Environmental Management Plan Report for Zambezi Regional Council's Proposed Up-Earthing of the Embankment on Muzii Combined School Platform located on the eastern floodplain of the Zambezi Region, Namibia

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Final Report

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EXPERTISE AND DECLARATION OF INDEPENDENCE

I.N.K Enviro Consultants cc is the independent firm of consultants that has been appointed by Zambezi Regional Council to undertake the Environmental Impact Assessment process.

Immanuel N. Katali, the EIA Lead Practitioner holds a B.Arts (Honors) in Geography, Environmental Studies and Sociology and has over 5 years of experience in conducting EIAs in Namibia.

The consultant herewith declare that this report represents an independent, objective assessment of the environmental impacts associated with the activities of the proposed project.

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1 INTRODUCTION

1.1 Introduction to the Proposed Project

The Zambezi Regional Council intends on obtaining an Environmental Clearance Certificate (ECC) for up-earthing of the embankment on the Muzii Combined School Platform, in order to allow learners and their parents to relocate to such a higher ground during flood times as a permanent solution to the flooding problem. Furthermore, raising the embankment aims to raise the platform of the school in order to increase the carrying capacity and prevent damage and disruptions of classrooms due to flooding.

The embankment project is proposed to be located approximately 120 km east of Katima Mulilo town on approximately 70 km earth road during dry season and 120 km river transport on the Zambezi River (Refer to Figure 1).

Prior to commencement of the construction activities, an Environmental Clearance Certificate (ECC) is required on the basis of an approved Environmental Impact Assessment (EIA). It is with this background that, I.N.K Enviro Consultants cc (I.N.K) an independent firm of consultants, was appointed to undertake the Environmental Impact Assessment process for this project.

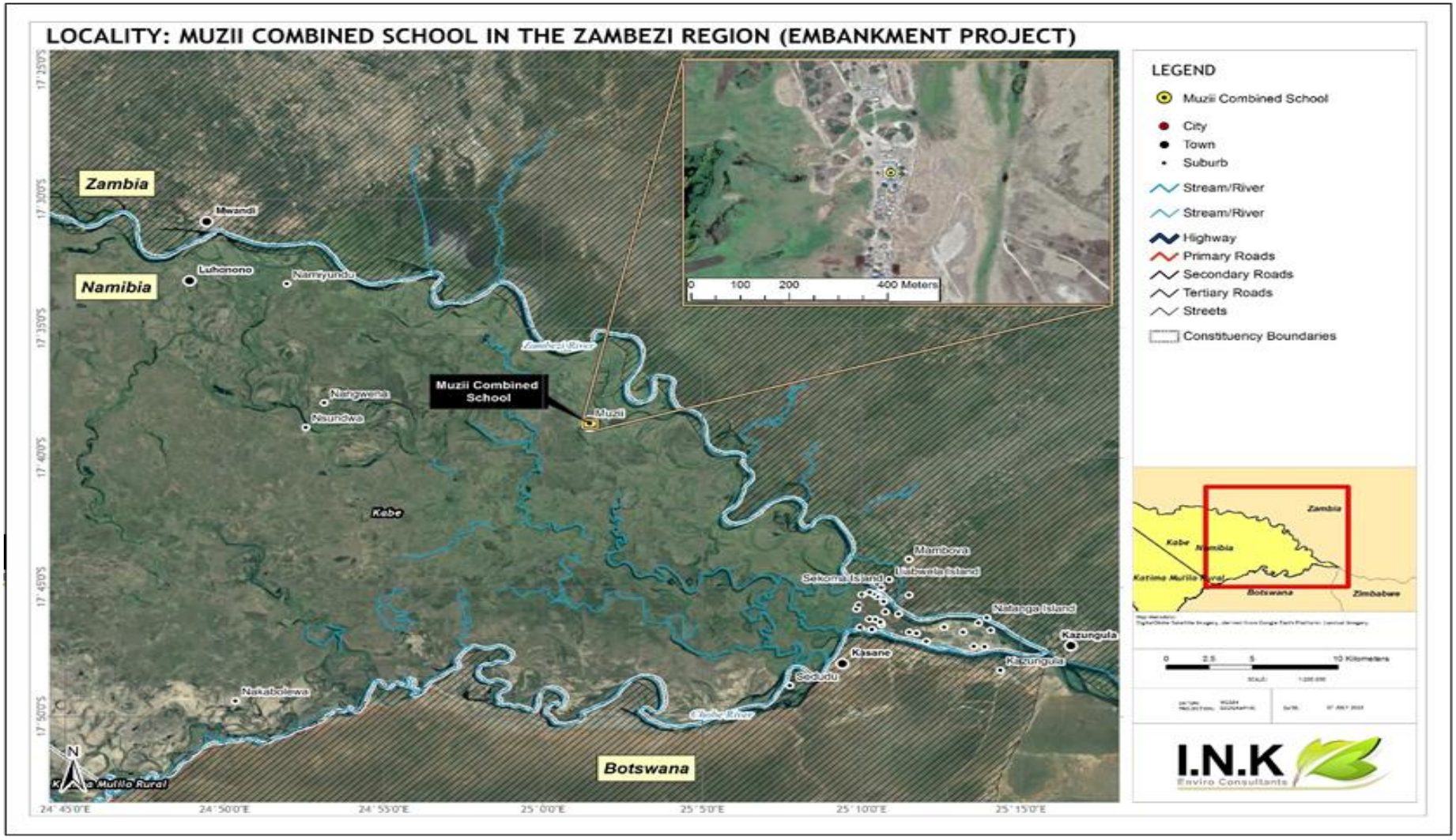

Figure 1: Location of the proposed Up-Earthing of Muzii Combined School Platform

1.1.1 Details of the Persons who compiled this report

I.N.K Enviro Consultants cc is the independent firm of consultants that has been appointed by the Zambezi Regional Council to undertake the environmental impact assessment and related processes.

Immanuel N. Katali, the EIA project manager and lead practitioner holds a B.Arts (Honours) Degree in Geography, Environmental Studies and Sociology and has over five years of relevant experience in conducting/managing EIAs, compiling EMPs and Socio-Economic Studies. Immanuel is certified as an environmental practitioner under the Environmental Assessment Professionals Association of Namibia (EAPAN).

Ms. Fredrika Shagama, the project Hydrogeology Specialist has over five years of experience and holds a BSc. Geological Engineering, and MSc. Geological Engineering (cum laude) with primary focus in Hydrogeology, obtained from VSB - Technical University of Ostrava, Czech Republic. Fredrika is a member of the Namibian Hydrogeological Association (NHA).

2 ENVIRONMENTAL LAWS AND POLICY

This section discusses and describes the governing laws, policies and acts that are relevant to the environmental impact assessment for the proposed project.

The Republic of Namibia has five tiers of law and several policies relevant to environmental assessment and protection, which includes:

- The Constitution
- Statutory law
- Common law
- Customary law
- International law

Key policies currently in force include:

- The EIA Policy (1995).
- Namibia's Environmental Assessment Policy for Sustainable Development and Environmental Conservation (1994).

As the main source of legislation, the Constitution of the Republic of Namibia (1990) makes provision for the creation and enforcement of applicable legislation. In this context and in accordance with its constitution, Namibia has passed numerous laws intended to protect the natural environment and mitigate against adverse environmental impacts.

2.1 Applicable Laws and Policies

In the context of the proposed irrigation project, there are several laws and policies currently applicable. They are reflected in Table 1 below.

Table 1: Relevant Legislation And Policies

YEAR	NAME	Natural Resource Use (energy & water)	Emissions to air (fumes, dust & odours)	Emissions to land (non-hazardous & hazardous	Emissions to water (industrial & domestic)	Noise	Visual	Impact on Land use	Impact on biodiversity	Impact on Archaeology	Socio-economic	Safety & Health
1990	The Constitution of the Republic of Namibia of 1990	X	X	X	X	X	X	X	X	X	X	X
2007	Environmental Management, Act 7 of 2007	X	X	X	X	X	X	X	X	X	X	X
2012	Regulations promulgated in terms of the Environmental Management, Act 7 of 2007	X	X	X	X	X	X	X	X	X	X	X
1976	Atmospheric Pollution Prevention		X	X					X		X	X

	Ordinance 11 of 1976											
1995	Namibia's Environmental Assessment Policy for Sustainable Development and Environmental Conservation	X	X	X	X	X	X	X	X	X		X
2003	Agricultural (Commercial) Land Reform Amendment Act										X	
2004	National Heritage Act									X		
2013	Water Resources Management Act, 11 of 2013	X			X						X	

2.1.1 Legal Framework for Water Resources Management and Protection

The project's operational primary purpose entails the manipulating the natural water flow at site through the up-earthing of the Platforms. This will in some way not only potentially, at minimum affect water quality and quantity (during up-earthing) but also the dynamics of the rain (flood) water flow in the long run. It is therefore necessary to consider the legislations and legal requirements governing the water management and protection.

The main legal framework presented herein is that of Namibia for the relevant project component under the scope of this document. The chapter also presents a summary of the relevant international legislations and agreements to protect the water resources, specifically the Transboundary Water Resources (Zambezi River).

2.1.2 General National (Namibian) Water Legislations

The Namibian legislations that govern the use, management and protection of water resources and related activities are as follows:

- **Water Act No. 54 of 1956**: To consolidate and amend the laws relating to the control, conservation and use of water for domestic, agricultural, urban and industrial purposes; to make provision for the control, in certain respects, of the use of sea water for certain purposes; for the control of certain activities on or in water in certain areas; for the control of activities which may alter the natural occurrence of certain types of atmospheric precipitation; for the control, in certain respects, of the establishment or the extension of townships in certain areas; and for incidental matters.

- **Water Resources Management Act No. 11 of 2013:** This Act (Government Gazette 5367) has been passed by Parliament, but it has not yet been brought into force. The Regulations have been passed in December 2016 but have not yet been promulgated. Therefore, the Regulations of the 1956 Water Act still apply. The objectives of this Act are to ensure that the water resources of Namibia are managed, developed, used, conserved, and protected in a manner consistent with, or conducive to, the fundamental principles set out in relevant Sections.

- **Environmental Management Act No. 7 of 2007 and its 2012 Environmental Impact Assessment (EIA) Regulations:** The Act aims at promoting sustainable management of the environment and use of natural resources. The Environmental Management Act (EMA) is broad; it regulates land use development through environmental clearance certification and/or Environmental Impact Assessments. The Act provides for the clearance certification for ''***construction of canals and channels including the diversion of the normal flow of water in a riverbed and water transfer schemes between water catchment and impoundments (Regulation 8.4) and construction and other activities in water courses within flood lines (regulation 8.8)".***
- **Soil Conservation Act No.76 of 1969:** The Act makes provision for the prevention and control of soil erosion and the protection, improvement and conservation of soil, vegetation and water supply sources and resources, through directives declared by the Minister.
- **The Water Policy:** National Water Policy White Paper, August 2000 (this laid the basis for the new Water Resources Management Act).

2.1.3 Zambezi River Legal Framework

The main international (inter-governmental) agreement pertaining to this project site is the Zambezi Watercourse Commission (ZAMCOM). As mentioned earlier, the ZAMCOM is a river basin management organisation that was established in 2014 that brings together 8 Riparian states that share the Zambezi River Basin, as stipulated in the 2004 ZAMCOM Agreement and in accordance with the revised SADC Protocol on Shared Watercourses of 2000. The Riparian States to the Zambezi River Basin are: the Republic of Angola, the Republic of Botswana, the Republic of Malawi, the Republic of Mozambique, the Republic of Namibia, the Republic of Tanzania, the Republic of Zambia and the Republic of Zimbabwe (Zambezi Watercourse Commission, 2019).

2.1.4 International Relevant Water Legislations, Policies and Guidelines

The international conventions and Treaties relevant to the use and management of the International (Transboundary) Watercourses according to Hiddema and Erasmus (2007) includes:

- United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses, 1997 (has not yet entered into force).
- SADC Protocol on Shared Watercourses 1995.
- SADC Revised Protocol on Shared Watercourses 2000 (has now entered into force)

- Agreement between Angola, Botswana, and Namibia on the establishment of a Permanent Okavango River Basin Water Commission (OKACOM) 15 September 1994; and
- Agreement between South Africa, Botswana, Lesotho, and Namibia on the establishment of the Orange-Senqu River Commission (ORASECOM).

3 ENVIRONMENTAL ACTION PLANS

The management measures proposed to mitigate the potential impacts are detailed in the action plans below.

3.1 Action plans to achieve objectives and goals

Action plans to achieve relevant objectives/goals are listed in tabular format together with timeframes for each action. The action plans include the timeframes and frequency for implementing the mitigation measures as well as identifying the responsible party.

Table 3-1: action plan – Hydrocarbon and associated spills MANAGEMENT

Objective:

The objective of the mitigation measures is to handle and store hydrocarbons in such a way as to prevent spills. Where spills do occur, to ensure the spill is contained and the contamination cleaned-up and contaminated material disposed of responsibly.

Activities / facilities	Management and mitigation measures	Action plan	
		Frequency / target date	Responsible parties
Storage of hydrocarbons (i.e. diesel bowser,)	• Mobile diesel tank(s) should be equipped with drip trays and spill kits including spill (hydrocarbon) absorbent material such as Biozorb. • Regular inspection of hazardous storage tanks for leakages and wear is required. • Regular environmental awareness should include potential risks associated with hydrocarbons.	Throughout the construction activity	Construction contractor/ supervisor
Vehicles, machinery, generators and equipment	• Establish and maintain impermeable bunded / drip trays around diesel generators. • Vehicles, machinery and equipment shall be kept in good working condition to ensure they do not leak oil/diesel. • Vehicles and machinery will be serviced off site as far as possible. However, in the event where machinery needs to be repaired/serviced on site all care shall be taken to prevent spillage of oil/diesel by performing the work on impermeable surfaces or proper placement of drip trays. • All used parts from vehicles and machinery (which may include, but not limited to, oil filter, pipes, rags, cans) will be collected and removed from site and disposed of in an appropriate manner. • All refueling of vehicles will take place on impermeable surfaces • Pollution will be prevented through basic infrastructure design and through maintenance of equipment in the nearest towns and not in the proposed sites.	Throughout the construction activity	Construction contractor/ supervisor

General (spills)	• Any spills will be contained and cleaned up immediately • Spill kits will be readily available on site. Employees and/or contractors will be shown how to use the spill kits to enable containment and remediation of pollution incidents. • The contractor will establish environmental awareness to employees • Soil contaminated with hydrocarbons shall be excavated and stored in plastic bags inside a designated wheelie bin and transported for disposal at the nearest disposal facilities in the towns.	Throughout the construction activity	Construction contractor/ supervisor

Table 3-2: action plan – Waste management

Objective:

The objective of the management measures is to ensure proper storage, removal, transportation and disposal/recycling of hazardous and non-hazardous (i.e. domestic) waste.

Activities / facilities	Technical and management options	Action plan	
		Frequency / target date	Responsible parties
General	• Waste shall be separated and recycled / re-used where possible.	Throughout the construction activity	Construction contractor/ supervisor
	• No burning or burying of waste material will be allowed on any of the construction sites.	Throughout the construction activity	Construction contractor/ supervisor
	• Contractors will be shown the importance of correct waste disposal as well as waste minimisation and recycling.	Throughout the construction activity	Construction contractor/ supervisor
Collection and storage of waste	• Suitable receptacles with lids for waste disposal will be required at all sites. • Ensure animals do not have access to waste bins. All food scraps need to be removed from site on a daily basis. • If rubbish containers are used, ensure these can be sealed from wild animals or strong wind and for during transport.	Throughout the construction activity	Construction contractor/ supervisor
Disposal of non-hazardous (domestic) waste	• Waste shall be transported a weekly basis from the site to the nearest disposal facility in Katima Mulilo. No disposal of waste on site and no burning of waste.	Throughout the construction activity	Construction contractor/ supervisor
Recyclables	• Recyclable material shall be taken to an identified recycling company.	Throughout the construction activity	Construction contractor/ supervisor
Disposal Hazardous Waste	• Hazardous Waste (including hydrocarbon contaminated material/soil) will be disposed off at the nearest hazardous waste disposal facility.	Throughout the construction activity	Construction contractor/ supervisor

Medical waste from First Aid Kit	• Medical waste where appropriate shall be disposed of at the medical waste facility.	Throughout the construction activity	Construction contractor/ supervisor
Disposal records (domestic and industrial)	• Written evidence of safe disposal of waste will be kept.	Throughout the construction activity	Construction contractor/ supervisor

Table 3-3: action plan – biodiversity & land use

Objective:

The objective of the mitigation measures is to limit the destruction and general disturbance of biodiversity.

Activities / facilities	Technical and management options	Action plan	
		Frequency / target date	Responsible parties
Vehicles and machinery	• Vehicles will follow designated tarred roads, access routes and gravel roads.	Throughout the construction activity	Construction contractor/ supervisor
Site preparation for construction of infrastructure	• Existing access roads and previously disturbed areas on the sites should be used. No additional footprint is anticipated. • Any additional excavations made in the area should be backfilled. • Trees on sites shall be conserved. This is best achieved through the demarcation of large trees on the site layout plan and the planning of infrastructure around all identified large trees.	Throughout the construction activity	Construction contractor/ supervisor
General	• The contractor will implement a zero tolerance policy with regards to the killing or collecting of any biodiversity. • Contractors will be shown the value of biodiversity and the need to conserve the species and systems that occur within the project area. • No open fires will be permitted on site. • Maintain machinery and equipment to prevent excessive noise. • Appropriate ablution facilities will be provided for contractor's workforce. These facilities must be maintained. • No indigenous hardwoods are to be used for any form of construction. • Speed limits will be enforced to promote road safety, and prevent corrugation and road kills. • Include these rules in the environmental awareness programme.	Throughout the construction activity	Construction contractor/ supervisor

Table 3-4: **ACTION PLAN – WATER QUALITY, QUANTITI, FLOW AND USE**

Objective:

The objective of the mitigation measures is to prevent negative impacts associated with water quality and water flow in the channels (drainage lines).

	Technical and management options	Action plan

Activities / facilities		Frequency / target date	Responsible parties
Mobile Ablution facilities	• Contractor must provide chemical toilets for the employees at all construction sites. • Contractor should ensure that toilets are working properly and are clean, so they do not pollute the surrounding environment or create hygiene problems. • All sewerage from the chemical toilets will be pumped out by a contractor when required for disposal at a permitted sewerage facility. • Personnel may not relieve themselves in the surrounding bush • Mobile ablution facilities should be placed in such a way they do not get blown by windy conditions in the area.	Throughout the construction activity	Construction contractor/ supervisor
Water use	• Obtained water from the nearest towns. • If the contractor opts to use a water jet to insert the pole columns into the ground, use the surface water that is available. No pollution of the surface water will be allowed (i.e. discharge same quality water only).		
Contamination of groundwater / surface water	• Refer to "Hydrocarbon and associated spills Management Action plan". • Areas where hydrocarbons will be utilized, the surface should be covered with a plastic impermeable plastic liner to prevent the spillage on the soils and eventual infiltration into the ground. • Project machines and equipment should be equipped with drip trays to contain possible oil spills when operated during construction works. • All hydrocarbon substances and other potential pollutants associated with the project activities should be contained in designated containers on site and later disposed of at nearby approved waste sites in accordance with the municipal or urban waste discharge standards. This is to ensure that these hazardous substances do not infiltrate into the ground and affect the groundwater quality. • In cases of accidental fuel or oil spills on the soils from site vehicles, machinery and equipment, the polluted soil should be removed immediately and put in a designate waste type container for later disposal as per the preceding bullet point. The removed polluted soil should either be completely disposed of or cleaned and returned to where it was taken from on site or can be replaced with a cleaner soil. This is to ensure that the pollutants contained int the soil does not infiltrate into the site soils and eventually reach to groundwater. • Spill control preventive measures should be in place on site to management soil contamination, thus preventing and or minimizing the contamination from reaching groundwater bodies. The impact would be more on groundwater	Throughout the construction activity	Construction contractor/ supervisor

	(aquifers) since the construction works will be done in the dry months, thus there would be no rain to trigger (polluted) runoff to surface water bodies.		
Water Quantity	• The Proponent and or their construction contractor should avoid abstracting from the aquifers and only use surface water as planned. • Even so (as per preceding point), water should be used sparingly through water re-use for some of the construction activities where possible. This is done to minimize the amount of water abstracted from the River or the preferred surface water source near the site. • In a special case, should the Proponent or the contractor later realize that for some reason they cannot use surface water during the construction period and that the nearest groundwater source such as a borehole could be used instead, this source should be abstracted and water used efficiently by limiting its use to the intended project activities only. The aim is to ensure that general environmental sustainability is not compromised in terms of water supply to the social and natural environmental components that depend on this source. • Regardless of the amount of water required for the project, the Proponent should raise awareness on the importance of water conservation and saving measures.	Throughout the construction activity	Construction contractor/ supervisor
Groundwater Flow Dynamics	• To ensure that the floodwater is largely or entirely diverted from the school premises, the embankment fill material should be designed and selected on the basis that it will not retain water within its ''body'' over a long period of time. In other words, the fill material should be hydraulically good and of porous nature that it can still allow water to flow through with ease to the intended directions streams and main channels (diverted) away from the School. This is to ensure that the embankment structures do not retain water to the point that the water starts to accumulate on the unwanted sites on the School area. • Provision should be made to allow sufficient free flow channels of floodwater from the vulnerable School sites to the main channels and streams. This is to ensure that the water can easily flow away from the School premises ''downstream'' to nearby surface water bodies (discharge/floodwater collecting points) and groundwater recharge points further from the School.	Throughout the construction activity	Construction contractor/ supervisor

Table 3-5: **ACTION PLAN –ARCHAEOLOGY SITES / HUMAN REMAINS**

Objective:

The objective of the mitigation measures is to prevent negative impacts associated with archaeology.

Activities / facilities	Technical and management options	Action plan	
		Frequency / target date	Responsible parties

Chance archaeological find of any (i.e. human burial/remains fossils, chipped stone age tools, pre-modern artefacts (bone, wood, metal, glass and/or ceramic), etc.)	Preserve the site by demarcating the site with flagging / danger tape, and cease any work in the vicinity of the site. (Work may continue at another location away from the demarcated site).	In the event of a chance find	Construction contractor/ supervisor
	Notify the Project Manager.		
	Inform the National Heritage Council (NHC) of the find and take further instructions. Actions recommended by the appropriate Authorities may include an archaeological assessment, site preservation, removal of fossils or artefacts.		

Table 3-6: **ACTION PLAN – SOCIAL ISSUES & TRAINING**

Objective:

The objective of the mitigation measures is to prevent negative social impacts associated the contractor's workforce on site.

Activities / facilities	Technical and management options	Action plan	
		Frequency / target date	Responsible parties
Employees (contractors) – social issues	• Have zero tolerance to alcohol in the workplace. • Establish a HIV / AIDS / TB workplace policy and wellness programme as part of social responsibility for the contractor. • Contractors are not allowed to camp at any of the construction sites. • A First Aid Kit should be available at all times during the construction process.	Throughout the construction activity	Construction contractor/ supervisor
Training & Awareness	• Rules should be communicated to employees/ contractors before any construction at all sites. • All individuals who work on, or visit, the sites are aware of the contents of the EMP.	Prior to any activities taking place Throughout the construction activity	Construction contractor/ supervisor

Table 3-7: **ACTION PLAN – REHABILITATION**

Objective:

The objective of the measures is to rehabilitate the construction sites to as close an approximation of the pristine state as is technically, financially and reasonably possible.

Activities / facilities	Technical and management options	Action plan	
		Frequency / target date	Responsible parties
Rehabilitation	• All construction sites should be photographed (1) before commencement, (2) after completion and (3) after rehabilitation of the activities. • At completion of the construction activity and in consultation with MEFT, the following rehabilitation works is recommended: • All unused equipment and material will be removed from all sites; • All litter from the construction sites will be taken to an appropriate disposal site. • All debris, scrap metal, etc. will be removed. • All small ditches/ trenches will be covered and contoured. • Impacted footprints outside are to be raked and/or ploughed to encourage re-vegetation. • Inspect to ensure rehabilitation measures are implemented	Before, during and after activities After construction activities at each of the sites.	Construction contractor/ supervisor

1. PARTIES RESPONSIBLE FOR THE IMPLEMENTATION OF THE EMP

This section describes the roles and responsibilities for implementing the different parts of the environmental management plan (EMP).

3.2 Site Manager/ Supervisor

The Site Manager has overall responsibility for environmental management and safety during the construction process and shall oversee the implementation of the EMP.

The Site Manager's responsibilities relating to compliance with this EMP:

- Regular inspections and auditing of compliance to this EMP and any other relevant legal requirements.
- Regular correspondence on environmental issues and incidents.
- Conduct environmental awareness training during induction training and on an ad hoc basis thereafter to all workers.
- Ensure compliance to this EMP
- Ensure that staff is controlled through the implementation of appropriate security measures.
- Carefully manage the handling of hydrocarbons and other hazardous materials.
- Monitor for excessive dust, noise and biodiversity losses and implement control measures if necessary.
- Report incidences
- Implement a waste management strategy.
- Monitoring and maintenance of equipment and machinery.
- Ensure the provision of adequate sanitation facilities.
- Implement an environmental awareness plan.
- Implementation of first-aid procedures.
- Control of traffic safety and access route conditions.

3.3 ENVIRONMENTAL REPRESENTATIVE

The Site Manager might nominate an Environmental Representative to assist with overseeing each of the sites and implementing of the relevant EMP commitments.

2. TRAINING AND AWARENESS

The purpose of the job specific environmental awareness training is to ensure that employees/all staff are equipped to implement the actions committed to in the EMP. The staff involved in operations will receive training regarding the requirements of this EMP.

Four main forms of training will be provided on site:

- Site induction
- Environmental management training – general and targeted

The training will generally be prepared by the Site Manager / Supervisor (or the Environmental Representative).

The following will be done to ensure all employees, contractors, suppliers and visitors receive the appropriate training/awareness:

3.4 Environmental Site Induction

All new members of staff receive a corporate Environmental Induction along with the obligatory Health & Safety induction. The induction gives a general overview of the environmental challenges faced by the project, how we are managing them, and general tips for reducing our impact in the workplace.

The main reason for environmental induction is to encourage new staff to be environmentally aware right from the beginning of their employment. This will ensure that environmental initiatives are successful by eliminating bad habits from the start.

Before working on all sites, all personnel and sub-contractors will undertake a site induction incorporating environmental requirements. The induction will address a range of environmental awareness issues specific to the construction process of the project.

As a minimum, training shall include:

- Explanation on the importance of complying with the EMP and environmental implications should the EMP not be effectively implemented.
- Explanation of the rules.
- Discussion of the potential environmental impacts of activities, recognition of environmental risks and how to control these risks.
- The benefits of improved personal performance, understanding of what to do in case of an environmental event or exposure.
- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out operational activities.
- Explanation of the requirements of the EMP and its specification.
- Explanation of the management structure of individuals responsible for matters pertaining to the EMP.

3.5 Environmental Awareness training

Targeted environmental management training will be provided to individuals or groups of workers with a specific authority or responsibility for environmental management or those undertaking an activity with a high risk of environmental impact. This environmental training will aim to achieve a level of awareness and competence appropriate to their assigned activities. This training will take place at the beginning of construction activity and a refresher towards the end of the construction project.