, examine and approve Method Statements.
- Promptly issuing instructions requested by the ESM and Resident Engineer to the Contractor/s.
- Deduct environmental penalties from certificate payments as agreed and instructed by the ESM.
- Assisting the ESM 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.

2.1.5 Responsibilities of the Contractor/s

The responsibilities of the Contractor/s can be summarised as follows:

- Be responsible for the overall implementation of the CEMP in accordance with the requirements of the Developer and CEMP; and guidance from the ESM.
- Inform both the Resident Engineer and ESM should environmental aspects on Site result in degradation e.g. erosion, dumping and pollution, etc.
- Assist in finding solutions to environmental problems that may arise during construction.
- Carry out instructions as given by the ESM and Resident Engineer.
- Compile Method Statements as listed under 2.2.3 above.
- Ensure that all sub-consultants and third parties, who carry out all or part of the Contractor's obligations under the Construction Contract, comply with the requirements of this CEMP.

2.1.6 Responsibilities of the Landscape Architect/Ecologist

A Landscape Architect/Ecologist will need to be employed to undertake the rehabilitation for the Project. The Landscape Architect/Ecologist must be qualified to set up and manage an on-site nursery (if necessary), to propagate required plant material and to rehabilitate disturbed areas. The Landscape Architect/ Ecologist will need to be instructed by a Botanist, who will compile the Rescue and Translocation programme for removal of species of special concern, where necessary.

2.2 ENVIRONMENTAL FORUM

As stated in Section 2.1 above, the Proponent will be responsible for the establishment of an Environmental Forum, which will comprise of two representatives from the Proponent, the Engineer and Environmental Site Manager.

The core function of this forum will be to provide feedback to stakeholders regarding the implementation of this CEMP; highlight stakeholder concerns regarding implementation; and to address stakeholder concerns.

2.3 DISPUTES AND DISAGREEMENTS

Any disputes or disagreements between role players on Site (with regard to environmental management) will be referred to the Environmental Forum. If no resolution on the matter is possible, it must be presented to an outside party (agreed to by all parties involved) or to the Directorate of Environmental Affairs; for clarification.

2.4 DOCUMENTATION

Copies of the documents described below must be maintained on site *at all times*; and made available to both the Engineer and ESM. These documents should be provided for inspection to authorities or stakeholders on request. Contractors' meeting minutes must

reflect environmental queries, agreed actions and dates of eventual compliance.

2.4.1 Site Instruction Entries

The Site Instruction Book entries will be used for the recording of general site instructions, as they relate to the works on site and EMP measures. It will also be used for the issuing of stop-work orders issued by the ESM; for the purpose of immediately halting any particular activities of the Contractor *in lieu* of serious environmental risk which the work may pose.

2.4.2 ESM Diary Entries

The purpose of these entries will be to record the comments of the ESM as they relate to activities on the site; including infringements, possible changes to the EMP, or work stop orders.

2.4.3 Method Statements

Method statements from the Contractor will be required for specific sensitive actions on request of the authorities or ESM. A method statement forms the baseline information on which sensitive area or high risk work takes place; and is thus considered a “live document” as modifications can be negotiated between the Contractor and ESM when 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 ESM 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 EMP documentation and are subject to all terms and conditions contained within the EMP document. The Method Statement shall cover applicable details with regard to:

- 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 ESM.

A method statement describes the scope of the intended work in a step-by-step description, in order for the ESM or Engineer to understand the Contractor’s intentions. This will enable the ESM or Engineer to assist in devising any mitigation measures, which would minimise environmental impact during the undertaking of these tasks. The method statement should also clearly stipulate mitigation methods for 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 ESM 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 prior to 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 ESM 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 Method Statements.

The RE or ESM 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 ESM, 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 commencement of the activity (See Appendix A for a pro-forma Method Statement):

- ***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.

2.4.4 Monthly Monitoring Reports

Copies of the monthly monitoring reports compiled by the ESM should be kept on site for inspection by designated persons and/or authorities.

2.4.5 Other Documents

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.
- Monthly site meeting minutes during construction.
- Environmental Forum's minutes of meetings.
- All relevant permits.
- All method statements from the Contractor.

2.5 ENVIRONMENTAL AWARENESS TRAINING

2.5.1 Environmental Site Manager (ESM)

The ESM must be an appropriately qualified person in environmental management and must possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

2.5.2 Environmental Awareness Course

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 EMP, as well as regarding environmental legal requirements and obligations. Training shall be conducted by the ESM 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 as well as how it will be implemented through monitoring. The general specifications as per Section Two of this CEMP should be clearly explained to the Contractors and their site staff; as well as non-compliance to the specification and related penalties.

Environmental and health awareness training programmes should be targeted at three distinct levels of employment, i.e. the executive, middle management and labour. The Developer shall ensure that adequate environmental training takes place. All employees shall be 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 and encouragement of minimising the production of waste; as well as the 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.

2.6 EMERGENCY PREPAREDNESS

The Contractor shall compile and maintain Environmental Emergency Response Procedures (ERP) to ensure that there will be an appropriate response to unexpected or accidental actions, or incidents that will cause environmental impacts during 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.

2.7 AMENDMENTS TO THE EMP

Any party involved with the project can suggest changes to the EMP via the ESM or RE. Such suggestions will be discussed with the Environmental Forum. Approved changes will be minute and drafted into the existing EMP in the form of an appendix or addendum.

SECTION 3: ENFORCEMENT, AUDITING & MONITORING

3.1 MONITORING

The ESM will carry the responsibility of monitoring the implementation of the CEMP on Site, assisted by the RE. In this regard, the ESM will submit a monthly monitoring report to the Environmental Forum and DEA (if required) throughout the construction phase up until all rehabilitation work has been completed. A *pro-forma* monitoring report is contained in Appendix B.

The monthly monitoring report should include:

- A copy of the Monitoring Report (Appendix B);
- A description of exceptional conditions on site whether they be meteorological, personnel related, machinery related, or otherwise stipulated;
- A description of any environmental accident or developments which could potentially develop into a non-conformance event by the Contractor; and
- Minutes from the meetings.

Regular meetings will be held between the Engineer, RE and the ESM. 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 EMP guidelines or environmental legislation;
- To assess the general state of the environment on site and discuss any environmental problems which may have materialised; and
- 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. This Report must describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor/s 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 mitigate 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 Monthly Monitoring Report.

3.2 ENVIRONMENTAL COMPLETION STATEMENT

An Environmental Completion Statement will be prepared by the ESM for submission to the Developer, indicating completion of the project and compliance with the CEMP and its conditions. This statement will be prepared after the final audit, following the completion of

rehabilitation of the Site.

3.3 POST-CONSTRUCTION ENVIRONMENTAL AUDIT

A post-construction environmental audit must be carried out and submitted to the Environmental Forum, in order to fulfil conditions of this CEMP.

3.4 FINANCING, MEASUREMENT & PAYMENT

Financing of the environmental requirements as outlined in this document, apart from the appointment of the ESM and specialists, is the sole responsibility of the Contractor appointed by the Developer.

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. Therefore, it is accepted that the cost incurred for implementing this EMP by the Contractor would be allocated for in the tender document.

Any responsibilities not defined in this document or where any uncertainties arise in this matter will be the responsibility of the Developer.

3.5 NON COMPLIANCE, FINES AND PENALTIES

Environmental management is concerned not only with the final results of the Contractor's operations to carry out the works but also with the control of how those operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operations required to complete the works. It is thus required that the Contractor shall comply with the environmental requirements on an on-going basis and any failure on his part to do so will entitle the ESM to certify the imposition of a fine subject to the details set out below. Moneys from fines/penalties will be managed and allocated at the discretion of the Environmental Forum.

3.5.1 Fines

The ESM 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 reported non-compliance. Failure to redress the cause may result in the issuance of fines.

Fines will be issued for certain transgressions. Fines may be issued per incident and per individual at the discretion of the ESM and Resident Engineer. Such fines shall be issued in addition to any remedial costs incurred as a result of non-compliance with the environmental Specifications. The ESM in consultation with the RE will inform the Contractor of the contravention and the amount of the fine, where it will be entitled to deduct the amount from monies due under the Contract.

Fines should be instituted for the following less serious violations as detailed below, and any other minor violations determined during the course of work:

- 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.
- Unnecessary 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 Developer and/or Contractor shall be liable.

Spot fines of between N$1,000.00 and N$10,000.00, including but not limited to those activities detailed in Table 1 below, shall be imposed by the ESM and Resident Engineer on the Contractor for contraventions of the environmental specifications by individuals or operators employed by the Contractor and/or his subcontractors. Where there are ranges, the amount shall depend on the severity and extent of the damage done to the environment:

Table 1: Fines

TRANSGRESSION	AMOUNT (N$)
An individual walking outside the demarcated boundaries of the Site or within a 'no-go' area	1,000.00
An individual operating any plant outside the boundaries of the Site	3,000.00 - 10,000.00
An individual driving off earmarked roads, outside the boundaries of the Site or within a 'no-go' area	10,000.00
A plant operator ignoring a verbal warning to have an oil leak from his machinery repaired	1,000.00
An individual littering on Site	1,000.00
An individual not making use of the ablution facilities	1,000.00

TRANSGRESSION	AMOUNT (N$)
An individual making an illegal fire on Site	2,000.00
An individual polluting the environment due to poor waste management, cement mixing on bare ground, paint washing, etc.	5,000.00 - 10,000.00

For each subsequent similar offence committed by the same individual, the fine shall be doubled in value to a maximum value of N$ 20,000.00. Repeat offenders may also face disciplinary and/or legal action and/or dismissal.

3.5.2 Penalties

Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications, he shall be liable to pay a penalty fine over and above any other contractual consequence.

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;
- The Contractor fails to comply with corrective or other instructions issued by the ESM and/or Engineer within a specific time period; and/or
- the Contractor fails to respond adequately to complaints from the public. The amount of penalty shall be determined by the ESM and Resident Engineer.

The following violations, and any others determined during the course of work, should 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 resources.

Payment of any penalties in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law. The following penalties presented in Table 2 are suggested for transgressions:

Table 2: Penalties

VIOLATION	PENALTY
Erosion and siltation	A penalty equivalent in value to the cost of rehabilitation plus 20%.
Unnecessary damage to vegetation outside the demarcated works area (no-go areas)	A penalty equivalent in value to the cost of rehabilitation plus 20%.
Unnecessary damage to archaeological material	A penalty to a maximum of N$10,000.00 shall be paid for any damage to archaeological material without permission.
Injuring or killing of wildlife	A penalty to a maximum of N$10,000.00 shall be paid for any wildlife injured or killed. The Contractor shall also be liable for all the costs of rehabilitation to all wildlife if they become injured as a direct result of neglect at the Site.

3.5.3 Removal from Site and Suspension of Works

The Engineer in consultation with the ESM, and approved by the Environmental Forum, may instruct the Contractor to remove from Site any person(s) who in their opinion is guilty of misconduct, or is incompetent, negligent or constitutes an undesirable presence on Site.

These Specifications requires that all Plant be in good working order, and accordingly the Engineer may order that any Plant not complying with the Specifications be removed from Site. Where the ESM and Resident Engineer deem the Contractor to be in breach of any of the requirements of this Specification, he may order the Contractor to suspend the progress of the Works or any part thereof.

3.5.4 Environmental Complaints

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. A *pro-forma* complaints register is contained in Appendix C.

SECTION 4: ENVIRONMENTAL SPECIFICATIONS

4.1 SCOPE

These specifications cover the requirements for controlling the impact of activities on the natural and social environment during the **CONSTRUCTION PHASE** of the **Opuwo Aerodrome** project.

4.2 CONSTRUCTION

4.2.1 Site Division and Establishment

The ESM and Resident Engineer shall be informed of the area that the Contractor intends 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 ESM.

The Contractor shall restrict all his activities, materials, equipment and personnel within the specified area. A Method Statement detailing the location, layout and method of establishment of the Contractor's Camp (including all buildings, offices, ablutions, lay down yards, plant wash areas, fuel storage areas, batching areas and other infrastructure required for the running of the project) shall be provided.

Contractor's 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 ESM.
- 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.
  - Its final location shall be identified in consultation with the Engineer and ESM.
- With the decommissioning of the structures all compacted platforms and slab foundations must be ripped-up and removed.

Vehicle Parking Area

- All vehicles will be allocated a dedicated parking area within the Contractor's Camp.
- No storage of vehicles will be allowed outside of the designated area.
- Drip trays to be placed under all vehicles standing for more than 12 hours or those suspected of leaking.

4.2.2 Aesthetics

The Contractor shall take reasonable measures to ensure that construction activities do not have an unreasonable impact on the aesthetics of the area. These can include the erection of hoarding or shade netting around visually sensitive activities and infrastructure.

4.2.3 Cement and Concrete Batching

Location

- Concrete shall not be mixed directly on the ground. Mortar boards or concrete aprons (plastic sheeting), or other secondary containment structures shall be used for this purpose.
- The concrete batching activity shall be located in an area of low environmental sensitivity, to be identified and approved by the RE and ESM.
- 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 ESM. A Method Statement indicating the layout and preparation of this facility is required in this regard.

Maintenance

- 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 ESM. 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.
- All wastewater resulting from batching of concrete shall be disposed of via the wastewater management system.
- Contaminated water treatment on Site shall require a Method Statement.
- The concrete batching works shall be kept neat and clean at all times. No batching activities shall occur on unprotected substratum or bare soil of any kind.
- Unused cement bags are to be stored so as not to be effected by wind, 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 ESM.
- 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 directly after plaster or concrete pour work and appropriately disposed of. All excess aggregate shall also be removed.

4.2.4 Crane Operations

Cranes shall be well maintained and drip trays shall be positioned at potential leak areas. Over-greasing of crane cables shall be avoided.

Movement and lifting of hazardous materials shall be undertaken such that they do not cause a pollution, spillage or safety risk (in particular were concrete buckets are in use).

4.2.5 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 erosion, siltation downstream, loss of topsoil, etc.

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.

Trenching

- Trenching for services shall be undertaken in accordance to the engineering specifications with the following environmental amplifications, where applicable:
  - Soil shall be excavated and used for backfilling of subsequent trenches to avoid double handling 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 backfilled to the same level (or slightly higher to allow for settlement) as the surrounding land surface in order to minimise erosion.

Drilling, Pecking 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 ESM and Resident Engineer.

- The Contractor shall submit a Method Statement detailing his proposals to prevent pollution during drilling operations.

4.2.6 Bitumen

Over spray of bitumen products outside of the road surface and onto roadside vegetation or the surrounding environment shall be prevented using a method approved by the Resident Engineer.

When heating bitumen products, the Contractor shall take cognisance of appropriate fire risk controls. Heating of bitumen products shall only be undertaken using LPG or similar zero emission fuels with the appropriate firefighting equipment readily available.

Stone chip/gravel excess shall not be left on road / paved area verges. This shall be swept / raked into piles and removed to an area approved by the ESM and Resident Engineer.

Water quality from runoff from new/ fresh bitumen surfaces will be monitored visually by the ESM and Resident Engineer and remedial actions taken where necessary by the Contractor.

4.2.7 Fencing

It is important that excavation works are 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 ESM or RE, sensitive areas shall be fenced off by the Contractor by means of a two-strand wire fence on which danger tape has been securely placed (zig-zagged).
- Fencing of the labour campsite (if applicable) and construction area shall be suitably secured to prohibit access by livestock and local fauna. Full shade cloth demarcation of 1.8m in height is recommended for the Contractor's Camp.
- Fences will be constructed around Heritage resources (should these be present) to prevent unauthorised 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 shall erect and maintain all fencing to the satisfaction of the RE and ESM. Such fences shall be erected before the start of any construction works.

4.2.8 Access Routes

Roads in the direct vicinity of the site will be subject to continual use by construction vehicles (particularly heavy vehicles) carrying building materials, waste, etc.

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 ESM and Resident Engineer immediately; and cleaned as soon as possible.

Notices should be placed on visible locations in the vicinity of the construction site to warn the public of construction activities and indicating that heavy vehicles may be using the road.

The Contractor/s shall control the movement of all vehicles and plant machinery on the Site so that they remain on designated/demarcated routes. The following apply:

- The gravel to be constructed for the operational phase of the Aerodrome should be used for construction access.
- Existing roads will be used as far as possible. No temporary access roads will be permitted, unless negotiated with the ESM and Resident Engineer and Developer.
- Any temporary roads required shall be decommissioned by the Contractor/s and rehabilitated using stockpiled topsoil.
- Topsoil shall be removed as described under 'Clearing and Grubbing' prior to the construction of the road/s.
- 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.

4.2.9 Clearing and Grubbing for Construction Purpose

Clearing should first be discussed with the ESM and Resident Engineer before commencement.

Plant Location and Rescue

- If considered necessary, the identification and rescue of endemic plants, and their transfer to a specified location shall be conducted by a suitably qualified contractor prior to the onset of any site clearing operations.
- Where possible direct transplantation of rescued plant material, into areas earmarked and prepared for re-vegetation, 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 site for transplantation once the permanent re-vegetation areas become available.
- Rescued plants shall be stored under damp shade cloth/hessian until they are transported to the required nursery sites. They shall be watered and bagged in topsoil from the area.

Vegetation Clearance

- The Contractor shall ensure that the clearance of vegetation is restricted to the minimum area required to facilitate the execution of the Works. Site clearance shall occur in a planned manner, and cleared areas shall be stabilised as soon as possible. The detail of vegetation clearing shall be to the Landscape Architect and ESM's approval.
- Areas that are, in the opinion of the Landscape Architect, less stable, shall be stabilised immediately following vegetation clearance.
- The disposal of vegetation by burying or burning is prohibited. Cleared vegetative material shall:
  - be removed from Site and disposed of at an approved disposal site;
  - be chipped and mulched, where suitable.
- Vegetation shall be cleared mechanically. Care shall be taken to minimise the disturbance to topsoil during this process.
- During site clearance, any old concrete, rubble or refuse shall be removed from the Site, or stockpiled for disposal at an approved disposal site. All stockpiles shall be managed so as to avoid spread of material and damage to vegetation.
- Where practical, indigenous plant material shall be kept separate from alien material.
  - The vegetative material shall be reduced either by mechanical means (chipper) or by hand axing to sticks of no longer than 100 mm.
- All indigenous vegetation cleared from the Site shall be collected and stored at the on-site nursery. Where appropriate, with permission from the Landscape Architect/Ecologist, the indigenous material shall be collected simultaneously with the topsoil.
- The Contractor shall store the mulched vegetation in bags. The bags shall be approved by the Landscape Architect and shall allow air to pass through the enclosed material. Mulch shall be protected from wetting.
- Subject to the approval of the Landscape Architect/Ecologist, seed-free material from exotic invasive plants (should these occur on site) shall be chipped and used to prepare mulch.
- The Contractor shall stabilise soil in unstable areas in order to control wind-blown dust and sand. The following methods shall be considered for soil stabilisation:
  - *Mulch stabilisation*
    - Mulch shall be applied by hand to achieve a layer of uniform thickness. The mulch shall then be lightly worked into the topsoil layer so that it mixes with the soil and serves to bind it.
    - The mulch shall be spread at a coverage rate of 100 kg per 250 m².
    - Where brush-cut material is to be utilised as mulch, this material shall be evenly spread across the area to a uniform depth of 25mm. The mulch shall then immediately be rotated into the upper 100 mm layer of soil. This operation shall not be attempted when the wind strength is such as to remove the mulch before it can be rotated in.
    - If the area is exposed to strong wind, the mulch stockpile shall be covered with a

fine nylon net with 100mm x 100mm openings.

- *Straw stabilisation*
  - Straw shall be utilised as a binding material in sandy areas. Baled straw shall be placed on the cleared area, opened and spread evenly by hand or machine at a coverage rate of 1 bale per 20 m² over the area to be stabilised. It shall then immediately be rotated into the upper 100 mm layer of soil. This operation shall not be attempted when the wind strength is such as to remove the straw before it can be rotated into the sandy substrate.
- *Stabilisation of steep slopes*
  - The Contractor shall take measures to protect all areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible. The Contractor shall take any other measures that may be necessary to prevent surface water from being concentrated in streams and from scouring the slopes, banks or other areas.
  - If runnels or erosion channels develop, they shall be back-filled and compacted, and the areas restored to a proper (stable) condition. The Contractor shall not allow erosion to develop on a large scale before effecting repairs.
  - Where artificial slope stabilisers are used, these should be applied to the slope before top soiling.
  - Near vertical slopes shall be stabilised using natural rock wall structures, stacked precast concrete blocks or rock-filled gabion baskets.
  - All structures shall have a 'natural' look and facilities for plants to grow in.
  - Where the slopes are 1:3 to 1:6 they should be logged or otherwise stepped (using stabilisation cylinders or similar) in order to prevent soil erosion. Logs/cylinders must be laid in continuous lines following the contours and spaced vertically 0.8-1.2m apart, depending on the steepness of the slope. These logs/cylinders must be secured by means of steel pegs and wire in rocky areas, and treated wooden pegs in other areas.
  - In areas where slopes are less than 1:6, horizontal grooves, shallow steps or ledges parallel to contours should be made on the cut slopes.
  - In areas where slopes are less than 1:6 these slopes should be stabilised by using logs in parallel rows, or stabilisation cylinders fastened randomly into position or using biodegradable netting. These structures shall hold the top-material on the slopes and serve as erosion prevention structures.
  - Shallow slopes shall be stabilised using commercial available and approved anti-erosion compounds.

Conservation of Topsoil

- The Contractor shall at all times carefully consider what machinery is appropriate for the task while minimising the extent of environmental damage.
- Topsoil shall be cleared of woody vegetation, and specifically exotic vegetation (should this occur), before ripping and removing. Identification of these species should be done by a competent person with the appropriate qualifications.
- The topsoil is regarded as the top 300 mm of the soil profile.

- Topsoil is to be handled twice only – once during clearing and stockpiling & once during rehabilitation.
- The topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process.
- Topsoil stockpiles shall not be higher than 2m or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1 to 2.5 (vertical/horizontal).
- 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 six to eight months before being used for rehabilitation. If stored for longer than six months, the Top material shall be analysed and, if necessary, upgraded before placement.
- No vehicles shall be allowed access onto the stockpiles after they have been placed.
  - Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation.
  - The Contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This can include the use of erosion control fabric or grass seeding.

4.2.10 Stockpiling

- The ESM will identify suitable sites for stockpiling.
- Stockpiles shall be convex in shape, shall be no higher than 2 m and shall be located so as to cause minimal disturbance. Stockpiles shall be so placed 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.

4.2.11 'No-go' Areas

- If so required by the Landscape Architect/Ecologist, certain areas shall be considered "no go" areas. All areas outside the demarcated working areas and Contractor's Camp as well as areas on the Site identified as sensitive by the ESM and/or Landscape Architect, are 'no go' areas.
- The Contractor shall ensure, insofar as he has the authority, that no unauthorised entry, stockpiling, dumping or storage of equipment or materials shall be allowed within the "no go" areas.
- "No go" areas shall be demarcated with fencing consisting of wooden or metal posts at 3m centres with 1 plain wire strand tensioned horizontally at 900 mm from ground level. Commercially available danger tape shall be wrapped around the wire strand. The ESM shall monitor the fence to ensure that it is maintained by the contractor for the duration of construction; and ensure that the danger tape does not become

dislodged.

4.2.12 Protection of Natural Features

- The Contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations; natural depressions) situated in or around the Site; for survey or other purposes unless agreed beforehand with the ESM and Landscape Architect/Ecologist. Any features affected by the Contractor in contravention of this clause shall be restored/ rehabilitated to the satisfaction of the Landscape Architect/Ecologist.
- The Contractor shall not permit his employees to make use of any natural water sources (e.g. springs, streams, and open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes.

4.2.13 Protection of Indigenous Fauna and Flora

- Except to the extent necessary for the carrying out of the Works, flora shall not be removed, damaged or disturbed. In addition, no vegetation shall be planted without authorisation. Disturbance and protection of fauna and flora within the boundaries of the Site must be done in accordance with the Method Statement.
- The construction area should be scoured for nests, dens or other habitats prior to the start of construction.
- Disturbance and protection of fauna and flora within the boundaries of the Site must be approved by the Landscape Architect/Ecologist.
- All construction workers must be informed that the intentional killing of animals is not permitted. This should be covered as part of induction programmes and talks held on site for construction staff.
- Where the use of herbicides, pesticides and other poisonous substances has been specified, they shall be stored, handled and applied in line with MSDS specifications; with due regard to their potential harmful effects. The use of these substances should be kept to an absolute minimum.
- Collecting of wood and/or killing trees in the area for the purpose of fire wood is prohibited. Trapping, removal, harming and/or killing of animals (reptiles, amphibians, mammals, avian/birds) are forbidden.
- No domestic pets are permitted on Site.
- All alien vegetation identified on site and along route alignments (should this occur) will be cleared by the Contractor. An effort must be made to remove the entire root system, and the plant left to dry out on a hard surface to prevent seed germination.

4.2.14 Erosion and Sedimentation Control

If possible, construction activities must be scheduled for the dry winter months to decrease the risk of erosion during heavy storms. An appropriate Erosion and Sedimentation Management Plan should be drafted prior to construction, but can also be in the form of an approved Method Statement.

During construction works the Contractor shall protect all areas susceptible to erosion and

siltation (e.g. stream banks) 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 Landscape Architect/Ecologist.

Consideration and provision shall be made for the following methods (or combination):

- Brush-cut packing.
- Mulch or chip cover.
- Straw stabilising (at the rate of one bale/20m² and, if required, additional straw should be added and rotated into the top 100 mm of the completed earthworks).
- Watering.
- Planting/sodding.
- Hand seeding sowing.
- Hydro-seeding.
- Soil binders and anti-erosion compounds.
- Mechanical cover or packing structures, e.g. gabions and mattresses, geofabric, hessian cover, armourflex, log/pole fencing and retaining walls.

4.2.15 Landscaping and Rehabilitation

Any areas that the Landscape Architect/Ecologist 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. Once construction is complete the Contractor shall clear everything from the Site not forming part of the Permanent Works. The area 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 the Landscape Architect/Ecologist.

The Contractor may not use herbicides, pesticides, fertilisers or other poisonous substances for the rehabilitation process unless otherwise agreed with the Landscape Architect/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.

Plant Location and Rescue

- If considered necessary, the location and rescue of endemic plants, and their transfer to a specified location (on-site nursery) shall be conducted by a suitably qualified ecologist prior to the onset of any site clearing operations.
- Where possible direct transplantation of rescued plant material, into areas earmarked and prepared for re-vegetation, 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 the on-site nursery for transplantation once the permanent re-vegetation 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 dipped into a moisture-retaining agent and bagged in the topsoil from the area.

Vegetation Clearance

- All cleared areas shall be stabilised as soon as possible. Areas that are, in the opinion of the Landscape Architect/Ecologist, less stable, shall be stabilised immediately following vegetation clearance. It is recommended that a phased vegetation clearance plan and strategy be drafted, accompanied with a map.
- The disposal of vegetation by burying or burning is prohibited. Cleared vegetative material shall:
  - be removed from Site and disposed of at an approved disposal site;
  - be chipped and mulched, where suitable.
- Vegetation shall be cleared mechanically. Care shall be taken to minimise the disturbance to topsoil during this process.
- During site clearance, any old concrete, rubble or refuse shall be removed from the Site, or stockpiled for disposal at an approved disposal site. All stockpiles shall be managed so as to avoid damage to vegetation.
- Where practical, indigenous plant material shall be kept separate from alien material.
- The vegetative material shall be reduced either by mechanical means (chipper) or by hand axing to sticks of no longer than 100 mm.
- All indigenous vegetation cleared from the Site shall be collected for later use.
- Where appropriate, with permission from the Landscape Architect/Ecologist, the indigenous material shall be collected simultaneously with the topsoil.
- The Contractor shall store the mulched vegetation in bags. The bags shall be approved by the Landscape Architect/Ecologist and shall allow air to pass through the enclosed material. Mulch shall be protected from wetting.

- Subject to the approval of the Landscape Architect/Ecologist, seed-free material from exotic invasive plants shall be chipped and used to prepare mulch.
- The Contractor shall stabilise soil in unstable areas in order to control wind-blown dust and sand.

Fertilisation

- Fertiliser shall be added to the soil on seeding or planting.
- The rate of application shall be as directed by the Landscape Architect/Ecologist after he has had the opportunity of testing the requirements of the soil in which the vegetation is to be planted.
- Fertilisers to be considered must be approved by the Landscape Architect/Ecologist prior to purchase and application.

Time of Planting

- The Contractor shall not begin planting work until all construction activities in the area to be revegetated have been completed.
- Reseeding and replanting shall occur at a time as indicated by the Landscape Architect/Ecologist by taking the rainfall period of the area into account.
- If planting occurs in the dry periods it shall be necessary to irrigate plants to ensure their successful establishment.

Re-vegetation

- The area shall be revegetated as follows:
  - The surface shall be levelled by hand or machine as far as practically possible.
  - Alien vegetation shall be cleared by cutting the plants off at ground level, and painting the stump with 0.5% Gallon in diesel.
  - For areas with a slope of greater than 1:3, straw shall be utilised as a binding material to stabilise the soil during re-vegetation and rehabilitation of the site. Straw shall consist of natural, dried fibres of hay or chaff of various lengths between 50 mm and 400 mm, delivered to Site in bales and shall be applied evenly by hand or machine at a rate of 1 bale per 20 m² over the area to be revegetated. It shall then immediately be rotated into the upper 100 mm layer of soil.
  - The prepared area shall be hydro- or hand-seeded at a rate of 40 kg/ha using Rye grass (Lolium multiflorum). In the event of hand-seeding, the seed mixture as specified shall be mixed with two parts per volume of clean dry plaster sand, then divided in half and applied evenly in two successive applications, one after the other, by means of an approved hand seeding machine. On completion of the seeding the surface shall be lightly raked to cover the seed with no more than 5 mm of soil.
  - Water used for the irrigation of vegetated areas shall be free of pollutants that will have a detrimental effect on the plants. The vegetated area shall only be watered once, immediately following seeding. Watering should be carried out from a tanker, using a fine nozzle spray to avoid erosion and disturbance of the

vegetation. Water for irrigation purposes may not be drawn from any water body.

Soil Stabilisation

The same methods as discussed under point 3.2.9 above will be applicable.

4.2.16 Protection of Archaeological and Paleontological Remains

Archaeological sites are protected by the National Heritage Act No 27 of 2004. Generally, 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.

Should any archaeological materials be uncovered, works shall cease immediately and the area shall be cordoned off until such time as the ESM authorises resumption of construction in writing. The ESM shall immediately report the findings to the National Monuments Council. The latter will inspect the area within 24 hours of a find being reported (to prevent unnecessary delays in works) and make further recommendations. Mitigation measures should be implemented if required.

4.2.17 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.

4.2.18 Fire Control

No fires may be lit on site. Any fires that occur shall immediately be reported to the ESM.

Smoking shall not be permitted in those areas where it is a fire hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other

material is such as to make liable the rapid spread of an initial flame. Cigarette butts must be disposed of in designated containers.

In terms of the Atmospheric Pollution Prevention Act (No. 45 of 1965), burning of any material is not permitted as a disposal method.

The Contractor shall appoint a competent fire safety officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed. The Contractor shall ensure that there is basic fire-fighting equipment (e.g. fire buckets, extinguishers, fire beaters, etc.) available on Site at all times. This shall include at least rubber beaters when working in urban open spaces and one fire extinguisher of the appropriate type when welding or other "hot" activities are undertaken.

Open fires for cooking purpose are not allowed, except within the Contractor's camp under controlled conditions.

4.2.19 Emergency Procedures

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

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.

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 ESM and Resident Engineer.
- The Contractor shall ensure that the necessary materials (e.g. chemcap, spill-sorb, drizit 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 ESM and Resident Engineer.

4.2.20 Traffic Management

- The gravel to be constructed for the operational phase of the Aerodrome should be used for construction access.
- Appropriate signs should be place along the Main Road 100 to suitably notify road users of the construction activity and the use of the road for load-bearing vehicles.
- A reduced speed limit nearer to intersections should be implemented and flagmen

should be used in times when work is adjacent to or along heavy-trafficked routes.

- All vehicles making deliveries or picking up material should adhere to the speed limits.
- Normal pick-ups and deliveries should be restricted to working hours (8:00 to 17:00).
- Construction vehicles should be in a roadworthy condition and they should be appropriately maintained throughout the construction period.
- Heavy equipment should be transported early in the morning (12:00 to 5:00) with proper pilotage.
- Raw materials such as sand should be appropriately covered to prevent loss of material during transit.
- All vehicles should park in demarcated areas on site until they are offloaded.

4.2.21 Community Relations

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

4.2.22 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 ESM.

4.2.23 Temporary Site Closure

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

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.

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.

Erosion and siltation

- Wind and dust mitigation in place.
- Stockpiles at stable angle.
- Detention ponds or channels in place.
- Erosion protection measures in place.
- Revegetated areas watering schedules and supply secured.

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.

4.3 MATERIALS

4.3.1 Hazardous Substances

Petroleum, chemicals, harmful and hazardous waste shall be stored in an enclosed and bunded area. This area shall be subject to the approval of the Engineer. The waste shall be disposed of at a hazardous waste disposal site as approved by the ESM.

4.3.2 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 Camp, and, if so required, out of the rain. All lay down areas outside of the Contractor's Camp shall be subject to the ESM's approval, which shall not unreasonably be withheld.

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 ESM and Resident Engineer.
- Stockpile areas will be identified by the Resident Engineer and agreed upon by the ESM and Landscape Architect before any stockpiling commences.

Topsoil

- The top 30 cm 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.

Spoil material

- The location of spoil stockpiles shall be identified by the Engineer and agreed upon by the ESM and Landscape Architect 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 ESM 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.

4.3.3 Plant Material

For all landscaping and rehabilitation work only plants approved by the Landscape Architect/Ecologist may be used. No declared invasive alien species may be used.

Shrubs and trees

- The Contractor shall ensure that each plant is handled and packed in the approved manner for that species or variety, and that all necessary precautions are taken to ensure that the plants arrive on Site in a proper condition for successful growth.
- Trucks used for transporting plants shall be equipped with covers to protect the plants from windburn. Containers shall be in a good condition. Plants shall be protected from wind during the transportation thereof.
- The Landscape Architect/Ecologist shall ensure that the plants are in a good condition and free from plant diseases and pests. The Landscape Architect/Ecologist in support

of the Contractor shall immediately remove plants containing any diseases and/or pests from the Site.

- There shall be sufficient topsoil around each plant to prevent desiccation of the root system. Where plants are stored on Site prior to planting they shall be maintained to ensure that the root systems remain moist.

4.4 CONSTRUCTION PLANT

4.4.1 Fuel and Oil

If so required, fuel may be stored on Site 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 ESM prior to any refuelling activities.

The Contractor shall ensure that an emergency spill control kit and absorbent material (e.g. chemcap, spill-sorb, drizit pads, enretech and peat moss) is always 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 spilled substances.

Fuel storage areas

- The ESM and Resident Engineer shall be advised of the area that the Contractor intends using for the storage of fuel. Fuels shall be stored at a suitable location inside the Contractor's Camp.
- 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 ensure that all liquid fuels (petrol and diesel) are stored in tanks with lids, which are kept firmly shut.
- The tanks shall be situated on a smooth impermeable surface (250 µm plastic or concrete) base with an earth bund (plastic must have a 5cm layer of sand on top to prevent perishing). The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be 110% of the total capacity of all the storage tanks.
- The floor shall be bunded and sloped towards a sump to contain any spillages of substances. 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 Contractor shall keep fuel under lock and key at all times. No smoking shall be allowed in the vicinity 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.

Fuel storage tanks

- Temporary above ground storage tanks may be permitted at the discretion of the ESM 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 3.5 m 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).

4.4.2 Ablution Facilities

Any 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. Provision shall thus be made for ablution and washing facilities.

The exact location of the facilities shall be approved by the ESM 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 30 workers (preferred 1:15) and be within walking distance (100m of active works areas) 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.

4.4.3 Eating Area

The Contractor shall provide bins with lids at the eating areas for his staff, which shall be emptied on a daily basis. The waste may be temporarily stored inside the Contractor's Camp in a facility that is weatherproof and scavenger-proof and which has been approved by the Engineer. The feeding or discarding of food for animals is strictly prohibited.

4.4.4 Solid Waste Management

No burning, burying or dumping of any waste materials, rubble, vegetation or refuse shall occur on Site. The Contractor shall set up a solid waste control and removal system to fit into the larger Project waste management system. The waste may be temporarily stored on Site in a central waste area that is weatherproof and scavenger-proof, and which the ESM and Resident Engineer have approved. The accumulation of construction waste materials must be avoided as far as possible.

The system shall comply with the following detailed requirements:

Dumping

- Receipts for hazardous waste disposal shall be copied to the ESM and Engineer.
- Refuse shall be disposed of into scavenger- (baboons, dogs, rodents, etc.) and weather-proof bins. The Contractor shall then remove the refuse collected from the working areas, from Site at least once a week or depending on necessity.
- Refuse must be disposed of at an authorised municipal landfill site.
- The Contractor shall make provision for workers to clean up the Contractor's Camp and working areas at least once a week as part of housekeeping.

Recycling

- Wherever possible, materials used or generated by construction shall be recycled.
- Containers for glass, paper, metals and plastics shall be provided (a four bin recycling system). Office and camp areas are particularly suited to this form of recycling process.
- Where possible and practical, such as at stores and offices, waste shall be sorted for recycling purposes.

4.4.5 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 waste water 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 ESM 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 shall ensure that the disposal of contaminated water is sanctioned by the ESM.

4.4.6 Workshop, Equipment Maintenance and Storage

Where practical, all maintenance of plant and equipment on Site shall be performed in a suitably equipped workshop. If it is necessary to do maintenance outside of the workshop area, the Contractor shall obtain the approval of the ESM 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 ESM and Resident Engineer.

In the case of an on-site workshop; it shall have a smooth impermeable (concrete or 250 µm plastic covered with sand) 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 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.

Contractor's Camp maintenance

The Contractor's Camp shall be kept neat and clean at all times. Waste and litter shall be disposed of into designated containers, which shall be emptied regularly by the Contractor. Waste materials shall be transported off the Site according to acceptable standards and procedures.

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. The bunded area should have a smooth impermeable surface with an earth bund.

4.4.7 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, tape recorders, 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.

The following specific measures must therefore be adhered to:

- 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.
- Screen construction activities from residential, social and business entities with soil berms to limit noise.

4.4.8 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 ESM.

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

- Details of the proposed source of water to be utilised and the details of permits acquired for such usage. As far as is possible, potable water must not be used as a means of dust suppression. The use of "grey", "brown" or raw water must be investigated as an alternative.
- Schedule of spraying water on unpaved roads, paying due attention to control of runoff.
- A wind monitoring station should be set up to indicate the direction and strength of daily winds. During period of high wind, construction activities should be limited.
- Speed limits for vehicles on unpaved roads and minimisation of haul distances.
- Measures to ensure that material loads are properly covered during transportation.
- Schedule for wheel cleaning and measures to clean up public roads that may be soiled by construction vehicles.
- Minimisation of the areas disturbed at any one time and protection of exposed soil against wind erosion, e.g. by dampening with water or covering with straw.
- 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 ESM and 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 ESM and Resident Engineer.
- Appropriate dust suppression measures shall be used when dust generation is unavoidable, e.g. straw, brush packs and chipping, particularly during prolonged dry periods in summer. Such measures shall also include the use of temporary stabilising measures (e.g. chemical soil binders and dustex).

4.4.9 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.

4.4.10 Site Structures

All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours 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.

4.4.11 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.

The mitigation measures proposed under the above sections will ensure the protection of groundwater resources and should be implemented.

4.5 POST CONSTRUCTION

4.5.1 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.

4.5.2 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. All burrow pits that were utilised for the abstraction of building materials should be rehabilitated to the minimum requirements of the Department of Minerals and Energy.

The rehabilitation plan must ensure that erosion by runoff water does not occur.

4.6 MITIGATION MEASURES AND PROPOSED MANAGEMENT PROGRAMME

Table 3 to Table 6 below outlines those specific mitigation measures required in order to fulfil the recommendations of the CEMP. The tables should be read in conjunction with Section 4.2 to Section 4.5 above. These measures must be implemented during the

construction phase (including future construction) of the proposed **Opuwo Aerodrome** project.

The responsibility for these measures is included in Column IV. While responsibilities have been assigned to various other parties, it must be noted that the applicant and his/her successor are ultimately held responsible for any damage to the environment as a result of the development; and that non-compliance with the CEMP will be regarded as non-compliance in terms of the Environmental Authorisation.

The management measures presented in the Tables to follow forms a general code of conduct for all contractors operating on the site.

Table 3: Specific Mitigation Measures for Pre-construction Activities

(I) Issue	(II) Objective	(III) Mitigation Measure	(IV) Responsibility	(V) Compliance Notes
PLANNING & DESIGN				
Contractor Requirements	Ensure that the Contractor is aware of his/her responsibility.	Provide the contractor with the EMP.	Client	
Environmental Site Manager	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.	Client	
Visuals & Aesthetics	Ensure that the visual aspects of construction are taken into consideration to lessen impacts on neighbouring activities.	Screen construction areas with shade cloth or other suitable material from adjacent properties.	Contractor	
Waste Management	Ensure the effective and efficient separation, storage and removal of waste from the site.	Develop a Waste Management Plan for the construction phase which will detail: ▪ Schedules for collection ▪ Responsible parties for collection ▪ Details regarding waste separation (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	Engineer	
Loss of habitat/eco-systems	Conserve tall indigenous trees.	Indigenous trees should be preserved to recreate and improve some important habitats.	Contractor	

(I) Issue	(II) Objective	(III) Mitigation Measure	(IV) Responsibility	(V) Compliance Notes
SITE ESTABLISHMENT				
Construction activities	Ensure that there is no unnecessary disturbance to areas on the site and that construction activities take environmental considerations into account.	A layout plan for construction activities needs to be developed and approved by the Environmental Site Manager.	Engineer Contractor ESM	
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.	ESM Contractor	

Table 4: Specific Mitigation Measures for Construction Activities

(I) Issue	(II) Objective	(III) Mitigation Measure	(IV) Responsibility	(V) Compliance Notes
CONSTRUCTION				
Archaeological Evidence	Ensure the protection of archaeological sites.	Construction must be stopped and a professional archaeologist consulted should any archaeological remains be uncovered.	Contractor ESM 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 & ESM	
Blasting	Ensure blasting does not pose a danger to workers or staff, or neighbouring activities.	Authorisation to undertake blasting activities must be obtained from the relevant authority.	Contractor	
	Ensure blasting does not pose a danger to workers or staff.	All conditions relating to blasting and the Occupational Health & Safety Act must be complied to.	Contractor	
Cleaning of equipment	Ensure that spillages are minimised and that where these occur, that they are appropriately managed.	Proper cleaning trays should be used for the cleaning of cement mixing and handling equipment.	Contractor	
Communication	Ensure that interested and affected parties are provided with a medium through which to lay complaints with regard to activities on site.	A complaints register should be kept in the site office. The Environmental Forum needs to be informed of all complaints and corrective action must be taken where required.	Contractor	
Contaminated Soil	Ensure that soils that are contaminated do not pollute the environment.	All soils that have been contaminated by fuel spills, paints spills, etc. must be appropriately removed from the 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	

(I) Issue	(II) Objective	(III) Mitigation Measure	(IV) Responsibility	(V) Compliance Notes
Dust	Ensure dust does not cause nuisance to neighbouring activities.	Wet all exposed sand areas such as roadways, stockpiles and working areas that give rise to dust. This must ensure adequate dust suppression.	Contractor	
Environmental Site Manager and ER	Ensure that there is compliance with the EMP on site.	An Environmental Site Manager may inspect the site at any time during the construction phase.	ESM	
Effect of the EMP	Ensure that the EMP is enforced on all contractors.	Each contractor and subcontractor must be notified on the content of this EMP.	Engineer & ESM	
		All contractors and subcontractors must be bound by the content and requirements in this EMP.	Engineer & ESM	
Ground Water	Prevent the contamination of groundwater resources.	Vehicles must be equipped with drip trays to prevent spillages of oils and fuels.	Contractor	
Loss of surrounding habitat and sensitive species	Prevent the destruction of protected, medicinal or sensitive 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.	Contractor	
Installation of Services	Ensure that all points for water provision are regularly inspected for erosion impacts.	Implement adequate mitigating measures to curtail any erosion impacts.	Contractor	
	Ensure that water used to wash machinery and any other “grey” water does not pollute the site.	Provide a wash bay with a impermeable floor to contain such water.	Contractor	
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	

(I) Issue	(II) Objective	(III) Mitigation Measure	(IV) Responsibility	(V) Compliance Notes
Noise	Ensure that nuisance noise from construction activities does not disrupt the surrounding landowners.	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	
	Ensure that nuisance noise does not disrupt the surrounding land owners.	Jack hammering and blasting, if required, must take place between the hours of 08:00 and 17:00 during the week only.	Contractor	
	Ensure that nuisance noise from construction vehicles does not disrupt the surrounding landowners.	No heavy vehicles may be permitted to move on site on Sundays.	Contractor	
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.	The movement of heavy vehicles from the site must occur outside of peak traffic hours (after 08h30 and before 16h30).	Contractor	
	Ensure that local residents are not inconvenienced by the movement of construction vehicles off-site.	Spillages on the roads should be avoided. When these occur, they should be cleaned immediately.	Contractor	
	Ensure that local residents are not inconvenienced by the movement of construction vehicles off-site.	Notices should be placed on the B6 Road during the construction period indicating that heavy vehicles are using the road.	Contractor	
Safety & Security	Ensure the safety and security of staff and the public.	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	

(I) Issue	(II) Objective	(III) Mitigation Measure	(IV) Responsibility	(V) Compliance Notes
Safety & Security	Ensure the safety and security of staff and the public.	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 and maintained.	Contractor	
		The movement of construction workers through the neighbouring area should be restricted wherever possible.	Contractor	
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.	Fuels stored on site shall be bunded to 110% of the capacity of the largest container.	Contractor	
	Ensure that fuel stored on site does not pose a pollution hazard.	The fuel storage area must not be located less than 100m 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 occur, that they are appropriately managed.	Minor vehicle repairs on an appropriate work surface may only take place within the provided area in the contractors camp	Contractor	

(I) Issue	(II) Objective	(III) Mitigation Measure	(IV) Responsibility	(V) Compliance Notes
Waste	Ensure the adequate removal of solid waste.	All wastes (hazardous or general) must be collected and disposed of at an appropriate registered facility.	Contractor	
	Ensure the adequate management of waste	Refuse shall be disposed of into scavenger-(baboons, dogs, rodents, etc.) and weather-proof bins. The Contractor shall then remove the refuse collected from the working areas, from Site at least once a week or depending on necessity.	Contractor	
		Refuse must be disposed of at an authorised landfill acceptable to the DEA.	Contractor	
		No waste should be burnt on site.	Contractor	

Table 5: Specific Mitigation Measures for Post-construction Activities

(I) Issue	(II) Objective	(III) Mitigation Measure	(IV) Responsibility	(V) Compliance Notes
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	
	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	

Table 6: Specific Mitigation Measures for Monitoring Activities

(I) Issue	(II) Objective	(III) Mitigation Measure	(IV) Responsibility	(V) Compliance Notes
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.	ESM	
Monitoring	Ensure compliance with the requirements of the EMP.	Undertake monitoring activities on a monthly basis.	ESM	

APPENDIX A PRO FORMA: ENVIRONMENTAL METHOD STATEMENT

ENVIRONMENTAL METHOD STATEMENT

Activity:

CONTRACT: _____ **DATE**: _____

WHAT WORK IS TO BE UNDERTAKEN? (give a brief description of the works)

*Insert additional pages as required

WHERE ARE THE WORKS TO BE UNDERTAKEN?
(where possible, provide an annotated plan and a full description of the extent of works)

*Insert additional pages as required

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)

*Insert additional pages as required

APPENDIX B PRO-FORMA: ENVIRONMENTAL MONITORING REPORT

ESM ENVIRONMENTAL MONITORING REPORT

Report No:	
Date:	

Method Statements	**Contractor:**	**Date received:**

Environmental Education	**Contractor:**	**Date undertaken:**

INSPECTIONS CHECKLIST

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?			
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?			

ISSUE	OBSERVATION	REMEDIAL ACTION	COMPLIANCE
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?			
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?			

ISSUE	OBSERVATION	REMEDIAL ACTION	COMPLIANCE
1.19 Restricted traffic over stabilised areas?			
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?			
1.27 Location and rescue of plants undertaken by suitably qualified contractor?			

ISSUE	OBSERVATION	REMEDIAL ACTION	COMPLIANCE
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?			
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?			

ISSUE	OBSERVATION	REMEDIAL ACTION	COMPLIANCE
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?			
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?			

ISSUE	OBSERVATION	REMEDIAL ACTION	COMPLIANCE
3. PLANT			
3.1 Fuel/oil storage facilities adequately secured and protected against leakage?			
3.2 Safety signage provided at fuel storage areas?			
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?			

ISSUE	OBSERVATION	REMEDIAL ACTION	COMPLIANCE
3.8 Adequate toilet facilities provided for staff (min. 1 toilet per 30 workers)?			
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?			
3.24 All plant and machinery have drip trays, which are checked and emptied daily?			

ISSUE	OBSERVATION	REMEDIAL ACTION	COMPLIANCE
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?			

SUPPLEMENTARY INFORMATION

EMP Transgressions	Contractor:	Date:	Fine issued:

Complaints	Date received:	Action taken:

Other issues	Comments

APPENDIX C PRO-FORMA: ENVIRONMENTAL COMPLAINTS REGISTER

ENVIRONMENTAL COMPLAINTS REGISTER					
Date	**Time**	**Name & Contact details of lodger of Complaint**	**Location and Nature of Complaint** *(Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)*	**Corrective Action Taken** (*Give details and attach documentation as far as possible)*	**Signature**