APPENDIX J
ENVIRONMENTAL MANAGEMENT PLAN
EXECUTIVE SUMMARY

The Nacala Dam and Reservoir, located on the Muecula River approximately 30 kilometres south west of Nacala, is the primary water source for the City of Nacala. Due to a previously identified risk of dam failure, water levels at the dam are reported to be kept low, reducing the water supply for Nacala significantly. Projected demands for urban growth in the City of Nacala and Nacala Velha greatly exceed the existing water supply capacity of the Nacala Dam Reservoir. The Government of the Republic of Mozambique (GOM) has received a grant from the Millennium Challenge Corporation (MCC) and through the Millennium Challenge Account-Mozambique (MCA-Mozambique), intends to use a portion of the proceeds of this grant, to carry out feasibility studies relating to the rehabilitation and augmentation of the Nacala Dam and Reservoir.

In June 2009, a consortium of firms, with Jeffares and Green (Pty) Ltd (J&G) as the lead consultant, was appointed to undertake the Nacala Dam Feasibility Study, Environmental and Social Impact Assessment, Design and Supervision Project. The aim of this project is to increase the water supply capacity of Nacala Dam in order to meet increasing demand of Nacala City and to supply Nacala Velha with water, while ensuring that the dam is structurally safe.

Project activities include a spillway upgrade, raising of the dam wall, a realignment of the N12 National Road, and the excavation of materials from borrow pits for these activities. The existing spillway is in a poor state of disrepair and has resulted in overtopping in the past and is considered a safety risk. The proposed spillway upgrade would involve the increase in capacity from $300m^3/sec$ to $734m^3/sec$. The upgraded spillways would have a free overflow crest that does not need to be operated by staff. Spilling will occur automatically when the water level exceeds the spillway crest. The existing malfunctioning spillways will be discontinued and replaced with a concrete bulkhead. Outlet pipes and valves will be introduced to be able to release the required ecological flow. Construction of a coffer dam will be required upstream of the proposed position of this spillway. Raising of the Dam Wall involves moving the existing National Road N12 off the embankment crest and onto a new embankment downstream of the dam wall.

This Environmental Management Plan (EMP) provides a comprehensive overview of the mitigation and monitoring requirements for construction and operation of the proposed project. Adherence to these mitigation measures and management requirements will minimise the impacts of the project to the extent that no significant residual impact of construction or operation is likely to occur. Key tasks for implementation of the EMP during the planning and construction phases include (but are not limited to):
• Compilation of detailed layout plans for construction camp site and construction areas, e.g. toilets to be located further than 50m from water courses; fuel tanks to be bunded, location of chemical stores, location of silt traps, etc.
• A stormwater layout plan designed to ensure adequate diversion and dissipation of stormwater to prevent erosion and sedimentation.
• Encouragement of preferential labour recruitment from the local communities to minimise social impacts associated with influx of a large labour force such as increased HIV/AIDS, increased crime, social disruption, alcoholism, etc.
• Regular dialogue between the Contractor’s Community Relations Officer (CRO) and representatives of the communities to keep the community abreast of work schedules and activities, and to hear and address concerns.
• Awareness raising and training of the workforce to ensure they are familiar with all on-site rules and requirements relating to aspects such as solid and chemical waste disposal; use of toilets; prohibition on use of the surrounding bush area as a toilet; for littering; trampling and harvesting of fauna and flora, or the lighting of fires. Other aspects covered include workforce awareness of communication channels and key points of contact for specific workforce issues.
• Implementation of the Contractor Standards for construction that are designed to mitigate erosion and sedimentation risks, pollution risks, and to manage social impacts (e.g. visual, dust/noise, blasting, traffic accidents etc) and other biophysical impacts (e.g. loss of flora and fauna, general habitat disturbance).
• Rehabilitation of disturbed areas such as borrow pits and appropriate landscaping of the project site so as to minimise the visual impacts of the construction activities, while minimising the risk of erosion.
• Implementation of a Resettlement Action Plan (RAP) in terms of World Bank’s Operational Policy 4.12 (OP 4.12) to assist the project affected people (PAP) that are affected by the project. Assistance is required in terms of physical displacement (households to be moved) and economic displacement (machambas lost due to anticipated rise in water levels).
• Auditing; monitoring, e.g. surface water quality monitoring; site inspections and reporting to be implemented by the Environmental Compliance Officer (ECO); the site Engineer and the regulatory organisations such as MCA-Mozambique, MICOA, etc. as appropriate.

Key tasks for implementation of the EMP during the operational phase include:
• Awareness raising and training of the Nacala Dam (FIPAG) workforce to ensure they are familiar with all on-site rules and requirements relating to aspects such as solid and chemical waste disposal. Other aspects covered include workforce awareness of communication channels and key points of contact for specific workforce issues.
• Ongoing surface water monitoring and analyses.
• Ongoing monitoring of outcome of the RAP.
• The operator with their staff must further develop and implement a detailed Emergency Response Plan which addresses aspects such as hazardous material accidents, e.g. diesel spill; compilation of an emergency contacts list; protocols for remedial action; and training of key staff to deal with incidents and accidents.
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## GLOSSARY AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>CRO</td>
<td>Community Relations Officer</td>
</tr>
<tr>
<td>DNA-GOH</td>
<td>Direcção Nacional de Águas (National Directorate of Water) - Cabinet of Hydraulic Works</td>
</tr>
<tr>
<td>DNAIA</td>
<td>Direcção Nacional de Avaliação de Impacto Ambiental (National Environmental Impact Assessment Directorate)</td>
</tr>
<tr>
<td>DPCAA</td>
<td>Direcção Provincial para a Coordenação da Acção Ambiental (Provincial Directorate for Co-ordination of Environmental Affairs)</td>
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<tr>
<td>ECO</td>
<td>Environmental Control Officer</td>
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<tr>
<td>EFR</td>
<td>Environmental Flow Requirements</td>
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<tr>
<td>ESIA</td>
<td>Environmental and Social Impact Assessment</td>
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<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>GOM</td>
<td>Government of Mozambique</td>
</tr>
<tr>
<td>HIA</td>
<td>Health Impact Assessment</td>
</tr>
<tr>
<td>mamsl</td>
<td>Metres Above Mean Sea Level</td>
</tr>
<tr>
<td>MAR</td>
<td>Mean Annual Runoff</td>
</tr>
<tr>
<td>MCA-Mozambique</td>
<td>Millennium Challenge Account – Mozambique</td>
</tr>
<tr>
<td>MCC</td>
<td>Millennium Challenge Corporation</td>
</tr>
<tr>
<td>mcm/a</td>
<td>million cubic metres per annum</td>
</tr>
<tr>
<td>MICOA</td>
<td>Ministério para a Coordenação da Acção Ambiental (Ministry for the Coordination of Environmental Affairs)</td>
</tr>
<tr>
<td>OP 4.12</td>
<td>World Bank’s Operational Policy 4.12 on Involuntary Resettlement</td>
</tr>
<tr>
<td>PPP</td>
<td>Public Participation Process</td>
</tr>
<tr>
<td>RAP</td>
<td>Resettlement Action Plan</td>
</tr>
<tr>
<td>RPF</td>
<td>Resettlement Policy Framework</td>
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<td>SIA</td>
<td>Social Impact Assessment</td>
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</table>
1 INTRODUCTION

1.1 OVERVIEW OF PROPOSED ACTIVITY

The Government of the Republic of Mozambique (GOM) has received a grant from the Millennium Challenge Corporation (MCC), an innovative United States established foreign assistance program designed to reduce poverty by promoting sustainable economic growth. The MCC operates on the principle that aid is most effective in countries that promote good governance, economic freedom and investments in people. The GOM, through the Millennium Challenge Account-Mozambique (MCA-Mozambique), a public institution created by the GOM, and its National Directorate of Water (DNA-GOH) organ, have used a portion of the proceeds of this grant to carry out feasibility studies relating to the rehabilitation and augmentation of the Nacala Dam and Reservoir. The Dam is the primary source of water supply for the city of Nacala and is therefore of strategic importance to the development of the city.

In June 2009 Jeffares and Green (Pty) Ltd (J&G) was appointed as the lead consultant to undertake the Nacala Dam Feasibility Study, Environmental and Social Impact Assessment (ESIA), Design and Supervision Project. As part of this project, a number of activities are proposed, including the rehabilitation and elevation of the dam wall; an upgrade of the spillway; the realignment of the N12 National Road; and the excavation of materials for these activities.

The existing spillway is in a poor state of disrepair and has resulted in overtopping in the past and is considered a safety risk. The proposed spillway upgrade would involve the increase in capacity from $300m^3/sec$ to $734m^3/sec$. The upgraded spillway would have a free overflow crest that does not need to be operated by staff. Spilling will occur automatically when the water level exceeds the spillway crest. The existing malfunctioning spillways will be discontinued and replaced with a concrete bulkhead. Outlet pipes and valves will be introduced to be able to release the required ecological flow requirements. Construction of a coffer dam will be required upstream of the proposed position of this spillway.

Raising of the Dam Wall involves moving the existing National Road N12 off the embankment crest and onto a new embankment downstream of the dam wall. The overall length of this new section of road would be approximately 1,288m. It is proposed that the road, bridge and culverts be constructed during the dry season at the beginning of the contract. It is envisaged that the road deviation and associated drainage works will be completed within the first six months of the contract, thus allowing traffic to be diverted off of the existing dam wall to facilitate construction work on the dam wall.

By removing the national road from the dam crest, the crest width can then be reduced from 11m to 6m. The dam embankment will then be raised by 4m, by increasing the side slopes on both the up and downstream face to a 1:2 slope. The core will also be raised to within 1m of the crest level. The downstream face will be widened by the addition of a gravel aggregate layer, and by the inclusion of a mid slope berm. A new rock toe will be incorporated into the downstream face.
The findings of the environmental and social impact assessment (ESIA) report were used as the basis for determining areas of management intervention in the Environmental Management Plan (EMP) (this report).

1.2 OBJECTIVES AND TARGETS OF EMP

The overall objective of this EMP is to demonstrate that the environmental implications of the proposed project, as identified during the ESIA, have been taken into account and that appropriate measures to prevent, reduce and control any adverse environmental impacts have been developed for the construction and operational phases of the project. It is designed to give the regulatory authority (MICOA) confidence that the impacts will be addressed and managed correctly to a sufficient level for issuance of an Environmental Licence for the project to proceed.

Each management action is designed to be practical, measurable and auditable. The defined target is designed to assist the Environmental Compliance Officer (ECO) (to be appointed by the Contractor) and/or external auditor with identifying the specific aspects to be managed and audited. Further, the EMP sets out instruction that will be included in a contract document for the construction phase of the project. It aims to ensure that the construction activities are conducted and managed in an environmentally sound and responsible manner. The EMP also describes the organisational authority and structure required to ensure the effective implementation of the EMP and measures to monitor and improve the application of the EMP.

1.3 LOCATION OF PROJECT

The Nacala Dam is located on the Muecula River approximately 30 kilometres south west of Nacala with the next closest town being Monapo (Figure 1). The dam is the primary water source for the city of Nacala, which is situated approximately 200 kilometres north east of Nampula City.

Most of the project construction activities will take place in the immediate Dam Wall area and in the area just downstream of the existing wall with the exception of the borrow pits sites. The borrow pit sites are located between 3km to approximately 19km away from the dam site along the present N12 route and along a prominent granite gneiss ridge, which is situated to the north and north east of the Nacala Dam and the N12 route. The aerial extent or project footprint area is more extensive and difficult to define. The positive impacts (a secure potable water supply system), resulting from the project will have a regional benefit and will specifically benefit the City of Nacala and Nacala Velha.

The project footprint area includes the Muecula River downstream of the dam. Although, the extent to which the project may affect the aquatic environment and downstream river users is difficult to quantify, it is estimated that a change in the flow volumes will be experienced for a distance of about 1.5km downstream of the Dam based on the semi-perennial nature of the river. The spillway is designed to allow water to be discharged to the downstream environment in a way that simulates the natural rainfall pattern and an environmental flow release equivalent to 21.41% (1.355 Mm$^3$) of the Mean Annual Runoff (MAR) is recommended.
Figure 1: Location of Nacala Dam Wall
1.3 FORMAT OF EMP

The format of this EMP includes the following sections:

- Chapter 1 – Brief project overview and objectives of EMP
- Chapter 2 – Legal Requirements and Administrative Framework
- Chapter 3 – Summary of predicted negative impacts associated with the project
- Chapter 4 – Description of feasible and cost-effective mitigation measures
- Chapter 5 – Environmental Awareness Programme
- Chapter 6 – Implementation of EMP including roles and responsibilities
- Chapter 7 - Reporting Procedures
- Chapter 8 - Monitoring and Auditing Programme
- Chapter 9 – Conclusions and Recommendations
2 LEGISLATION, POLICIES AND GUIDELINES

This section provides a summary of the legislative framework and international best practice guidelines and standards that the Contractor should be aware of and adhere to. The ESIA process is regulated by a number of laws that include the Constitution of Mozambique, the Environmental Law (Decree No. 20/1997), and the Regulations for the Environmental Impact Assessment Process (Decree No. 45/2004):

2.1 THE CONSTITUTION OF MOZAMBIQUE

The Constitution is the supreme law of the land and any act or conduct inconsistent with it is invalid and will have no force of law. Any development has to ensure that none of its activities will be inconsistent with the constitutional rights of the people of Mozambique. The key provisions relevant to this EIA are:

“Article 27: The state shall promote efforts to guarantee the ecological balance and the conservation and preservation of the environment for the betterment of the quality of life of its citizens”.

“Article 72: All citizens shall have the right to live in, and the duty to defend, a balanced natural environment”.

2.2 ENVIRONMENTAL LAW

The Environmental Law (Decree No. 20/1997 of 1 October) serves as the framework environmental legislation for Mozambique. Its overall objective is defined as follows:

“Article 2: The current Act has the objective of defining the legal basis for the utilisation and correct management of the environment and its components, with a view of ensuring a system of sustainable development in this country”.

2.3 REGULATIONS FOR THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The Regulations for the Environmental Impact Assessment Process Act (Decree No. 45/2004), as amended by Decree No. 42/2008 of November defines the rules and regulations concerning competent authorities, applications for environmental authorisation, and the procedures that must be followed in an EIA. This includes undertaking an EIA Pre-assessment Application (Screening), Environmental Pre-Feasibility and Scoping (EPDA) and the EIA, as well as a Public Participation Process. An EIA, as defined under Article 12 of the EIA regulations should, at minimum, include a clear assessment of potential environmental and social impacts. Supporting specialist studies and an EMP (this report) should be included as an annexure to the EIA.

2.4 SUPPORTING ENVIRONMENTAL LEGISLATION

A number of Decrees and ministerial Diplomas have been enacted in support of the above acts. The following are considered relevant:

- Regulations for the Environmental Audit Process (Decree No. 32/2003 of 20 August)
• Regulations for Environmental Inspections (Decree No. 11/2006 of 15 June)

2.5 OTHER LEGISLATION

The following legislation or sectoral legislation may to varying degrees be relevant to the EIA process:

The Water Law, Decree 16/1991 of 3 August states that hydraulic works will not be approved without the previous analysis of its effects and impact on the environment, economy and society.

The Forestry and Wildlife Law, Decree 10/1999 of 7 July provides lists of economic important timber species and of protected fauna. Projects likely to have an impact on areas where these species predominate even though the area itself is not protected by law, require a more careful evaluation than projects that do not impinge on this kind of resources.

The Land Law, Decree 19/1997 of 1 October refers to the extinction of land occupation and usage rights, stating that payment of just compensation will precede any process of expropriation. There is no specific legislation concerning responsibility neither for organizing and implementing compensation and resettlement nor on the procedures to be followed. In the absence of a clearly defined resettlement policy, the GOM has been following the principles set forth in the World Bank’s Operational Policy 4.12 on Involuntary Resettlement to deal with the issues raised by the need to resettle people.

The Emission of Effluents, Decree 18/2004 of June 2 lays out the standards for environmental quality and the emission of effluents. This regulation sets standards for air, water, soil and noise and is of relevance particularly during the construction phase. In general, the emission of effluents should occur in such a manner that “there is no change in the quality of the receiving environment which turns the use of its waters for other aims impossible” (Article. 16). In Annex IV, the Decree defines the standards for liquid effluents with regard to colour, smell, pH, temperature, Chemical Oxygen Demand, Total Suspended Solids (TDS), Phosphorus and Nitrogen for fresh water bodies.

Decree 10/1988 and Decree 27/1994 of 20 July and Regulation for the Protection of Archaeological Heritage protects explicitly any archaeological heritage even if not registered and requires that construction be carried out in such a way that damage to this heritage is avoided. The Regulation determines that the Ministry of Culture (now: the Ministry of Education and Culture) has to be informed about any project involving excavation. If during the execution of the project traces with an archaeological interest are found, the Ministry has to be informed within 24 hours and the works have to be suspended.
2.6 INTERNATIONAL BEST PRACTICE

2.6.1 Millennium Challenge Corporation

The MCC recognises that all MCC-funded projects are to be environmentally sound, legally compliant and should not result in unacceptable environmental, health, or safety impacts. The MCC have developed three specific guidance documents in this regard – the Guidelines for Environmental and Social Assessment (MCC, 2006), Gender Policy (MCC, 2006a) and MCC Guidance on the Implementation of Resettlement Activities (MCC, 2008). These guidelines are briefly described below:

Guidelines for Environmental and Social Assessment

The purpose of this guideline is to establish the procedures and principles for the review of environmental and social impacts associated with any project funded by the MCC. The ultimate aim is to ensure that the projects undertaken are environmentally sound, and compliant with local regulatory requirements. Under this guideline document, the proposed project is defined as a Category A project as it has the potential to have a significant adverse environmental and social impact. For all Category A projects, the MCC requires an EIA to be undertaken in accordance to MCC guidelines and local regulations.

Gender Policy

The Gender Policy provides guidance in terms of the responsibilities for the integration of gender into projects funded by the MCC. The ultimate aim of this policy is to address gender inequality as part of its overall mission of promoting economic growth and poverty reduction, and to incorporate gender into the development, design, implementation and monitoring of programs funded by MCC (MCC, 2006). The primary means of integrating gender into the planning process is to ensure full consultation with women. This is being promoted during the EIA as part of the PPP and within the Social Impact Assessment and the Resettlement Policy Framework studies.

Guidance on the Implementation of Resettlement Activities

This guideline defines the principles and actions of how resettlement and compensation of project-affected households and people is to be undertaken in any projects funded by the MCC. This guideline makes specific reference to the World Bank’s OP 4.12 on Involuntary Resettlement.

2.6.2 World Bank

Although the proposed project is not World Bank funded and therefore not subject to World Bank Standards, the various operational policies and standards are useful in providing guidance in meeting international best practice. World Bank Standards have been adopted in support and supplementary to the MCC guidelines. Of particular importance is Operational Policy 4.12 for Involuntary Resettlement, which forms the key guideline for undertaking and implementing the resettlement process that will be required as part of the project. This guideline defines the
procedures and steps required in the development of the Resettlement Policy Framework (RPF) and the principles under which the resettlement will be undertaken.

2.6.3 **International Conventions and Treaties**

Mozambique is a signatory to a number of international conventions and treaties on environmental issues (ACIS, 2007) including:

- Resolution 18/81, of 30 December, ratifying the African Convention of Nature and Natural Resources Conservation
- Resolution 17/96, of 24 August, ratifying the UN Convention on Biological Biodiversity
- Resolution 45/2003, of 05 November, ratifying the Convention on Humid Areas of International Importance which serve as Habitats for Aquatic Birds

2.7 **ADMINISTRATIVE FRAMEWORK**

MCA-Mozambique was formed to act on behalf of the GOM, and is primarily responsible for the provision of financial resources and coordination of the Nacala Dam project. A critical function of MCA-Mozambique is coordination with the GOM in terms of providing the required reports, information and resources and ensuring appropriate monitoring and oversight.

The DNA-GOH will function as the implementing entity during the feasibility and construction phases of the project. The DNA-GOH will transfer the operational and post-construction management responsibility to the Regional Water Authority for the North Central Region which has legal standing but is not yet operational. Due to the combined responsibilities, the implementing entity is a co-ordinated effort between the DNA-GOH and the Regional Water Authority for the North Central Region (hereafter termed the Implementation Entity).

DNA-GOH will be responsible for ensuring that all activities of the Project are implemented in a manner consistent with MCC’s Environmental Guidelines and applicable Mozambican environmental laws and regulations. DNA-GOH will also have responsibility for overseeing the implementation of the Environmental Management Plan (EMP) for all activities in the Project and verifying that the Works contractors are implementing relevant mitigation measures as defined in and required by the EMP. All activities will be carried out in close coordination with the MCA Environment and Social Impact Specialist (MCA ESI Specialist).
Figure 2  Institutional Arrangements for Nacala Dam Project
3 IMPACT IDENTIFICATION AND RISK ASSESSMENT

This section provides a summary of the predicted negative impacts for which mitigation is required. Table 1 summarised the specific environmental risks and issues associated with the construction phase of the project. The significance rating is based on management measures being applied.

Table 1: Summary of Construction Impacts

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>ASPECT</th>
<th>IMPACT</th>
<th>SIGNIFICANCE RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Benefits / Positive Impacts</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>All construction activities</td>
<td>Local economy</td>
<td>Construction jobs for local residents, Expansion of the local skills base, Small business opportunities, Enhanced access to markets for local farmers, Economic development in the region and Return of Young People to the village Area</td>
</tr>
<tr>
<td>2</td>
<td>Construction activity</td>
<td>Improved services and facilities for local residents in terms of OP 4.12</td>
<td>Secure and sustainable potable water supply system</td>
</tr>
<tr>
<td></td>
<td>Project implementation</td>
<td>Improved Water Supply</td>
<td>Nacala City and Nacala Velha have a more secure and sustainable potable water supply system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Negative Impacts</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Road construction and dam earth works: site clearing, excavations and spoil disposal</td>
<td>Site clearing (topsoil &amp; vegetation removal)</td>
<td>Soil erosion and water pollution of Mueculea River.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unsightly spoil disposal</td>
<td>Visual impact</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Air quality</td>
<td>Elevated particulate matter concentrations arising from dust emissions</td>
</tr>
<tr>
<td>2</td>
<td>Stormwater management within construction site</td>
<td>Surface Water runoff</td>
<td>Stormwater runoff may cause elevated levels of suspended solids in Mueculea River and transport pollutants from construction areas to watercourse</td>
</tr>
<tr>
<td>3</td>
<td>Vehicles, plant and equipment operation</td>
<td>Noise pollution</td>
<td>Air Quality</td>
</tr>
<tr>
<td>4</td>
<td>Borrowing from borrow pits</td>
<td>Topography</td>
<td>Soil erosion Health (malaria in stagnant water pools)</td>
</tr>
<tr>
<td>5</td>
<td>Waste generation from construction activities and from construction</td>
<td>Solid waste disposal</td>
<td>Scavenging Visual impact Water pollution Spread of diseases</td>
</tr>
<tr>
<td>ACTIVITY</td>
<td>ASPECT</td>
<td>IMPACT</td>
<td>SIGNIFICANCE RATING</td>
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</tr>
<tr>
<td>camp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>All construction works</td>
<td>Social disruption</td>
<td>Decreased emotional well being and sense of place Changes in the traditional livelihood strategy of households Community conflict as a result of differential benefits from the Project Tensions between outsiders and local communities</td>
</tr>
<tr>
<td>7</td>
<td>Transport management</td>
<td>Traffic management along N12 highway</td>
<td>Accidents due to poor traffic management associated with road deviation and with speeding of vehicles</td>
</tr>
<tr>
<td>8</td>
<td>Raising of embankment</td>
<td>Increase in reservoir water levels</td>
<td>Loss of or reduced access to agricultural land (machambas) by approximately 30 field owners. Loss of access to natural resources.</td>
</tr>
<tr>
<td>9</td>
<td>All construction works and operation including campsite construction</td>
<td>Health, safety and security</td>
<td>Increase in communicable diseases (HIV/AIDS, STI’s, TB, etc), traffic safety risks and security risks</td>
</tr>
<tr>
<td>10</td>
<td>All construction works</td>
<td>Pedestrian safety</td>
<td>Accidents due to construction vehicles on site</td>
</tr>
<tr>
<td>11</td>
<td>All construction works</td>
<td>Occupational health</td>
<td>Spread of diseases due to poor sanitation</td>
</tr>
<tr>
<td>12</td>
<td>Raising of embankment</td>
<td>Disruption of homesteads</td>
<td>Disruption of homesteads (physical relocation of 17 homesteads and two buildings (Police Station and Frelimo offices)</td>
</tr>
<tr>
<td>13</td>
<td>Vehicles, plant and equipment operation</td>
<td>Vehile, plant and equipment operation</td>
<td>Noise pollution Air Quality Soil contamination by hydrocarbons spills</td>
</tr>
<tr>
<td>14</td>
<td>Vehicle and plant operation and maintenance</td>
<td>Disposal of sensitive materials -Waste oil and oil spills -Diesel spills</td>
<td>Oil water and soil pollution; Diesel spillage pollution of water and soil.</td>
</tr>
<tr>
<td>15</td>
<td>All construction works</td>
<td>Flora and fauna conservation</td>
<td>Flora harvesting and fauna hunting</td>
</tr>
<tr>
<td>16</td>
<td>Raising of embankment</td>
<td>Increase in reservoir water levels</td>
<td>Loss of village water supply - standpipes next to existing WTW will be inundated</td>
</tr>
</tbody>
</table>
4 MANAGEMENT MEASURES
4.1 SOCIAL MITIGATION MEASURES

It is recommended that during the construction phase, the following plans are developed and implemented:

4.1.1 Emergency Response and Preparedness Plan

The Contractor is to develop an Emergency Response and Preparedness Plan for the construction phase. Such a plan must deal with procedures associated with community emergencies (e.g. fire) and with construction-related emergencies such as hazardous material spills, fires, blasting accidents, vehicle or plant accidents, etc.

The Operating Entity is to prepare an Emergency Preparedness Plan for the Nacala Dam for implementation during the operational phase. The operating entity of the Nacala Dam should have a dedicated person (e.g. Emergency Officer) to prepare the response of the organisation for an emergency situation and to oversee the technical aspects of the response, as well as interfacing with the community, the media, outside response organisations and regulatory agencies, as required. The Emergency Officer must be an employee and a member of management with the authority to make decisions. He/she will be responsible for frontline management of the incident, for tactical planning and execution, for determining whether outside assistance is needed and for relaying requests for internal resources or outside assistance.

![Figure 3: Required team members for the development and maintenance of the Emergency Response Plan for the Nacala Dam](image)

4.1.2 Human Resources Plan

The Developer is to develop a Human Resources Plan that includes a Recruitment Strategy and labour policy (local preferential procurement). The Contractor will be referred to this plan
and must be encouraged to employ local people and to undertake a skills training as required (within reason).

4.1.3 Resettlement Action Plan
The major adverse social impact along both the N12 and in the village will be due to the relocation of project-affected people (PAP). To address this impact a resettlement action plan (RAP) will have to be prepared and implemented by the Developer. The core principle of resettlement is that no one defined as project-affected, should be worse off after resettlement. A resettlement plan frameworks has been developed and it provides core principles that the developer is to adopt with respect to the resettlement process:

**Principle 1: Resettlement Must Be Avoided or Minimised**
*Action:* To comply with the principle the developer will demonstrate that the proposed resettlement is both necessary and viable, and that its scope and extent cannot be lessened. The current layout of of the spillway and road deviations has taken the location of villages into account, in order to avoid all villages and exclude these from resettlement impact where ever possible.

**Principle 2: Genuine Consultation and Participation Must Take Place**
*Action:* Given its focus on resettlement, the primary concern of the resettlement planning will be to take seriously the rights and interests of the displaced and “to-be-resettled” people. Structures and procedures need to be put in place for this to occur, which will be through the formation of a local level consultative forum. This consultative body will be given official recognition within the MCA/Nacala Dam implementing agencies institutional framework. Project boundaries should be made known to all interested and affected parties and should not be changed without sufficient consultation and notice.

**Principle 3: A Pre-Resettlement Data Baseline Will Be Established**
*Action:* To support the successful re-establishment of affected homesteads, the following activities will be undertaken prior to displacement or property acquisition:
- An inventory of landholdings and immovable/non-retrievable improvements (buildings and structures) to determine fair and reasonable levels of compensation or mitigation.
- A census detailing household composition and demography, and other relevant socio-economic characteristics. The information obtained from the inventories and census will be entered into a computerised database to facilitate resettlement planning, implementation and monitoring.

**Principle 4: Assistance with Relocation to be Made Available**
*Action:* MCA and or its agents will provide transport for affected households’ assets from the impacted homesteads to new locations.
Principle 5: A Fair and Equitable Set of Compensation Options Must Be Negotiated

Action: MCA-Mozambique and its agents will guarantee the provision of any necessary compensation for people who will be disturbed to make way for the dam and road, or any other disturbances of residence and/or productive land associated with the project in accordance with the Law and not below the rates as set out by law. Compensation will be according to set rates that are deemed fair and equitable to all parties. No one will be resettled without full and fair compensation having been handed over.

Principle 6: Resettlement Must Take Place In Accordance With Legal Requirements And International Best Practice

Action: Resettlement and compensation of PAPs will be carried out in compliance with Mozambican legislation and the requirements of the World Bank OP 4.12 and IFC Performance Standard 5.

Principle 7: Vulnerable Social Groups Must be Specifically Provided For

Action: Special account of vulnerable groups will be taken in the consultation and planning processes, as well as in establishing grievance procedures. In particular, physically disabled and weak persons, female-headed households, child-headed households, the aged and youth may be disadvantaged. This will entail that MCA specifically identifies vulnerable social groups in the pre-resettlement database and makes provision for them to be included in consultative fora. Data derived from the pre-resettlement baseline survey will assist in a real definition of vulnerable households.

Principle 8: Resettlement Must Be Seen as an “Upfront” Project Cost

Action: MCA-Mozambique is to ensure that compensation costs, as well as those resettlement costs that fall within their scope of commitment, are built into the overall project budget and are clearly defined as such. Experience across the world shows that unless resettlement is built in as an “upfront” project cost, it tends to be under-budgeted, that money gets whittled away from the resettlement budget to ‘more pressing’ project needs, and that it tends to be seen as peripheral to the overall project.

Principle 9: An Independent Monitoring Procedure Must Be In Place

Action: An independent team will monitor the implementation of the resettlement components of the project. Monitoring will specifically take place via measurement against the pre-resettlement database.

Principle 10: A Grievance Procedure Must Be In Place

Action: Grievance procedures will be organised in such a way that they are accessible to all affected parties, with particular concern for the situation of vulnerable groupings. The resettlement planning documents will spell out a grievance process.
4.1.4 Stakeholder Engagement Plan

A Stakeholder Engagement Plan is to be developed by the Contractor with the assistance of a Community Relations Officer. It is important to emphasise that the Project will need to collaborate with local residents, traditional leadership, local government and NGOs in the execution of the management plans.

4.1.5 HIV/AIDS Education and Awareness Programme

The Contractor is responsible for managing HIV/AIDS issues within the workforce and all formal and informal workers engaged in construction.

Objective
To minimise the risk of HIV/AIDS infection of the workforce and local community through increased HIV/AIDS awareness and education.

Target
All staff able to communicate on the existence of HIV/AIDS; the consequences of transmission to or from the local community, and to recall and communicate the mode of HIV transmission and preventative measures, including the proper use of condoms.

Management Measures
Management measures that are likely to be contained in the HIV/AIDS education and prevention programme are likely to be similar to those contained in the FIDIC HIV/AIDS Education and Awareness Programme policy which requires the Contractor to:

- Provide and HIV Awareness Programme for personnel on site within two weeks of arrival and to repeat at intervals not exceeding 4 months.
- Make condoms complying with requirements of ISO 4074 available to employees at readily accessible points on site.
- Place and maintain HIV/AIDS awareness posters of at least A1 size in areas well used by construction workers or provide workers with a pamphlet in the appropriate language.
- Encourage voluntary HIV/STI testing.
- Provide information on counselling, support and care of those who are infected, and
- Report on actions taken with regard to HIV/AIDS education and awareness programme including a schedule listing the names, identity numbers, trade/occupation and name of employer of all construction workers exposed to the programme.
- Local recruitment of labour may assist in minimising the risk of spread of HIV/AIDS by avoiding the need for a large temporary work camp of migrant labour during construction of the WTW.

Outcomes
The outcomes of the HIV Awareness Programme shall as a minimum, result in contractors personnel exposed to such a programme being able to:

- Communicate the existence of problems of HIV and be able to outline the consequences of transmission of HIV to or from the local community;
• Recall and communicate the mode of HIV transmission and preventative measures including the proper use of the condom.

4.1.6 Traffic Management Plan

The following traffic management measures are to be applied as part of a Traffic Management Plan:

• Provide adequate traffic control for both construction vehicles and diverted traffic.
• Suitable road signs should be provided during development and construction to warn local communities and visitors of any operations or structures which could affect their activities, or lifestyle, or prove dangerous.
• If hazardous activities such as major earthmoving or blasting are contemplated, a meeting must be held with the local communities to explain the nature of these activities, when they will take place and the necessary safety precautions that are applicable to them.
• If N12 Highway is to be closed due to construction activities, a suitable alternative route downstream of dam is to be provided and reasonably maintained.
• If the road is to be closed for periods exceeding one hour, notification must be widely broadcasted, using local papers, radio and direct notification to commercial concerns, government departments and transport companies.
• If construction is to take place in a constricted area (e.g. at a river crossing), an alternative crossing point should be provided.
• If the crossing point is located on the bridge being constructed or upgraded, the crossing point should, if possible, be wide enough for one lane of vehicles and two pedestrians (or one pedestrian and one animal) walking abreast.
• A clear division should be made between the vehicle and pedestrian routes, using safety rails or other suitable methods. A safety officer should be present to direct traffic.
• Warning lights should be supplied.

4.1.7 Health and Safety

Minimal health and safety impacts are likely to occur during the construction work associated with the dam rehabilitation.

Management measures

• Construction camps which are likely to be a source of potential public health problems would be kept clean and hygienic;
• Proper sanitation would be provided to prevent introduction and spread of water-borne diseases;
• Proper disposal for all types of wastes generated on-site will be followed.
• All employees to be supplied with personal protective equipment and Contractor to ensure that all PPP is worn by his/her staff.
4.1.7 Layout Plan
The Contractor shall present a proposed layout plan of construction work areas and present this to the project Engineer for approval prior to starting construction activities. This plan shall take account of provisions of this EMP and shall demarcate the different works areas including:

- All buildings and structures including: contractors’ accommodation; contractors’ camp and lay down areas, site offices, laboratory, chemical storage buildings, fuel stores, toilets and ablutions, construction materials stores, vehicle and equipment stores, workshops, wash bays and solid waste storage and disposal sites, including hazardous waste
- Works areas such as batching plants, crusher plants (if required),
- Roads and access routes
- Gates and fences
- Essential services (permanent and temporary water, electricity and sewage and substations)
- Rubble and waste rock storage and disposal sites.
- Firebreaks.
- Excavations and trenches, borrow areas, cut and fill areas, trench and berm systems, spoil areas, rubble and waste rock storage and disposal sites, topsoil stockpiles and sand extraction points.
- Features and plants to be conserved.
- No Go areas
- All temporary and permanent water management structures including water abstraction points, pipelines and irrigation systems, bunds and sumps, settlement ponds, waste discharge points (including energy dissipation specifications) and water testing points
- Sewage water management systems and positions
- Stormwater system

4.2 WASTE MANAGEMENT

4.2.1 Solid Waste Management
The Nacala Dam Project is likely to generate solid waste during construction, with volumes that are dependent on the size of the residential temporary work force accommodated on site. Solid waste will include general household refuse, office waste, as well chemical waste generated during construction and operation of the plant.

The Contractor will be required to use haulers to remove solid waste from the construction site and construction camp and take it to a licensed waste facility or one approved by the regulatory authority. Given the largely unregulated waste disposal system in Mozambique and lack of licensed waste sites, waste minimisation should be a key feature of solid waste management on the Dam project.

Objectives
- To initiate procedures to prevent, minimize, recycle and reuse domestic and construction waste material.
• To dispose of residual wastes in an environmentally acceptable manner.

**Targets**
Disposal of solid waste minimised, all solid waste disposed of in correct receptacles on site, and waste disposed of in an environmentally-acceptable waste site.

**Management measures**
- Train and inform all construction workers regarding waste minimisation, location and use of waste bins, and general waste management.
- The Contractor shall provide receptacles for the appropriate storage of garbage at all accommodation facilities and works areas. The Contractor shall be responsible for the removal of garbage off site by a hauler to a registered disposal facility or a facility approved by the regulatory authority on an as required basis throughout the duration of the contract.
- All storage of solid waste shall be fenced and locked to keep unauthorized persons from entering the area. The storage area shall be kept clean at all times. No solid waste of any kind shall be outside the bins at any time. Vermin and insect controls shall be imposed.

4.2.2 Hazardous Waste Management
A small amount of hazardous waste will be generated by the project in the form of used or waste oil, oily rags or oily adsorbents from spillages, and possibly small quantities of empty containers of solvents, pesticides or herbicides, batteries, and medical waste. This will be removed by haulers for disposal at registered recycling or disposal facilities, as appropriate.

**Objectives**
To recycle oil waste and dispose of non-recyclable hazardous wastes in an environmentally acceptable manner.

**Targets**
All spent oil to be recycled, and all hazardous waste disposed in an appropriate licensed hazardous waste facility.

**Management measures**
Waste oil from workshops and other areas shall be stored separately, and collected by a licensed hauler and taken to a licensed recycling company.

4.2.3 Effluent Management
The Contractor will be expected to implement best practice pollution controls such as the IFC Environmental, Health and Safety Guidelines (IFC, 2003) to ensure that all effluent from the site does not cause soil or water pollution. Waste water flows during construction will comprise effluent from operational areas such as concrete batching, wash areas, and temporary accommodation areas. The Contractor is responsible for implementing appropriate measures to handle waste water to meet the required Mozambique’s effluent discharge standards (refer to
Section 2.5, The Emission of Effluents, Decree 18/2004 of June 2). Effluent cannot be discharged into the Muecula River unless it complies with these effluent standards.

**Objectives**
To ensure handling and disposal of waste water complies with Mozambique effluent standards and is done in such a way so as to pose no or minimal risk to the natural environment.

**Targets**
- Full compliance at all times with the Mozambique’s effluent standards.
- No discharge of polluting effluent to any stormwater drain, or watercourse.

**Management measures**
- Prevent discharge of concrete, lime, cement, chemicals and fuels into any water course.
- All waste water generated during construction must be contained in a suitable area such as lined sedimentation ponds prior to disposal. Such ponds are to be appropriately sited to ensure no inflow of stormwater and shall be not be allowed to overflow by ensuring water is treated and discharged within 24 hours of the water level reaching discharge levels. Solid material from such ponds should be periodically collected and disposed of in an appropriate manner, such as disposal to landfill.
- Site sanitation to comply with effluent guidelines and to the satisfaction of the Engineer and ECO.
- Water from concrete batching shall be disposed via the waste water management system designed by the Contractor.
- Fuel stores to be kept in a bunded area on an impervious surface with a ready supply of absorbent materials in case of spillage. Bunded areas to have a minimum containment capacity of 110% of the largest storage tank or container or 25% of the combined volume in order to contain accidental spills from a leak or rupture.
- Hydrocarbon spills should be absorbed with absorbent material and collected and disposed of off-site in an approved landfill site.
- All effluent from wash bays, fuel stores or from pumps shall be collected and disposed of through an oil trap to remove oil residues prior to release to sedimentation ponds.
- The Contractor shall arrange to take water samples at each discharge point on a monthly basis, or more frequently should the effluent not comply with the specified standard. The Contractor shall have the samples analysed for suspended solids, faecal coli and oil and grease and shall submit copies of the reports to the Engineer within 7 days of the tests having been carried out.

4.3 **BIOPHYSICAL MANAGEMENT MEASURES**

4.3.1 **Stormwater and Erosion Control**
Poor management of stormwater has a high potential to cause erosion on the site causing loss of top soil and reduced rehabilitation potential on site as well as contributing to sedimentation of the river downstream.

**Objectives**
To ensure the site is developed with sufficient stormwater management measures to minimise erosion and sedimentation of nearby watercourses.

**Targets**
No evidence of erosion on site throughout construction.

**Management measures**
- The Contractor must compile a stormwater drainage plan for approval by the Engineer, which shall include proposals for protection against stormwater damage, and containment of flows, and rehabilitation measures should any damage arise. The stormwater plan should show the location of stormwater channels, silt traps, dispersive measures, sedimentation ponds, and any other special measures to control or collect water flow. Sedimentation ponds should be sized to contain a 1:10 year rainfall event and lined to prevent soil contamination.
- All activities involving pumping or release of water must ensure water is dispersed in such a way as to avoid soil erosion.
- Any runnels or erosion channels that develop during construction must be backfilled and compacted and measures taken to prevent further scouring.
- Cleared areas likely to be subject to erosion from heavy rainfall events or stormwater flows should be stabilised with mulch, straw or geofabric until they can be revegetated or are constructed upon.

**4.3.2 Noise and Dust**
Noise and dust will be generated by construction of the new N12 highway section; by use of heavy excavation machinery during site clearance, and occasional blasting. Site clearance activities, leaving exposed soil and soil dumps, will also generate dust. Dust and noise will create a nuisance to the local community and should be controlled as far as possible to maintain or protect the residents’ quality of life. Dust generated by the Dam construction may smother crops adjoining the construction area and may affect crop yields.

**Objectives**
- To minimise the impact of noise and dust on the surrounding communities.

**Targets**
- Comply with applicable noise standards of at the edge of the construction site.
- In terms of IFC guidelines, noise levels for an industrial site is 70dB, while noise levels at the nearest receptor site should not exceed 3dB above normal ambient noise levels.
- The Contractor shall provide all his plant and equipment with suitable silencers or adopt other measures such that the noise level in villages adjacent to the work areas will not increase by more than 7 dB(A)_{eq80} above residual sound levels.

**Management measures**
• Normal work hours are restricted to between 06h15 and 16h15 Monday to Friday (unless otherwise agreed with the Engineer, local community and adjacent residents).
• Local residents are kept informed of the nature and duration of intended construction activities.
• Record community complaints in the Complaints Register and respond by taking reasonable action to ameliorate the impact or inform the complainant of the likely duration.
• Where possible, equipment should be equipped with suitable silencers.
• Dust control measures should include regular watering of access roads and exposed areas during windy conditions and water spraying of aggregate areas to meet applicable standards.
• Exposed soil mounds should be covered with netting or other shade cloth until re-vegetated or constructed upon.

4.3.3 Blasting controls, warning and monitoring
Blasting shall meet the requirements of the South African Explosives Act (Act No 41 of 1958) or other International Best Practice and a permit will be required from the relevant national authorities. It is anticipated that limited blasting will occur. However, blasting of rock outcrops on site may result in vibration damage to nearby properties, flying rock and noise disturbance.

Target
100% safety record attained and no blasting accidents recorded.

Management Measures
• Benchmark monitoring (dilapidation survey)
• Notification of residents at least 24 hours in advance of blasting event.
• Warning system to ensure livestock and people are evacuated from out of the area of possible disturbance and fly rock.
• Clearance of humans and livestock from the area and definition of a no-go area during blasting where there is risk of fly rock.
• All workers involved in blasting to be provided with protection equipment and be appropriately trained for health and safety.

4.3.4 Damage to the Natural Environment
The presence of a workforce in the construction area may lead to uncontrolled trampling and damage to plants, disturbance of local fauna, defacement of rock overhangs and boulders, as well as fouling of the area with litter and excrement, unless human activities are controlled.

Objectives
To ensure that increased human activity in the area does not disturb or damage the natural environment outside the construction site.

Target
• No damage caused to natural flora and fauna and the surrounding area remains litter-free and unpolluted by human waste.

Management measures
• Workforce is instructed to use existing paths when leaving the construction area and to spend break times in a specific dedicated area.
• Workers are made aware of prohibitions on littering, trampling of vegetation, use of the veld as a toilet and risk of fires from disposal of cigarette butts.
• Notify the local community, including traditional herbalists, they can remove any plants they require prior to site clearance.

4.3.5 Borrow Pits
Existing borrow pits and suppliers shall be used for new material in preference to disturbing new sites.

Management measures
Vehicles leaving borrow pits shall be not over-filled to the point that debris can be deposited onto roadsides, and truck loads should be covered with tarpaulin to minimise wind blown dust.

• On completion of operations in a borrow area, the contractor shall reinstate the entire area so as to blend it with the surrounding area and to permit the re-establishment of vegetation.
• Borrow area shall be shaped to avoid steep slopes wherever possible.
• All material in and around the borrow area, whether spoil from road-building operations, excess stockpiled material, oversize material left in the borrow pit, material resulting from clearing and grubbing operations or excess overburden, shall be used or disposed of during rehabilitation of quarry.
• Material incapable of supporting vegetation shall be buried and used for shaping the borrow area and shall subsequently be covered with soft material.
• All available soft material shall be spread evenly to the prescribed thickness, and where sufficient material is not available for so covering the entire area, the remaining portions shall be scarified along the contours so as to avoid undue erosion.
• The shaping and finishing-off of the borrow pit shall be done in such a manner that the borrow pit will be properly drained wherever practicable, and, where required, the contractor shall place earth banks to divert surface water from the borrow area.
• The contractor shall furnish the client with a signed certificate from the landowner stating that he is fully satisfied with the finishing-off of any borrow area.
• Contractor to consider giving community members first preference in employment opportunities.
• Contractor to have in place agreed access arrangements
• Contractor to develop a work plan giving an outline of direction, timing and depth of working; reinstatement plan detailing final shape, method of achieving it, drainage and sediment control, re-soiling and vegetation measures; siting to minimize damage to water courses and human habitation; restoration for re-use (not wasteland).
5 ENVIRONMENTAL AWARENESS PROGRAMME

The Contractor is to develop and implement an environmental awareness training programme.

5.1 OBJECTIVES

Before starting training or regular work, all employees will be required to attend an induction programme, which shall include site safety procedures (e.g. blasting), emergency procedures, health and safety (e.g. HIV/AIDS), and environmental safeguards. The Contractor must ensure that all people involved in the project (including sub-contractors, casual workers, drivers etc.) are aware of and familiar with the environmental requirements for the project. Environmental Induction should ensure that the workforce:

- Understands the key environmental features of the Site and environs and the kind of activities that impact on them
- Are thoroughly familiar with the environmental management measures contained in this EMP and the environmental protection requirements as they apply to the project.
- Are trained in the identification of archaeological artefacts and flora and fauna of special interest that may occur on site and the measures that must be applied when they are encountered, and
- Are fully aware of all rules regarding general behaviour on site e.g. littering, noise, toilet behaviour, etc.

5.2 TARGETS

All staff members on site have received environmental awareness training, are informed of, and apply the codes of conduct and required management measures.

5.3 MANAGEMENT AND MITIGATION

It is the Contractor’s responsibility to ensure that all people involved with the project receive environmental awareness training before starting work on site. This shall include all new staff recruited during the construction phase.

Environmental training shall include but not be limited to the following:

- Awareness-raising of how different construction activities can impact on the environment, why it is important to avoid environmental damage and what steps can be taken to mitigate the impacts of construction activities.
- Identification of possible archaeological or historical objects and the requirement to notify the ECO or Engineer if such an object is found, and to be informed of ‘No Go’ areas of cultural heritage.
- General conduct on site such as noise levels (e.g. shouting and hooting), alcohol consumption, drug use, toilet behaviour, littering, no firearms, no pets, no harvesting of firewood / plants, no trespassing or damage to property, etc.
- Responsible handling of chemicals and spills and correct disposal of chemical containers and other waste objects.
- Emergency procedures and incident reporting.
- Location of fire-fighting equipment and its use.
• HIV/AIDS awareness, including use of and access to condoms; and behaviour towards the local community. Such an HIV/AIDS awareness campaign is to target both Contractor employees and the local community.
• Health and Safety Training

The Contractor is to maintain a record of all staff that have received Environmental Awareness Training and shall monitor the performance of the construction staff to ensure that the points that were relayed during their induction have been understood and are being followed. If required, a translator may be requested to explain aspects of the environmental requirements or acceptable social behaviour that are unclear. Consideration should be given to the feasibility of introducing fines for workers who transgress the rules e.g. littering, use of the veld as a toilet, damage to property, etc.
6 IMPLEMENTATION OF THE EMP

The contract documentation provided to the Contractor includes the Employer’s Requirements detailing the technical specifications for the construction and operation of the project with which detailed design must comply; this EMP, with which the Contractor is legally bound to comply; and an Invitation for Bid (IFB) document, which specifies a number of requirements for environmental compliance that the Contractor will be required to implement. This includes the appointment of staff to handle different aspects of environmental and social safeguards, the roles of which are discussed below. In addition, the Contractor will be required to compile Method Statements (Section 6.2).

6.1 ENVIRONMENTAL COMPLIANCE STAFF

It is proposed that the Contractor makes provision for an Environmental Compliance Officer (ECO) and a Community Relations Officer (CRO) to ensure environmental (and social) compliance. The roles and responsibilities of each of these are described below.

6.1.1 Environmental Compliance Officer (ECO)

The role of the ECO will be to:

- Provide input into the Environmental Protection Plan (EPP) that the Contractor is required to submit as a basis for all work undertaken on site during construction.
- Conduct regular monitoring of the site and operations in accordance with these specifications.
- Report non-compliance to the Engineer, as applicable and recommend corrective action.
- Attend site meetings to be able to report on and respond to any environmental issues and be issued copies of minutes of such meetings.
- Provide input on method statements drafted by the Contractor and other environmental issues within the defined work areas.
- Take photographs (digital) of the site prior to, during and immediately after construction and rehabilitation as a visual reference.
- Inform the Engineer immediately where clearly defined and agreed “no-go” areas are violated or in danger of being violated.
- Inform the Engineer immediately when prescriptive conditions are violated or in danger of being violated.
- Provide input into the Engineer’s environmental compliance documentation and monitor compliance.

The ECO is charged with four broad responsibilities:

- To monitor design and construction activities with emphasis on avoidance and minimization and to determine whether environmental commitments and requirements are incorporated into the construction of the project.
- To monitor modification(s) to the original plans for environmental compliance, prepare modification requests for submittal to the Engineer, and monitor accurate execution of the modifications during construction.
• To function as a source of environmental expertise to the Engineer, including making recommendations to the Engineer of measures and actions to reduce impact and to rectify non-compliance issues.
• To function as a liaison with the Community Liaison Officer appointed by the Contractor with respect to environmental commitments.

Specific on-site administration the ECO will be required to do includes:
• Conduct quarterly or six monthly environmental audits during the construction phase to check adherence to the management provisions of the EMP.
• Compile a quarterly or six monthly environmental audit report based on the findings of the regular audits and submit to Engineer.
• Liaise as needed with the Engineer on implementation and compliance issues.
• Monitor the Contractor’s record of environmental incidents (Incident Book) such as spills, impacts, transgressions, including nature and extent of the incident, cause, responsibility, and corrective and preventive actions taken. All incidents must be reported to the Engineer and a summary of recorded incidents must be included in the monthly audit reports.
• Monitor Contractor’s complaints register in which all social and environmental complaints and any actions taken are recorded. All issues and responses or action taken should be recorded in a Public Complaints Register.
• Liaise with the Contractor’s Community Relations Officer (CRO), through the Engineer, on issues of concern to the local community e.g. to keep the CRO informed of scheduled activities that may concern the community such as blasting.

6.1.2 Community Relations Officer
The Contractor is advised to appoint a suitably qualified and experienced Community Relations Officer (CRO) acceptable to the Engineer with all necessary support staff and facilities. The CRO is to be appointed within 14 days of the commencement date, and should remain in this position until the Taking Over Certificate is issued. The CRO shall be responsible for liaising and co-operating with the Employer’s Representative Public Relations Manager (PRM) for the purpose of:
• Keeping the local communities advised about the general progress of the Works
• Giving advance notification to the local community when particular operations will commence and finish, particularly those which might inconvenience the inhabitants of the area or against which they should take safety precautions.
• Receiving and replying to complaints from the general public about all matters related to the Works.
• Ensuring that remedial and corrective action is taken wherever necessary in response to complaints from the public.
• Arranging tours of the Works by approved visitors.
• Supporting community awareness programmes and local development programmes.
• Publicising training and job opportunities.
• Discouraging and controlling proliferation of informal settlements in and around the site, and
• Discouraging non-local persons from seeking employment at the site and monitoring that procedures for recruiting, employing and accommodating employees are effective.

The CRO is to develop a Grievance Mechanism or protocol based on the IFCs (2009) guidelines for grievances for project affected communities. The steps on which this grievance mechanism should be based include:

• Publicising grievance management procedures
• Receiving, registering and keeping track of grievances
• Reviewing and Investigation grievances
• Developing resolution options and preparing a response
• Notification of the response

### 6.2 METHOD STATEMENTS

The Contractor shall compile Method Statements for the following activities. Method Statements describe:

• Construction and Operational procedures
• Materials and equipment to be used
• How and where material will be stored
• Actions to contain leaks or spills of any liquid or material
• The timing and location of construction and operational activities

It is anticipated that the Contractor will be required to compile Method Statements for the following aspects, amongst others:

• **Access routes:** Location of proposed access routes, rehabilitation of temporary access routes.
• **Blasting:** details of all methods and logistics
• **Bunding:** method of bunding the static plant
• **Camp establishment:** layout and preparation; method of installing fences for no go areas; working areas and construction camp areas
• **Cement/concrete/bitumen batching:** Location, layout, and preparation of cement/concrete batching facilities including methods employed for mixing concrete and management of run off water
• **Contaminated water:** including containment of runoff and disposal of polluted water
• **Dust control methods**
• **Clearance of vegetation:** method during site establishment.
• **Earthworks:** Method for control of erosion during bulk earthwork operations, and method of undertaking earthworks, including hand excavation and spoil management.
• **Emergency:** Response to possible emergencies on site
• **Environmental awareness:** Logistics for environmental awareness for contractors’ employees and management staff.
• **Fire, hazardous and poisonous substances**: Handling and storage of hazardous wastes; emergency spillage procedures and compounds to be used; emergency procedures for fire; use of herbicides and other poisonous substances;

• **Fire and fuel spills**: Methods of refuelling vehicles; methods for cleaning up fuel spills; refuelling of construction vehicles;

• **Piling, jacking and thrust boring**: Method of piling operation (e.g. driven or bored) or in situ casting or pre-cast pile structures.

• **Rehabilitation**: Methods for disturbed areas, and revegetation after construction is complete; retaining walls and gabions.

• **River corridors**: Methods of release of construction related effluent water into any natural stream or river course; method of construction activities within 1:50 year floodplain; and details of methods to control downstream sedimentation or to cross rivers during construction

• **Solid waste management**: Solid waste control and removal of waste from the Site

• **Settlement ponds and sumps**: Layout and preparation of settlement ponds and sumps. 
  **Sources of material**: details of materials to be imported to the site.

• **Stream diversion**: methods of diverting a water course and reinstatement

• **Traffic safety measures**: entry and exit off public roads,

• **Wash areas**: Location, layout, preparation and operation of all wash areas including vehicle washing, workshop wash, and painting wash and cleaning.

• **Water abstraction**: Methods of abstraction and use of water from natural water courses.
7 REPORTING PROCEDURES AND INSPECTIONS

The issues identified in this EMP need to be documented in a format that is readily available for review/auditing. The ECO should meet with the Contractor/Engineer on a regular basis, e.g. weekly to discuss the contractors’ tasks and review the progress from the past week. The ECO and the Contractor should discuss and agree on the issues in the EMP and how they should be managed and mitigated.

7.1 DOCUMENT HANDLING AND RECORD KEEPING

All meetings and site inspections should be recorded and filed (in hard copy and electronically) for future reference and to provide input into monthly reports.

7.2 MINUTES OF MEETINGS

Regular meetings should be held between the ECO, CRO, Engineer and Contractor to discuss the schedule of construction activities and requirements for adherence to the EMP requirements on a weekly basis, at least, or more frequently if required. The minutes of such meetings should be recorded immediately, and shall include the activities to be done, the responsibilities for carrying them out, and deliverable dates. The minutes should be circulated to those concerned and hard and electronic copies filed for safe-keeping. These minutes should provide the basis for follow up at subsequent meetings.

7.3 MONTHLY REPORTS

Monthly review meetings should be held with the Engineer, Contractor, ECO and the CRO to confirm the status of the construction progress and issues associated with implementation of the EMP. The meetings should aim to collate the inputs for preparation of a monthly report. The monthly report should synthesise all information on work progress, scheduling changes, recorded incidents and complaints, monitoring results, site problems and risks/hazards, areas of compliance and non-compliance with the EMP targets, and measures take or required to rectify problems.

The targets and reports relating to the EMP that MICOA has approved in the Record of Decision should be documented in the form of minutes with agreed upon targets, outputs, and deliverable dates. The documents/minutes should be signed off by the ECO and the Contractor once a week to indicate progress. In addition to the day to day and monthly reports mentioned above, the following types of reports will be produced by the Contractor (Section 7.3.1 – 7.3.2):

7.3.1 Complaints Register and Grievance Procedure

All queries and complaints raised by the local community shall be recorded in a Complaints Register located at the Contractor’s site office. All complaints relevant to the dam construction project shall be forwarded to or discussed with the Contractor through the CRO for handling and response. All queries and/or complaints from Interested and Affected Parties (I&APs) are to be addressed with the shortest possible delay in accordance with the defined grievance procedure. The CRO will play an important role in keeping the community informed of key project activities such as labour recruitment, or scheduled activities, in order to create and maintain a level of trust and avoid expectations, and thereby minimise complaints. All complaints and claims will be
recorded in a central register managed by the CRO and acknowledged and responded to within 28 days of receipt.

The following information must be recorded in the Complaints Register:

- Complainant’s name and contact details (if not anonymous)
- Date, time and nature of the complaint
- Response and investigation undertaken
- Actions taken and the name of the person responsible for the action
- Follow up within a specified time frame, e.g. one month to determine whether the issue has been resolved

7.3.2 Incidents Register

The ECO should compile and keep an Incidents Register on site in which all incidents are recorded, e.g. chemical spills, fires, accidents involving workers and vehicles, etc. The following information must be recorded in the Incidents Register:

- Name and contact details of the persons involved
- Person recording the incident
- Date and time of incident
- Nature, extent and cause of the accident
- Name and contact details of any persons notified of the incident
- Actions taken to deal with the incident and whether the accident has been sufficiently dealt with
- Additional steps required to prevent recurrence of the incident

7.3.3 General Reporting

The Contractor is required to specify all reports and reporting procedures, including those required for monitoring environmental compliance, as part of the Quality Control Management System. Reports that will be required to monitor implementation of the EMP and provide a paper trail for effective auditing, or which are required to prevent or respond to accidents, include (but are not limited to):

- Site inspection reports
- Site instructions
- Weekly report
- Monthly reports (CRO, ECO and Engineer)
- Monitoring reports (e.g. water quality / effluent monitoring).
- Auditing reports
- Safety and Health Plan, and
- Emergency preparedness and response procedures
7.4 INSPECTIONS

Environment site inspections are undertaken on regular/daily basis by the Contractor’s appointed ECO for checking the construction activities’ negative impacts on the existing environment. The ECO ensures that the Contractor complies with the EMP specifications. EMP Site inspections are recorded on the ECO’s field note book or developed checklist form.

7.5 ACCIDENTS & EMERGENCIES

The Contractor and the ECO should prepare an accident and emergency reporting format. The accidents and emergencies reporting should contain, but is not limited to:

7.5.1 Accidents

Accident form containing these elements but not limited to:

- Date and time of the accident
- Where the accident occurred
- The parties involved
- What equipment was involved
- Description of the accident
- Genuineness or carelessness
- Cause of the accident
- What action was taken after the accident
- Who was informed
- Police involvement

7.5.2 Emergencies

For emergency situations:

- Type of emergency
- Who should be informed and the contact telephone/cell numbers
- Who should take action
8  MONITORING AND AUDITING

8.1  MONITORING PROGRAMME

Key aspects to monitor during construction include:

- All effluent discharge points or runoff areas, which may include workshop and vehicle maintenance areas, fuel bund areas, chemical store and handling areas, waste storage areas, sedimentation ponds and toilets and wash areas in the temporary camp, waste water drains
- Solid waste storage sites (general and hazardous)
- Chemical storage areas for general tidiness and good housekeeping
- Noise and dust levels
- General site cleanliness
- The most potentially significant aspect to monitor is effluent discharges on the construction site. Effluent cannot be discharged to the natural environment unless it complies with the discharge standards of Mozambique included as Annexure C.

The ECO is to be involved in monitoring the following aspects:

- Effectiveness of the stormwater management system
- Erosion, vegetation protection and restoration/rehabilitation
- Construction staging areas (environmental clearances)
- Cultural and historical issues and commitments
- HIV/AIDS education and awareness programme
- Environmental education and awareness training
- Compensation and Resettlement Action Plan, and
- Other commitments made in the environmental Record of Decision (ROD)

Monitoring requirements for the Construction Phase are contained in Table 2. It should be noted that this table does not include aspects which form part of other monitoring plans such as the Resettlement Action Plan.

A baseline water quality monitoring programme is to be implemented and maintained by the Contractor. To this effect, quarterly monitoring of surface (Dam) water quality has been undertaken during the EIA Phase and these water quality analyses are included as Annexure B.
Table 2: Summary of monitoring requirements for Construction Phase

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Objective</th>
<th>Method</th>
<th>Frequency</th>
<th>Sampling locations</th>
<th>Detection limit</th>
<th>Responsibility</th>
<th>Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effluent discharges – Water Quality</td>
<td>To minimise risk of soil and water pollution from effluent discharge from construction site</td>
<td>Surface water quality sampling</td>
<td>Monthly and after flow events when bunds or cause uncontrolled discharge into the natural environment</td>
<td>Runoff from fuel bunds; chemical handling areas, waste storage areas, vehicle storage / wash areas, and sedimentation ponds</td>
<td>Mozambique water quality standards for discharge to natural environment (Decree 18/2004 of June 2)</td>
<td>ECO</td>
<td>Weekly records and summarised in monthly report</td>
</tr>
<tr>
<td>Bunds</td>
<td>To minimise risk of bunds overtopping in rainfall events or major spill</td>
<td>Visual check of bund volume</td>
<td>Daily (when in use)</td>
<td>All bunded areas</td>
<td>Bunds are maintained below discharge levels and can accommodate a major rainfall event.</td>
<td>ECO</td>
<td>Inspection notes and monthly report</td>
</tr>
<tr>
<td>Sedimentation ponds / detention basins</td>
<td>To minimise risk of discharge of polluted water to the natural environment</td>
<td>Visual check of pond level</td>
<td>Weekly or after significant discharge or rainfall events</td>
<td>Sedimentation ponds</td>
<td>Ponds are maintained below discharge level and can accommodate a major rainfall event</td>
<td>ECO</td>
<td>Inspection notes and monthly report</td>
</tr>
<tr>
<td>Oily/diesel water</td>
<td>To minimise risk of oily water contamination</td>
<td>Surface water quality monitoring</td>
<td>Weekly or after significant spill or rainfall events</td>
<td>Discharge points for oily wastes</td>
<td>Mozambique water quality discharge standard</td>
<td>ECO</td>
<td>Monthly report</td>
</tr>
<tr>
<td>Aspect</td>
<td>Objective</td>
<td>Method</td>
<td>Frequency</td>
<td>Sampling locations</td>
<td>Detection limit</td>
<td>Responsibility</td>
<td>Reporting</td>
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<tr>
<td>General solid waste &amp; Hazardous waste</td>
<td>To minimise risk of soil and water pollution and human health risks from poor waste management</td>
<td>Check waste is separated into different components; stored in sealed containers in fenced or walled area, and no leakage or tampering by vermin evident.</td>
<td>Weekly</td>
<td>At all waste storage areas</td>
<td>Waste components mixed (not clearly separated); leakage of waste or tampering evident, and/or bad odours.</td>
<td>ECO Health and Safety officer</td>
<td>Inspection notes and monthly report</td>
</tr>
<tr>
<td>Traffic hazards</td>
<td>To ensure risk of traffic hazards kept to a minimum.</td>
<td>1. Visual spot checks of supplier vehicles (tyres, loading, etc.) and general driving behaviour. 2. Check public complaints register 3. Monitor road condition and signage and traffic calming needs</td>
<td>1. Daily 2. Weekly Regularly or on request of Metolong Authority</td>
<td>At construction site and along roads approaching Dam (both sides of wall)</td>
<td>1. Un roadworthy vehicles 2. Increase in public complaints 2 to 3 per week 3. Potholes, unsafe roads and inadequate signage</td>
<td>1 and 2. ECO 3. GoM Road Department</td>
<td>Weekly inspection reports and Monthly report</td>
</tr>
<tr>
<td>Noise</td>
<td>To ensure noise levels maintained below level that is a danger to hearing or creates a long-term</td>
<td>Check public complaints register.</td>
<td>Monthly on average or during certain construction activities. Weekly</td>
<td>Boundary of the construction site and at distance of nearest house</td>
<td>IFC. Estimated 65dB limit on site and 50dB in residential area.</td>
<td>Engineer</td>
<td>Monitoring records and Monthly report</td>
</tr>
<tr>
<td>Aspect</td>
<td>Objective</td>
<td>Method</td>
<td>Frequency</td>
<td>Sampling locations</td>
<td>Detection limit</td>
<td>Responsibility</td>
<td>Reporting</td>
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</tr>
<tr>
<td>Dust</td>
<td>To ensure that dust produced during construction does not create significant nuisance to nearby residents and staff</td>
<td>Visual observation of dust nuisance level and dust traps. Checks of public complaints register</td>
<td>Daily (visual observation of dust levels); Weekly (complaints register)</td>
<td>Boundary of the construction site and at distance of nearest houses</td>
<td>Strong prevailing winds and dry conditions creating windblown dust from the site and road traffic. Increase in complaints to more than 2 per week.</td>
<td>ECO (dust levels); CRO (public complaints)</td>
<td>Monitoring records and Monthly report</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>Minimise risk of HIV/AIDS spread due to presence of construction work force</td>
<td>Observations of records that HIV/AIDS awareness training done in accordance with schedule and involving all staff; condoms available at all times, posters displayed in public areas, particularly where construction staff live/eat and in toilets.</td>
<td>Weekly</td>
<td>Public areas and toilets (condoms &amp; posters) construction staff</td>
<td>Condoms and posters at all times. All staff listed as having attended HIV/AIDS awareness sessions.</td>
<td>ECO / Safety and Health Officer</td>
<td>Weekly inspection report and Monthly report</td>
</tr>
</tbody>
</table>
8.2 AUDITING

Prior to commencement of work on site, the Contractor shall be briefed by the Engineer and ECO on obligations related to environmental controls and methodologies in terms of the EMP. The briefing will take the form of an on-site talk and demonstration and any other written or graphic material applicable to the project. In this briefing the auditing requirements and responsibilities will be specified. Auditing of the compliance of the Contractor to the requirements of this EMP will be the responsibility of several organizations namely:

- Contractor (internal compliance) undertaken by the ECO
- MICOA
- MCA-Mozambique
- DNA-GOH

The ECO is to be involved in auditing the on-site issues as specified in the EMP that includes quarterly or six monthly environmental audits for the construction phase to check adherence to the management provisions of the EMP.

The Contractor must appoint an external auditor to undertake regular audits (e.g. every six months) during construction phase and the operator similarly appoints an auditor to do annual audits during operational phase. Ideally, the external auditor should submit a TOR to MICOA or to MCA-Mozambique for approval prior to the audit.

The environmental audits that are undertaken should for instance:

- Analyse the results obtained from monitoring.
- Assess whether objectives and targets have been met and whether there are variances from the stipulated EMP and legal requirements.
- Assess whether EMP implementation has been undertaken according to planned arrangements and that the EMP itself is being appropriately updated.
- Confirm that identified corrective actions have been undertaken and then assess the effectiveness of such actions.

The ECO is responsible for the maintenance of the environmental audit information that is required prior, during and after an audit. The MCA-Mozambique may undertake ad hoc internal compliance audits to ensure the contractor is environmentally compliant. Site inspections will be undertaken as part of many of the audits indicated above as well as many of the mitigatory measures. The Engineer and ECO will be on site daily and will constantly check whether the objectives of the EMP are being met. Random site inspections are encouraged to be undertaken by the following organizations:

- MICOA
- MCA-Mozambique
- DNA-GOH
8 CONCLUSIONS AND RECOMMENDATIONS

During construction, employment opportunities for members of the local communities could supplement family incomes. Businesses could benefit from providing services such as the provision of construction materials, transport services, food and drink for the workforce. When complete, the project will boost agriculture productivity through ease of access to water for irrigation, thereby increasing farming revenues. Other commercial activities could also be stimulated, leading to more agro-industries being set up, and consequently more social infrastructure will be established.

During construction traffic accidents are likely to increase, and there is risk of STDs/HIV/AIDS spreading due to the interaction of the local communities with construction workers, truck drivers and/or newcomers who will migrate to the project areas in search of livelihood and employment opportunities. Minimal health and safety impacts are likely to occur during the construction work associated with the dam rehabilitation.

There will be positive social impacts associated with the project as follows:

- Creating a safe structure of Nacala Dam will increase efficiency of the dam and hence a secure potable water supply for the local community
- Employment on the construction work force since the contractor will largely recruit labour locally, enhancing economic opportunities for the local working-age population;
- Alleviate the risk of internal displacement of people who would be affected should the dam fail if the planned intervention is not undertaken;
- The rehabilitation will serve as a catalyst for rapid economic development of Nacala Porto and Nacala-a-Velha. Job creation could also stem from the fact that more people may be encouraged to take up irrigated agriculture as a result of the opportunities provided by the dam’s water.

With the rehabilitation of the dam therefore, the quality of life of the people in Muerete and Barragem could be enhanced through improved socio-economic well being and job creation. Project development must begin with the community and with their concerns and needs. To obtain the essential trust and support for a sustainable project the developer should be prepared to work with the community before starting any project implementation activities in the field. It is better to work with traditional patterns of community leadership and organization that have proved to be effective in the past than to set up procedures and rules for project development that are imported from outside the community.
9 REFERENCES


Millennium Challenge Corporation, 2006a: Gender Policy, Millennium Challenge Corporation, Washington, USA.

ANNEXURE A

IMPACT ASSESSMENT RATING METHODOLOGY
Table A1: Rating methodology to determine the significance of Impacts

<table>
<thead>
<tr>
<th>IMPACT CRITERIA</th>
<th>NATURE OF IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO AFFECT</td>
<td>The activity or activity component will result no, or such little impact such that it would be considered negligible.</td>
</tr>
<tr>
<td>Low Negative</td>
<td>Short term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary. Low Benefits</td>
</tr>
<tr>
<td>Medium Negative</td>
<td>Medium to long term impacts on the affected system(s) or party(ies), which could be mitigated. For example constructing a narrow road through vegetation with low conservation value. Medium Benefits</td>
</tr>
<tr>
<td>High Negative</td>
<td>Long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming, or some combination of these. High Benefits</td>
</tr>
<tr>
<td>Fatal Flaw</td>
<td>An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated. For example the permanent loss of endangered species or significant social impacts.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEMPORAL SCALE OF IMPACT</th>
<th>SPATIAL SCALE OF THE IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Planning</td>
<td>Individuals/ Individual species</td>
</tr>
<tr>
<td>Construction</td>
<td>Local Communities/ Natural Habitats</td>
</tr>
<tr>
<td>Operation</td>
<td>Regional</td>
</tr>
<tr>
<td>Permanent</td>
<td>National and International</td>
</tr>
</tbody>
</table>

Table A2: Impact Probability

<table>
<thead>
<tr>
<th>LIKELIHOOD</th>
<th>PROBABILITY OF IMPACT OCCURRING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown</td>
<td>The probability of the impact occurring can not be reasonably predicted.</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Less than 40% sure of a particular fact or of the likelihood of an impact occurring</td>
</tr>
<tr>
<td>May Occur</td>
<td>Only over 40% sure of a particular fact or of the likelihood of an impact occurring</td>
</tr>
<tr>
<td>Probable</td>
<td>Over 70% sure of a particular fact, or of the likelihood of that impact occurring.</td>
</tr>
<tr>
<td>Definite</td>
<td>More than 90% sure of a particular fact. Should have substantial supportive data.</td>
</tr>
</tbody>
</table>
Table A3: Overall Environmental Significance Statement

<table>
<thead>
<tr>
<th>ENVIRONMENTAL SIGNIFICANCE STATEMENT</th>
<th>Low Negative Impact Or Low Positive Benefits</th>
<th>Moderate Negative Impact Or Moderate Positive Benefits</th>
<th>High Negative Impact Or High Positive Benefits</th>
<th>Very High Negative Impact Or Very High Positive Benefits</th>
<th>Unknown</th>
<th>No Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>These impacts will usually result in short term effects on the social and/or natural environment. Impacts rated as LOW will need to be considered by the public and/or the specialist as constituting a fairly unimportant or benefits to be minimal overall.</td>
<td>These impacts will usually result in medium term effects on the social and/or natural environment. Impacts rated as MODERATE will need to be considered by society as constituting a fairly important but manageable. Benefits are real but not considered substantial.</td>
<td>These impacts will usually result in long term effects on the social and/or natural environment. Impacts rated as HIGH will need to be considered by society as constituting an important and require significant resources to mitigate. Benefits are considered substantial and would be noticeable in the receiving environment.</td>
<td>VERY HIGH impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or social) environment. In some cases this may be defined as a project or environmental Fatal Flaw. VERY HIGH benefits would be considered to be significant effects on the local, regional and national (natural and/or social) environment. In some cases these benefits may form part of the project rationale.</td>
<td>In certain cases it may not be possible to determine the significance of an impact. For example, the primary or secondary impacts on the social or natural environment given the available information.</td>
<td>There are no primary or secondary effects at all that are important to scientists or I&amp;APs</td>
</tr>
</tbody>
</table>
ANNEXURE B

BASELINE SURFACE WATER QUALITY DATABASE
Insert baseline water quality analysis undertaken to date
ANNEXURE C

EMISSION OF EFFLUENTS DECREE 18/2004 JUNE 2