Government of the Republic of Malawi

Ministry of Health

EBOLA PREPAREDNESS PLAN

Environmental and Social Management Plan for the proposed Construction of an Ebola Virus Diseases Treatment Centre at Mzuzu Central Hospital

11 May 2016
CONTENTS

LIST OF TABLES ........................................................................................................ i
LIST OF FIGURES ..................................................................................................... i
LIST OF ACRONYMS ................................................................................................. ii
ACKNOWLEDGEMENTS .............................................................................................. iii
EXECUTIVE SUMMARY .............................................................................................. iv

CHAPTER 1 INTRODUCTION ....................................................................................... 1

1.1. PROJECT BACKGROUND ..................................................................................... 1
1.2. NATURE OF THE PROJECT ................................................................................. 4
1.3. OBJECTIVE OF THE ESMP ................................................................................ 5
1.4. SCOPE OF THE ESMP STUDY .......................................................................... 5
1.5. ASSESSMENT METHODOLOGY FOR THE ESMP ................................................ 5

CHAPTER 2 POLICY AND LEGAL FRAMEWORK FOR THE PROJECT ...................... 7

2.1 POLICIES ................................................................................................................ 7

2.1.2 Malawi Growth and Development Strategy (2011 – 2016) ............................ 7
2.1.3 The National Environmental Policy (2004) ...................................................... 8
2.1.4 The National Environmental Action Plan (2002) ............................................. 8
2.1.5 The National Water Policy (2005) .................................................................. 8
2.1.6 Guidelines for Environmental Impact Assessment (EIA), 1997 ....................... 9
2.1.7 National Construction Industry Policy, 2015 .................................................. 9
2.1.8 Infection Prevention and Control Policy (2006) .............................................. 9
2.1.9 National Sanitation Policy (2007) ................................................................ 9
2.1.10 Decentralization Policy 1998 ....................................................................... 10
2.1.11 Revised Decentralized Environmental Management Guidelines, 2012 ....... 10
2.1.12 Malawi Standards (MS) 615: 2005: Waste within health-care facilities, 
handling and disposal (code of practice) ............................................................. 10

2.2 LEGAL FRAMEWORK .......................................................................................... 10

2.2.1. The Environment Management Act (1996) .................................................. 10
2.2.2. Public Health Act 1966 ................................................................................ 11
2.2.3. The Water Resources Act (2013) ................................................................ 11
2.2.4. Occupational Safety, Health and Welfare Act, 1997 ................................. 12
2.2.5. National Construction Industry Act, 1996 .................................................... 12
2.2.6. The Local Government Act (1998) ............................................................... 12

2.3 ADMINISTRATIVE FRAMEWORK ....................................................................... 13

2.4 THE WORLD BANK SAFEGUARD POLICIES .................................................. 13

2.4.1. Environmental Assessment (OP/BP 4.01) ....................................................... 14
5.2.1. Positive impacts during planning phase ............................................. 33
5.2.2. Positive impacts during construction phase ...................................... 33
5.2.3. Positive Impacts during the Operation and Maintenance Phase .......... 34
5.3 DESCRIPTION OF NEGATIVE IMPACTS ........................................... 35
5.3.1. Impacts during the planning and design .......................................... 35
5.3.2. Impacts during construction ......................................................... 35
5.3.3. Impacts during Operation and Maintenance .................................. 37
5.3.4. Impacts during Decommissioning .................................................. 40
5.4. SIGNIFICANCE RATING OF NEGATIVE IMPACTS ......................... 41

CHAPTER 6 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN .... 44
6.1. THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN .................. 44
6.2. ENVIRONMENTAL AND SOCIAL MONITORING PLAN ........................ 52
6.3. INSTITUTIONAL RESPONSIBILITY AND REPORTING STRUCTURE ......... 63
6.4. SUMMARY OF THE COSTS FOR ENVIRONMENTAL MANAGEMENT ......... 64

CHAPTER 7 CONCLUSION AND RECOMMENDATIONS .................................. 65
7.1 CONCLUSIONS .................................................................................. 65
7.2 RECOMMENDATIONS ................................................................. Error! Bookmark not defined.

REFERENCES .......................................................................................... 66

ANNEXES ................................................................................................. 68

ANNEX 1: TERMS OF REFERENCE ............................................................. 68
ANNEX 2: LIST OF KEY PEOPLE CONSULTED ....................................... 69
ANNEX 3: MAIN ISSUES RAISED BY KEY STAKEHOLDERS ......................... 70
ANNEX 4: NOTES FROM THE CONSULTATION ON LAND ISSUE AT MZUZU CENTRAL HOSPITAL .................................................................................................................. 71
ANNEX 5: A SIGNED LETTER CONTAINING THE RESOLUTIONS FROM THE MEETING ON LAND ISSUE .................................................................................................................. 72
ANNEX 7: ENVIRONMENTAL GUIDELINES FOR CONTRACTORS ................. 76
LIST OF TABLES

Table 3.1: Main rooms in the EVD treatment centres in the Referral Hospitals......................15
Table 3.2: Specifications of the incinerator for the EVD treatment centre ............................19
Table 3.3: Average emissions/EU standards on basic incinerators (with secondary chamber) .................................................................................................................................20
Table 4.4: Construction Materials for the EVD treatment centre ..........................................20
Table 4.1: Top ten causes of morbidity in Mzuzu and in Malawi ............................................28
Table 5.1: Significance rating for negative impacts ..................................................................42
Table 6.1: Environmental and Social Management Plan .........................................................45
Table 6.2: Environmental and Social Monitoring Plan .............................................................53
Table 6.3: Summary of the costs for Managing the Environment ............................................64

LIST OF FIGURES

Figure 1.1: Map of Malawi showing the districts for the proposed EVD Centres .......................3
Figure 3.1: The Floor Plan for the Ebola Treatment Centre in Mzuzu .....................................16
Figure 3.2: Designs of Septic Tanks .......................................................................................18
Figure 3.3: Foundation trenches for Mzuzu EVD treatment centre .........................................21
Figure 4.1: Map showing location of Mzuzu City ....................................................................22
Figure 4.2: Satellite image of Mzuzu Central Hospital showing the proposed site ..................23
Figure 4.3: Topography and Drainage of Mzuzu City and the proposed site ..........................24
Figure 4.4: Satellite image for Lunyangwa River and the sewage ponds .................................25
Figure 4.5: Average temperature and average rainfall for Mzuzu ...........................................26
Figure 4.6: Receptacles for waste disposal at Mzuzu Central Hospital .................................29
Figure 4.7: A filled up pit for no-infectious wastes ...............................................................30
Figure 4.8: Smoke coming out from a leaking incinerator ....................................................30
**LIST OF ACRONYMS**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>DPPD</td>
<td>Department of Policy, Planning and Development</td>
</tr>
<tr>
<td>DEHO</td>
<td>District Environmental Health Officer</td>
</tr>
<tr>
<td>EHO</td>
<td>Environmental Health Officer</td>
</tr>
<tr>
<td>ESIA</td>
<td>Environmental and Social Impact Assessment</td>
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<tr>
<td>ESMP</td>
<td>Environmental and Social Management Plan</td>
</tr>
<tr>
<td>EVD</td>
<td>Ebola Virus Disease</td>
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<tr>
<td>GoM</td>
<td>Government of Malawi</td>
</tr>
<tr>
<td>IPC</td>
<td>Infection Prevention Control</td>
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<tr>
<td>MGDS II</td>
<td>Malawi Growth and Development Strategy II</td>
</tr>
<tr>
<td>MNREM</td>
<td>Ministry of Natural Resources, Energy and Mining</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>NCIC</td>
<td>National Construction Industry Council of Malawi</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental Organisation</td>
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<tr>
<td>NEAP</td>
<td>National Environmental Action Plan</td>
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<td>NCE</td>
<td>National Council for the Environment</td>
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<td>NEP</td>
<td>National Environmental Policy</td>
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<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
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<tr>
<td>TCE</td>
<td>Technical Committee on the Environment</td>
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<td>WHO</td>
<td>World Health Organisation</td>
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ACKNOWLEDGEMENTS

The Consultant, Kent Kafatia, is indebted to the National AIDS Commission (NAC), the Ebola Coordination Unit, and the Department of Planning and Policy Development of the Ministry of Health for the support that was provided during the preparation of this Environmental and Social Management Plan (ESMP). The ESMP is a result of information and knowledge gathered during stakeholder consultations, community consultations and site investigations. Therefore the consultant wishes to express deep gratitude to all the people that were met with and participated in the consultations.
EXECUTIVE SUMMARY

Introduction

The Government of Malawi, with support from the World Bank, is implementing Ebola Virus Disease (EVD) preparedness activities which include infection control interventions, particularly provision and use of Personal Protective Equipment (PPEs); and construction of EVD quarantine/treatment centres. The project is being implemented in selected border districts and referral hospitals. Mzuzu Central Hospital is among the referral hospitals where the EVD treatment centres are proposed to be constructed.

The project is important for Malawi as during the Ebola outbreak of 2014, worst hit countries were those with a weak health-care system and poor infrastructure, thus unprepared. In addition, with the Ebola threat still existing in other countries, Malawi is at risk of an Ebola Virus Disease outbreak due to migration.

Objectives of the ESMP

Construction of the proposed Mzuzu EVD treatment centres is likely to result in moderate environmental and social impacts; hence this ESMP. The ESMP is in line with the World Bank’s category B projects, within which this project is classified. The ESMP is also prepared in response to the “Environment Management Act, 1996” and the “Guidelines for Environmental Impact Assessment (EIA) for Malawi, 1997”, which recommend an ESMP for projects with moderate Environmental and Social Impacts. The main objective of the ESMP is to provide measures to minimize adverse effects on the biophysical and socio-economic environment during construction and operation of the Mzuzu Central Hospital EVD treatment centre.

Methodology for the study

In order to predict the impacts of construction of the EVD treatment centre at Mzuzu Central Hospital, field investigations were conducted at and around the project site to appreciate the extent of impact of the project activities and determine their environmental and social footprint. The field investigations were also conducted to gather biophysical and socio-economic data and hold discussions with relevant stakeholders. In addition, literature review was conducted including the review of World Health Organisation Ebola Guidelines for Environmental Management and Infection Control in Ebola Units.

Impacts of the Project

Potential environmental and social impacts will emanate from the project activities during the construction, operation and maintenance and decommissioning phase. The following are identified as potential positive impacts of the project:

i. Increase in knowledge and skills in infection control and prevention
ii. Employment opportunities
iii. Acquisition of skills in construction of prefabricated buildings
iv. Income for material/equipment suppliers
v. Increased space for medical services  
vii. Improved EVD surveillance, isolation and treatment

On the other hand, potential negative impacts that are likely to occur include:

i. Noise vibrations disturbances  
ii. Waste generation and increased land degradation  
iii. Water pollution  
iv. Accidents to workers and the public on the construction site  
v. Fear of being infected with EVD  
vi. Air pollution from incineration of wastes  
vii. Loss of access to agricultural land  
viii. Water pollution  
ix. Increased runoff  
x. Occupation safety and health risks  
xi. Air, land and water contamination  

Management of the Impacts
In view of the negative impacts outlined above, this document has presented an environmental and social management plan (ESMP) in Chapter 6, which outlines mitigation measures that must be implemented by the Ministry of Health and other key stakeholders in order to eliminate or mitigate the impacts on the socio-economic environment. A monitoring plan, which outlines responsibilities for the Ministry of Health and other key stakeholders; along with monitoring verifiable indicators for each of the mitigation measures, has been provided in this ESMP. It is expected that if the ESMP is effectively and efficiently implemented, the negative impacts will be reduced to low or will be eliminated such that the project can be implemented sustainably.
CHAPTER 1 INTRODUCTION

1.1. PROJECT BACKGROUND

Ebola virus disease (formerly known as Ebola haemorrhagic fever) is a severe, often fatal and highly infectious disease. The virus is transmitted to people from wild animals and spreads in humans through direct contact with the blood, body fluids and tissues of infected people. Severely ill patients require intensive supportive care. During an outbreak, those at high risk of infection are health workers, family members and others in close contact with the sick and deceased.

The recent Ebola Virus Disease (EVD) outbreak started in March 2014 in the West African countries of Liberia, Guinea and Sierra Leone. A few cases were also reported in Italy, Mali, Nigeria, Senegal, Spain, United Kingdom and United States of America as a result of migration. Since the outbreak began, there have been approximately 28,602 cases of the virus, causing 11,301 deaths (WHO, 2016). The worst hit countries were Liberia and Sierra Leone due to a weak health-care systems and a lack of infrastructure. The countries have been declared Ebola Free but enhanced surveillance is continuing.

Ebola preparedness and response planning has been in effect since shortly after the outbreak in Western Africa in 2014. Ebola infection prevention and control training has been administered across the entire country based on World Health Organization (WHO) guidance. Training included nurses and clinicians (doctors/ clinical officers) and focused on clinical management of Ebola patients based on WHO training materials. A training-of-trainers program was also established by the WHO in Brazzaville, Congo to provide a foundation on which to administer more regular Ebola response training.

With regards to Ebola waste management, specific Infection Prevention and Control (IPC) is built on already existing hospital IPC infrastructure. There is an IPC Unit in the Ministry of Health and the National Focal Officer is part of the team of Trainers on Ebola.

Ebola response equipment is also already in place at all the hospitals where EVD treatment centres are being constructed as part of this project. This includes vehicles (ambulances, double cabin 4X4 utility vehicles and motor cycles) washing machines, patient beds, mattresses and blankets. The different supplies and logistics necessary for IPC personal protective equipment (PPEs- coveralls, aprons, N-95 mask, gumboots, goggles, etc) have also been supplied to all district hospitals.

According to WHO, the introduction of an EVD case into unaffected countries remains a risk, as long as cases exist in any country. With adequate preparation, however, such an introduction can be contained through a timely and effective response. Therefore, the Government of Malawi (GoM), with support from the World Bank, is implementing EVD preparedness activities, which comprise construction of EVD quarantine/treatment centres and Infection Control Interventions.

The EVD quarantine centres being proposed at Karonga, Dedza, Mchinji and Mwanza Districts are inside the fences of the respective District Hospitals. In these locations, the major activity will be screening and isolation of suspected cases. Treatment for confirmed cases will be provided at the referral centres to be constructed in the major cities of Malawi – Lilongwe (the capital city), Blantyre and Mzuzu. In Lilongwe the EVD treatment centre will be at Kamuzu Central Hospital (KCH). In Mzuzu the Centre will be at Mzuzu Central Hospital and in Blantyre the facility will be at an undeveloped site owned by the government, along the M1 road after Kameza Roundabout, near the Kamuzu College of Nursing complex.

Karonga, Mwanza, Mchinji and Dedza are border districts. Karonga borders with Tanzania to the North of Malawi; Mwanza boarders with Mozambique to the east; and Mchinji and Dedza border with Zambia and Mozambique to the west of Malawi. A map showing the districts for the EVD quarantine/treatment centres is provided in figure 1.1.
Figure 0.1: Map of Malawi showing the districts for the proposed EVD Centres
1.2. NATURE OF THE PROJECT

EVD preparedness activities for Malawi aim to develop infrastructure and strengthen the health-care system in readiness of an Ebola outbreak. The activities started during the recent outbreak in East Africa. For the Malawi project, the World Bank is supporting the following two components:

**Component 1**: This Component will focus on Infection Control Interventions, specifically provision and use of Personal Protective Equipment (PPEs). Under this component, health-care workers will be trained in the use of PPEs, provision of care and treatment to Ebola patients, infection prevention and control and waste management. This component will also provide $20,000 for each of the seven districts where the project’s Ebola component is being implemented to increase capacity for district health authorities and the community to manage infectious disease response, including Ebola. This includes developing and implementing training of trainer programs with district health authorities where the EVD treatment centres are being constructed. Front-line staff are also being recruited and trained as part of this effort to investigate suspected cases, provide early warning and community level response. The community will also be targeted with social behaviour change communication programs to increase knowledge, shift attitudes and cultural norms and produce changes in a wide variety of behaviours. These activities are separate from the project’s Health Care Waste Management Plan (HCWMP).

**Component 2**: Construction EVD quarantine/treatment centres.

**Seven** Ebola Virus Disease quarantine/treatment centres are proposed to be constructed in Karonga, Mzuzu, Dedza, Mchinji, Mwanza, Lilongwe and Blantyre districts. Karonga, Dedza, Mchinji and Mwanza have been proposed because they are border districts. In these districts, health-care workers will be working with immigration officers at the borders to identify suspected cases and isolate them in the quarantine centres, in addition to surveillance of cases within the districts. When a suspected case is confirmed to be Ebola infected, the person will be referred to Blantyre, Lilongwe or Mzuzu EVD treatment centre. In Lilongwe the EVD treatment centre is being constructed at Kamuzu Central Hospital (KCH) by the Ministry of Health (MoH).

The scope of the project for all the sites, except Lilongwe include construction of the EVD pre-fabricated structure on a concrete base, construction of septic tanks, installation of incinerators, construction of ash pits and the construction of a safety fence around the treatment centre. For the Lilongwe EVD centre, the scope of work includes construction of a septic tank and an ash pit in addition to provisions for Ebola centre furniture.

As a requirement for all World Bank supported infrastructure development projects; and in consideration of the highly infectious nature of EVD, the project was screened for potential environmental and social impacts. The results showed that the construction activities of the EVD quarantine/treatment centre and the activities in the operational and maintenance phases will have moderate Environmental and Social Impacts. The project was assigned to the World Bank’s category B projects. Hence, preparation of the Environmental and Social Management Plans (ESMPs) was recommended for all the seven sites. The screening and
the preparation of the ESMP are also in line with the “Guidelines for Environmental Impact Assessment (EIA) for Malawi, 1997”.

1.3. OBJECTIVE OF THE ESMP

The main objective of the ESMP is to provide measures to minimize adverse effects on the biophysical and socio-economic environment; during construction and operation of the Ebola Virus Disease (EVD) quarantine and treatment centre. The ESMP predicts and describes impacts of the project; and outlines the enhancement and mitigation measures to be implemented by Ministry of Health and other key stakeholders. These impacts were determined through investigations carried out on and around the site earmarked for erection of the pre-fabricated Ebola treatment centre; as well as key stakeholder consultations and input from community representatives.

1.4. SCOPE OF THE ESMP STUDY

This ESMP is specifically for the identification of impacts related to construction and operation activities at the EVD treatment centre at Mzuzu Central Hospital; focusing on waste management during operation and maintenance phases. Preparation of the ESMP included the following activities:

- review of project reports, relevant literature and government regulations;
- identification and analysis of potential environmental and social impacts, which the project activities are likely to trigger and generate within and around the project site;
- determination of appropriate mitigation measures to minimize undesirable effects resulting from the proposed development;
- determination of costs of environmental management activities;
- preparation of an ESMP, which details the anticipated positive and negative impacts of the proposed project activities on the biophysical and socio-economic environment, and provides mitigation measures for the negative impacts; and
- recommendations for future environmental protection during operation and maintenance of the EVD quarantine/treatment.

1.5. ASSESSMENT METHODOLOGY FOR THE ESMP

The following assessment methods were employed in order to prepare the ESMP:

a) field surveys to the construction site, to appreciate the magnitude of project activities and determine their environmental and social footprint. The surveys facilitated the collection of biophysical and social data, and discussions with relevant stakeholders and surrounding communities;

b) surveys of the waste management facilities at the hospital (sewage ponds, incinerators, placenta pits and solid waste disposal sites) to appreciate the existing waste management and infection control practices;

c) literature review on the policies, regulations and environmental standards for the ESMP preparation. The purpose of reviewing such documents was to develop a comprehensive and guided policy and legal framework so that the ESMP is responsive and aligned with government’s and financiers’ policies;

d) interviews with key stakeholders including the Hospital Administrator, Chief Medical Officer, Ebola Preparedness Activities Coordinator, Chief Nursing Officer and the
Principal Environmental Health Officer for Mzimba North District Health Office. Community members were represented by the Ward Councillor and Cleansing Services Officer from the Mzuzu City Council;
e) assessment of socio-economic and the health-care systems data and prevailing national regulations, policies and standards.
CHAPTER 2 POLICY AND LEGAL FRAMEWORK FOR THE PROJECT

2.1 POLICIES

In Malawi, the overarching legislation is the 1996 Environment Management Act, currently under revision. The Malawi Guidelines for Environmental Impact Assessment were developed in 1997 and are also under revision. The Environmental Affairs Department determines whether an ESIA is required or not, for all projects. The Technical Committee on the Environment (TCE) reviews environmental impact assessment reports and makes recommendations to the Director, who reports to the National Council for the Environment (NCE). The NCE considers the recommendations and advises the Minister for approval and issuing the environmental certificate for the project to proceed. The Malawi national policies relevant to the activities for EVD preparation include:


The Constitution of the Republic of Malawi is supreme over any legal policy or Act in Malawi. Any Act of Government or any law that is inconsistent with the provisions of this Constitution shall, to the extent of such inconsistency, be invalid (Section 5). Hence the policies and legislation, relevant to the project activities have to be in line with the constitution.

In relation to the project, section 13 (c) dictates the provision of adequate health-care, commensurate with the health needs of the Malawian society and international standards of health-care. This is what the project as well as management of medical waste for the EVD aim to achieve. The proposed project must help improve rural life (section 13e).

Sections 13 (d) defines the role of the State as to manage the resources responsibly in order to prevent degradation of the environment, provide a healthy living and working environment for the people of Malawi, accord full recognition to the rights of future generations by means of environmental protection and sustainable development of natural resources and biodiversity of Malawi.

The proposed project at Mzuzu Central Hospital must sustainably safeguard the rights to a healthy living environment and protection of natural resources by ensuring that adverse impacts (particularly from medical wastes) on people and natural resources are avoided; and that mitigation measures are implemented for those impacts that cannot be avoided.

2.1.2 Malawi Growth and Development Strategy (2011 – 2016)

The Malawi Growth and Development Strategy II (MGDS II) is a decisive and strategic single reference document to achieve wealth creation through sustainable economic growth and infrastructure development. It acknowledges that a healthy population is key to increased productivity and sustainable economic growth. The following challenges facing the health sector are highlighted in the MGDS II: prevalence of preventable diseases, high mortality rates, high prevalence of HIV, high incidence of malaria cases, high incidence of TB cases,
limited access to maternal health services, low institutional capacity and inadequate supply of essential drugs and health infrastructure.

The project will improve infrastructure in readiness for EVD and improve capacity in infection control and provision of health interventions. All these are in line with the MGDS II.

2.1.3 The National Environmental Policy (2004)

The National Environmental Policy (NEP) developed in 1996 and revised in 2004 advocates for sustainable social and economic development through sound management of the environment and natural resources. Areas of priority include efficient utilization and management of natural resources; through involvement of the private sector, NGOs and communities for sustainable environmental management. The policy empowers communities to protect, conserve and sustainably utilize the nation’s natural resources and advocates for enhancement of public awareness and promotion of public participation.

In line with the requirements of the NEP, the proposed project has included participation of the local communities in the identification of potential impacts and development of appropriate mitigation measures.


The National Environmental Action Plan (NEAP) of 1994, updated in 2002, provides a framework for integrating the environment into all socio-economic development activities of the country. It documents and analyses major environmental issues and measures to alleviate them; promote sustainable use of natural resources in Malawi; and develop an environmental protection and management plan. The NEAP identifies the following as key environmental issues to be addressed, in relation to the proposed project: soil erosion, water resources degradation, air pollution and climate change. The NEAP also outlines actions to be undertaken to ensure adequate environmental protection. Hence the project must aim to protect the environment by avoiding as many of the significant impacts as possible in the first place; and where this is not possible, mitigation measures are to be implemented through management plans and monitoring has to be done effectively.

2.1.5 The National Water Policy (2005)

The overall goal of the National Water Policy 2005 is to provide an enabling framework for sustainable management and utilization of water resources, to provide water of acceptable quality and in sufficient quantities; and to ensure availability of efficient and effective water and sanitation services for every Malawian. In line with this policy, the project developers and administrators must: advocate for efficient utilization and management of water resources; participate or support efforts towards water resources conservation, harvesting and protection; ensure and promote proper management and disposal of wastes; properly dispose material that can pollute water resources; promote public awareness on guidelines and standards for water quality, public health and hygiene as well as pollution control.
2.1.6 Guidelines for Environmental Impact Assessment (EIA), 1997

The EIA Guidelines of 1997 outline the process for conducting ESIA to ensure compliance with the ESIA process as required in the Environment Management Act 1996. The Guidelines contain a list of prescribed projects for which ESIA is mandatory and those that may require an ESIA; hence they assist in environmental screening. The Guidelines require that no licensing authority issues any license for a project unless the Director of Environmental Affairs (DEA) has given consent to proceed, on the basis of a satisfactory ESIA or non-requirement of n ESIA. The EVD treatment centre for Mzuzu is being developed on the hospital land but outside the main fence. Hence it is an addition to the existing buildings and will comprise a pre-fabricated structure on a small area of land. An ESIA is not necessary in the case of this subproject.

2.1.7 National Construction Industry Policy, 2015

Construction of EVD quarantine/treatment centres triggers the Construction Industry Policy, whose broad policy goals include to promote environmental sustainability in implementation of construction projects. In accordance with the policy goal, project implementers must ensure that the contractor protects the environment, in line with national and international policies for environmental sustainability. Other focus areas include disaster risk management; occupational health and welfare; gender; and HIV and AIDS.

2.1.8 Infection Prevention and Control Policy (2006)

This policy was formulated to guide health facility operators in development and implementation of infection prevention and control programs. It emphasises infection prevention and control programs at various levels of health-care delivery system for the public and private sectors. The policy also stipulates that all health-care facilities in Malawi shall have an active IPC program in place; aimed at promoting IPC practices and surveillance focusing on clients, patients, health-care personnel and the environment. Infection control measures to be enforced in the event of EVD must be in line with the existing infection prevention and control programs in the respective hospitals.

2.1.9 National Sanitation Policy (2007)

The policy stipulates the need for delivery of improved sanitation services in Malawi. Some of the strategies for accomplishing this objective include: (1) providing adequate wastewater disposal facilities at all wastewater generation points and (2) ensuring adequate provision of wastewater treatment and disposal facilities for all new piped water supply connections. One of the specific goals in the National Water Policy (NWP), is to ensure water of acceptable quality for all needs in Malawi. Wastewater and solid waste will be generated in the EVD quarantine/treatment facilities. The Ministry of Health must therefore ensure that there are adequate wastewater disposal facilities.
2.1.10 Decentralization Policy 1998

The Decentralization Policy was adopted in 1998 to:

- Devolve administration and political authority to the district level;
- Integrate governmental agencies at the district and local levels into one administrative unit, through the process of institutional integration, manpower absorption, composite budgeting and provision of funds for the decentralized services;
- Divert the centre of implementation responsibilities and transfer these to the districts;
- Assign functions and responsibilities to the various levels of government; and
- Promote popular participation in the governance and development of districts.

Through the Decentralisation Policy, some of the roles of the authority at district level are to implement or facilitate development projects; to ensure development projects in their area are implemented in a sustainable manner; and to mobilize masses for socio-economic development at the local level. Therefore, for effective implementation of the project, the MoH must work closely with Mzuzu City Council. The Decentralisation Policy also provides for provision of environmental services such as refuse disposal, sewage removal and disposal, environmental reclamation, and environmental education. MoH must use the existing environmental services where they are not in capacity.

2.1.11 Revised Decentralized Environmental Management Guidelines, 2012

The Decentralized Environmental Management Guidelines (DEMG) were adopted in 2012 to address gaps and inconsistencies from other previous guidelines including the DEMG, 2002 and help ensure that Councils include emerging and critical environmental issues in the preparation of district plans and actions. The DEMG aims at guiding stakeholders to manage the environment and natural resources in a sustainable manner.

In line with the Decentralization Policy, the DEMG promotes local level environmental management, including planning, implementation, monitoring and evaluation

2.1.12 Malawi Standards (MS) 615: 2005: Waste within health-care facilities, handling and disposal (code of practice)

This standard provides criteria for segregation, collection, movement, storage and on-site disposal of waste within health-care units and biological research facilities, among others. The standards must be observed at the EVD quarantine/treatment centres. The hospital incinerators are being procured by the MoH in accordance with established international standards and no permits are required to have them installed or operated.

2.2 LEGAL FRAMEWORK

2.2.1. The Environment Management Act (1996)
The Act is the legal basis for protection and management of the environment; and the conservation and sustainable utilization of natural resources. Section 24, specifies the types and sizes of activities that require an ESIA before implementation. The Act further outlines the ESIA process to be followed in Malawi; and requires compliance with the process. Non-compliance with the ESIA requirements is an offence and attracts penalties.

The Act also recognises that improper waste disposal can impact various environmental and social resources and therefore regulates the management, transportation, treatment and recycling; as well as safe disposal of waste. The project, therefore, has to be implemented in an environmentally responsible manner to ensure protection of the environment and sustainable utilization of natural resources.

2.2.2. Public Health Act 1966

The Public Health Act 1966 seeks to preserve public health through the following provisions relevant to the project:

- Parts III, IV, V, VI and VII discuss infectious and epidemic diseases and how to handle them. The Act dictates notifying the Ministry of Health, when diseases such as T.B., Cholera and Measles are identified. A full list of notifiable diseases is presented in Part III. Medical personnel, project managers and family members have to follow the provisions given in the Act, which among others include isolating the patients and allowing medical personnel to attend to the patients.
- Part IX of the Act relates to sanitation and prohibited nuisances. Contractors have to ensure that there are sanitary structures; vehicles and that any other materials used are not in a state that can cause accidents; machine smoke cannot cause injuries to health; and that all material defined as nuisance are not in the work place.
- Part X has provisions for conservancy; sewerage and drainage; and encourages new buildings to have sewage systems, either private or public (connecting to the local authority sewerage). The Act also guides the protection of sewerage systems by preventing the throwing or emptying of waste that may injure the sewer, affect free flow of contents or affect treatment of sewage.

The provisions of the Public Health Act are to be followed and any deviation from the Act is punishable by fines and imprisonment. The Act gives the local authorities the right to inspect any premises for compliance with the Act.

2.2.3. The Water Resources Act (2013)

The Water Resources Act of 2013 supersedes the 1969 Water Resources Act and aims at improving on already existing water resources management efforts in the country. The Act is administered by the Water Resources Authority under the Ministry of Agriculture, Irrigation and Water Development. The Act requires any developer discharging wastewater (effluent) into surface water ecosystems to have an “Effluent Discharge” permit. One of the conditions in the permit is the need to comply with discharge quality limits for effluent, in accordance with applicable Malawi Standards or any relevant international standards.
2.2.4. **Occupational Safety, Health and Welfare Act, 1997**

The Occupational Safety, Health and Welfare Act has provisions for the registration of a workplace and the regulation of the conditions of employment in workplaces; with regard to the safety, health and wellbeing of employees. The Act provides for inspection of plant and machinery, for the prevention of accidents in the workplaces, including government establishments and operations, as well as building and civil engineering construction works (Section 5). It requires that employees are provided with appropriate protective clothing and equipment to prevent accident and injury.

The project will comply with the Occupational Safety, Health and Welfare Act. Workers will have to be provided with appropriate protective clothing to prevent accidents related to the construction and operation functions; and breathing masks, ear muffs and goggles where they will be exposed to potential risks and offensive substances; as required by Sections 58, 59, 60.

2.2.5. **National Construction Industry Act, 1996**

The Act provides for the establishment of the National Construction Industry Council of Malawi (NCIC), for the promotion and development of the construction industry, registration of persons engaged in the construction industry in Malawi, co-ordination of training of persons engaged in the construction industry and general matters incidental thereto. The NCIC is responsible for regulating the construction industry in Malawi through among others: registering consultants and construction firms, standardising quality control, codes of practice, procurement process; and legal contractual procedures in liaison with other organisation. In accordance with the Act, the NCIC must be involved in identifying the contractors, ensuring that a quality contract is in place, resolving conflicts between contractor and client and ensuring that quality structures are developed.

2.2.6. **The Local Government Act (1998)**

The Local Government Act was enacted to further democratic principles, accountability, transparency and participation of the Malawian people in the decision making and development process. According to the Act, District Councils have the mandate to: promote infrastructure and economic development (Section 6 (c)); establish, maintain and manage services for the collection, removal and disposal of solid and liquid waste (second schedule 2(a). The construction and operation of the EVD quarantine/treatment centres will generate both solid and liquid waste; hence there is need for the developer and contractors to work with the relevant district councils in waste management and disposal in the project areas, in line with the provisions of the Act. During the operation phase medical and domestic wastes will be generated. It will be important to involve the respective district councils in the managing of these wastes.

The Local Government Act also provides for local governance structures through which this Environmental and Social Management Plan must be implemented. These include:

- The District Executive Committee (DEC), which is responsible for implementation of all aspects of the District Development Planning System (DDPS).
• The District Environment Sub-Committee (DESC), which is the focal point on issues of the environment. It acts as a multi-disciplinary forum for environmental management and comprises environmental and natural resources management sector district officers. Some of the functions of the DESC include appraising micro-projects and facilitating their development; conducting awareness campaigns on environmental and natural resources management; and developing capacity on sustainable environmental management at community level so that issues of environment are integrated into decision-making process and planning systems.

2.3 ADMINISTRATIVE FRAMEWORK

The mission of the Ministry of Health (MoH) is to raise the level of health of all Malawians by reducing incidences of illness and death of the population. To achieve this, the major objective of MoH is to deliver health services and disseminate health information to the general public. It has the directorate of Administration, Finance, Technical Support Services, Planning and Policy Development, Clinical Services, Nursing Services, Reproductive Health, Physical Assets Management, Pharmaceutical Services and Preventive Health Services (PHS); and a number health institutions throughout Malawi.

The health institutions are categorised into referral (major) hospitals, district hospitals, health centres and clinics. MoH is headed by the Minister of Health who handles policy issues, while operational issues are handled by the Principal Secretary. At district level, there is the District Health Officer (DHO) who is responsible for effective and efficient delivery of quality health services in the district and the District Medical Officer (DMO) in charge of medical services.

The construction activities for the Mzuzu EVD treatment centre are being implemented by the Department of Planning and Policy Development (DPPD) in the MoH, working hand in hand with the Ebola Coordination Unit under the directorate of Preventive Health. Managing of the EVD treatment centre during the operation phase will be done by Mchinji District Hospital, together with the Local Council and with assistance from the Ebola Coordination Unit.

2.4 THE WORLD BANK SAFEGUARD POLICIES

The World Bank has keen interest in protection of the environment, for investment projects they support, in line with its ten environmental safeguards policies. These policies provide guidelines, aimed at preventing and mitigating undue harm to people and the environment, when implementing development projects. The environmental safeguard policies, which provide a platform for the participation of stakeholders in project design and implementation, are:

a) Environmental Assessment (OP/BP 4.01)
b) Forests (OP/BP 4.36)
c) Involuntary Resettlement (OP/BP 4.12)
d) Indigenous Peoples (OP/BP 4.10)
e) Safety of Dams (OP/BP 4.37)
f) Pest Management (OP 4.09)  
g) Physical Cultural Resources (OP/BP 4.11)  
h) Natural Habitats (OP/BP 4.04)  
i) Projects in Disputed Areas (OP/BP 7.60)  
j) Projects on International Waterways (OP 7.50)

This project triggers OP 4.01 on Environmental Assessment. This is because moderate environmental and social impacts are anticipated since the construction works and waste management activities will be primarily confined to within the existing hospital building premises.

2.4.1. Environmental Assessment (OP/BP 4.01)

The objective of environmental and social impact assessment is to ensure that project activities are environmentally sound and sustainable; and that decision-making is improved through appropriate analysis of actions and mitigation of their likely environmental impacts. This policy is triggered if a project is likely to have potential adverse environmental risks and impacts in its area of influence. Construction of the EVD treatment centre may have negative environmental impacts, which require mitigation. Hence this ESMP has been prepared.
CHAPTER 3  DESCRIPTION OF THE PROJECT AND COMPONENTS

3.1  THE EVD TREATMENT CENTRE FOR MZUZU

Ebola Virus Disease preparedness activities in Malawi include the development of a treatment centre, dedicated septic tank and high temperature incinerator, ash pit and security fence at Mzuzu Central Hospital. The proposed centre will be used for isolation and treatment of EVD suspected and confirmed cases in the Northern Region. It shall also act as an information sharing centre; hence the designs have included a conference centre.

The EVD treatment centre has been designed by the Ministry of Health (MoH) by adapting World Health Organisation specifications for Ebola quarantine/treatment centres. The main consideration in the design is infection prevention and control. Hence careful attention has been paid to isolation (case – case, patient-health care worker, case – visitor isolation), ventilation of the facility, hand hygiene, safe water supply, sanitation and waste management. This is supported by fund allocations under Component 1 of this project for infectious disease management training and surveillance programs targeting district health officials, frontline staff and community.

The main rooms in the facility are as provided in table 3.1:

Table 0.1: Main rooms in the EVD treatment centres in the Referral Hospitals

<table>
<thead>
<tr>
<th>1. Isolation Ward – to be used by suspected cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Ambulance Area</td>
</tr>
<tr>
<td>1.2 Bed space</td>
</tr>
<tr>
<td>1.3 Toilets</td>
</tr>
<tr>
<td>1.4 Linen store</td>
</tr>
<tr>
<td>1.5 Sluice room</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Confirmed Cases Ward – to be used by confirmed cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Bed Space</td>
</tr>
<tr>
<td>2.2 Wash rooms</td>
</tr>
<tr>
<td>2.3 Conference room</td>
</tr>
<tr>
<td>2.4 Laboratory</td>
</tr>
<tr>
<td>2.5 Steam steriliser</td>
</tr>
<tr>
<td>2.6 Dirty Linen Dispatch areas</td>
</tr>
<tr>
<td>2.7 Visitors Lounge</td>
</tr>
</tbody>
</table>
3.2 WASTE DISPOSAL SYSTEMS

3.2.1. Liquid Waste Disposal

According to the World Health Organisation (WHO) guidelines, all liquid waste from an EVD quarantine/treatment centre are not supposed to go into the public sewerage system. Therefore a separate septic tank will be constructed for the EVD treatment centre at Mzuzu.

The septic tank is a typical two chamber septic tank and a soak-pit. The design by MoH provides for specifications which are to be strictly adhered to during construction. Among others, these specifications include the size of the tank, cement mix ratios, walls thickness, materials to be used and the suitability of different types of soils for effluent disposal. Coarse sand or gravel with no clay silt is specified for disposal of effluent from the soak-pit. The specifications in general, aim at ensuring that there are no pollution effects. The design of the septic tank is provided in figure 3.2.
Figure 2: Designs of Septic Tanks
3.2.2. Solid Waste Disposal

All solid waste from the EVD treatment centre is considered infectious. Hence, all the solid wastes will be treated in an incinerator and the ash will be disposed in a well-covered ash pit to be constructed near the incinerator. The architectural design of the ash pit is provided in Annex 6.

It is recommended that international industry best practices related to hazardous waste incineration are followed in accordance with the World Bank Group’s environmental, health, and safety technical (EHS) guidelines for Health Care facilities as well as the General EHS Guidelines. Considering the infectious nature of the wastes, expected quantities and the potential air pollution impact from incineration, the following specifications have been proposed for the incinerator:

Table 0.2: Specifications of the incinerator for the EVD treatment centre

<table>
<thead>
<tr>
<th>Property</th>
<th>Description/ Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational temperature of 950 - 1320°C</td>
<td>To be able to fully incinerate highly infectious wastes</td>
</tr>
<tr>
<td>Two chambers</td>
<td>The second chamber to be equipped with an afterburner to allow for re-burn of harmful emissions</td>
</tr>
<tr>
<td>High chimney (Stack Height to be determined based on Good International Industry Practice – See General EHS Guideline Annex 1.1.3)</td>
<td>To ensure that smoke does not impact on the surrounding people and environment.</td>
</tr>
<tr>
<td>Top loading for waste</td>
<td>For easy loading and effective spreading of waste</td>
</tr>
<tr>
<td>Mechanical and air controlled operation</td>
<td>To ensure optimal combustion</td>
</tr>
<tr>
<td>150 – 200 kg batch size</td>
<td>To be able to take in a large volume of waste that would be expected during an outbreak.</td>
</tr>
<tr>
<td>100kg per hour burning rate</td>
<td>In the event that there is a lot of waste, a quick burning rate will ensure that the waste storage time is minimised.</td>
</tr>
<tr>
<td>Efficient average fuel consumption</td>
<td>To ensure operational costs are minimised</td>
</tr>
<tr>
<td>Average emissions according to</td>
<td>To reduce air pollution</td>
</tr>
</tbody>
</table>

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice. When a member of the World Bank Group is involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. The World Bank Group’s EHS Guidelines for Health Care Facilities can be found at: http://www.ifc.org/wps/wcm/connect/bc554d80488658b6b6e666a6515bb18/Final%2B-Health%2BCare%2BFacilities.pdf?MOD=AJPQES&id=132316196611169 and the General Environmental Health and Safety Guideline can be found at http://www.ifc.org/wps/wcm/connect/532ff48048863ab4d6f66a6515bb18/1%2BAir%2BEmissions%2Band%2BAmbient%2BAir%2BQuality.pdf?MOD=AJPQES
European Union standards as provided in table 3.3

Table 0.3: Average emissions/EU standards on basic incinerators (with secondary chamber)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Limits (1/2 hr. avg.)</th>
<th>Measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total dust</td>
<td>30 mg/m³</td>
<td>12 mg/m³</td>
</tr>
<tr>
<td>Sulphur dioxide</td>
<td>200 mg/m³</td>
<td>2.4 mg/m³</td>
</tr>
<tr>
<td>Nitrogen dioxide</td>
<td>400 mg/m³</td>
<td>60 mg/m³</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>100 mg/m³</td>
<td>78.3 mg/m³</td>
</tr>
</tbody>
</table>

3.3 CONSTRUCTION MATERIALS

Construction Materials for the EVD treatment centre as specified by the Architect are provided in Table 3.2:

Table 0.4: Construction Materials for the EVD treatment centre

<table>
<thead>
<tr>
<th>Structure</th>
<th>Characteristic feature</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor</td>
<td>Concrete slab with cement finish</td>
<td>cement, sand, concrete, wire mesh, damp proof membrane</td>
</tr>
<tr>
<td>Wall</td>
<td>Plaster and steel windows</td>
<td>burnt bricks, sand, steel, paint</td>
</tr>
<tr>
<td>Roof</td>
<td>Roof sheets and trusses</td>
<td>corrugated iron sheets, timber trusses</td>
</tr>
</tbody>
</table>

The prefabricated materials, including windows and steel framework will be imported from South Africa; whereas sand, paints, cement, concrete, wire mesh and damp proof course will be sourced locally.

3.4 CONSTRUCTION WORKS

Construction activities at the site started in December but were stopped after excavation of foundation trenches, (see figure 3.3), to ensure that the environmental and social management plans are in place. The construction activities were planned for a 4 Months period; but another 4 months have been added.
3.5 LABOUR FOR CONSTRUCTION

One international contractor has been engaged by the Ministry of Health to construct the EVD treatment/quarantine centres in all the sites except at Kamuzu Central Hospital in Lilongwe District. The contractor has subcontracted a local construction company to construct the concrete slabs.

Considering the small size of the EVD quarantine centre and that prefabricated materials are being used, a small team is engaged for the construction activities. About 10 locals will be employed as labourers for the Mzuzu Central Hospital EVD treatment centre project.
CHAPTER 4  ENVIRONMENTAL AND SOCIAL SETTING OF MZUZU EVD TREATMENT CENTRE

4.1  PROJECT LOCATION

4.1.1. Location and Accessibility

The project site is at Mzuzu Central Hospital in Mzuzu City. Mzuzu is the largest urban centre in the Northern Region of Malawi and the third largest City in Malawi. The City is in Mzimba District and it borders with Nkhata Bay District to the east and south (see figure 4.1). It is about 367 Kilometres from Lilongwe, the Capital City of Malawi and it is located at the road junction where the M5 from the lake shore region joins to the M1 road from Lilongwe.

To reach Mzuzu Central Hospital from the M1 – M5 junction, one proceeds with the M1 road and takes the left turn before Mzuzu University, at Luwinga. Mzuzu Central Hospital is about 5.5 km from the M1-M5 junction and about 1 km from the junction at Luwinga. The proposed site is outside the hospital fence and it is between a guardian shelter to the south and an unfinished building to the north (see figure 4.2). The site is accessed through the tarred road that continues to the west from the main entrance of Mzuzu Central Hospital.

Figure 0.1: Map showing location of Mzuzu City
Using Universal Transversal Mercator Coordinates, the proposed site is at 36L 608497 m E and 36L 8736399 m S. Figure 4.2 is the satellite image of Mzuzu Central Hospital including the proposed site.

Figure 0.2: Satellite image of Mzuzu Central Hospital showing the proposed site
4.1.2. Site Selection

The site for the project was selected by the Department of Planning and Policy Development (DPPD) of the Ministry of Health, in consultation with Mzuzu Central Hospital. The following are the reasons for selecting the site:

- Isolation of the site and EVD cases: the site is outside the hospital fence; hence it is isolated and away from traffic including people;
- Access by medical personnel: the site is near the hospital. Hence medical personnel will be moving a short distance to it.

4.2 BIO-PHYSICAL CHARACTERISTICS

4.2.1. Topography

Mzuzu is on the northern end of the Viphya Plateau, at the edge of the Rift Valley escarpment and at the altitude between 1,200m and 1,370m above sea level. It is bordered by Viphya Mountains to the north and by Kaning’ina Mountains to the east. The land is gently-sloping, with ridges and gullies to the east and south. Mzuzu Central Hospital and the project site are in the flat area at an average elevation of 1275m above sea level. Figure 4.3 shows the topography of Mzuzu City and the proposed Ebola treatment and quarantine site.

![Figure 0.3: Topography and Drainage of Mzuzu City and the proposed site](image-url)
4.2.2. Drainage

There are several rivers in Mzuzu City. Lunyangwa is the most prominent and the only reliable source of water for Mzuzu City. The river is also important as the natural receptor for the effluent from Mzuzu Central Hospital sewage oxidation ponds (see figure 4.4). The source for Lunyangwa River is Kaning’ina. Other rivers and streams in the city include Chingamba, Katoto, Kavuzi and Kajiliwi.

![Satellite image for Lunyangwa River and the sewage ponds](image)

Figure 0.4: Satellite image for Lunyangwa River and the sewage ponds

4.2.3. Air Quality/ Air pollution

The National Environmental Action Plan (2002) identifies gaseous emissions from industries, car exhaust fumes as well as burning of old tyres as the main cause of air pollution in urban centres in Malawi. Bush fires and burning of wastes, including incineration of medical wastes in the hospitals are also a source of pollution.

Air pollution is not a significant environmental problem for Mzuzu City, as there are no major industries; and the number of cars is not large as compared to the other cities in Malawi. In addition the city is surrounded by large forest reserves which contribute to fresh air. However the city is developing and industries are coming up and the number of cars is increasing. The forest is also getting smaller due to increasing timber production and bush fires. Air pollution could be a serious problem in future.
4.2.4. Soil type

The project site has red sandy clay soils (see figure 3.3). According to the soil mapping\(^3\) for Malawi, these are humic ferralic soils and have high organic content. The soils are highly leached of phosphate, nitrogen and potassium. Hence agricultural crops do not do well (Mzuzu Profile, 2013).

4.2.5. Flora and fauna

The natural vegetation of the city is made up of Brachystegia trees. There are two large forest reserves at Lunyangwa and Kaningi’ina. The project area is however a cultivated area and there is no significant population of natural vegetation and fauna. Hence, the project will have no significant impact on fauna and natural flora.

4.2.6. Climate

Mzuzu enjoys a cool climate that is highly influenced by its topography and proximity to Lake Malawi. The wet season is from December to April; and a moderately dry season starts from May to November. In general Mzuzu experiences a humid climate all year round, with an annual rainfall of approximately 1,225mm. The highest average rainfall of about 222mm is experienced in March, while the least rainfall of normally about 8mm falls in August.

The Average monthly temperature is 18.1°C, with a mean monthly maximum of 22.0°C in November and a mean monthly maximum of 7.8°C in July. The hottest period is September - November before the onset of first rain. The average temperature and rainfall for the city are provided in figure 4.4.

Recently, Mzuzu City has been experiencing intense rainfall, change in rainfall pattern, high temperatures, prolonged dry spells and floods. Generally there has been a moderate temperature increase with incidences of rains. These are characteristic of climate change which is negatively affecting the whole Malawi.

![Temperature and Rainfall Chart](chart.png)

**Figure 0.5:** Average temperature and average rainfall for Mzuzu

4.3 SOCIO-ECONOMIC CHARACTERISTICS

4.3.1 Population

As at 2008 census, the population of Mzuzu City was 133,968; of which 67,197 were male and 66,771 were females. The population density was 932 persons/km², which was significantly less than the population densities for Lilongwe (674,448 persons/km²) and Blantyre 3,006 people/km² respectively. Mzuzu City is the third largest urban centre in Malawi. The population growth rate was 4.4% in 2008 and according to the National Statistics Office (NSO) projections; Mzuzu City has a population of 239,008 in 2016. There are 119,374 males and 119,634 females in Mzuzu City and the population is steadily growing.

4.3.2 Migration

Mzuzu City experiences high immigration rates from surrounding areas due to business attractions. Some of the immigrants are from Tanzania. According to the Mzuzu Socio-economic Profile (2013), the majority of the immigrants are young, unskilled and uneducated. Their daily number is believed to be more than 20,000.

4.3.3 Land Ownership and Use

The project site is on a public piece of land, owned by the Ministry of Health. The land was however idle and the local communities were encroaching on it. The site where the foundation has been excavated was also used for cultivation. To stop encroachment by the community the hospital administration, through the social welfare committee, allocated the land to hospital staff in 2002.

When excavations for the foundation to the EVD treatment centre were being done, the land was being used by Mrs. Ruth Mtemang’ombe, a member of staff for the hospital, who had grown maize and applied fertiliser. Mrs. Ruth Mtemang’ombe has since been compensated for the loss of crop and the fertiliser (see Annex 5). Currently there is no one using the piece of land and members of staff have been reminded not to use the piece of land for any activity including cultivation.

4.3.4 Economy

The economy of Mzuzu is largely supported by the production of coffee, timber, fruits, milk and honey. Mzuzu coffee is exported internationally. In Mzuzu City there is also the manufacturing of pharmaceuticals, cosmetics and timber. The city has a highly skilled labour force; and a good capital mobility through banking facilities. The City on a strategic location (junction to Lilongwe, Karonga Border Post and to the M5 lakeshore road). Hence it is an important trading centre for cross boarder products.

4.3.5 Water, Electricity, Telephone and Internet Services

Public utilities in the City include electricity supplied by ESCOM and piped water by the Northern Region Water Board. There is a good supply of water and electricity as compared
to the other cities. However even a short period without electricity or water at a hospital can have dire consequences including deaths. Hence at Mzuzu Central Hospital has a diesel generator for electricity and 10,000l water reservoir tanks.

Telecommunication is supplied by MTL, mobile phone networks (AIRTEL, TELKOM and ACCESS). Internet services are provided by the phone service companies.

### 4.3.6 Health Services

Mzuzu Central Hospital is a referral hospital under the Ministry of Health. It provides referral health services for the whole northern region. Other hospitals include St John’s Hospital and St. John’s Mental Hospital; both belonging to Mzuzu Catholic Diocese. Mzuzu Health Centre (under Mzimba North District Health Office), Moyale Barracks Hospital, and Mzuzu Police Health Facility are owned by Malawi police. Mzuzu City Council manages 5 outreach clinics in five wards and there are also a number of private clinics.

Health services in the City are provided at household, community and health centre level. Mzimba north does not have a district hospital. Hence referral cases from health centres are directed to Mzuzu Central Hospital.

The leading cause of illness in Mzuzu City is Malaria; contributing to nearly 30 percent of all out-patient visits. There are also other major ailments, as provided in table 4.1.

<table>
<thead>
<tr>
<th>No</th>
<th>Ailment</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Malaria</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>Upper respiratory infections</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>Musculoskeletal pains</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>All other non-communicable disease</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>All other skin conditions</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>Diarrhoea – no blood</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>Traumatic Conditions</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Acute eye infections</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Asthma</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>STIs</td>
<td>1</td>
</tr>
</tbody>
</table>

*Source: Mzuzu Socio-economic Profile*

### 4.4 MZUZU CENTRAL HOSPITAL FEATURES

#### 4.4.1. Infrastructure

Mzuzu Central Hospital was opened in 2000 and has a capacity of 322 beds. The hospital has several departments including the Outpatient, Eye, Maternity, Tuberculosis, Radiology, 

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4 Due to its vastness, Mzimba District is divided into Mzimba North DHO and Mzimba South DHO
Pharmacy and Casualty departments. The infrastructure is well maintained except at the guardian shelter. Cleaning at the hospital is outsourced to a private service company.

The proposed site for construction of the EVD Centre is near an unfinished building, which was intended to be an anti-retroviral treatment unit. Construction stopped at roofing stage and it has stayed for over 5 years without any construction activities due to lack of funding. The construction was funded by the Government of Taiwan, which later pulled out for political reasons. During the consultations it was proposed that MoH must identify funding and finish the building so that it should be part of the Ebola preparedness activities.

4.4.2. Waste Management Services

4.4.2.1. Solid Waste Management

Health care waste from various departments at the hospital, including from the laboratory and the wards is segregated into sharps (e.g. syringes), infectious waste (e.g. cannulas) and non-infectious wastes (e.g. papers). The waste is collected in colour coded receptacles (see figure 4.6). The colour coding for the receptacles is however not consistent hence labels are also used. It was noted that no bin liners (hazardous waste bags) and covers (especially for infectious and non-infectious waste) are placed in the receptacles due to funding problems.

![Figure 0.6: Receptacles for waste disposal at Mzuzu Central Hospital](image)

When full, the receptacles are emptied into wheelie bins and are kept in a closed waste collection area. Bin liners are also no used for the large bins.

From the collection area, wastes are carted to the waste disposal area where sharps and infectious waste is disposed in an incinerator whereas non-infectious waste is disposed in an open pit and burned. The hospital also receives infectious waste from the Malawi Blood Transfusion Services (MBT) and the Southern Bottlers (SOBO) Limited which is incinerated.

From the site visit to the waste disposal area and through on site interviews, the following was established:
i. Waste segregation is not effectively done – infectious waste such as gloves were also found at the pit for disposal of non-infectious waste;  

ii. Non-infectious waste is burnt in the pits and this produces smoke (especially when the waste is mixed with wet infectious waste);  

iii. The waste disposal pit was full and not covered (see figure 4.7) which attracts flies and birds. Some sections of the wire fence around the pit have been cut away. This result in dogs entering the area.  

![Figure 0.7: A filled up pit for no-infected wastes](image)

iv. The incinerator needs major repairs. The mechanical parts (e.g. fans, and igniter) are no longer functioning and the incinerator has leaks, such that it is unable to attain very high temperatures. Smoke leaks out before reaching the chimney (see figure 4.8);  

![Figure 0.8: Smoke coming out from a leaking incinerator](image)

v. Waste handlers are provided with basic personal protective equipment i.e. gumboots, uniforms, mouth and nose masks; and gloves. However these people do not always use the PPEs.
vi. Food waste is collected in a skip, which is carted away by the City Council for emptying. The City Council, however does not remove the skip on the scheduled times Hence it is overfilled with waste and overflows.

vii. Liquid waste for Mzuzu Central Hospital is directed into four oxidation ponds where it is treated and the final effluent is released into Lunyangwa River. The sewer system was rendered non-functional in 2009 due to blockage of the sewer lines, which have just been repaired in 2015 by Plan Malawi. Currently the ponds are not full and there is no release of effluent into the river. The EVD treatment centre will have its own septic tank for treatment of liquid waste.
CHAPTER 5  IMPACTS OF THE PROJECT

Construction and operation of the Ebola Virus Disease treatment centre at Mzuzu Central Hospital will have both positive and negative impacts on the bio-physical and social-economic environment.

5.1 IDENTIFICATION OF THE POTENTIAL IMPACTS

The impacts for the Ebola Virus Disease treatment centre were identified using the following approach and methodology:

5.1.1. Literature review

The consultant reviewed a number of documents including the Mzuzu Socio-economic Profile and the World Health Organisation (WHO) manual for the care and management of patients in Ebola Care Units. The documents were reviewed to obtain a clear description of the environment in which the project will be implemented, the activities during operation and the anticipated impacts. The WHO has also prepared guidelines for environmental management and infection control in Ebola Units and these have been included in the mitigation measures of some of the anticipated impacts. A list of documents reviewed is indicated in the references.

5.1.2. Site Investigations

Site investigations were carried out to complement the literature review. Specifically the consultant carried assessments at the hospital, the project site and access areas; the waste disposal area including the incinerator, the sewage ponds and the nearby Lunyangwa river. The investigations focussed on identification of critical environmental and socio-economic elements likely to be affected during the implementation and operation of the project.

5.1.3. Stakeholder Consultations

Stakeholder consultations were conducted with the Hospital Administrator, Chief Medical Officer, Ebola Preparedness Activities Coordinator, Chief Nursing Officer and the Principal Environmental Health Officer for Mzimba North District Health Office. Community members were represented by the Ward Councillor and Cleansing Services Officer from the Mzuzu City Council in the consultations. These consultations were conducted on 10 February, 2016 and 12 April, 2015, and the list of people consulted is provided in annex 2, while issues raised are in annex 3.

5.1.4. Study of satellite images

Satellite images were produced for assessment of fine details of the site. This was important as project area of influence is too small to be fully assessed on conventional maps.
5.2 DESCRIPTION OF POSITIVE IMPACTS

5.2.1. Positive impacts during planning phase

The main activities during this phase include:

i. Training and sensitizations;
ii. Designing of the EVD treatment centre;
iii. Assessment of existing infrastructure;
iv. Identification of the contractor; and
v. Identification of the project site.

Anticipated significant impacts from the above activities will be as follows:

5.2.1.1. Increased knowledge and skills in infection control and prevention

The hospital staff that attended the training and sensitization in Ebola Virus Disease case management, Infection Control and Waste Management acquired knowledge and skills which can also be applied to the management of other infectious diseases. These efforts will be further supported under the infectious disease management training and surveillance programs targeting district health officials, frontline staff and community members that are a part of this Ebola response project.

The following measures can help to enhance the impact:

i. MoH must use standardised procedures when selecting people to participate in trainings to ensure that some people do not feel that they have been left out;
ii. Trained people must sign agreement forms to be available during an outbreak;
iii. Ensure that the trainings are continuous and that many more people are trained and sensitised;
iv. Ensure that the Health Care Waste Management Plan completed for the Nutrition and HIV/AIDS Project is implemented and followed to address potential environmental and health impacts due to operational activities; and
v. Conduct simulation exercise to firm up EVD response in case there is an outbreak;

5.2.2. Positive impacts during construction phase

Main activities during the construction phase include:

i. Site clearing and excavations for foundation trenches;
ii. Construction of a concrete slab;
iii. Installation of prefabricated walls;
iv. Roofing of the building;
v. Excavation for the septic tank; and
vi. Construction of the septic tank as well as installation of incinerators.

4.4.2.2. Employment opportunities
The construction works will provide employment opportunities for the local people, although this will be short term and very few locals will be employed (about 10 people). During operation, the facility may also require skilled personnel (e.g. nurses and laboratory assistants); and unskilled workforce (e.g. guards and cleaners).

**Enhancement Measures**

i. The international contractor must observe local labour laws; and
ii. Workers must be paid fairly for the services rendered.

**4.4.2.3. Acquisition of skills in construction of prefabricated buildings**

The local labourers will acquire skills in construction of prefabricated buildings.

The main contractor is from South Africa, but he has engaged local labourers. The local labourers are expected to acquire new skills from their counterparts through observation and training. To enhance the impacts, the contractor must be encouraged to provide on job training to the labourers.

**4.4.2.4. Income to material/ equipment suppliers**

Construction of the treatment centre will require cement, sand and concrete. This will provide business opportunities for local materials suppliers hence increased income. The impact can be enhanced by paying suppliers within the agreed time. Local suppliers must also be encouraged to supply quality products.

**5.2.3. Positive Impacts during the Operation and Maintenance Phase**

**5.2.3.1. Increased space for medical services**

The EVD treatment centre will be an additional infrastructure to the hospital; hence increased space for medical services. The centre will also have a conference room and rooms which can be used for other activities, including staff training, during times when there is no Ebola outbreak.

The impact could be enhanced by taking proper care and maintenance of the EVD treatment centre; and ensure the Centre is not misused.

**5.2.3.2. Improved EVD surveillance, isolation and treatment**

The project will provide surveillance and ready access to isolation and treatment of the Ebola Virus Disease suspected cases and patients. The related trainings will increase knowledge in EVD surveillance to ensure Ebola cases are identified through early warning; the trainings will help improve capacity to handle EVD cases; and the infrastructure will provide space to adequately isolate and provide treatment to EVD cases.

The impact can be enhanced by:
• Providing staff that has been adequately trained in EVD case management, use of equipment and use of PPEs; and
• Ensuring that the treatment centre has enough supplies all the time.

5.3 DESCRIPTION OF NEGATIVE IMPACTS

5.3.1. Impacts during the planning and design

There will be no significant impacts on the biophysical and socio-economic environment in this phase as the activities are limited and predominantly desk work.

5.3.2. Impacts during construction

5.3.2.1. Noise and vibration disturbances

Noise and vibrations disturbances are expected from metal fabrication activities and other machinery. The noise will be a source of discomfort to construction team.

Mitigation measures include:
• The contractor must use efficient machines that do not make a lot of noise; and
• The contractor must provide appropriate PPE (e.g. ear muffs) to workers.

5.3.2.2. Utilizing unlicensed quarry sites

Construction of the treatment centre will require cement, sand and concrete. Indiscriminate mining activities can take place in sensitive areas and create depressions that often block surface drainage system and create pools of stagnant water. Such pools of stagnant water are breeding grounds for mosquitoes.

Mitigation measures include:
• Identify licensed quarries with the suitable materials for construction.
• Procure construction material only from permitted sites and licensed / authorized quarries

5.3.2.3. Use of lead-based paint products

Lead is commonly absorbed into the body by inhalation from use of and/or scrapping of lead-based products like paint. When workers breathe in lead as a dust, fume, or mist, their lungs and upper respiratory tract absorb it into the body. They can also absorb lead through the digestive system if it enters the mouth and is ingested.

Mitigation measures include:
• Ensuring that no paint containing lead or lead products are used.
• Provide facemasks to workers if a surface with lead paint is rubbed and scraped for removal.
5.3.2.4. Dust nuisance

Construction of the concrete slab will require digging the foundation, cement and concrete mixing. These activities will likely lead to generation of dust, which can reach the nearby hospital wards, depending on the wind direction.

To avoid or mitigate the impact:

- The construction team must wear dust masks during site clearing and levelling;
- The contractor must erect a barrier around the work sites to break or reduce wind and dust movement to the nearby hospital ward and departments; and
- The contractor must spray water on the activity area to suppress dust.

5.3.2.5. Waste generation and land degradation

Solid waste will be generated at the site during the construction phase. The waste may consist metal cuttings, excavated materials during levelling and landscaping, paper/cement bags, empty paint and solvent containers, broken glass among others. Some of the wastes may be hazardous to the environment e.g. paints and cement while others like plastic are not biodegradable e.g. plastics. The excavated soils on the other hand can be carried by rain water and increase sedimentation in the nearby stream.

Land degradation may also occur away from the project site, at the places where construction materials such as sand and quarry stones are sourced, due to mining and quarrying practices that are not recommended e.g. uncontrolled mining, mining in areas that are prone to soil erosion and failure to rehabilitate the mined areas.

To avoid or mitigate the impact:

- Properly segregate and separate wastes to encourage reuse of some of the wastes e.g. cartons and paint containers;
- Minimise excavations during landscaping and levelling through carefully designed landscape;
- Use some of the excavated materials e.g. stones for backfilling and rehabilitating eroded areas; and
- Excavate a waste disposal pit which must be closed and the site rehabilitated when the pit is full.
- Enforce procurement of supplies from licensed suppliers through construction contract.

5.3.2.6. Water pollution

Surface water pollution may result from cement, paints, lubricants and fuels for generators where these fall or spill on the ground and are washed to the nearby Lunyangwa River. Ground water pollution may occur where the wastes seep into the ground.

Mitigate the impact by:
• Lining surfaces where cement, paints and oils will be stored;
• Lining the floor during painting and use of lubricants;
• Sensitize the workers to appropriately manage construction supplies and wastes; and
• Proper supervision of the workforce.

5.3.2.7. Risk of Spread of STIs and HIV/AIDS

Enhanced social interaction with the construction employees, most of whom are likely to come from other parts of the country, with the residents (considering the influence of money) is a potential avenue for transmission of HIV/AIDS and other social infections.

Mitigation measures include to:
• Sensitize the workers to avoid the sex trade
• Strengthen advocacy through awareness training in HIV/AIDS and other STDs; encourage the use of preventive measures like condoms

5.3.2.8. Accidents to workers and the public on the construction site

Accidents to staff, patients and the general public on the construction site may occur during construction. Sources of accidents may include electric shocks during welding, objects falling on people, workers falling from heights, nailing or hammering oneself and injuries from lifting and carrying building materials. The general public and animals may also be exposed to risks of falling into open trenches, especially outside the contractor’s working hours.

Mitigation measures include to:
• Train workers on prevention and managing incidences;
• Restrict hospital staff and public from going to the construction site during and outside working hours by placing posters, reflecting tapes and erecting barriers;
• Workers must wear protective gear; and
• Provide first aid kit.

5.3.2.9. Loss of access to agricultural land

The land for the proposed project is currently used for agriculture by a member of staff for the hospital. Therefore it is anticipated that there be loss of access to this land for agriculture by the said member of staff.

The developer should mitigate the impact by:
• Engaging the member of staff to voluntarily stop cultivating on the piece of land; and compensating the member of staff as appropriate

5.3.3. Impacts during Operation and Maintenance

Activities during operation and maintenance phase include:

i. Isolation and of suspected EVD cases;
ii. Provision of health-care and treatment to confirmed cases;
iii. Laboratory tests – the designs have included a laboratory which will be able to carry out some tests;
iv. Specimen handling (collection and transportation) to South Africa for tests;
v. Waste management (collection, transportation, treatment and disposal); and
vi. Trainings and conferences;

Significant negative impacts anticipated during this phase include:

5.3.3.1. Fear of being infected with EVD

EVD is a highly infectious disease and causes fear of being infected among health workers and the general public. During the operational phase there is likely to be fear among the hospital staff, suspected cases, and the nearby community. Some of the staff may be reluctant to work in the facilities and others may abscond for fear of getting the virus. Likewise some community members may shun using the hospital and may resist burial of dead bodies at their graveyards. To avoid or mitigate the impact the following measures must be taken:

• Adequately sensitize staff and the surrounding community on how the EVD may be contracted and transmitted;
• Adequately train staff on EVD case management, Occupational Safety and Health and Infection Control;
• Motivate staff to ensure their availability during an outbreak, after attending appropriate trainings;
• Inform and demonstrate to the staff and the community how safe burial practices may be conducted for EVD dead bodies;
• Secure consent to bury EVD corpses, at nearby graveyards, from the chiefs and local leaders;
• Frequently update the public on the activities in the EVD treatment centre

5.3.3.2. Air pollution and operational risk from incineration of wastes

Air pollution is expected from smoke from incinerators to be used for destruction of medical wastes. The impact is anticipated to have cumulative and long term health effects for incinerator operators. Proposed mitigation measures for air pollution impacts are as follows:

• Install a high temperature mechanical incinerator as specified for the EVD centre;
• Ensure that international industry best practices related to hazardous waste incineration are followed in accordance with the World Bank Group environmental, health, and safety technical (EHS) guidelines for health care facilities.5

5 The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry- specific examples of Good International Industry Practice. When a member of the World Bank Group is involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. The World Bank Group’s EHS Guidelines for Health Care Facilities can be found at: http://www.ifc.org/wps/wcm/connect/bc554d80488658b6b6e6f6a6515bb18/Final%2B-%2BHealth%2BCare%2BFacilities.pdf?MOD=AJPERES&ID=1323161961168 and the General Environmental
• Train staff on how to operate the incinerators;
• Orient laboratory and health-care staff to the Infection Control and Waste Management practices;
• Plant trees in the project area to help absorb carbons in the air;
• The hospital must sensitise the farmers to voluntarily leave the project affected land;
• Sort the waste to ensure only combustible waste goes into incinerators.

5.3.3.3. Water pollution

Spillages of wastewater and chemicals from the EVD treatment centre may occur during the operation phase, resulting in water pollution. Sewage disposal for the EVD treatment centre will also be through a septic tank and a soak-pit, which may also be a source of water pollution, when the wastewater overflows either through the manholes or broken pipes. Since the wastes from the EVD treatment centre will be infectious, water pollution can result in indirect and cumulative impacts.

To mitigate the impacts:
• Sensitize staff to avoid spillage of waste water on the ground surface;
• Ensure that wastewater disposal is adequately budgeted to ensure regular cleaning of the septic tank;
• Only licensed waste collectors shall be employed for this disposal;
• Sensitize staff and users of the EVD centre to appropriately use the waste drainage facilities to avoid blockages;
• Construct the septic tank and soak-pit according to the design specifications;
• The septic tank and soak pit site should be regularly monitored to ensure early detection of problems.

5.3.3.4. Increased runoff

The roof of the EVD treatment centre will serve as a water collector, thereby increasing runoff around the centre. The terrain of the site is slightly sloping towards the Lunyangwa River. Hence, increased runoff may occur leading to sedimentation and other undesirable effects downstream. To mitigate or avoid the impact, carefully design the surface drainage for the EVD treatment centre and the site.

5.3.3.5. Occupation safety and health risks

The main health and safety issues are likely to relate to the following:

i) Working in a confined space and highly infectious disease;
ii) Improper use of personal protective equipment e.g. the Ebola Suit;
iii) Shortage of medical supplies;

Health and Safety Guideline can be found at http://www.ifc.org/wps/wcm/connect/532ff4804886583ab4d6f66a6515bb18/1-1%2BAir%2BEmissions%2Band%2BAmbient%2BAir%2Bquality.pdf?MOD=AJPERES
iv) Exposure to highly infectious waste especially by the waste handlers who will operate the incinerators;
v) Inadequate maintenance for medical equipment;
vi) Inadequate supply of PPEs including waste bin liners; and
vii) Failure or neglecting to use PPE.

viii) Intermittent water and electricity supply problems contributing to compromised sanitation;

To mitigate the impact:

- Mzuzu Central Hospital shall be responsible for ensuring an adequate and sustainable supply of water and electricity to the EVD treatment centre;
- The MoH and Mzuzu Central Hospital must continue to train and sensitize its staff in infection control and best practices for managing infectious wastes in accordance with the World Health Organization’s *Safe Management of Wastes from Health-care Activities*\(^6\) handbook and its *Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings*\(^7\). Other relevant infection prevention and control guidelines provided by WHO should further inform operational procedures;
- Regularly train staff on how to use PPE;
- Ensure that a fence around the EVD treatment centre is constructed according to WHO guidelines to keep visitors at distance but allowing them to see through;
- Ensure that the Project’s Health Care Waste Management Plan and the infectious disease management training and surveillance programs targeting district health officials, frontline staff and community members under Component 1 are implemented.
- Regularly monitor performance of equipment and carry out maintenance;
- Ensure there is enough supply of medical supplies and PPE;

5.3.4. Impacts during Decommissioning

Decommissioning entails closure of the facilities and services. Consideration of impacts of decommissioning is important so that on closure of these facilities, due consideration is given to mitigate impacts from abandoned structures and equipment. Consideration should also be given to staff that may be made redundant.

5.3.4.1. Air, land and water contamination

Air, land and water contamination from waste would result from cleaning of premises and equipment and from transportation and disposal of wastes. The impact can be mitigated through the following measures:

- Disposing wastewater in appropriate and approved drainage systems; and

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\(^6\) http://apps.who.int/iris/bitstream/10665/85349/1/9789241548564_eng.pdf?ua=1

\(^7\) http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1
• Incinerating contaminated solid waste and disposing ash in approved landfill sites

5.3.4.2. Risk of infection from contaminated equipment

The decontamination team and other people are likely to be at risk of infection of handling equipment that has not been fully decontaminated. Mitigation measures would include to:

• Provide appropriate PPE for staff for destroying equipment used in the centre; and
• Destroy all equipment used in the EVD treatment centre.

5.4. SIGNIFICANCE RATING OF NEGATIVE IMPACTS

The significance of the identified potential negative environmental and social impacts has been determined by assessing and rating the impacts as (-1), (-2) or (-3), using the available information, professional judgement and experience from similar development projects. The ratings are based on:

a) Likelihood of occurrence (L) – a measure of the likelihood of the impact to occur;
b) Spatial Distribution (SD) - size of the area to be impacted; and
c) Time (duration) of impact Distribution (TD) - the period of time over which the impact may occur.

The significance of the impact has been determined by the product of L, SD and TD. Table 5.1 provides the significance rating of the impacts of the construction and operation of the EVD treatment centre at Mzuzu Central Hospital before mitigation. After implementation of the mitigation measures, the impacts are assessed as low to nil.
### Table 0.1: Significance rating for negative impacts

<table>
<thead>
<tr>
<th>SN</th>
<th>Impact</th>
<th>Likelihood of occurrence (L)</th>
<th>Spatial Distribution (SD)</th>
<th>Time (duration) of impact Distribution (TD)</th>
<th>Severity of Impact (LxSDxTD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Very likely to occur=-3</td>
<td>Regional=-3 National=-2 Local=-1</td>
<td>Long term= -3 Medium term= -2 Short term= -1</td>
<td>High: -8 to -27 Moderate: -4 to -7 Low: -1 to -3</td>
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<tr>
<td>1.</td>
<td>Construction phase</td>
<td>May occur=-2</td>
<td>Unlikely to occur=-1</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>1.1 Noise and Vibration disturbances</td>
<td>-3</td>
<td>-1</td>
<td>-1</td>
<td>-3</td>
</tr>
<tr>
<td></td>
<td>1.2 Utilizing unlicensed quarry sites</td>
<td>-2</td>
<td>-2</td>
<td>-1</td>
<td>-4</td>
</tr>
<tr>
<td></td>
<td>1.3 Use of lead-based paint products</td>
<td>-2</td>
<td>-1</td>
<td>-2</td>
<td>-4</td>
</tr>
<tr>
<td></td>
<td>1.4 Dust nuisance</td>
<td>-2</td>
<td>-1</td>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td></td>
<td>1.5 Waste generation and land degradation</td>
<td>-3</td>
<td>-1</td>
<td>-2</td>
<td>-6</td>
</tr>
<tr>
<td></td>
<td>1.6 Water pollution</td>
<td>-2</td>
<td>-1</td>
<td>-2</td>
<td>-4</td>
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<td></td>
<td>1.7 Risk of Spread of STIs and HIV/AIDS</td>
<td>-2</td>
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<td>-4</td>
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<td></td>
<td>1.8 Accidents to workers and the public on the construction site</td>
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<td>-2</td>
<td>-4</td>
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<td>1.9 Loss of access to agricultural land</td>
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<td>Operational and Maintenance phase</td>
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<td>2.1 Fear of being infected with EVD</td>
<td>-3</td>
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<td>-2</td>
<td>-6</td>
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<td></td>
<td>2.2 Air pollution and operational risks from incineration of wastes</td>
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<td>-3</td>
<td>-9</td>
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<td></td>
<td>2.3 Land degradation and soil contamination</td>
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<td>-3</td>
<td>-6</td>
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<td>2.4 Water pollution</td>
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<td>2.5 Increased runoff</td>
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<td>2.6 Occupation safety and health risks</td>
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<td>3.</td>
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<td>3.1 Air, land and water contamination</td>
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<td>-4</td>
</tr>
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<td></td>
<td>3.2 Risk of infection</td>
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<td>-1</td>
<td>-2</td>
<td>-4</td>
</tr>
<tr>
<td>SN</td>
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<td>from contaminated equipment</td>
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<td></td>
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<td>Local=-1</td>
<td>Short term= -1</td>
<td>Low: -1 to -3</td>
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CHAPTER 6 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

6.1. THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This Environmental and Social Management Plan (ESMP) has been prepared to facilitate the integration of environmental and social management measures in the construction and operation of the EVD treatment centre. The ESMP contains:

- Anticipated negative impacts of the proposed project and mitigation measures identified in Chapter 5 of this report;
- Responsible institutions to implement the mitigation measures; and
- Time frame for implementation of the mitigation measures and associated costs for impact mitigation.

The aim of the ESMP is to ensure that the Ministry of Health (MoH) will prevent, reduce, mitigate and compensate for the impacts of the proposed project on the biophysical and socio-economic environment. Key elements of the ESMP are summarised table 6.1. As part of the environmental management, the Department of Planning and Policy Development (DPPD) in the MoH must ensure that the ESMP is included as part of the contractor’s contract documents. The MoH and Mzuzu Central Hospital must also ensure that funds are available for implementation of the ESMP.

Several issues with the existing infrastructure and operational sustainability at the hospital have been identified through the development of this ESMP, including an incinerator in poor condition as well as intermittent power and electrical supply. While these are not directly linked to this project, it is recommended that Mzuzu Central Hospital take a phased approach to correct systemic challenges affecting human health, the natural environment and the general level of hospital performance. Other systemic issues, like those associated with inadequate water and electrical supplies, need to be mitigated as they can directly result in potentially serious environmental health issues during operation of the EVD treatment centres.
<table>
<thead>
<tr>
<th>No.</th>
<th>Potential Environmental or Social Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Institutional Responsibility</th>
<th>Time for Implementation</th>
<th>Source of Funds</th>
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<td>1.</td>
<td>Construction Phase</td>
<td></td>
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</tbody>
</table>
| 1.1 | Noise and vibration disturbances       | • The contractor must use efficient machines that do not make a lot of noise; and  
• The contractor must provide appropriate PPE (e.g. ear muffs) to workers. | Contractor                   | Throughout the construction phase | Include in the contractor’s bid |
| 1.2 | Utilizing unlicensed quarry sites      | • The Contractor will identify materials from existing licensed quarries with the suitable materials for construction.  
• Procurement of construction material only from permitted sites and licensed / authorized quarries. | Contractor                   | Throughout the construction phase | Include in the project bid for the Contractor |
| 1.3 | Use of lead-based paint products.      | • The Contractor shall ensure that no paint containing lead or lead products is used. | Contractor                   | Throughout the construction phase | Include in the project bid for the Contractor |
| 1.4 | Dust nuisance                          | • The construction team must wear dust masks during site clearing and levelling;  
• The contractor must erect a barrier around the work sites to break or reduce wind and dust movement to the nearby hospital ward and departments; and  
• Spray water on the activity area to suppress dust. | Contractor                   | Throughout the construction phase | Included in the project bid for the Contractor |
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</thead>
</table>
| 1.5 | Waste generation and land degradation  | • Properly segregate wastes to encourage reuse of some of the wastes e.g. cartons and paint containers;  
• Minimise excavations during landscaping and levelling through carefully designed landscaping;  
• Use some of the excavated materials e.g. stones for backfilling and rehabilitating eroded areas; and  
• Excavate a waste disposal pit which must be closed and the site rehabilitated after the pit is full.  
• Enforce procurement of supplies from licensed suppliers through the construction contract. | Contractor | Throughout the construction phase | Include in the project bid for the Contractor |
| 1.6 | Water pollution                         | • Line surfaces where cement, paints and oils will be stored;  
• Line the floor during painting and use of lubricants;  
• Sensitize the workers to appropriately manage construction materials and wastes;  
• Proper supervision of the construction workforce. | Contractor | Throughout the construction phase | Include in the contractor’s bid |
| 1.7 | Risk of Spread of STIs and HIV/AIDS     | • Sensitize the workers to avoid the sex trade  
• Strengthen advocacy through awareness training in HIV/AIDS and other STDs; encourage the use of preventive measures like condoms | Contractor | Throughout the construction phase | Include in the project bid for the Contractor |
<table>
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<tr>
<th>No.</th>
<th>Potential Environmental or social Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Institutional Responsibility</th>
<th>Time for Implementation</th>
<th>Source of Funds</th>
</tr>
</thead>
</table>
| 1.8 | Accidents to workers and the public on the construction site | • Train workers on prevention and managing incidences;  
    • Restrict hospital staff and public from going to the construction site during and outside working hours by placing posters, reflecting tapes and erecting barriers;  
    • Workers must wear protective gear; and  
    • Provide first aid kit. | Contractor | Throughout the construction phase | Include in the contractor's bid |
| 1.9 | Loss of access to agricultural land | • Engage the member of staff to voluntarily stop cultivating on the piece of land; and compensate the member of staff as appropriate | Mzuzu Central Hospital | Once during construction phase | Include in the hospital’s recurrent budget |
| 2.  | Operational and Maintenance phase | | | | |
| 2.1 | Fear of being infected with EVD | • Adequately sensitize staff and the surrounding community on how the EVD may be contracted and transmitted;  
    • Adequately train staff on EVD case management, Occupational Safety and Health and Infection Control;  
    • Motivate staff to ensure their availability during an outbreak, after attending appropriate trainings;  
    • Inform and demonstrate to the staff and the community how safe burial practices may be conducted for EVD dead bodies;  
    • Secure consent to bury EVD corpses, at nearby graveyards, from the chiefs and local leaders;  
    • Frequently update the public on the activities in the EVD treatment centre | Mzuzu Central Hospital, Mzimba North District Health Office, | Once every month | Include in the project budget |
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</table>
| 2.2 | Air pollution and operational risks from incineration of wastes | - Install a high temperature mechanical incinerator as specified for the EVD centre and in accordance with the World Bank’s environmental, health, and safety technical (EHS) guidelines for waste management facilities;  
- Plant trees in the project area to help absorb carbons in the air;  
- Ensure that international industry best practices related to hazardous waste incineration are followed in accordance with the World Bank’s environmental, health, and safety technical (EHS) guidelines.  
- Sensitize and train staff to adequately segregate the waste from the point of generation, to ensure only combustible waste goes into incinerators;  
- Adequately budget for fuel for the incinerators;  
- Provide appropriate breathing masks to incinerator operators and other staff that work near the incinerator;  
- Regularly maintain the incinerators to ensure they are working properly. | Contractor; Mzuzu Central Hospital | Once during construction for installing the incinerator | Include in the project budget |
| 2.3 | Water pollution | - Construct the septic tank and soak-pit according to the design specifications; | contractor | Once during construction of septic tank | Include in the project budget |

8 The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice. When a member of the World Bank Group is involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. The World Bank Group’s EHS Guidelines for Health Care Facilities can be found at: http://www.ifc.org/wps/wcm/connect/bc554d80488658b6b6e6f66a6515bb18/Final%2BHealth%2BCare%2BFacilities.pdf?MOD=AJPERES&id=1323161961169 and the General Environmental Health and Safety Guideline can be found at http://www.ifc.org/wps/wcm/connect/532ff4804886583ab4d6f66a6515bb18/1-1%2BAir%2BEmissions%2Band%2BAmbient%2BAir%2BQuality.pdf?MOD=AJPERES
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<tr>
<td>2.4</td>
<td>Increased runoff</td>
<td>- Carefully construct the surface drainage for the EVD treatment centre and the site.</td>
<td>Contractor</td>
<td>Once in the construction phase</td>
<td>Include in the contractor’s bid</td>
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<td></td>
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<td>- Sensitize staff to avoid spillage of waste water on the ground surface;</td>
<td>Mzuzu Central Hospital; Mzuzu City Council</td>
<td>As appropriate</td>
<td>Include in the hospital’s recurrent budget</td>
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<td></td>
<td></td>
<td>- Sensitize staff and users of the EVD centre to appropriately use the waste drainage facilities to avoid blockages; and</td>
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<td></td>
<td>- The septic tank and soak pit site should be regularly monitored to ensure early detection of problems.</td>
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<td></td>
<td></td>
<td>- Ensure that wastewater disposal is adequately budgeted to ensure regular cleaning of the septic tank;</td>
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<td></td>
<td></td>
<td>- Only licensed waste collectors shall be employed for this disposal;</td>
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<td>Proposed Mitigation Measure</td>
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</table>
| 2.5 | Occupation safety and health risks      | - Mzuzu Central Hospital shall be responsible for ensuring an adequate and sustainable supply of water and electricity to the EVD treatment centre  
- The MoH and Mzuzu Central Hospital must continue to train and sensitize its staff in infection control and best practices for managing infectious wastes in accordance with the World Health Organization’s *Safe Management of Wastes from Health-care Activities*\(^9\) handbook and its *Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings*\(^10\). Other relevant infection prevention and control guidelines provided by WHO should further inform operational procedures;  
- Ensure that a fence around the EVD treatment centre is constructed according to WHO guidelines to keep visitors at distance but allowing them to see through;  
- Ensure that the Project’s Health Care Waste Management Plan and infectious disease management training and surveillance programs targeting district health officials, frontline staff and community members are implemented;  
- Regularly train staff on how to use PPE;  
- Regularly monitor performance of equipment and carry out maintenance;  
- Ensure there is enough supply of medical supplies and PPE; | Mzuzu Central Hospital; Mzimba North District Health Office | Throughout the operation phase | Include in the hospital’s recurrent budget |

\(^9\) [http://apps.who.int/iris/bitstream/10665/85349/1/9789241548564_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/85349/1/9789241548564_eng.pdf?ua=1)  
\(^10\) [http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1](http://apps.who.int/iris/bitstream/10665/130596/1/WHO_HIS_SDS_2014.4_eng.pdf?ua=1&ua=1&ua=1)
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<tbody>
<tr>
<td>3.</td>
<td>Decommissioning Phases</td>
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<tr>
<td>3.1</td>
<td>Air, land and water contamination</td>
<td>• Dispose wastewater in appropriate and approved drainage systems; and • Incinerate contaminated solid waste and dispose ash in approved landfill sites</td>
<td>Mzuzu Central Hospital</td>
<td>Throughout the decommissioning phase</td>
<td>Include in the hospital’s recurrent budget</td>
</tr>
<tr>
<td>3.2</td>
<td>Risk of infection from contaminated equipment</td>
<td>• Provide appropriate PPE for staff for destroying equipment used in the centre; and • Destroy all equipment used in the EVD treatment centre.</td>
<td>Mzuzu Central Hospital</td>
<td>Throughout the decommissioning phase</td>
<td>Include in the hospital’s recurrent budget</td>
</tr>
</tbody>
</table>
6.2. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

Environmental and social monitoring has to be carried out during construction, operation and maintenance; and decommissioning of the Ebola Virus Disease treatment centre. Table 6.2 provides the proposed monitoring institutions, monitoring indicators, monitoring frequency and the estimated costs for monitoring the ESMP implementation. The contractor (Project Engineer) will also perform monitoring activities as stipulated in the contract.
<table>
<thead>
<tr>
<th>No</th>
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<th>Proposed Mitigation Measure</th>
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<th>Institution/person to monitor</th>
<th>Monitoring frequency</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Construction Phase</strong></td>
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<tr>
<td>1.1</td>
<td>Noise and vibration disturbances</td>
<td>• The contractor must use efficient machines that do not make a lot of noise; and&lt;br&gt;• The contractor must provide appropriate PPE (e.g. ear muffs) to workers.</td>
<td>• Efficiency of machines&lt;br&gt;• Availability of PPEs&lt;br&gt;</td>
<td>Contractor, Mzuzu Central Hospital, District Health Office, Local Council, MoH (DPPD)&lt;br&gt;</td>
<td>Once every month during the construction phase</td>
<td>3,000 USD (for transport and allowances for officials from the Ebola Coordination Unit and DPPD)</td>
</tr>
<tr>
<td>1.2</td>
<td>Utilizing unlicensed quarry sites</td>
<td>• The Contractor will identify materials from existing licensed quarries with the suitable materials for construction.&lt;br&gt;• Procurement of construction material only from permitted sites and licensed / authorized quarries.</td>
<td>• Evidence provided upon request demonstrating source of construction materials</td>
<td>Contractor, DHO, DPPD&lt;br&gt;</td>
<td>As appropriate during the construction phase</td>
<td>Included in 1.1</td>
</tr>
<tr>
<td>1.3</td>
<td>Use of lead-based paint products.</td>
<td>• The Contractor shall ensure that no paint containing lead or lead products is used. He shall provide facemasks for use to the workers when paint is applied in the form of spray or a surface having lead paint is rubbed and scraped.</td>
<td>• Evidence of using non lead-based paint.</td>
<td>Contractor, DHO, DPPD</td>
<td>As appropriate during the construction phase</td>
<td>Included in 1.1</td>
</tr>
<tr>
<td>No</td>
<td>Potential Impact</td>
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</table>
| 1.4 | Dust nuisance    | • The construction team must wear dust masks during site clearing and levelling;  
      |                   | • The contractor must erect a barrier around the work sites to break or reduce wind and dust movement to the nearby hospital ward and departments; and  
      |                   | • Spray water on the activity area to supress dust. | • Use of mouth and nose masks  
      |                   |                                           | • Presence of a barrier during dust making activities  
      |                   |                                           | • Area sprayed with water | Contractor, District Health Office, Local Assembly, MoH (Planning Department) | Once every month during the construction phase | Included in 1.1 |
| 1.5 | Waste generation and land degradation | • Properly segregate wastes to encourage reuse of some of the wastes e.g. cartons and paint containers;  
      |                   | • Minimise excavations during landscaping and levelling through carefully designed landscaping;  
      |                   | • Use some of the excavated materials e.g. stones for backfilling and rehabilitating eroded areas; and  
      |                   | • Excavate a waste disposal pit which must be closed and the site rehabilitated after the pit is full.  
      |                   | • Enforce procurement of supplies from licenced suppliers through the construction contract. | • Volume of waste reused  
      |                   |                                           | • Volume of soils excavated  
      |                   |                                           | • Use of the soils  
      |                   |                                           | • Presence of a waste dumping pit  
<pre><code>  |                   |                                           | • Use of licenced suppliers | Contractor, Mzuzu Central Hospital, District Health Office, Local Council, MoH (Planning Department) | Once every month during the construction phase | Included in 1.1 |
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<table>
<thead>
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<th>No</th>
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<th>Proposed Mitigation Measure</th>
<th>Monitoring indicator</th>
<th>Institution/person to monitor</th>
<th>Monitoring frequency</th>
<th>Implementation cost</th>
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</table>
| 1.6 | Water pollution | • Line surfaces where cement, paints and oils will be stored;  
• Line the floor during painting and use of lubricants;  
• Sensitize the workers to appropriately manage construction materials and wastes;  
• Proper supervision of the construction workforce. | • Area lined during application of cement and paints  
• Area lined for storage of paints etc.  
• Records of sensitizations | Contractor, Mzuzu Central Hospital, District Health Office, City Council, MoH (Planning Department) | Once every month during the construction phase | Included in 1.1 |
| 1.7 | Accidents to workers and the public on the construction site | • Train workers on prevention and managing incidences;  
• Restrict hospital staff and public from going to the construction site during and outside working hours by placing posters, reflecting tapes and erecting barriers;  
• Workers must wear protective gear; and  
• Provide first aid kit. | • Number of workers trained  
• Number of posters and perimeter covered with barrier  
• Number of workers wearing protective gear  
• Types and number of supplies in the first aid box | Contractor, Mzuzu Central Hospital, District Health Office, MoH (Planning Department) | Once every month during the construction phase | Included in 1.1 |
| 1.8 | Risk of Spread of STIs and HIV/AIDS | • Sensitize the workers to avoid the sex trade  
• Strengthen advocacy through awareness training in HIV/AIDS and other STDs; encourage the use of preventive measures like condoms | • Records of sensitization | Contractor; DEHO; Environmental District Officer. | Monthly | Included in 1.1 |
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<th>Institution/person to monitor</th>
<th>Monitoring frequency</th>
<th>Implementation cost</th>
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<tbody>
<tr>
<td></td>
<td>Loss of access to agricultural land</td>
<td>Engage the member of staff to voluntarily stop cultivating on the piece of land and compensate the member of staff for the loss of crop as appropriate.</td>
<td>• Reports on sensitization of land users;</td>
<td>Mzuzu Central Hospital, City Council, District Health Office, MoH (Ebola Coordination Unit, Planning Department)</td>
<td>Twice</td>
<td>Included in 1.1</td>
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<tr>
<td>1.9</td>
<td></td>
<td></td>
<td>• Time for land acquisition;</td>
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<td>• Number of farmers leaving the land voluntarily or compensated.</td>
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<td>2.</td>
<td>Operational and Maintenance phase</td>
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</table>
| 2.1| Fear of being infected with EVD | - Adequately sensitize staff and the surrounding community on how the EVD may be contracted and transmitted;  
- Adequately train staff on EVD case management, Occupational Safety and Health and Infection Control;  
- Motivate staff to ensure their availability during an outbreak, after attending appropriate trainings;  
- Inform and demonstrate to the staff and the community how safe burial practices may be conducted for EVD dead bodies;  
- Secure consent to bury EVD corpses, at nearby graveyards, from the chiefs and local leaders;  
- Frequently update the public on the activities in the EVD treatment centre | - Number of times sensitizations meetings are conducted  
- Number of staff and community members people sensitized  
- Existence of signed agreement form  
- Consent for conducting burial at nearby community graveyard  
- Number of staff trained in occupation safety and health and infection control  
- Records of public notice on activities at the EVD treatment centre | Mzuzu Central Hospital, District Health Office, City Council, Local NGO’s, MoH (Ebola Coordination Unit) | Once every month | 4,000 USD for transport and allowances for officials from the Ebola Coordination Unit and the DPPD, and 20,000 USD for infectious disease management training and surveillance programs under Component 2. |
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<th>Implementation cost</th>
</tr>
</thead>
</table>
| 2.2| Air pollution and operational risks from incineration of wastes                  | - Install a high temperature, mechanical incinerator as specified for the EVD Centre and in accordance with the International Finance Corporation’s environmental, health, and safety technical (EHS) guidelines for waste management facilities; and  
  - Plant trees in the project area to help absorb carbons in the air; | - Number of trees planted  
  - Completed incinerator  
  - Type of incinerator | Contractor, Mzuzu Central Hospital, City Council, District Health Office, MoH (Ebola Coordination Unit, Planning Department) | At the end of construction phase | Included in 2.1 |
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<th>Proposed Mitigation Measure</th>
<th>Monitoring indicator</th>
<th>Institution/person to monitor</th>
<th>Monitoring frequency</th>
<th>Implementation cost</th>
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</thead>
</table>
|    |                  | Ensure that international industry best practices related to hazardous waste incineration are followed in accordance with the International Finance Corporation’s environmental, health, and safety technical (EHS) guidelines for waste management facilities; | • Litres of fuel available every month  
• Volume of waste sorted appropriately  
• Records of training on how to operate the incinerator  
• Records of maintenance of incinerators  
• Number of staff oriented in infection control and waste management | Mzuzu Central Hospital, City Council, District Health Office, MoH (Ebola Coordination Unit, Planning Department) | Once every month | |
|    |                  | Properly budget for fuel for the incinerators; | • Litres of fuel available every month  
• Volume of waste sorted appropriately  
• Records of training on how to operate the incinerator  
• Records of maintenance of incinerators  
• Number of staff oriented in infection control and waste management | | |
|    |                  | Provide appropriate breathing masks to incinerator operators and other staff that work near the incinerator; | • Litres of fuel available every month  
• Volume of waste sorted appropriately  
• Records of training on how to operate the incinerator  
• Records of maintenance of incinerators  
• Number of staff oriented in infection control and waste management | | |
|    |                  | Sort the waste to ensure only combustible waste goes into incinerators; | • Litres of fuel available every month  
• Volume of waste sorted appropriately  
• Records of training on how to operate the incinerator  
• Records of maintenance of incinerators  
• Number of staff oriented in infection control and waste management | | |
|    |                  | Train staff on how to operate the incinerators; and | • Litres of fuel available every month  
• Volume of waste sorted appropriately  
• Records of training on how to operate the incinerator  
• Records of maintenance of incinerators  
• Number of staff oriented in infection control and waste management | | |
|    |                  | Regularly maintain the incinerators to ensure they are working properly; and | • Litres of fuel available every month  
• Volume of waste sorted appropriately  
• Records of training on how to operate the incinerator  
• Records of maintenance of incinerators  
• Number of staff oriented in infection control and waste management | | |
|    |                  | Orient laboratory staff to the Infection Control and Waste Management practices. | • Litres of fuel available every month  
• Volume of waste sorted appropriately  
• Records of training on how to operate the incinerator  
• Records of maintenance of incinerators  
• Number of staff oriented in infection control and waste management | | |

11 The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice. When a member of the World Bank Group is involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. The World Bank Group’s EHS Guidelines for Health Care Facilities can be found at: [http://www.ifc.org/wps/wcm/connect/bc054d80488658b6b66e6f15b115bb18/Final%2BEHS%2BHealth%2BCare%2BFacilities.pdf?MOD=AJPERES&%2B%26id=1323161961169](http://www.ifc.org/wps/wcm/connect/bc054d80488658b6b66e6f15b115bb18/Final%2BEHS%2BHealth%2BCare%2BFacilities.pdf?MOD=AJPERES&%2B%26id=1323161961169) and the General Environmental Health and Safety Guideline can be found at [http://www.ifc.org/wps/wcm/connect/532ff480488658ab4d6f66a6515bb18/1-1%2BEmissions%2Band%2BAmbient%2BAir%2BQuality.pdf?MOD=AJPERES](http://www.ifc.org/wps/wcm/connect/532ff480488658ab4d6f66a6515bb18/1-1%2BEmissions%2Band%2BAmbient%2BAir%2BQuality.pdf?MOD=AJPERES)
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<th>Institution/person to monitor</th>
<th>Monitoring frequency</th>
<th>Implementation cost</th>
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</table>
| 2.3 | Water pollution  | • Sensitize staff to avoid spillage of waste water on the ground surface;  
• Sensitize staff and users of the EVD centre to appropriately use the waste drainage facilities to avoid blockages;  
• Construct the septic tank and soak-pit according to the design specifications;  
• Ensure that wastewater disposal is adequately budgeted to ensure regular cleaning of the septic tank;  
• Only licensed waste collectors shall be employed for this disposal; and  
• The septic tank and soak pit site should be regularly monitored to ensure early detection of problems. | • Reports of spillages in inappropriate places  
• Number of staff sensitized to appropriately use the drainage system  
• Specifications of constructed septic tank  
• Records of monitoring and maintenance of the septic tank and soak-pit | Mzuzu Central Hospital, City Council, District Health Office, MoH (Ebola Coordination Unit, Planning Department) | Once every month | Included in 2.1 |
<p>| 2.4 | Increased runoff | • Carefully design the surface drainage for the EVD treatment centre and the site. | • Presence of a well designed and constructed drainage system | Mzuzu Central Hospital, City Council, MoH (Ebola Coordination Unit, Planning Department) | Twice during the construction phase | Included in 2.1 |</p>
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<th>Institution/person to monitor</th>
<th>Monitoring frequency</th>
<th>Implementation cost</th>
</tr>
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</table>
| 2.5 | Occupation safety and health risks       | • Mzuzu Central Hospital shall be responsible for ensuring an adequate and sustainable supply of water and electricity to the EVD treatment centre  
• Mzuzu Central Hospital must adequately train and sensitize its staff in infection control and best practices for managing wastes in accordance with the World Health Organization’s *Safe Management of Wastes from Health-care Activities* handbook and its *Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings*. Other relevant infection prevention and control guidelines provided by WHO should further inform operational procedures;  
• Ensure that a fence around the EVD treatment centre is constructed according to WHO guidelines to keep visitors at a distance;  
• Ensure that the Project’s Health Care Waste Management Plan and infectious disease management training and surveillance programs targeting district health officials, frontline staff and community members under Component 1 is implemented;  
• Regularly monitor performance of equipment and carry out maintenance;  
• Ensure there is enough supply of PPE;  
• Regularly train staff on how to use PPE; and  
• Regularly train staff in infection control and waste management. | • Number of times and Number of staff trained in occupational safety, infection control and waste management  
• Number of times equipment is maintained  
• Number of PPE in stock  
• Number of staff trained in use of PPE  
• Size of water reservoir and availability of a borehole  
• Size of electricity generator | Mzuzu Central Hospital, District Health Office, MoH (Ebola Coordination Unit, Planning Department) | Once every month | Included in 2.1 |
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<tr>
<th>No</th>
<th>Potential Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Monitoring indicator</th>
<th>Institution/person to monitor</th>
<th>Monitoring frequency</th>
<th>Implementation cost</th>
</tr>
</thead>
</table>
| 3. | Decommissioning Phases | 3.1 Air, land and water contamination | • Dispose wastewater in appropriate and approved drainage systems; and  
• Incinerate contaminated solid waste and dispose ash in approved landfill sites | • Area for disposal of wastewater  
• Volume of solid waste incinerated | Mzuzu Central Hospital, District Health Office, MoH (Ebola Coordination Unit and Planning Department) | Twice during decommissioning phase | 1000 USD for transport and allowances for officials from the DPPD |
| | | | | | | |
| 3.2 Risk of infection from contaminated equipment | • Provide appropriate PPE for staff for destroying equipment used in the centre; and  
• Destroy all equipment used in the EVD treatment centres. | • Reports of use of PPE during cleaning  
• Number of equipment destroyed | Mzuzu Central Hospital, District Health Office, MoH (Ebola Coordination Unit, Planning Department) | Twice during decommissioning phase | |
6.3. INSTITUTIONAL RESPONSIBILITY AND REPORTING STRUCTURE

For effective implementation of the Environmental Management and Monitoring Plan, there is need for clear roles, responsibility and reporting procedure:

The Ministry of Health through the Department of Planning and Policy Development (DPPD) and the Ebola Coordination Unit have the responsibility to ensure that the ESMP is implemented. They must ensure that all stakeholders are familiar with the contents of the ESMP and their roles; resources are available and key staff for implementing the activities are adequately trained. As part of the environmental management, the DPPD must also ensure that ESMP is included as part of the contract documents. Specific guidelines which the contractor must observe to minimise or mitigate impacts on the biophysical and social economic environment are provided in annex 7.

Since the impacts are mainly localised and moderate, the actual implementation of the ESMP and monitoring rests with the stakeholders at district level as follows:

1. **Mzuzu Central Hospital** as the owners of the project must lead in the implementation of the ESMP. The hospital’s Environmental Health Officer (EHO) must lead in familiarising with the ESMP, mobilising resources and stakeholders and ensuring that the mitigation measures are implemented. The EHO will however need training in management of wastes from an Ebola treatment centre. The EHO will be reporting to the Hospital Administrator who will be sending reports to the MoH, the EAD and the City Council.

   The hospital also has the **Maintenance Supervisor** who will be responsible for daily liaison and monitoring of the contractor during construction, ensuring that the contractor is adhering to the contract agreement with regard to the ESMP implementation. The Maintenance Supervisor will be reporting (through the Hospital Administrator) to the Projects Engineer in the Department of Planning and Policy Development.

2. **Contractor** is responsible for ensuring construction activities are carried out sustainably. Since the project is small and the contractor may not have an Environmental Officer; the foreman must enforce compliance to the ESMP. The contractor will report to the Hospital Administrator and the Project Engineer from the DPPD.

3. **Mzimba North District Health Office**, is responsible for delivering health services including environmental health in the area. The DHO has a well-established network which should be utilised in the provision of training, awareness and sensitization in Ebola infection control, treatment and waste management. The Environmental Health Officer at the DHO’s office will also require training.

4. **The City Council** is the local authority for the city. They have a say on site plans, environmental standards and community engagement. The City Council will be reviewing monitoring reports from the Hospital administrator and provide recommendations. The City Council’s Environmental Officer and Engineer must assist Mzuzu Central Hospital in implementing the ESMP and monitor the project activities.
During the land acquisition, the City Council must work with local leaders in engaging the community to voluntarily leave the land affected by the project.

5. The Environmental Affairs Department (EAD) in the Ministry of Natural Resources, Energy and Mining (in accordance with the EMA, 1996) will review the ESMPs and certify the project. They also have inspectors who will inspect the project for compliance with Environmental Standards and the Environmental and Social Management Plan.

Apart from the mentioned institutions, there is also need for involvement of NGOs such as Plan Malawi, World Vision Malawi and Community Based Organisations which are active in Mzuzu City.

6.4. SUMMARY OF THE COSTS FOR ENVIRONMENTAL MANAGEMENT

Costs for managing the impacts on the biophysical and socio-economic environment are, in general, included in the project budget. Costs for monitoring the ESMP have also been estimated in dollars at the exchange rate of 1 USD = MK 700.00 and they are as in Table 6.3.

Table 0.3: Summary of the costs for Managing the Environment

<table>
<thead>
<tr>
<th>Item/Activity</th>
<th>During construction phase</th>
<th>During operation phase (5 Years)</th>
<th>During decommissioning phase</th>
<th>Total Cost (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport and allowance for monitoring staff from the Ebola Coordination Unit and Planning Department of Ministry of Health</td>
<td>3,000</td>
<td>20,000</td>
<td>1,000</td>
<td>24,000</td>
</tr>
<tr>
<td>Infectious disease management training and surveillance programs targeting district health officials, frontline staff and community members</td>
<td>20,000</td>
<td></td>
<td></td>
<td>20,000</td>
</tr>
<tr>
<td>Total</td>
<td>3,000</td>
<td>40,000</td>
<td>1,000</td>
<td>44,000</td>
</tr>
</tbody>
</table>
CHAPTER 7  CONCLUSION AND REQUIREMENTS

7.1 CONCLUSIONS

This Environmental and Social Management Plan (ESMP) has been prepared for the construction of Ebola Virus Disease (EVD) treatment centre at Mzuzu Central Hospital. The study for the ESMP has revealed that implementation of the project will have both beneficial and adverse impacts on the environment. It is expected that the plan will serve as a basis for integration of environmental considerations into the project and will guide in mitigation of the negative impacts to low and negligible levels with the aim of improving the sustainability and the performance of the EVD treatment center.

7.2 REQUIREMENTS

The following overall requirements pertaining to the project are summarized: The ESMP is adopted and effectively implemented;

- The Ministry of Health (MoH) and Mzuzu Central Hospital will ensure that funds are available for implementation of the ESMP;
- MoH will include the ESMP in the construction activities contract;
- Ensure adherence to the relevant legal provisions of Malawi and International Standards during the implementation of the project;
- Land acquisition will follow the land laws for Malawi;
- The Ministry of Health must compensate for loss of agriculture crops, where applicable;
- The MoH and Mzuzu Central Hospital must continue to train and enforce infection control practices for managing wastes in accordance with standards set by the World Health Organization, including those outlined in the Safe Management of Wastes from Health-care Activities handbook in addition to the Interim Infection Prevention and Control Guidance for Care of Patients with Suspected or Confirmed Filovirus Haemorrhagic Fever in Health-Care Settings.
- During construction, operation and maintenance phases, the MoH and the Mzuzu Central Hospital must implement all the good international industry practices provided in the International Finance Corporation’s environmental, health, and safety technical (EHS) guidelines for health care facilities.
- Mzuzu Central Hospital is responsible for ensuring an adequate and sustainable supply of water and electricity to the EVD treatment centre
- Mzimba North District Hospital will be engaged in the implementation of the project and implementation of the ESMP; and
- The City Council, Communities around the project area and all other stakeholders will be involved in all stages of the project and the implementation of the ESMP.
REFERENCES

21. UNDP (2014). *Assessing the socio-economic impacts of Ebola Virus Disease in Guinea, Liberia and Sierra Leone - The Road to Recovery*

ANNEXES

ANNEX 1: TERMS OF REFERENCE

Environmental and Social Management Plans for 6 Ebola Sites

Introduction:
Any civil works/constructions being funded under World Bank projects require an Environmental and social due diligence to be undertaken during project conceptualization/preparation and prior to start of works. Such due diligence requires actions to be taken, and the process is documented, consulted and disclosed before project implementation starts. This step was missed out when the AF phase was approved; however, this is a requirement which the Bank has mandated which cannot be bypassed. Recognizing that the project is in active implementation, the Bank would help in any way possible to ensure requirements are adhered to and compliance is met, while also not significantly delaying project implementation. Therefore as a start, site-specific Environmental and Social management plans (ESMPs) must be prepared.

Scope of the ESMP:
1. Include a description of the geographical locale of each site and its environs and the associated social aspects during construction and operation of the Ebola Virus Diseases quarantine/treatment centres;
2. Where the EVD quarantine/treatment is being constructed at a hospital include a detailed description of the existing waste management systems including incinerators and conditions of sewage systems;
3. Provide the mode of treatment of infectious waste water, a description what is to be undertaken in the event that a connection has been made to the municipal sewer lines. Likewise the system to be put in place for infectious sharps and waste;
4. Assess impacts of installation of incinerators, wastewater discharges and solid waste management will not have any negative impacts
5. Define any measures required to prevent any longer-term impacts on the environment and the neighbouring community and could also build in such enhancements into the design/infrastructural plan of the units.
6. Propose an EMP in tabular form by which all of the mitigation measures prescribed will be carried out. An environmental monitoring plan should also be prepared.
7. The ESMPs will need to be consulted with the local community and disclosed prior to continuation of works.

Report format:
Considering the project has been stopped prepare a summarised report of 6 – 10 pages.

Assignment Duration: 13 days

12 ToRs based on communications with World Bank and meetings between NAC and the Consultant. No official ToRs were provided
# ANNEX 2: LIST OF KEY PEOPLE CONSULTED

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation -</th>
<th>Institution</th>
<th>Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timothy Soko</td>
<td>Hospital Administrator</td>
<td>Mzuzu Central Hospital</td>
<td>0999520869</td>
</tr>
<tr>
<td>Dr Chipolombwe</td>
<td>Chief Medical Officer</td>
<td>Mzuzu Central Hospital</td>
<td>0882676544</td>
</tr>
<tr>
<td></td>
<td>Ebola Preparedness Activities Coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blair Sibale</td>
<td>Chief Nursing Officer</td>
<td>Mzuzu Central Hospital</td>
<td>0888352906</td>
</tr>
<tr>
<td>Grace Funsani</td>
<td>Principal Environmental Health Officer</td>
<td>Mzimba North DHO</td>
<td>0999950398</td>
</tr>
<tr>
<td>Charles Mlogera</td>
<td>Ward Councillor</td>
<td>Mzuzu City</td>
<td>0999328716</td>
</tr>
<tr>
<td>Duncan Nyirenda</td>
<td>Cleansing Services Officer</td>
<td>City Assembly</td>
<td>0884937358</td>
</tr>
</tbody>
</table>

A photo of some of the people consulted
ANNEX 3: MAIN ISSUES RAISED BY KEY STAKEHOLDERS

<table>
<thead>
<tr>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Trainings in EVD case management, infection control and waste management have started using hospital resources. However the hospital does not have enough funding.</td>
</tr>
<tr>
<td>2. There was no community consultations during the site selection. The City Council indicated that it was wrong not to consult them.</td>
</tr>
<tr>
<td>3. There is no adequate monitoring of the contractor.</td>
</tr>
<tr>
<td>4. Waste management is outsourced – they collect waste from the wards and offices and take it to incinerator and disposal pit.</td>
</tr>
<tr>
<td>5. Food waste is collected in a skip. However the city assembly takes time to empty the skip and dispose the waste.</td>
</tr>
<tr>
<td>6. Ebola is being handled using the normal hospital budget.</td>
</tr>
<tr>
<td>7. Sluicing is a big challenge at the hospital – it is not done adequately.</td>
</tr>
<tr>
<td>8. The hospital does not have a comprehensive waste management plan.</td>
</tr>
<tr>
<td>9. The project affected person has launched a complaint with the administration.</td>
</tr>
<tr>
<td>10. The proposed site is near an abandoned unfinished building which must be finished and it can be part of the Ebola Facility.</td>
</tr>
</tbody>
</table>
ANNEX 4: NOTES FROM THE CONSULTATION ON LAND ISSUE AT MZUZU CENTRAL HOSPITAL

At Mzuzu Central Hospital, an issue was raised in the ESMPs concerning compensation for a staff member who was cultivating the land in question.

A consultation meeting was conducted whereby some members of the hospital management and relevant staff (Dr. John Chipolombwe-EVD Coordinator, Mrs. Violet Kamfose- representing the Hospital Director, Mr. Timothy Soko- Principal Hospital Administrator, Mrs. Esther Ngoma- Assistant Hospital Administrator and Mr. Wilson Katete- Senior Maintenance Supervisor) and the concerned staff (Mrs. Ruth Mtemang’ombe-Laundry Attendant) were in attendance.

Mrs. Ruth Mtemang’ombe was requested to express her views on the issue of compensation. She expressed surprise that she is being asked about compensation for an issue that was resolved already prior to commencement of construction on the site.

The consultation meeting established that the issue of compensation only re-surfaced in the draft ESMPs as picked by the consultant since the consultants did not have this background information that the issue was resolved internally between the hospital management and the concerned staff. Confirmation of the matter to have been settled is in Annex 5, which bears Mrs. Ruth Mtemang’ombe’s signature.
ANNEX 5: A SIGNED LETTER CONTAINING THE RESOLUTIONS FROM THE MEETING ON LAND ISSUE

MCH/ADM/69

12th May, 2016

The Secretary for Health,
P. O. Box 30377
Capital City
Lilongwe 3

Attention: Head of Epidemiology Unit

CC: Director of Administration

Dear Sir,

RE: ISSUE OF COMPENSATION OF MAIZE GARDEN AT MZUZU CENTRAL HOSPITAL EBOLA TREATMENT SITE

I write to inform you that the management of Mzuzu Central Hospital has internally resolved the issue of the maize garden by a member of staff of Mzuzu Central Hospital who had her maize garden at the site identified for construction of Ebola Treatment Unit as raised in the Environmental and Social Managent Plan (ESMP) report by Water Waste Consultants team of assessors.

The way we resolved the matter internally was that the staff of Mzuzu Central Hospital was told not to cultivate on the land before she started working on it for it was a hospital land and earmarked for construction of Ebola Isolation Unit for Mzuzu Central Hospital. However she went on to work on the land with the thinking that the project was to take long before the construction started. During our internal meeting it was also noted that Mr Precious Chaponda, water waste consultant did not have this background information and that is why the issue of compensation was in the report from him as a consultant. All staff members who are cultivating on the hospital land were unofficially allowed to work on the land just to secure the land from being cultivated by villagers.

However, basing on the humanitarian ground, the management has agreed to pay Mrs Ruth Mtmang’ombe, the one who was cultivating on the land the sum of K57, 240.00 for seed and fertilizer she used during this farming season. Attached is the signed copy of fulfillment of the payment.

We therefore ask you to go ahead with the project.
The following were present when we were resolving the issue internally:

Dr John Chipolombwe - Mzuzu Central Hospital Ebola activities Coordinator

Mrs Violet Kamfose - Representative of Hospital Director

Mr Timothy Soko - Principal Health Service Administrator

Mrs Esther Ngoma - Assistant Hospital Administrator

Mr Wilson Katete - Senior Maintenance Supervisor

Mrs Ruth Mtemang’ombe - Laundry Attendant and one who was cultivating on the land

Yours sincerely,

Dr John Chipolombwe

For: HOSPITAL DIRECTOR
PAYMENT OF COMPENSATION

Receive herewith MWK57,240.00 (fifty seven thousand two hundred and forty kwacha) being compensation for cost of seed and fertilizer incurred whilst cultivating on Mzuzu Central Hospital land.

Received By: ........................................

Ruth Mtemang’ombe
12th May, 2016

Witnessed By: .................................

Dr. John Chipolombwe
12th May, 2016

In the Presence of: .................................

Mr. M.M. Kaluwa
Chief Accountant
12th May, 2016

R.K Nyirenda (Mrs)

Hospital Director (Mzuzu Central Hospital) – 12th April, 2016
ANNEX 6: ARCHITECTURAL DESIGN OF ASH PIT FOR THE EVD CENTRES

NOTES
1. DO NOT SCALE OFF FROM THE DRAWING. ALL CONTRACTORS MUST CHECK ON SITE, ALL DIMENSIONS MUST BE ACCURATE. ANY QUESTIONS OR DISCREPANCIES MUST BE REFERRED TO THE PROJECT ARCHITECT BEFORE MATERIALS ARE ORDERED OR WORK PUT IN HAND.

2. THE CONTRACTOR IS RESPONSIBLE FOR THE EFFECTIVENESS AND PROPER PERFORMANCE OF NEW WORK.

REVISIONS

MALAWI GOVERNMENT
BUILDINGS DEPARTMENT
PRIVATE BAG E 399
LILONGWE S.
Tel: 01 788 467 Fax: 01 788 299 E-mail: buildings.department@ redhead.mw

PROJECT TITLE
CONSTRUCTION OF AN INCINERATOR

CLIENT
SECRETARY FOR HEALTH
P.O. BOX 30377
LILONGWE

ELEVATIONS

ASH PIT, FLOOR PLAN, scale 1:50

ASH PIT, LAYOUT PLAN, scale 1:50
ANNEX 7: ENVIRONMENTAL GUIDELINES FOR CONTRACTORS

1. General Provisions and Precautions
The contractor shall take all necessary measure and precautions to ensure that all the works and associated operations on or off the work sites are carried out in accordance with statutory and regulatory environmental and social requirements of the Malawi. The contractor shall take all measures necessary to implement the requirements of the ESMP and protection measures relevant to the works.

The contractor shall avoid and prevent any nuisance or disturbance associated with execution of work under this project. In the event of any soil, debris or silt from the work sites being deposited on any adjacent land, the contractor shall immediately remove all such spoil debris or silt and restore the affected area to its original state, to the satisfaction of the responsible authorities. Any temporarily acquired land for construction purposes should be restored to its prior condition, to the satisfaction of the client or client’s representative.

The contractor shall include environmental management costs in the bid and shall commit to implementing the environmental management activities as agreed in the contract conditions.

The contractor shall be liable to a fine as determined by the Environmental Affairs Department (or Minister of Natural Resources, Energy and Mining) in accordance with the EMA 1996, where his actions contravene environmental compliance.

2. Protection of Water and other Public Services
The Contractor shall ensure that no public services are disrupted as a result of execution of the construction works. In particular, the Contractor shall:

- Not interfere with supply or abstraction of water for public or private use; and shall not pollute any water resources (including groundwater);
- Not disrupt power supply or telephone connections or any other public or private services including footpaths and walkways;
- Not discharge or deposit any waste or any material into any waters or any grounds except with the permission of the appropriate regulatory authorities.
- At all times ensure that all streams, drains and trenches within and adjacent to the work sites are kept safe and free from any debris and any material arising from the works;
- Protect all water courses (including ditches, canals, drains and lakes) from pollution, siltation, flooding or erosion as a result of the execution of the works.
- Assume all responsibility to locate or to confirm the details and location of all utility services on or in the vicinity of the site
- Assume responsibility for any damage and \or interference caused by him or his agents, directly or indirectly, arising from actions taken or a failure to take action to protect public or private utilities.
- Be responsible for full restoration of any damage caused and for restoration of services. Restoration shall be to the satisfaction of the client/client’s representative. The client/ client’s representative will ensure that any affected
third party is content before confirming they are content with the restoration enacted by the contractor.

- Ensure that water and waste products shall be collected, removed and disposed of at a site approved by the District Council in a manner that will not cause pollution or nuisance.
- Not dispose of any surplus material on private land unless authorized in writing by the owner(s), authenticated before a notary public, and with previous authorization of the District/City Council.

3. Control of Air Pollution
   - Open fires and burning of construction waste shall not be permitted;
   - Dust-generating operations shall not be permitted to affect any residential areas, pedestrians or any public or private property. Where dust generation is inevitable, appropriate measures such as use of water sprays and fencing shields or appropriate covering material shall be employed. All workers shall be protected from dust emissions by providing them with appropriate protective wear.
   - All construction machinery, plant and equipment including all vehicles shall be regularly maintained to ensure that no smoke or obnoxious gas is discharged to pollute the air and affect the public or property.

4. Acquisition of Construction Material
   - Only licensed quarrying, sand mining and brick-making operations and sites shall be used as sources of construction materials.

   - The Contractor shall fence off construction sites, provide appropriate drainage and ram or compact soils where necessary to stabilize the soils and reduce erosion.
   - All construction sites shall be backfilled, levelled and re-planted with trees, vegetation and grass to restore them to the original state and to prevent soil erosion to the satisfaction of the client or client’s representative.
   - As far as possible the contractor shall avoid or reduce construction activities and mining of construction material during the peak of rainy seasons.

6. Control of Social Impacts
   - The Contractor shall coordinate with all the neighbouring land users and respect their rights to a clean and safe environment. Written agreements with local landowners for temporary use of their sites or property shall be made and sites must be restored to original condition or conditions acceptable to the owner within an agreed time. Camp sites shall be maintained and cleaned up at all times and on completion of the works.
   - Health and safety of workers shall be protected by providing basic emergency health and first aid facilities and awareness meetings aimed at the prevention of sexually transmitted diseases. Awareness meetings shall be conducted as a part of all construction employee orientation programs. Employees shall be provided with condoms for protection from STIs.
• The Contractor shall obtain all necessary written traffic control permissions including for use of flagmen, traffic cones or other devices such as barricades and/or lights which he must use to control traffic for safety of pedestrians, cyclists and all road users, particularly school children.

• The Contractor shall neither stockpile nor store any construction materials; nor park construction plant or vehicles in walk ways, pedestal routes or driveways. Stockpiles of material shall be covered with tarpaulins or sprayed with water where these materials pose risks of dust to the public or people’s property.

7. Noise Control and Regulation

• The Contractor shall take all necessary measures to ensure that the operation of all mechanical equipment and construction processes on and off the site shall not cause any unnecessary or excessive noise to the public. In addition, the Contractor shall operate noisy equipment within government working times unless with prior arrangement and permission from the employer.

• Vehicle, plant and equipment exhaust systems shall be maintained in good working order, as recommended by the manufacturers, to ensure that no noise is unnecessarily generated to inconvenience the public.

• Construction works and operations shall be scheduled to coincide with periods when people would least be affected by noise, having due regard for avoiding any noise disturbances to local residents, hospitals, schools or any other public and private places in the work site neighbourhood.

• The contractor shall notify public (likely to be affected by the works) of impending construction operations and specify methods to receive and handle all public complaints.

8. Environmental Monitoring

• The Contractor shall be responsible for monitoring all his activities and ensuring that all environmental requirements and the above conditions are met at all times.

• Contractor shall also facilitate regular environmental, social and health; and safety monitoring by the Client, the Client’s representative or an independent monitor appointed by the Client, or any other national agency with a remit to inspect and monitor construction, environmental, social and health and safety performance.

• The contractor will immediately agree and implement a rectification plan to bring the contractor back into compliance where inspections, audits and monitoring identify issues that are not in compliance with the ESMP as included in the contract.