DIREDAWA CITY ADMINISTRATION
URBAN LOCALGOVERNMENT
DEVELOPMENT PROJECT
(ULGDP)

Environmental Impact Assessment Report for
The Upgrading of Diredawa City Abattoir

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### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>EPA</td>
<td>Environmental Protection Authority</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>STD</td>
<td>Sexual transmitted disease</td>
</tr>
<tr>
<td>ULGDP</td>
<td>Urban Local Government Development project</td>
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<tr>
<td>ESMF</td>
<td>Environmental and Social Management Framework</td>
</tr>
<tr>
<td>DDEPA</td>
<td>DireDawa Environmental Protection Authority</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>ESIA</td>
<td>Environmental and Social Impact Assessment</td>
</tr>
<tr>
<td>RAP</td>
<td>Resettlement Action Plan</td>
</tr>
<tr>
<td>FDRE</td>
<td>Federal Democratic Republic of Ethiopia</td>
</tr>
<tr>
<td>BOD</td>
<td>Bio-chemical Oxygen Demand</td>
</tr>
<tr>
<td>COD</td>
<td>Chemical Oxygen Demand</td>
</tr>
<tr>
<td>LWK</td>
<td>Live animal Weight Kilo-gram</td>
</tr>
<tr>
<td>DDASA</td>
<td>DireDawa Administration Statistical Abstract</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>BAT</td>
<td>Best Available Techniques</td>
</tr>
<tr>
<td>SS</td>
<td>Suspended Solids</td>
</tr>
<tr>
<td>TDS</td>
<td>Total Dissolved Solids</td>
</tr>
<tr>
<td>HRT</td>
<td>Hydraulic Retention Time</td>
</tr>
<tr>
<td>VSP</td>
<td>Volatile Solids Portion</td>
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<tr>
<td>TOR</td>
<td>Term of Reference</td>
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Executive Summary

The objective of the Environmental and Social Impact Assessment was to analyze and evaluate the anticipated impacts of the modern abattoir construction. The assessment involves studying the whole area of the abattoir totaling 15 hectares and other abattoir facility consists of lairge block, slaughter block, meat dispatch and administration block. The project site is connected to the main DireDawa- Addis Ababa road via a gravel road. The choice of the plant site is appropriate from the point of view of topography and proximity to livestock markets.

The aim of the study is to provide guidelines that shall enable harmonize the coexistence of the project with the surroundings and at the same time facilitates Ethiopian Abattoir Service Agency and the Diredawa Environmental protection Authority, make informed decision during evaluation and approval of the project.

The ESIA Study, was conducted in accordance with the Legal requirement stipulated in the Environmental Protection Authority Act (EPA) of 2002 and its subsequent supplements; the Environmental (Impact Assessment) Regulation 2002; EPA (Solid Waste Management) Regulations, 2007 and EPA (Waste Handling and Disposal) Regulations, 1997; EPA (National Sanitation protocol) Regulations, 1999; EPA (Environmental Pollution Control) Regulations,2002; EPA (Public Health) Regulations, 2000; the Land Acts, Water Act, among other pertinent legal and institutional framework regulating abattoir development including the international conventions and protocols. The international conventions and protocols taken into consideration during project impact evaluation are convention on climate change 1994, Vienna convention on the protection of the ozone layer 1989, conventions to combat desertification 1997, the Stockholm convention on persistent organic pollutants 2002,
convention on international trade in endangered species of fauna and flora 1970.

The EIA study was conducted by a team of experts through collection of baseline information on the environmental status of the project area by conducting field studies and public consultations with the communities living along the project abattoir construction. Abattoir project is proposed to be located at about 5km from Diredawa city in Ijaneni kebele, on the road to legaoda Rural kebele.

The scope of the EIA study included studying various project components which includes:

- Land and Groundwater Quality
- Air Quality
- Energy and Greenhouse Gas Balance
- Surface Water and Effluent
- Ecology
- Landscape Impact
- Noise and Vibration and
- Socio-Economic Effects

Whilst emphasis was placed upon these issues the assessment considered the full range of potential environmental impacts.

The development abattoir is normally anticipated to bring both positive and negative changes to the community and environment at large. These changes can be long term, short term, cumulative, reversible or irreversible and thus needs to be depicted early, their impacts analyzed, evaluated and coasted to enable come up with practical and applicable mitigation measures which shall optimize the positive impacts and reduce the negative impacts to manageable or acceptable levels. Our investigation examined the potential impacts of the project on the immediate and surrounding environments along the project abattoir with due regard to all the phases from construction, operation, maintenance, commissioning and Decommissioning. It encompassed all
aspects pertaining to the physical, ecological, socio-cultural, health and safety conditions at the site and its environs during and after construction.

The study was based on laid down scientific qualitative procedures with the most recent methodologies and analysis required to conduct an EIA with assurance to strict adherence to the relevant legislative framework governing the abattoir service. Reference was also made to EIA reports dealing with similar projects within Ethiopia and even internet references to projects from other parts of the world.

The notable potential negative environmental impacts that were identified from deductions of the consultative meetings and site visits were:

- Destruction of physical environment through quarrying, extraction of construction materials, cover and excavation
- Over abstraction of water
- Floods and Erosion
- Air and noise pollution
- Instances of decreased health and sanitation
- Water logging and poor drainage during project implementation
- Increased water demand in the area
- Increased immigration which might lead to changes in socio-cultural settings
- Conflicts on importation of labourers

However, the identified potential negative impacts can be mitigated by implementing the proposed Environmental Management Plan (EMP) which aims at having a sound environmental project. Recommendations provided in the EMP included: preservation of indigenous trees, conducting periodic consultative meetings with community members, formation of umbrella bodies with adequate representation from community members, provision of portable exhaustible toilets to the workers, use of hand tools or machines with silencers to reduce noise levels and ambient air pollution, restoration and landscaping of area after construction, provision of employment to community members where applicable use clean fuels to reduce Green House Gas emission, among other measures.
The project is envisaged to benefit the local community by opening up the area to employment, increased economic activities and other associated opportunities arising from the proposed project. The project will also enhance the Regional economy through increased flow of goods and services, increased pace of movement, payment of taxes on purchased goods and also by Contributing to poverty alleviation through increased food production, acquisition of material goods and services among others.

The study observes that mitigation measures, design features, or actual impacts can be monitored to ensure acceptability of the project both during and after construction works. In some cases, monitoring can be done as part of routine or periodic maintenance, while socio-economic or ecological parameters can only be effectively assessed in the long term. It planned and required 75,000 Eth.Birr for Operation and Maintenance Phase every year to monitor Ground water and employing an environmental health safety officer.

Parameters that can be monitored include:
- Soil conservation interventions;
- Water flows in surface and underground water sources;
- Gravel pit rehabilitation;
- Efficiency of drainage structures;
- Impact on public health (due to STDs, clean drinking water);
- Frequency of road traffic accidents;
- Air quality;
- Noise quality and;
- Sanitation at the workmen's camp;

Integrated monitoring requires the participation by majority of stakeholders so as to ensure that critical success factors are properly worked throughout the monitoring of Environmental management plan.
1. Introduction

Livestock production is the most important economic activity in the surrounding rural areas of DireDawa Administration. Animals produced in different agro ecological zones of the neighboring areas are supplied to DireDawa market. This situation coupled with the high meat consumption pattern of the town’s dwellers has created the highest demand for livestock products mainly meat.

To satisfy this demand, large number of livestock is being slaughtered in the existing abattoir and outside illegally. The existing abattoir, which is constructed 31 years ago, lacks the necessary rooms with facilities that enable to conduct the proper meat inspection activities.

On the other hand, the land use planning and water shade management study conducted by the agricultural office of DireDawa in 1992EC indicate the presence of the economically important fatal diseases in the locality. Thus the situation indicates the need to have a facilitated abattoir so as to assure the supply of safe meat to the public.

The above-mentioned shortcomings of the existing abattoir have created the need for the construction of another abattoir that is equipped with the necessary working facilities and rooms on appropriate location. In view of this fact and in order to materialize the Administration’s urban development objectives, the DireDawa City manager office is allocating the World Bank budget to develop an abattoir with a daily slaughtering capacity of 200 cattle and 400 small ruminants in the area of 15 hectares around Genet Menafesha area of the city administration.

According to the environmental policy of Ethiopia and the World Bank supported Urban Local Government Development project (ULGDP) of Environmental and Social Management Framework (ESMF) guideline projects are subject to environmental impact assessment prior to implementation. To this end, DireDawa City Manager Office has retained Dynamic Planners Plc as its consultant to prepare Environmental Impact Assessment for the proposed
Abattoir project. Hence this report deals with the Environmental Impact Assessment and suggests the possible mitigation measure of the proposed Abattoir project and is prepared for submission to the World Bank and Dire Dawa Environmental Protection Authority (DDEPA) for their approval.

1.1. Location and Accessibility

The Abattoir project is proposed to be located at about 5 km from DireDawa City in Ijaneni rural kebele, on the road to Legaoda rural kebele. The project site is connected to the main DireDawa- Addis Ababa road via a gravel road. The choice of the plant site is appropriate from the point of view of topography and proximity to livestock markets.

Figure 1: Site Location Areal View

And as can be seen in the figure 2 below, the project location has good transport link and is accessible from a permanent road to allow ready transport of both livestock and meat.
Figure 2: Proposed Abattoir Site and Land/EscAPE Plan

Legend

1. Cattle Slaughter House (Christian)  
2. Sheep Slaughter House (Christian)  
3. Camel Slaughter House (Muslim)  
4. Cattle Slaughter House (Muslim)  
5. Sheep Slaughter House (Muslim)  
6. Truck Shade (Caracas Delivery)  
7. Cafeteria, Clinic & Administration  
8. Laundry Though  
9. Sheep Holding (Muslim)  
10. Cattle Holding (Muslim)  
11. Cattle Housing (Muslim)  
12. Cattle Holding (Muslim)
13. Camel Holding (Muslim)  
14. Sheep Holding (Christian)  
15. Cattle Holding (Christian)  
16. Cattle Holding (Christian)  
17. Cattle Isolation Pen  
18. Cattle Isolation Pen  
19. Camel Isolation Pen  
20. Shoats Isolation Pen  
21. Generator House  
22. Hid shade  
23. Hide shade  
24. Hide shade  
25. Rendering plant  
26. Incinerator  
27. Guard house  
28. Guard Hose  
29. Guard House  

1.2. Environmental Screening

The ULGDP Environmental and Social Management Framework states that any project which is funded by World Bank must first be screened and based on the screening result, categorized in one of the three possible categories. According to the manual, a full and partial EIA study should be conducted for those projects that fall into Schedule ‘1’ and schedule ‘2’ respectively.

To this effect, environmental screening of the proposed project operation has been undertaken to determine the appropriate extent and type of EIA to be carried out. According to the environmental policy of Ethiopia and Urban Local Government Development project (ULGDP) guideline, the proposed Abattoir project is classified as schedule ‘1’. Schedule ‘1’ projects have potential significant adverse social or environmental impacts that are diverse, irreversible or unprecedented. The scope of ESIA for such projects’ examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent,
minimize, mitigate, or compensate for adverse impacts and improve environmental performance.

The proposed Abattoir project falls under Schedule 1 as per the DireDawa EPA’s EIA guideline. According to the guideline, the projects assigned to Schedule 1 require a full EIA, including the preparation of an EIA report and EMP.

The EIA Process as applicable to development projects in Ethiopia is governed by the Environmental Impact Assessment Procedural Guidelines Series 1’ of November 2003. As per the Schedule I of the Guidelines, the project has significant environmental impacts, and, therefore, requires a full EIA/ EA.

1.3. Scoping of EIA Study

In line with the environmental procedures of the World Bank Guidance Notes, a Scoping Study was undertaken for the proposed project. The purpose of the Scoping Study was to ensure that the EIA focuses on pertinent issues. This exercise helps to decide upon the boundaries and sensitivity of the study area for the project and draw the list of activities and impacts to be considered within the full EIA study.

The scoping process was conducted based on available primary and secondary data sources. In this respect, the consulting team employed different tools and techniques relevant to the proposed project.

Field visits of existing Abattoir facilities in the country, consultants expertise in the specific field of specialization and consultation with different stakeholders (including experts, project affected people and local administrators) were the major sources of information in carrying out the scoping exercise.

As a result of the Scoping study it was concluded that the main issues to be addressed in this EIA study would be:

- Land and Groundwater Quality
- Air Quality
- Energy and Greenhouse Gas Balance
1.4. Objectives of ESIA Study

The overall objective of the assessment is to identify possible impacts of the establishment of the abattoir and devise mitigation measures and monitoring arrangements.

The specific objective involves;

- Identification and classification of Impact
- Impact analysis
- Consideration of alternatives
- Preparation of management plan (mitigation, monitoring activities)

Furthermore, the objectives of the ESIA Study include assisting the City Administration, concerned stakeholders and the governmental authorities in recognizing the environmental, social and economic impacts of the proposed project, increasing awareness about the plant and its potential impacts, recommending appropriate control, mitigation and institutional monitoring measures.

For the proposed project, the Dire Dawa City manager office aims the following objectives:
1.4.1. Operational

- Provide stable and adequate supply of fresh meat to the community whilst ensuring the highest international standards for hygiene and safety
- Establish good quality meat production capacity by installing state-of-the-art equipment, and environmental management.
- Develop and manage the facility in an environment friendly manner according to the regulatory requirements and best environmental practices, whilst ensuring socio economic viability
- Maximize operational flexibility
- Optimize natural resources use
- Develop and operate the plant to meet community expectations in terms of environmental outcomes and cost.

1.4.2 Environmental

- Protect the surrounding during operation of proposed Abattoir project with appropriate environmental safeguards
- Ensure that ecological balance of the area is not adversely affected by air emissions, waste water discharges and solid wastes.
- Protect native flora and fauna
- Protect quality of local surface and groundwater
- Minimize public health risks
- Minimize noise and vibration impacts on surroundings.

1.4.3 Socio-Economic

- Improvement in direct and indirect means of livelihood
- Establish monitoring programmed and provide procedures for resolution of community concerns, if any
Improvement in the living standard of local inhabitants.

1.5 Scope of Work

The scope of work has been designed:

- To assess the existing baseline status of air, water, noise, soil, land, ecology, hydrology and socio-economic environment.
- To solicit stakeholders’ concerns regarding the project
- To identify and quantify significant impacts due to various operations of the proposed Abattoir project on various environmental components through prediction of impacts.
- To evaluate the beneficial and adverse impacts of the proposed project.
- To assess the risks on community due to operation of the project
- To prepare the Environmental Management Plan (EMP) including measures to be adopted for mitigation of adverse impacts if any, as a consequence of the operation of the project.
- To design Post Project Monitoring Programmed for regulating the environmental quality during operation and help in sustainable development of the area.

1.6. Approach and Methodology

Any change in the present activity is expected to cause impacts on surrounding environment. The impacts may be adverse or beneficial. In order to assess the impacts, a detailed EIA study has been conducted around the project area. This EIA Report is based on the observations made by the consulting team during visits to the study area and collection of primary and secondary environmental data. Literature has also been reviewed and relevant information has been collected for environmental and social baseline.
1.6.1. Collection of Baseline Status

1.6.1.1. Water Environment

Previous studies of ground water resource potential of the area were used to assess the potential of surface and ground water in the area.

1.6.1.2. Land Environment

Land use and land cover pattern of the study area has been assessed through secondary data. Field surveys were conducted to identify the land use around the site.

Representative soil samples were collected from different locations within the plant site for analysis of the physico-chemical characteristics. Standard procedures were followed for sampling and analysis. The samples collected were also analysed to check the suitability for growth of native plant species in and around the plant site. Information on flora and fauna in the study area has been collected in the Ecological survey conducted during the study period. Satellite imageries of the study area were studied to assess the geology, geomorphology, drainage pattern, land use pattern, vegetation cover, etc.

1.6.1.3. Socio-Economic Environment

Details on economic status of various villages around the project site have been collected. Information on amenities existing in the area has been collected to determine the developmental activities to be undertaken by the plant authorities. Such developmental activities would result in upliftment of the economic status in the area.
1.6.2. Study of Various Activities

Various processes involved in the Abattoir operation have been studied in detail to identify areas resulting in impact on various environmental components.

1.6.3 Public Consultation

Detailed consultations have been held at various levels, including Federal and Regional Governments, Wereda, Kebele PAs and affected local population. The details of the Public Consultation process with minutes are annexed to this Report.

1.6.4 Quantification/ Prediction of Impacts

The identified impacts based on the above study are quantified using various mathematical simulation models and computing software.

1.6.5 Evaluation of Impacts

The quantified incremental impacts are superimposed on the baseline status of various environmental components to have an overall scenario. The overall scenario estimated has been checked for compliance with various statutory requirements/ standards.

1.6.6. Formulation of Environmental and Social Management Plan

Based on the existing environmental status and quantified impacts, a detailed Environmental Management Plan has been formulated for implementation during the construction phase and operational phase. A detailed environmental monitoring programme has also been drawn for implementation. Agricultural and grazing land has been acquired by the project. The details of expropriation of land holdings and the Compensation paid are also given in this section of the report.
1.7. Structure of This Report

This report is divided into the following chapters:

- Chapter 2 presents policy, legal, and administrative framework applicable to the project
- Chapter 3 presents a brief description of the project.
- Chapter 4 presents the environmental baseline information
- Chapter 5 presents the analysis of alternatives for the project
- Chapter 6 presents the environmental and social impacts of the project
- Chapter 7 presents a summary of public consultation
- Chapter 8 presents the environmental and social management plan
- Chapter 9 presents the monitoring plan

2. Policies, Legislative and Institutional Framework

The EIA study for the proposed Abattoir project has been carried out within the framework of local, national and international environmental regulations. The legislative framework applicable to the proposed project is governed by the Federal Democratic Republic of Ethiopia (FDRE), the World Bank. The following sections describe the national and international regulations/ conventions/ standards applicable to the proposed project.

2.1. Regulatory Framework of FDRE

2.1.1. Environmental Policy of Ethiopia

The goal of the Environmental Policy of Ethiopia is to improve and enhance the health and quality of life of all Ethiopians and to promote sustainable social and economic development through the sound management and use of resources and the environment as a whole so as to meet the needs of the
present generation without compromising the ability of future generations to meet their own needs.

For the effective implementation of the Environmental Policy of Ethiopia, the policy encourages creation of an organizational and institutional framework from federal to community levels. The Environmental Policy of Ethiopia provides a number of guiding principles that require adherence to principles of sustainable development; in particular the need to ensure that Environmental Impact Assessment:

a) Considers impacts on human and natural environments;
b) Provides for early consideration of environmental impacts in projects and programs design;
c) Recognizes public consultation;
d) Includes mitigation and contingency plans;
e) Provides for auditing and monitoring; and
f) Is a legally binding requirement.

2.1.2. Institutional Framework

The FDRE consists of the Federal State and Regional States, which are nine in number. Proclamations 33/ 1992, 41/ 1993 and 4/ 1995 define the duties and responsibilities of the Regional States which include planning, directing and developing social and economic development programs as well as protection of natural resources.

The most important step in setting up the legal framework for the environment in Ethiopia has been the establishment of the Environmental Protection Authority (EPA) by Proclamation no. 299/ 2002. According to this Proclamation, the EPA as a Federal Environmental agency is responsible for:
The establishment of a required system for EA of public and private sector projects, as well as social and economic development policies, strategies, laws, and programs of federal level functions;

Reviewing and passing decisions and follow-up the implementation of Environmental Impact Study Reports of projects, as well as social and economic development programs or plans where they are
  - subject to federal licensing, execution or supervision;
  - proposed activities subject to execution by a federal agency;
  - likely to entail inter or trans regional, and international impacts

Notifying its decision to the concerned licensing agency at or before the time specified in the appropriate law or directives;

Auditing and regulating the implementation of the conditions attached to the decision;

Provide advice and technical support to the regional environmental agencies, sectoral institutions and the proponents;

Making its decisions and the EA report available to the public, resolving all complaints and grievances in good faith and at the appropriate time;

Develop incentive or disincentive structures required for compliance of EA requirements, pave the way and involve in EA awareness creation, etc.

The Regional Environmental Agencies are responsible to:

Adopt and interpret federal level EA policies and systems or requirements in line with their respective local realities;

Establish a system for EA of public and private projects, as well as social and economic development policies, strategies, laws, or programs of regional level functions;

Inform EPA about malpractices that affect the sustainability of the environment regarding EA and cooperate with EPA in compliant investigations;

Administer, oversee, and pass major decisions regarding impact assessment of:
o projects subject to licensing by regional agency
o projects subject to execution by a regional agency
o projects likely to have regional impacts

The Proclamation assigns responsibilities to separate organizations for environmental development and management activities on one hand, and environmental protection, regulation and monitoring on the other. It gives the EPA the legal powers required for enforcing as well as to spearhead the enforcement of and ensure compliance with environmental laws and standards.

In this regard, EPA has established an Environmental Impact Assessment system for Ethiopia including the preparation of Procedural and Sectoral Guidelines as a prerequisite for the approval of new development activities and projects.

**PROCLAMATION 295/2002, ESTABLISHMENT OF ENVIRONMENTAL PROTECTION ORGANS**

Proclamation 295/2002 establishes the organizational requirements and identifies the need to establish a system that enables coordinated but different responsibilities of environmental protection agencies at federal and regional levels. The Proclamation indicates the duties of different administrative levels responsible for applying federal law. Depending on the decisions made, resources available and specific organizational situation in each Region, Regional States have allocated responsibilities and duties to woredas, ULGs and kebeles.

**PROCLAMATION 299/2002, ENVIRONMENTAL IMPACT ASSESSMENT**

The Environmental Impact Assessment (EIA) Proclamation makes EIA a mandatory requirement for the implementation of major development projects, programs and plans. The Proclamation is a tool for harmonizing and integrating environmental, economic, cultural, and social considerations into decision making processes in a manner that promotes sustainable
development. The why and how to prepare, methodologies, and to whom the report is submitted are described in this law. The law clearly defines:

a) Why there is a need to prepare EIAs;
b) What procedure is to be followed by the ULG in order to implement EIA of the project;
c) The depth of environmental impact studies;
d) Which projects require full EIA reports;
e) Which projects need partial or no EIA report; and
f) To whom the report has to be submitted.

**PROCLAMATION 300/2002, ENVIRONMENTAL POLLUTION CONTROL**

Proclamation 300/2002 aims to mitigate pollution as an undesirable consequence of social and economic development activities. The proclamation needs to be observed for effective EIA administration.

**PROCLAMATION 513/2007, SOLID WASTE MANAGEMENT**

Proclamation 513/2007 aims to promote community participation in order to prevent adverse effects and enhance benefits resulting from solid waste. It provides for preparation of solid waste management action plans by urban local governments.

**2.2. Sectoral Environmental Policies**

Sectoral policies have been prepared by various agencies. The Federal Water Resource Policy formulated by the Ministry of Water Resources advocates comprehensive and integrated water resource management. The overall goal of the policy is to enhance and promote all national efforts towards the efficient and optimum utilization of the available water resources for socio-economic development on a sustainable basis.
2.2.1. Environmental Guideline and Standards

National environmental standards have not yet been established for Ethiopia. Currently, the EPA is implementing international best practice standards for pollution control, emissions and waste as outlined in the Proclamation for Environmental Pollution Control. The Environmental Protection Authority have produced a number of documents to guide any person or organization who is undertaking activities that may have positive or negative impacts on social, physical or cultural environments. These are described in Error! Reference source not found. below.

Table 1: EPA Guidelines and Standards

<table>
<thead>
<tr>
<th>GUIDELINE / STANDARD</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| EIA Guideline, July 2000 | The EIA Guideline Document provides essential information covering:  
⇒ Environmental Assessment and Management in Ethiopia  
⇒ The Environmental Impact Assessment Process  
⇒ Standards and Guidelines  
⇒ Issues for sectoral environmental impact assessment in Ethiopia covering: agriculture, industry, transport, mining, dams and reservoirs, tanneries, textiles, hydropower generation, irrigation projects and resettlement projects.  
⇒ Annex 1 identifies the activities for which a full EIA, partial measure or no action is required. Annex 2 provides an example of an application form. Annex 3 provides standards and guidelines for water and air. |
| EIA Procedural Guideline, November 2003 | The guideline outlines the screening, review and approval process for development projects in Ethiopia and defines the criteria for undertaking an EIA. |
## Draft Guideline for Environmental Management Plan (draft), May 2004

The guideline outlines the necessary measures for preparation of an Environmental Management Plan (EMP) for proposed developments in Ethiopia and the institutional arrangements for implementation of EMPs.

## Waste Handling and Disposal Guideline, 1997

The Government has developed Waste Handling and Disposal Guideline which is being used by health facilities since 1997. The Guidelines are meant to help industry and local authority to deal with the waste situation at a local level.

## National Sanitation Protocol

The Ministry of Health has developed a National Sanitation Protocol which is designed to follow the national strategy for hygiene and sanitation improvement with its focus on universal access (100% hygienic and sanitized households) in rural or peri-urban environments.

## Labor Proclamation(42/93)

The Labor proclamation requires an employer to take the necessary measures to adequately safeguard the health and safety of the workers.

## Public Health Proclamation (200/2000)

This proclamation:

- Prohibits discharge of untreated liquid waste generated from septic tanks, seepage pits and industries into water bodies, or water convergences

- Prohibits the disposal of solid or liquid or any other waste in a way which contaminates the environment or affects public health.

### 2.2.2. Overview of the National Legislative Requirements

The Constitution adopted by Ethiopia in 1995 provides the guiding principles for environmental protection and management in Ethiopia. The concept of sustainable development and environmental rights are enshrined in article 43, 44 and 92 of the Constitution of GOE.
**Article 43: The Right to Development identifies peoples' right to:**

- Improved living standards and to sustainable development; and
- Participate in national development and, in particular, to be consulted with respect to policies and projects affecting their community.

**Similarly, in Article 44: Environmental Rights, all persons:**

- Have the right to a clean and healthy environment; and
- Who have been displaced or whose livelihoods have been adversely affected as a result of State programs has the right to commensurate monetary or alternative means of compensation, including relocation with adequate State assistance.

**Moreover, in Article 92: Environmental objectives are identified as:**

- Government shall endeavor to ensure that all Ethiopians live in a clean and healthy environment.
- The design and implementation of programs shall not damage or destroy the environment.
- People have the right to full consultation and to the expression of views in the planning and implementation of environmental policies and projects that affect them directly.
- Government and citizens shall have the duty to protect the environment.

**2.2.3. PROVISIONAL STANDARDS FOR INDUSTRIAL POLLUTION CONTROL IN ETHIOPIA Provision**

The provisional standards for industrial pollution control prevent which is prepared by EPA in collaboration with UNIDO and issued in 2003 provides:

- Standards for Specified Industrial Sectors
- Standards for Industrial Effluents (General)
Standards for Gaseous Emissions (General)

Standards for Noise Limits.

PART 2 (i.e. Standards for Specified Industrial Sectors); of the document provides ‘Emission Limit Values for Discharge to Water’ and ‘Emission Limit Values for Emission to Air’ for 8 different industrial sectors. For those industries that are not stated under this part of the Standard (like the proposed Soap and Detergent Factory), PART 3 of the document provides a general standards for industrial effluents and gaseous emission. These general standards shall apply to all industrial effluents and emissions other than those from specific sectors under PART 2 of the document. Thus, issues stated under PART 3 of the document will be relevant to the proposed project.

The provisional standard prepared in the aim of identifying significant industrial pollution by indicating standards which must be observed and by indicating pollution limits beyond which the environment would not tolerate. These standards will be periodically reviewed and updated in the light of additional information and knowledge.

2.3. EPA’s Environmental impact assessment guidelines (2002)

As part of the ongoing effort to develop environmental legislation and guidelines in Ethiopia, the EPA released its EIA guidelines document. The document provides a background to environmental impact assessment and environmental management in Ethiopia. The document aims as being a reference material to ensure effective environmental assessment and management practice in Ethiopia for all parties who are engaged in the process. The basic objective of the guide is:

- Providing all interested parties with a consistent approach in EIA
- Providing background information for the context of EIA in Ethiopia
- Assisting proponents in identifying their EIA responsibility
• Assisting communities & NGO groups in realizing environmental rights with regard to EIA

• Assisting the authority in determining their roles and responsibility as decision makers in the EIA process: and

• Assisting with regard to cost and benefits of proposed development projects.

The document details the required procedures for conducting an EIA in Ethiopia and the requirements for environmental management. These requirements are presented on a step-by-step basis in the guideline. In addition, the document specifies tools that may be considered when engaging in the EIA process. Reference is made to the legislation and policies with which potential investors and developers in Ethiopia must comply and key issues for environmental assessment in specific development sectors are detailed for consideration.

In addition, the EIA Guideline provides the categories, the relevant requirements for an EIA, and lists project types under each category. In accordance with this Guideline, projects are categorized into three schedules:

**Schedule-1**: Projects, which may have adverse and significant environmental impacts and therefore require a full Environmental Impact Assessment.

**Schedule-2**: Projects whose type, scale or its characteristics have potential to cause some significant environmental impacts but are not likely to warrant a full EIA study.

**Schedule-3**: Projects which would have no impact and do not require an EIA. Accordingly, programs related to handling and processing fall into Schedule 1.
2.4. International conventions and protocols

In addition to national environmental legislations, there are also a number of regional and international conventions and protocols on environment. The government has established an Environmental Protection Authority, and this Authority is designated as focal point for the implementation of these conventions and protocols.

According to; Article 9(4) of the constitution of the Federal Democratic Republic of Ethiopia provides that once an international agreement is ratified through the accepted or established procedure, it automatically becomes an integral part of the law of the land. Consequently, the convention and the Protocol are the laws of this land. Therefore; the following international conventions and protocols are relevant to the proposed soap and detergent manufacturing project.

2.4.1 Convention on biological diversity

The convention on biological diversity has three goals. These are:

- Conservation of biodiversity;
- Sustainable use of the components of biodiversity; and
- Fair and equitable sharing of the benefits arising from the use of genetic resources.

The convention was ratified by Ethiopia through proclamation No.98/94, May 31, 1994.

2.4.2 Framework convention on climate change
Ethiopia ratified this convention through proclamation No. 97/1994 on May 2/1994. This convention takes into account the fact that climate change has trans-boundary impacts.

The basic objective of this convention is to provide for agreed limits on the release of greenhouse gases into the atmosphere so as to prevent the occurrence of climate change.

2.4.3 The Vienna convention on the protection of the ozone layer

The basic objective of the convention is to combat the negative impact on the environment and human beings resulting from ozone depleting substances by reducing the amounts released and eventually banning their commercial use through internationally agreed measures. The Montreal protocol entered into force in 1989 to facilitate the implementation of this convention.

Ethiopia ratified and become party to the Vienna convention and the Montreal protocol in January 1996. The National Meteorological services agency has been mandated for the coordination and supervision of implementation of this convention.

2.4.4. The united nations conventions to combat desertification

The objective of the convention is to combat desertification and mitigate the effects of droughts in countries experiencing serious drought and desertification, particularly in Africa. Ethiopia has ratified the convention through its proclamation no. 80/1997.
2.4.5. THE BASEL CONVENTION

The objective of the Basel convention is to control and regulate the trans boundary movement of hazardous wastes. The Bamako convention of 1991 plays a similar role at the level of the African continent. Ethiopia ratified the Basel convention through its proclamation No. 357/2002. Its amendment was ratified through proclamation No. 356/2002. The country has also ratified the Bamako convention through proclamation No. 355/2002.

2.4.6. The Stockholm convention

In 2002, Ethiopia fully accepted and ratified the Stockholm convention on persistent organic pollutants by proclamation No. 279/2002 designed to ban the use of persistent organic pollutants. The Environmental protection authority has the mandate to implement the convention at the national level.

2.4.7 Convention on international trade in endangered species of fauna and flora

The objectives of the convention are to control international trade in endangered species and to ensure that international trade in non-endangered species is carried out in a manner which ensures stable markets and economic benefits for the exporting countries as well as to control and regulate illegal trade in such non endangered species, fossils and/ or their derivatives. Ethiopia ratified the convention through proclamation No.l4/1970. The mandate to implement the convention at federal level is the responsibility of the Ethiopian wildlife protection and development organization.
3. Project Description

3.1. PURPOSE OF THE PROJECT

The intent of the new Abattoir project is to provide a stable and adequate supply of fresh meat to the community of Dire Dawa Administration and its surrounding areas whilst ensuring the highest international standards for hygiene, safety and environmental management.

The realization of the project will also have parallel socio-economic benefits which are to be discussed in subsequent parts of the study.

3.2. Layout of the Proposed Project

The location and extent of the proposed Abattoir plant is illustrated in Figure 1 and 2 of Chapter 1. The development of the Abattoir is proposed to be located at a considerable distance from the urban inhabitants, schools, churches and other public or commercial buildings to avoid possible impact of from noise, bad odor and congestion.

While selecting the project site, likely future commercial and residential developments were also taken into account and it was ensured that the abattoir site will not affect future residential and commercial areas.

The proposed Abattoir project is characterized as:

- A multiple building located within one piece;
- Self-enclosed;
- Far from airfields according to Air Transport Authority regulation;
- Free from big trees that may harbor scavenging birds
- Located on the lee ward of residential areas and social services.
- Has good transport link and
- Is accessible from a permanent road to allow ready transport of both livestock and meat.
3.3. DESIGN CONSIDERATIONS

The layout of the premises and building are designed so that the production process moves in one direction without any cross flow of products, which may adversely affect the hygiene of the product.

Livestock are received at the “dirty” end of the abattoir, slaughtered and meat is out loaded from the clean side of the abattoir. This way, the proposed project is designed to meet the highest international standards for hygiene and safety.
Overall, the Abattoir facility consists of the following elements: Lairage block 38,000 m² 3 no. storeys
- Slaughter block 11,800 m² 3 no. storeys
- Meat dispatch block 2,200 m² single storey
- Administration block 2,950 m² 4 storeys
- Platform and railway siding area 2,520 m² single storey
- Wastewater Treatment Plant (underground) 9,500 m² x approximate 12 m high
- Rendering plant

3.3.1. HYGIENE

Hygiene is the prevention of contamination of the product. Separation between "dirty" and "clean" operations must be taken into consideration. "Clean" and "Dirty" areas are separated by distance, physical barriers and in certain cases by time.

To achieve this, new provisions have been incorporated as follows:

- The staffs are required to wash and clean properly before entering to "clean" area.
- The homogeneous clean area consisting of slaughter hall and meat dispatch area, including delivery vans, are fully air-conditioned to avoid contamination from outside.
- Floor and wall finishes in slaughter hall is seamless construction to avoid the accumulation of dirt. All surfaces are non-adsorptive and can be easily cleaned by using water jet.
- The offal trays are washed and sterilized automatically after use.
- Equipment and knife sterilizers and wash hand basins are strategically and conveniently located along the slaughter line to ensure proper cleaning after slaughtering process of each cattle/goat or sheep.
- Hot water cleansing is provided for washing down the slaughter hall after slaughtering.
3.3.2. SAFETY

To address the safety aspect, which is also a key design consideration; the following principles have been adopted:

- Protection covers and facilities are installed to all equipment and plants.
- Warning signs and signals are displayed at appropriate locations.
- Adequate rails and barriers are provided to protect the workers.

It was recognized that with the introduction of new technology, equipment and procedures it will necessitate substantial change of work culture for the butchers. Hence, an extensive period of training by the manufacturers has been allowed for as part of the contract to provide the necessary training for the operator.

3.3.3. UTILITIES

3.3.3.1. WATER SUPPLY

Abattoirs demand high water use requirement. Hence, an adequate water supply is essential. However, it has been observed that with a reduction of the water use also the waste load decreases. Water is used mainly for cleaning purpose in the project. This include run-off yards, lairage, slaughterhouses, truck washes, uncontrolled surface runoff and wash water for product and equipment. It is estimated that the project will require a water supply of about 2080 metric ton per year.

Three water sources have been proposed for the project. These include Dire Dawa water supply line, Harar water supply line or ground water. Of the three options available and feasible the best option will be Dire Dawa water supply line.
3.3.3.2. ENERGY CONSUMPTION

The operation of the proposed project requires a considerable electrical energy resource. Therefore a three-phase electricity supply is proposed to properly light all rooms and areas of the facility, buildings and etc. Adequate lighting must be available especially in inspection areas to prevent glare while providing the required maximum illumination. Hence, stand by source of energy e.g. diesel engine must be available at all times. Furthermore, the project is also characterized by activities that require great amounts of hot water and steam for sterilization and cleaning purposes. Steam is generated by boilers that use heavy furnace fuel oil where it will be used for heating.

Table 2 shows the energy use of slaughterhouses and comparable figures for the developing world situation. According to Heinen (2006) meat plants in the developing countries are highly inefficient in their energy-consumption.

<table>
<thead>
<tr>
<th>Activity description</th>
<th>Gas (m³)</th>
<th>Steam (GJ)</th>
<th>Electricity (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slaughter (per ton carcass)</td>
<td>1.52</td>
<td>4.83</td>
<td>41</td>
</tr>
<tr>
<td>Cut and debone (per ton carcass)</td>
<td>2.28</td>
<td>1.1</td>
<td>10</td>
</tr>
<tr>
<td>Rendering (per ton input)</td>
<td>10.2</td>
<td>21.1</td>
<td>117</td>
</tr>
</tbody>
</table>

3.4. Current livestock slaughterhouse situation

3.4.1. The Existing Slaughterhouse

The existing slaughterhouse is constructed by the second livestock development project in 1971 EC. At the time of construction it was about
3.5Km away from the center of the town and reasonably far from the settlers and hence was considered to be appropriate in that it has got enough distance from the center of the town.

However, due to the ever-growing nature of the population in the Administration, the project area is currently well surrounded by settlers and it is also expected that the future settlement expansion will go far beyond the exiting abattoir location.

Furthermore, it lacks the most important working rooms and facilities like laboratory section, meat detention room, meat chilling room, appropriate waste disposal system etc., without which safe meat supply cannot be assured.

The above-mentioned shortcomings of the existing abattoir have created the need for the construction of another abattoir that is equipped with the necessary working facilities and rooms on appropriate location.

3.4.2. THE PROPOSED SLAUGHTER HOUSE

The proposed Abattoir project will have a daily slaughtering capacity of 200 cattle and 400 goats and sheep. While keeping the basic structural plan and functions of an export standard Abattoir, the standard Municipal abattoir was required to have

- Slaughter houses for Cattle and shoats separately for both Christian and Muslims
- Slaughtering equipments
- Cattle holding and inspection area
- Truck parking
- Clinic, administration and cafeteria,
- Hide shade
- Laundry
- Rendering plant with all equipments
- Incinerator
Separate gates
- Site facilities like water, sewerage, drainage, roads, walkway, landscaping trees etc
- Waste treatment plant

3.5. DESCRIPTION OF THE SLAUGHTER PROCESS

3.5.1. SLAUGHTERING
In slaughterhouses animals are received and kept around in stockyards and pens for 1 day. On reception the slaughtered animals will pass a veterinary inspection, before being taken to the lairage, accommodating approximately 50 head per section. The lairage will have sufficient place to accommodate 350 animals depending on the capacity of the plant.

Sick animals are isolated in separate lairage and are dealt with according to the instructions from veterinarian. The animals are then driven from the holding pens to the slaughtering area where the following activities take place:

**Stunning and killing:** From the lairage the animals are directed through a race to the stunning box. Locally made knives do the stunning. After the stunning the animal falls automatically. Now a bleeding shackle is fixed to left of the rear legs and the animals lifted by a hoist to the bleeding rail. Sticking is done and the animal dies from the bleeding.

**Slaughtering, Re-hanging:** After bleeding the head is cut off. Next operation is removal front legs at the knee joint. Now the animal to the rehanging platform, where first right of the rear leg is cut at the knee joint, the skin opened above the joint and a roller hooks is fixed at the Achilles tendon. The roller hook is lifted to the dressing rail. Next the skin of the leg with the bleeding shackle is opened above the knee joint and a roller hook fixed to the Achilles tendon. The roller hook is lifted to dressing rail, and the bleeding shackle released and returned to the stunning area. The rear leg is cut at the knee joint and the
rear legs passed through a chute to by-product collection. The utter is removed and passed through a chute to the by-product collection and further on to the rendering plant.

**Pre De-hiding:** The skin is opened without dehiding machine along the legs, neck and the stomach. This operation takes place manually.

**Dressing:** After dehiding, the carcass will pass the brisket saw, where breastbone is cut open. Next operation is removal stomach and intestines. Finally, the plunks are removed, before the carcass is cut in 2 halves with the splitting saw.

**Evisceration:** Next operation is removal stomach and intestines. Finally, the plunks are removed, before the carcass is cut in 2 halves with the splitting saw. For all animals, possible sources of contamination must be eliminated or controlled by the abattoir operator during the dressing and evisceration operation. The most common sources of contamination are flying insects, the hide, feet, contents of the digestive and reproductive tract, diseased tissue and unclean equipment or personnel. During insect season, carcasses will be sprayed with an acetic acid solution before entering the abattoir.

**Splitting:** Next operation will be split the carcass in two through electric powered splitting band saw. Then the next processes continue.

**Veterinary Inspection:** The veterinary inspection is the final approval of the carcass for human consumption. The veterinarian has three options: approving the carcass, retaining the carcass in a detain chiller for later reinsertion or condemning the carcass. The inspection of heads and other organs is done simultaneously with the inspection of the carcass. In case the carcass is condemned or detained, the head and the intestine are condemned.
Condemned carcasses are cut into smaller pieces and transferred in containers to the incinerator.

**Chilling:** The chiller module is to be comprised of the chilling, heat rejection, and pumping equipment, as well as, the associated electrical gear and controls.

**Deboning:** The deboning arrangement should have in complete customer adapted solutions.

**Product Packing:** Slaughterhouses are required to dispose of animal by-products within 48 hours of slaughter.

### 3.5.2. RENDERING

Rendering is a heating process for meat industries waste products through which fats are separated from water and protein residues for the production of edible lards and dried protein residues. Here, the soft offal, bone, meat cut-off and condemned carcasses are transported from the processing plant (slaughterhouse) to the reception room of the rendering plant. After the raw material has been arrived, are transported from the preparation room to the reception room of the rendering plant in standard 500 lit. (Stainless steel containers). Blood is collected from the slaughtering floor in the blood storage tank at the raw material preparation floor from where it can be pumped in to cooker/ drier by means of a blood pump. After all the raw materials are seweried into the rendering plant, the following activities will take place.

**Sterilizing, Cooking and Drying:** The cooker dryer is filled through the filling dome of the cooker. The batch of offal is heated indirectly by steam condensing in the jacket and the agitator of the cooker/drier. Hydrolyzing (if
necessary hear only), sterilizing and cooking are carried out under pressure and at the corresponding temperature. Drying to the final moisture content takes place by means of continuous heating under atmospheric conditions.

**Condensation:** Vapour released from the cooker/ drier can be condensed in the air cooled condenser. Non condensable gases can be extracted from the condensate by means of a fan and led to a chemical air washer to prevent excessive smell.

**Greaves Handling:** When the content of the cooker /drier has been dried, the discharge door of the cooker /drier is opened. The greaves are discharged into a percolating tank or receiving bin, which holds full batch load of greaves, so that the cooker can immediately be filled with the next batch.
A discharge screw conveyor transports the greaves to the press. This discharge screw conveyor takes the greaves to the press. The screw conveyor is mounted obliquely. It has a drain section for fat separation as well as a variable speed drive for consistent in feed into the press. The greaves enter the press through a non-magnetic inlet chute fitted with a permanent magnet to remove any ferrous particles, to prevent damage to the press. In the press the fat is separated from the greaves.

**Fat handling:** The fat separated out in the press is collected in the fat pump and can be transferred in to fat settling tanks. After a minimum settling period of 12 hr. the fat can be collected in drum or fat storage tank.

**Meal Handling:** Defatted meal is discharged from the press into a crackling screw conveyor. This conveyor is equipped with notched flights, which pre-break the meal lumps and convey the meal to curing bin. In the curing bin the meal is temporary stored to allow time for curing, which has the effect of making the meal more brittle and therefore easier to grind. From the screw conveyor with variable speed transport the meal the hammer mill for grinding.
The hammer mill discharge screw provided with dust filter transports the ground meal to the bagging-off spout.

3.5.3. WASTE STABILIZATION PONDS

DESCRIPTION

Waste stabilization ponds (Lagoons) are often the most cost-effective and efficient way of treating organic waste waters when land is not prohibitively expensive and receiving water effluent quality limitations are not severe. Wastewater flows into a lagoon, where bacteria transfer and remove pollutants such as BOD, nutrients, suspended solids and pathogens. The treatment work will have a series of treatment process. A series of anaerobic and facultative ponds shall be used by the project. This would enable to maintain the standard limit set for water discharge and emission level. Accordingly a waste stabilization pond has been designed to reduce the discharge of pollutants to nearby water body and reduce pollution.

APPLICATIONS

According to the standard document for Industrial Pollution in Ethiopia, facultative or aerobic lagoons can be used as a final process to polish effluents before final discharge. Anaerobic lagoon will be followed by an aerobic or facultative lagoon since effluent will need further treatment. Figure 1 shows the schematic layout of the waste treatment process for the proposed project.

Figure 3: schematic layout of project effluents flow
OPERATION & MAINTENANCE

Lagoons may require sludge removal every few years and regular vegetation maintenance. Regular maintenance of mechanical components, such as recirculation pumps, mixers, or aeration equipment, is also required for lagoon designs.

3.3.5. DESCRIPTION OF EMISSIONS

3.3.5.1. SOLID WASTE

Table 3 shows the estimated solid waste of slaughterhouses (RIVM, 2007). All the solid waste mentioned in the table has a potential use as fertilizer (manure) or animal feed (fat).
Table 3: Estimated solid waste of slaughterhouses

<table>
<thead>
<tr>
<th>Slaughter process:</th>
<th>kg/ton carcass weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>manure</td>
<td>5.5</td>
</tr>
<tr>
<td>fat (pretreatment wastewater)</td>
<td>1.7</td>
</tr>
<tr>
<td>Meatpacking:</td>
<td></td>
</tr>
<tr>
<td>fat (pretreatment wastewater)</td>
<td>1</td>
</tr>
<tr>
<td>Intestine handling:</td>
<td></td>
</tr>
<tr>
<td>fat (pretreatment wastewater)</td>
<td>1.15</td>
</tr>
<tr>
<td>paunch manure</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>53.85</strong></td>
</tr>
</tbody>
</table>

With a daily slaughter capacity of the proposed project (86 ton of carcass/day), it would appear that around 5.1 tons of solid waste will be generated.

### 3.3.5.2. WASTEWATER

The effluents of slaughterhouses constitute one of the most serious causes of environmental pollution, bad odours and health hazards if they are poorly managed. Table 6 presents some values of the quality of the wastewater, as recently estimated by the RIVM (2007).

Table 4: Wastewater quality estimates for slaughterhouses

<table>
<thead>
<tr>
<th>Pollutants</th>
<th>Goats/Sheep (kg/ton carcass weight)</th>
<th>Cattle (kg/ton carcass weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD</td>
<td>2.4</td>
<td>4.4</td>
</tr>
<tr>
<td>COD</td>
<td>2.7</td>
<td>4.1</td>
</tr>
<tr>
<td>N_kj</td>
<td>0.6</td>
<td>1.1</td>
</tr>
<tr>
<td>SS</td>
<td>0.04</td>
<td>0.84</td>
</tr>
<tr>
<td>P</td>
<td>0.2</td>
<td>0.33</td>
</tr>
</tbody>
</table>

Values are estimated from data given by Taiganides (2004),
3.3.5.3. **AIR POLLUTION**

Slaughtering is an activity that requires great amounts of hot water and steam for sterilization and cleaning purposes. In the process of generating the energy for heating, gasses are emitted (CO\(_2\), CO, NO\(_x\) and SO\(_2\)).

Emissions of CFC’s and NH\(_3\) into the air are the result of evaporation of chilling liquids and of the stripping of chilling and freezing-machines, when out of use.

The smoking of meat products and the singing of hogs in a gas flame to complete the hair removal lead to the production of mainly CO\(_2\), CO and NO\(_x\) and obnoxious smells.

According to RIVM (2007), the overall energy to be used by slaughterhouses in Developing Countries is estimated at 137’ kWh/ton of carcass and about 28.7 m\(^3\) gas/ton of carcass. The processes of “dehairing”, “water heating” or “production of electricity” each lead to different levels of emission.

Based on estimates of the RIVM (2007), emissions of CO\(_2\), CO and NO\(_x\) resulting from the burning of gas for heating and steam production are as indicated in the table below.

**Table 5: Air emissions of slaughterhouses by process**

<table>
<thead>
<tr>
<th>Process</th>
<th>Pollutants</th>
<th>emission (Kg per ton of carcass weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating by burning gas:</td>
<td>CO:</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>CO(_2):</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>NO(_x):</td>
<td>0.01</td>
</tr>
<tr>
<td>Dehairing (using gas)</td>
<td>CO:</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>CO(_2):</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>NO(_x):</td>
<td>0.015</td>
</tr>
</tbody>
</table>
3.6. PREVENTION OF WASTE PRODUCTION

No source of contamination should occur in the environment in which we place an abattoir. The quality of overall cleaning-up practices determines to a large extent the total waste load produced. It has been established by RIVM (2007) that the waste load decreases with a decrease of the water being used.

With reference to the process outlined above, the following actions may contribute to waste (water) reduction.

- As much blood as possible should be collected and processed. Indirect heating can reduce the amount of wastewater (and thus the waste load), compared with direct heating from 1.3 to 0.3 kg BOD per ton of LWK.
- Whole paunch handling (removal of the entire paunch, intact, for rendering)
- Dry animal pen clean-up reduces the amount of wastewater. If the pens are covered, no rain or snow water can enter, which reduces the amount of wastewater
- Heads and lungs should be rendered;
- Intestines may be rendered directly;
- Tank water (from the rendering process) can be evaporated. This will reduce the waste load from 2 to 0.5 - 1 kg BOD ‘per ton of LWK. Evaporation on the other hand consumes energy which will lead to CO₂ production.
- The wastewater from abattoir and from other human sources shall be treated separately;
- The waste treatment plant should be at least 50 meters away from the slaughter hall and accessories;
- Septic tanks and soak pits shall be located on lower points relative to water wells and must be located separately from water wells
There should be sufficient space available to bury inedible wastes and condemned animals and provide for compost stacks, hide drying frames or burn etc.

Adequate drainage must be available throughout the establishment.

All drain lines should be sloped at least 2 cm per meter and have not less than 10 cm inside diameter, be deep-seal trapped, properly vented to the outside air, and equipped with effective rodent screens.

Properly constructed valley drains are permitted in slaughter and Evisceration areas, if they are an integral part of the floor.

Equipment discharging a large volume of water shall be provided with direct drainage, preventing water from flooding the surrounding areas.

Floors should slope uniformly to drain inlets, with no low spots to collect liquids.

Toilet and urinal drain lines should be separate and apart from other drain lines to a point outside.

4. Description of Receiving Environment (baseline)

An accurate description of the existing environment is necessary to predict the likely significant impacts of a new development. This provides baseline data, which can be used for environmental monitoring of the impacts of the project, once it is in operation.

This section identifies and describes the relevant aspects of the existing environment in and around the proposed slaughterhouse development location that could be potentially affected by the construction and operation of a slaughterhouse.

In order to assess the baseline environmental status of the proposed project area, primary and secondary data collection programme has been undertaken. The environmental components studied include:
Human Beings: Economic activity; Social patterns; Land use; Employment; Health & Safety; Settlement patterns;

Air & Noise: Air quality – pollution / suspended particulates; Odours; Noise / vibration

Water: Ground / surface; Physical / chemical attributes; Biotic; Beneficial uses.

Flora & Fauna: Habitats / Communities; Terrestrial / aquatic; Breeding grounds; Mammals / birds / fish / reptiles / insects; Routes; Protection status / habitat requirements; Seasonality / succession; Critical resources.

Landscape: Landscape character / context / topography; Views & prospects; Historical landscapes; Manmade landscapes

Cultural Heritage: Architecture / settlements; Monuments / features

4.1. THE STUDY AREA

In this assessment, the study area has been defined as the proposed project site of the Abattoir facility. However, the surrounding environmental feature has been viewed to get broader and comparative picture of the particular site.

4.1.1 LOCATION

The proposed site for the establishment of Municipal Abattoir is located at the Southern part of Dire Dawa, around Ijaneni rural kebele. The specific project site is located on the way to Legaoda rural kebele, in the village called Genet Menafesha. Its geographic GPS coordinates are 814273.3038 E and 1056531.7462 N.
4.1.2. TOPOGRAPHY AND SLOPES

Topography of the project area and of the surroundings consists of plains and mountains. Generally, the specific site is sloped 4% from south to north, with some eroded gully in site and scattered shrubs.

Figure 4: Project Site Topography

4.1.3. CLIMATE

The area is categorized mainly by warm and dry climate with relatively low rainfall and hence categorized as kolla climatic zone. Days are very hot and the nights are moderate in temperature. The mean annual precipitation and the mean annual temperature are about 594mm and 25°C respectively.

4.1.4. GEOLOGY

The general site area belongs to upper part of the Jurassic Antalo formations dips at between 30 and 40° to east. It is intersected by sub vertical dykes of Tertiary igneous rocks comprising fine grained porphyritic and esite-basalt. The
dykes are between 20 cm and 16 cm or more wide and are estimated to constitute around 10% of the rock mass.

The geological sequence comprises high grade crystalline basement rock overlain by Mesozoic Era transgression and regression deposition events of sandstone, which rests uncomfortably on the crystalline basement Rock.

4.1.5. WATER RESOURCES

4.1.5.1 SURFACE WATER

No surface water was observed during the site inspection but several erosion terrains were noted on the site indicating that the site is exposed to flooding and erosion during the rainy seasons. Obviously, the high runoff generated from the surrounding hills coupled with the nature of the site terrain significantly attributes to the flooding and erosion of the site.

4.1.5.2 GROUNDWATER HYDROLOGY

The groundwater level is controlled by both the topography and the local geology. Enhanced groundwater flow is depicted in stone-line zones where there is alluvial and coarse alluvial sediments overlying the solid rock. According to previous studies of ground water resource potential of the area, ground water basin is contained in the upper and lower sand stone, limestone and basaltic aquifers, which can be categorized as consolidated aquifers. Unconsolidated alluvial aquifers consists quaternary sediments and travertine aquifers. The quaternary sediment and travertine aquifer units are mainly exposed in the plain areas of the administration. The alluvial units are mainly composed of quartz sand of fine to coarse grained in size.
The studies showed that, potential ground water in the area is generally encountered at variable depths ranging from 120-150 meters below ground surface. Such shallow ground water is obtained from quaternary sediments and travertine aquifers in the low land plains, which are used for the supply of domestic water in the rural area of the administration but with low yield.

4.1.6. VEGETATION

Vegetation development in the project area is mainly governed by physiographic/ altitude, climate, etc besides other factors. Vegetation in the study area is scanty except along the intermittent streams. The natural vegetation is largely scanty acacia trees and cactus.

At present, there is no much vegetation cover throughout the project area. This is mainly due to continuous stress on the area for fuel and construction wood and sever agricultural expansion.

Figure 5: Vegetation of the project area

![Vegetation of the project area](image-url)
As can be seen in the picture above, the dominant vegetation covers of the project area ecosystem consists of deciduous shrubs

4.1.7. WILDLIFE

According to the information obtained from the local people there are various wildlife species in the relatively dense shrub land areas of the project site. These include Porcupine, Hyenas, Lesser kudu, and Warthog. Since the proposed abattoir may have plant remnants which attract these scavenger animals, a tight and high masonry fence is essential around site.

4.1.8. SOIL COVER

According to the soil sample taken from the site and laboratory investigation, the dominant soil type is sandy-silt. It has a lose formation at the top with high permeability rate.

3.1.9. NOISE LEVELS

The noise levels within the study area are well within the World Bank and Ethiopian standards. Some mild track noise are expected to be observed while the firm carries out transportation of products and inletting of raw materials to the site. The processing machine of the project has no significant noise both to the employees and the adjacent firms.

4.1.10. SETTLEMENTS

No residential settlers are found in the project site, though the land is being used by the land owners for agricultural, wood collection animal feeding activities. A part from that, no religious, historical or cultural site is present in the proposed area for the abattoir. However, as can be seen in the Picture 3 below, there are one or two instances of corrugated iron-roofed houses around a one to two kilometers radius from the project site.
The issue of compensation for the land owners has been discussed and agreed upon, the detail of which is presented in a latter section of this report.

4.1.11. Socio-Economic Scenario

A detailed socio-economic survey has been carried out in the areas around the project site.

4.1.11.1. Demography

As already been discussed in the previous sections, the study area is located close to Genet Menafesha village of Ijaneni rural kebele. According to the Dire Dawa Administration Statistical Abstract (DDASA, 2009/10), there are around 838 households in Ijaneni rural kebele accounting to around 4057 population from which 2059 were male and 1998 of them were female. The population of the Ijaneni rural kebele is almost entirely of the Oromo ethnic group (91.5%) and Oromiffa is the major language spoken in the area. The Local Consultation is therefore carried out verbally and in Oromiffa
language. The remaining 8.5% of the total households belong to Amhara and Somali ethnic groups.

4.1.11.2. Consumption/Expenditure

The results of the household survey carried out for the project area reveal that the per capita consumption/expenditure of the population in the Ijaneni kebele is estimated to be Birr Birr 1262.2. According to Endale (2010), food consumption on average accounts for 75.8% of the household budget. Within the non-food category, clothing and house maintenance account for greater share of total expenditure (8.5 and 10.7%). Medical care and education budget contribute 3% and 1.2% of the total household budget respectively.

4.1.11.3. INCOME

The communities can be characterized as mainly low income. The major source of employment and income in the project area is mixed farming, i.e. crop production and livestock. Apart from the heads of the households who are often the breadwinners of the family, other family members also contribute to family income through employment in farming and off-farm activities. The most important part of the income accounting to over 79.8% originates from agricultural and related activities mainly from the production of cereals and vegetables, perennial crops, domestic animals and its products, agro-forestry products and renting of farming lands. The remaining activities, i.e., trading, labour employment and others bring in the remaining income of the people.

4.1.11.4. Land Use

Land use and land cover pattern of the study area has been assessed through secondary data. Field surveys were conducted to identify the land use in and around the project site. Accordingly, the survey findings suggest that the
practical site of the proposed project and its vicinity areas are committed to grazing areas. While some patches of lands were seen used for cereals and vegetables production. Picture 1 and 2 shows the land use patterns of the project area.

Figure 7: Dominant land use patterns in the study area

4.1.1 Education

There are no schools observed around the project site. However, the survey respondents mentioned that there is one school at about 4 kilometers distance from the project area, called Jelobelina Primary School. According to findings of the socio-economic survey, the overall literacy rate in the project area is very low. 85.5% of the surveyed household heads are illiterate whereas the remaining 14.5% are literate. Of this, less than a quarter
of the household heads had formal education of which the majority was only till primary level.

4.1.11.5. Farm Assets

The main source of livelihood in the project area is agriculture. Therefore, land ownership in the project area becomes an important determinant of welfare. The major crops of the area are maize, sorghum, chat, etc. The area is mainly cultivated by means of traditional rain fed subsistence farming.

4.1.11.6. Health

No health center was observed around the project site or in the Ijaneni rural kebele. However, MoH (2009) stated that the top leading causes of morbidities and mortalities in the study area are infectious and communicable diseases.

4.1.12. Electric and Water Requirement

The sources of household energy in the surrounding areas of the project site are biomass, fuel wood (which is collected from common lands) and diesel (which is used for lighting). However, electric power is provided to the areas around the office of the Ija Aneni kebele Administration. The area obtains its water requirements from the DireDawa water supply line.

4.1.13. Road Transportation

The project site is connected to the main DireDawa- Addis Ababa road by a gravel road. As the site is connected to the road by a drive way of 0.85 km, there will be no problem of transportation. Picture 3 shows the road to the project site. From left to right, the picture shows the gravel road’s point of departure from the main road and the way to the project site respectively.
4.1.14. Traffic

A simple survey of Traffic movements was undertaken to provide an indication of flows past the plant. The results suggest that traffic flows were neither heavy nor continuous.

The number of vehicles going in both directions along the Legeoda- DireDawa gravel road was estimated to be around 10 buses per day.

4.1.15. Historical, cultural, religious and archeological resources

There is no reported historical or archeological resource in the project area. During the field visit the Consultant do not encountered site of historical, cultural, religious and archeological importance located near to the project area.

Enquiries to residents in the area have indicated that there are no known sites of historical or archeological significance in the vicinity of the proposed project site.
5. Alternative Analysis

5.1. ALTERNATIVES EXAMINED

Alternatives where relevant may be described at different ways indicating the main reason for selecting the proposed slaughterhouses development, namely consider alternative locations, designs and processes. Therefore the purpose of this section is to summarize the various alternative options relative to the selection of a proposed slaughterhouses site, design and process. Given the nature of slaughterhouse activities, the consideration of alternatives are therefore of prime importance.

5.1.1 Description of Alternative Locations

In terms of location selection this is one of the main factors, which have to be considered in relation to the proposed slaughterhouses development. Site selection is usually conducted prior to establishing a final developmental site. Some locations have more inherent environmental problems than others. Such sites can usually be avoided in favor of sites, which have fewer constraints and the maximum capacity to sustainably assimilate the development. Engineering and economic evaluations largely determine the location of a slaughterhouse so that it will serve the area designated to the best advantage. The final location was based on economic and engineering justifications. In relation to the proposed project, three alternatives were taken in to consideration after which the best alternative has been selected for implementation. The brief description of the alternative analysis has been presented in the following.
<table>
<thead>
<tr>
<th>S. N.</th>
<th>Alternative considered</th>
<th>Advantages</th>
<th>Limitations</th>
<th>Remark</th>
</tr>
</thead>
</table>
| 1.   | Expansion/upgrading of the existing abattoir | ➢ There might be a reduction of cost  
➢ Availability of infrastructure (water, road, electricity) | ➢ Lack of sufficient land  
➢ Unsuitable for modern machineries  
➢ Located in the middle of the city  
➢ Higher environmental impact | Not selected |
| 2.   | New abattoir around Gendaser kebele 16 | ➢ Availability of sufficient land,  
➢ Suitable for modern machineries,  
➢ Outskirt of the city.  
➢ Low environmental impact | ➢ A relatively higher cost  
➢ With in 10 KM radius of the runway of DireDawa airport thus prohibited by airport regulation | Not selected |
| 3.   | New abattoir around Genet Menafesha | ➢ Availability of sufficient land,  
➢ Suitable for modern machineries,  
➢ Outskirt of the city.  
➢ Availability of infrastructure (water, road, electricity)  
➢ Low environmental impact | ➢ A relatively higher cost | Selected       |
5.1.2. Description of Alternative Designs and Processes

Most problems will be capable of a number of design solutions. Typical approach towards alternative slaughterhouse designs can include the following:

- Minimization of environmental impacts including, noise, odour and aspect;
- Optimum capital and running costs;
- Land area requirements.

**Alternative 1: (Not selected)**

Designers were briefed at an early stage of the project to design a well-equipped export standard Abattoir with the following basic requirements:

**A. Structural Requirement**
1. Production Of Safe Meat
2. Safe Working Condition For Workers
3. Minimum Initial Investment

**B. Layout And Composition**

The Abattoir plant is required to have the following layout and composition

1. Three Gates
   - The first: for Transportation Of By Products
   - The Second: Clean Gate For Dispatch Meat, Administrative And Slaughter Workers
   - The Third: for Slaughtering Animals To Enter in to the Abattoir
2. Anti-Mortem Inspection Crash
3. Lairage
4. Stunning Box
5. Rail System
6. Bleeding Area
7. Shank Removing Area
8. Hind leg and hind flaying area
9. Total flaying area
10. Hide outlet
11. Head Removing area
12. Brisket Breaking area
13. Green and red offal removing area
14. Green offal outlet
15. Green offal cleaning-cutting in four pieces
16. Dispatching room
17. Red offal Inspection area
18. Caracas chilling room
19. Caracas detention room
20. Chest breaking or Caracas splitting spot
21. Cutting area
22. Caracas collection and Dispatch Room
23. Other facilities
   - Meat inspection office
   - Laboratory rooms with facility
   - Shower and changing rooms
   - Office rooms
   - Generator room
   - Guard house
   - Incinerator
   - Rendering Plant
   - Ground water Reservoir
   - Water Tower
   - Truck parking
   - Rendering plant
   - By Product store
   - Hide store
Livestock market
- Residence for workers

**Alternative 2: (Selected)**
This alternative, although, was just the same as the former (export standard Abattoir) in terms of minimization of environmental impacts, land area requirements and basic structural plan and functions, the basic facility design and capacity was minimized to a standard municipal abattoir due to financial constraints.

Therefore, a standard Municipal abattoir design was considered as a best alternative for implementation. It will have the following facilities:
- Slaughter houses for Cattles and shoats separately for both Christian and Muslims
- Slaughtering equipments
- Cattle holding and inspection area
- Truck parking
- Clinic, administration and cafeteria,
- Hide shade
- Laundry
- Rendering plant with all equipments
- Incinerator
- Separate gates
- Site facilities like water, sewerage, drainage, roads, walkway, landscaping trees etc
- Waste treatment plant

Hence this report is prepared according to the latest alternative design. All the major slaughtering houses designed for export abattoir are to be constructed in different phase in the future.
6. Environmental Impacts and Mitigation Measures

6.1. General Consideration

This part of the report addresses potential impacts associated with the proposed Abattoir project and delivers measures for both mitigating (i.e. avoidance, reduction, or restoration of) negative impacts and enhancing (i.e. improving) the positive effects of the project.

The major positive impacts of the proposed project are mainly the economic and social benefits that can be acquired at the national, regional and local levels. On the other hand, the major adverse impacts arise from generation of solid wastes, wastewater and air pollutants.

Cost-effective and environmentally sustainable techniques that can mitigate the adverse impacts and enhance the positive effects are proposed. Emphasis is given in selection of best available techniques (BAT) and practices for preventing and reducing discharge of processed wastes to the environment.

Special consideration is also given to the sustainability of the proposed project through integration of best available pollution prevention technique (e.g. reusing and recycling of process wastes and by-products) without compromising the economic and social benefits of the project. In doing so, those parameters stated in the Standards for Industrial Pollution Control in Ethiopia are considered.

Based on the standard requirements a suitable by-products rendering and wastewater treatment plants are proposed and a preliminary design data and operational requirements is given (Please Refer the attached drawings of the recommended wastewater treatment and rendering plants).

6.2. Beneficial impacts and measures for enhancement

The establishment of this Abattoir will have a number of positive impacts both at the regional and local community levels. Some of the major positive impacts include technological capacity building, economic development and creation of
employment. These potential positive impacts, their origin and characteristics are presented below.

6.2.1. Economic Benefit

6.2.1.1. Contribution to regional economic performance

The implementation of the project has an array of economic benefits. Generally, it generates employment, promotes skill development and disseminates technological changes. The reduction in waste products and the resulting savings in the municipality costs of clearing such wastes; the increased ability of butchers to comply with public health and hygiene regulations resulting in the reduction of public disease levels and the income generation through sales of byproducts processed in rendering plant are some of the economic benefits to be realized at a regional level.

Since the project is a technology intensive enterprise, which involves many industrial technologies, it is also believed that its implementation will add additional knowledge to the local industries and at the same time create the opportunity and exposure to the local experts on the sector.

BENEFIT ENHANCEMENT MEASURES

Executing the proposed project in a manner that benefits the country at large (example: production of quality products, introduction of technologies that maximize the product yield at the same time reducing the environmental burden of the production process) is the proposed benefit enhancement measure.

Participating local professionals at different stages of the project will enhance capacity building in the sector. This is also an opportunity to minimize operating costs and professionals can be readily available locally for maintenance and expansion activities.
6.2.1.2. Employment

The project would be able to employ significant number of staff from the locality during the construction as well as operation phase thereby contributing to the social and economic wellbeing of the community.

The project is expected to create direct job opportunities for more than 53 slaughter men per shift and a further 155 full time attendants who will be from the local people residing near by the project area and from city. Thus, the project will be an opportunity for the working class community of DireDawa by lightening the brunt of unemployment in the town to some extent. In addition to this long term employment opportunity, the construction stage of the project will have a short term employment opportunity, particularly for about 30 local laborers.

Furthermore, the project is also expected to have interactions with local small and micro enterprises, product dealers and service providers through its provision of access for by products like hide and skin, organic fertilizer and animals’ feed. In view of this fact, indirect employment to be created from the project can be considered indispensable.

BENEFIT ENHANCEMENT MEASURES

Special consideration is given to enhancement of the positive effects of the project by maximizing the distribution of this employment related project benefits.

Hiring professionals and service providers will be based on merits and yet on competitive base in order to get quality technical workers. However, the project will provide priority to the local community while hiring for those positions that do not requiring especial skill.

As there will be high demand for daily laborers, especially during construction phase of the project, it will be twofold advantages to hire laborers from local people. First, the project managers will reduce time of searching for laborers and save the money that is needed for transportation of these laborers to
project site and second, it will enhance social acceptability of the project in general.
In addition to the above proposed measures that can enhance the direct employment benefits, procuring by product processing enterprises from local sources to the maximum extent possible also enhances the indirect employment opportunity of the project.

6.3. Adverse impacts and proposed mitigation measures

The proposed Abattoir project is characterized with certain negative impacts of short term construction phase and long-term operation phase. This section of the report outlines these adverse impacts and presents the proposed prevention and mitigation measures.

6.3.1. Construction phase negative impacts and mitigations

The construction phase of the project involves clearing, land leveling, transportation of construction materials, erection of machineries, and installation of utility systems etc.

Potential adverse impacts associated with the construction activities of the project are:

- Alteration of vegetation, landscape and land use pattern
- Impact on Water Resources
- Impact on Air Quality
- Impact on flora and fauna
6.3.1.1. Impact on flora and fauna

Construction of a slaughterhouse and associated services such as transmission mains and pumping stations will have an impact on flora and fauna habitats. Potential impacts on flora include those associated with the loss of vegetative habitats and increase in natural instability of plant communities. However, since the project site is characterized by a scattered shrubs and bushes, de-vegetation of native vegetation cover is minimal. Similarly, physical site disturbance and noise from construction activities will cause temporary displacement of most fauna from the vicinity of the construction site and adjacent areas. However, following construction, displaced species are expected to resume their normal habitats consistent with the availability of post-construction habitats. Generally, due to the less ecological significance of the existing environment, the construction phase is expected to have minimum impact on flora and fauna.

MITIGATION MEASURES

Though the impact on flora and fauna is minimal during the construction activities, the following measures are recommended:

- Limit clearing and soil disturbance around construction sites
- Limit and control movement of trucks and construction machineries during construction
- Prepare green areas by planting grasses and other trees in empty land of the premise
- Create awareness for the local people and workers in every opportunity about the importance of vegetation cover for soil and water conservation
- Grade disturbed areas and restore landscape
6.3.1.2. Impact on landscape integrity and land use pattern

Land clearing and leveling as well as dumping of excavated material can be a cause for the alteration of landscape integrity in the project area. However, from the existing environmental features of the project area point of view, the impact from land clearing and leveling will not be significant. Construction of the slaughterhouses and utility systems is the other potential cause for landscape modification in the project area. But as the setting of the Abattoir will not interfere with the scenic value of the landscape (for example it does not obstruct the panoramic view of the rural landscape, waterfalls, or mountains) the impact is not significant. In addition to this, the site does not have any interference with any traditionally important feature of landform. Similarly, alteration of the land use pattern due to dumping of excavated materials is expected to be insignificant, both from the scale of the project and the reversibility of the impact with application of proper mitigation measures perspective.

MITIGATION MEASURES

Though those described impacts are not significant they can be avoided by undertaking the following mitigation measures:

- Grade limitation to avoid spoiling scenery and view lines with earthworks
- Dumping excavated material at selected suitable site and re-shaping it with the dumping site
- Minimizing the movement of vehicles and construction machineries particularly outside the premise of the project site to avoid the distraction of road side vegetation cover
- Paying a proper compensation to those people who are physically displaced due to the project
6.3.1.3. Impact on Water Resources

Water here refers to: surface freshwater and groundwater, each of which has their own distinct sensitivity in relation to emissions during construction of a facility and in the discharge of effluent. Excavation and earth movement during construction and operation can cause pollution of surface and groundwater quality and alter hydrological conditions. There are also potential effects during the final stages of capping and restoration, where natural topography of the area may be altered. The main source of pollution from these activities is increased surface runoff and soil erosion from exposed ground causing high turbidity (suspended solids) and sedimentation in water bodies.

In addition to this, during the construction phase of the project foreign materials like oil, grease, fuel and residues of derbies can originate, which are potential threats for water quality degradation. However, the problem is not significant, since the potential ground water in the area is generally encountered at a high depth below ground surface. Alteration of the natural water cycle is the other water resource impact in relation to the construction phase of the project. But the impact is not an issue here, as there is no surface water resource in the area that can be impacted by the proposed project.

MITIGATION MEASURES

The following measures mitigate the impacts:

- Continuous attempt should be made to optimize/reduce the use of water
- Water harvesting will be carried out to the maximum extent possible
- Regular monitoring of ground water table
6.3.1.4. Impact on Ambient Air Quality

Impacts on air quality nature as a result of a slaughterhouse development are usually only short term and minor. Operation of construction equipment results in crankcase emissions, exhaust and fugitive dust being released. Construction equipment to be utilized by the project will also produce emissions of nitrogen oxides (NOx), hydrocarbons, and suspended particulates along with limited quantities of sulphur dioxide (SO2), which will result from the use of diesel fuel. However, the contribution of their impacts on the air quality degradation is expected to be localized and insignificant.

However, as the dust storm can have visibility impact on site operation and decrease breathing because of the suspended particles in the air, this problem is an important issue that requires consideration.

MITIGATION MEASURE

The practical option to avoid local air quality degradation due to dust emissions that can arise from construction activities is to sprinkle water on fresh construction spoil. In addition to this, instructing the site workers on the procedures of construction and safety precaution prevents the consequence of visibility loss during operation of construction machineries.

6.3.1.5. Impact on Ambient Noise Levels

Construction of a slaughterhouse may cause temporary and localized increases in background ambient sound, although the specific impact will depend on the method of construction and equipment used. Hence, the principal noise sources associated with the proposed slaughterhouse construction activities include heavy equipment such as
bulldozers, scrapers, and trucks which will only have a temporary impact for the duration of the construction. Since the construction doesn’t involve the use of explosives or blasting, it does not entail significant noises that affect human population or wild lives of the project area. Furthermore, absence of institutions sensitive to noise such as schools, health institution or other offices close to the project site, also makes the impact more insignificant.

**MITIGATION MEASURES**

All equipment to be employed in the construction of the facility will be designed to operate with low noise levels, and will not exceed the maximum allowable noise level for the surrounding receiving land use.

6.3.2. **Operational Phase Adverse Impacts and Mitigations**

6.3.2.2. **Identification of Environmental aspects**

The byproducts to be generated by the proposed project, as estimated in the previous sub section, are potential sources for the generation of environmental pollutants.

6.3.2.2.1. **Wastewater Effluents**

Following the assumption that the waste load will decrease with a reduction of the water use, attempts should be made to limit water consumption in the operation phase of the project. For this reason, it is expected that, on average, it would take about 100 liters of water for each cattle slaughtered and 50 liters for each small ruminant slaughtered giving rise to an average flow of 40,000 liters of water per day.

**MAJOR CONTRIBUTION TO THE TOTAL WASTE LOAD**

**PRODUCTION OF BLOOD**
Of all waste products, the waste in the form of blood has the highest polluting value. Blood itself has a high BOD. In the killing, bleeding and skinning phases, blood is produced which, when completely sewer, leads to a total waste load of 10 kg BOD, 4.61 Kg COD, 0.37 Kg SS, 0.92Kg TDS and 0.2 Kg Phosphorus per ton of live animal weight.

**PAUNCH**

Paunch manure is the second most important source of pollution. It may substantially contribute to the total waste load if not properly handled. Although, there are several ways to handle paunch, dumping (sewering) of the entire paunch content gives a BOD of 2.6 kg, a COD OF 1.2 Kg, an SS of 0.1 Kg, a of TDS of 0.24 Kg and a P of 0.005 Kg per ton of LWK.

**STOCKYARDS AND PENS**

Waste results from manure and urine, feed, livestock dirt, sanitizers and cleaning agents. The waste will reach the sewer by means of water overflowing from water troughs. The sewer raw waste, assuming that solid contaminants have been removed, has been estimated at 0.25 kg BOD, 0.11 Kg COD, 0.01 Kg of SS, 0.02 Kg of TDS and 0.0004 Kg of P per ton of LWK.

**SLAUGHTERING**

During the slaughtering the following wastes are produced (Edible offals are excluded because these are considered as meat (by-products)):

- Blood and tissue produced during hide removal fall on the floor. External contamination of the hide with dirt and manure is a secondary source of pollutants. The waste load is also increased as a result of cleaning-up operations in this area.
- Wastewater is produced from intentional overflow from scalding tanks that contain blood, dirt, manure and hair. The fluming of the mechanically removed hair also results in wastewater containing residual hair, blood and dirt after recovery of the bulk of the hair.

- Slime and casings from intestines. De-sliming and casing washing add 0.6 kg BOD per ton of LWK to the raw waste load;

- Inedible offals that are produced are hair, recovered from fluming water, heads and carcass trimmings, lungs and paunch. They also contribute to the amount of wastewater. Table 7: summarizes the potential wastewater emissions of red meat slaughterhouses.

<table>
<thead>
<tr>
<th>No.</th>
<th>Sources</th>
<th>Amount of pollutants (kg/ton of live animal weight)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>BOD</td>
<td>COD</td>
</tr>
<tr>
<td>1</td>
<td>stockyards and pens</td>
<td>0.25</td>
<td>0.11</td>
</tr>
<tr>
<td>2</td>
<td>cleanup hide removal</td>
<td>3</td>
<td>1.37</td>
</tr>
<tr>
<td>3</td>
<td>scalding, dehairing</td>
<td>0.15</td>
<td>0.067</td>
</tr>
<tr>
<td>4</td>
<td>general cleanup</td>
<td>3</td>
<td>1.37</td>
</tr>
<tr>
<td></td>
<td>Potential emissions</td>
<td>9</td>
<td>4.15</td>
</tr>
</tbody>
</table>

*: authors’ estimate (not mentioned by Barnes).

Given the slaughtering capacity of the proposed abattoir at 68 ton of live animals per day, a waste load of up to 612 Kg BOD, 282 Kg COD, 22.44 Kg
SS, 56.44 Kg TDS and 1.2 Kg P per day may occur in wastewater flowing out of the stockyards and pens, hide removal, scalding, dehairing and general cleanup activities.

Following the procedures used in Oyedemi (2009), a simulation model was employed to estimate the amount of pollutants that exist in the wastewater generated by the project. The following equation illustrates the model.

\[ PL \text{ (mg/liter)} = C \text{ (ton/day)} \times TP \text{ (Kg/ton of LWK)} \times MF \text{ (m}^3\text{/day)} \]

Where:

- **PL**: Wastewater load of pollutants in milligram per liter
- **C**: daily slaughter capacity of the project in tons of live animal weight per day
- **TP**: Total amount of pollutants available expressed in kilograms per ton of animal live weight (LWK)
- **MF**: Mean flow in meter cube per day

Finally, in order to bring the two sides of the equations to a similar unit, standard unit converter software (www.xyntes.com) was employed.

Consequently, the amount of pollutants contained in the wastewater discharge of the project was estimated, given the following information:

- a. potential wastewater emissions for the project, as estimated in the table 7. above,
- b. the daily slaughter capacity of the proposed project (86 ton of carcass/day)
- c. a water flow of 40,000 liters per day, and
- d. 2lit/head/day of sludge rate

The simulation model results suggest that the wastewater would contain 526.6 mg/L BOD, 238.0 mg/L COD; 189 mg/L suspended solids; 59.5
mg/L TDS and 161 mg / L. Total Kjeldahl Nitrogen and 10mg/L phosphorus as (P).

IMPACT OF WASTEWATER ON WATER RESOURCES AND LAND

Unless an appropriate treatment work is put in place, the wastewater to be discharged from the abattoir during its operational phase would have polluting effect on the nearby seasonal water course and the rich underground water and also degrade the soil. And this intern would have adverse impact on the quality of supply of water and health of the community.

The provisional industrial pollution control standard prepared by Environmental Protection Authority of Ethiopia (EPA) has set limits for the pollutants in the wastewater discharged into the environment. In this standard, the parameters of relevance to the Abattoir facility are BOD, COD, TDS, SS and P.

Based on the basic constituent groups of concern parameters stated in the standard, the wastewater effluent of the operation process as compared to the standard are expected to have the following average values.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimated Average Value</th>
<th>Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td></td>
<td>40 °C</td>
</tr>
<tr>
<td>pH</td>
<td>11</td>
<td>6 – 9</td>
</tr>
<tr>
<td>BOD</td>
<td>526.6 mg/L</td>
<td>80 mg/l</td>
</tr>
<tr>
<td>COD</td>
<td>2380 mg / L</td>
<td>250 mg/l</td>
</tr>
<tr>
<td>Suspended Solids</td>
<td>189 mg / L</td>
<td>80 mg/l</td>
</tr>
<tr>
<td>Total Dissolved Solids (TDS)</td>
<td>59.5 mg/L</td>
<td>20 mg/l</td>
</tr>
<tr>
<td>Total nitrogen (as N)</td>
<td>161 mg/L</td>
<td>40 mg/l</td>
</tr>
<tr>
<td>Total phosphorus (as P)</td>
<td>10 mg / L.</td>
<td>5 mg/l</td>
</tr>
</tbody>
</table>
As illustrated in the Table 5; the quality of the wastewater from the production process is above the stated standards. Thus, the wastewater effluent from the production process of the project should not be discharged to the environment prior to treatment.

**MITIGATION MEASURES**

Utilization of the best available technologies together with the adoption of Cleaner Production techniques is the first mitigation measure to minimize the generation of these process wastes at their source. However, as indicated in Table 6.1 the physico-chemical properties of the effluents are higher than that of the country’s emission limit values. Thus, in order to bring the final wastewater effluent up to a standard with the provisional wastewater discharge limit, the following wastewater treatment plant is recommended for the project.

**WASTE STABILIZATION POND (LAGOON):** According to the Standard document for Industrial Pollution Control in Ethiopia, Anaerobic lagoons remove about 60 percent of influent BOD. In secondary facultative ponds, the removal is less, but the combined performance of anaerobic and secondary facultative ponds generally gives a BOD out flow of 30mg/L. Furthermore Borja et al. (1994a) reported a 94.5% COD reduction in anaerobic lagoons at an operating temperature of 35°C, and a hydraulic retention time (HRT) of 12 h. The same source also indicated that a 90 to 96% TDS reduction could be attained by using this design of anaerobic and facultative lagoons.

As per the design of the lagoons, nutrients such as suspended solids and pathogens will be reduced by 90 to 96% at OLRs ranging from 2.07 to 4.93 kg m⁻³ d⁻¹ and an HRT of two days.

Hence, at an operating temperature of 35°C, an OLR of 10.1 kg m⁻³ d⁻¹ and a hydraulic retention time (HRT) of 12 h, It would appear that the wastewater effluents quality can be well reduced to below the limit values set in the standard. Table 9 depicts the estimated quality of wastewater effluents after being treated in the waste stabilization ponds.
Table 9: Comparison between the before and after treatment effluents quality

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Estimated Average Values of pollutants before treatment</th>
<th>after treatment</th>
<th>Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td></td>
<td>35°C</td>
<td>40 °C</td>
</tr>
<tr>
<td>pH</td>
<td>11</td>
<td>pH 5.7 to 8.4</td>
<td>6 – 9</td>
</tr>
<tr>
<td>BOD</td>
<td>526.6 mg/L</td>
<td>30 mg/L</td>
<td>80 mg/l</td>
</tr>
<tr>
<td>COD</td>
<td>438.0 mg/L</td>
<td>21.9 mg/L</td>
<td>250 mg/l</td>
</tr>
<tr>
<td>Suspended Solids</td>
<td>189 mg / L</td>
<td>15.12 mg/L</td>
<td>80 mg/l</td>
</tr>
<tr>
<td>Total Disolved Solids (TDS)</td>
<td>59.5 mg/L</td>
<td>6.54 mg/L</td>
<td>20 mg/l</td>
</tr>
<tr>
<td>Total nitrogen (as N)</td>
<td>161 mg/L</td>
<td>11.9 mg/L</td>
<td>40 mg/l</td>
</tr>
<tr>
<td>Total phosphorus (as P)</td>
<td>10 mg / L.</td>
<td>2.75 mg/L</td>
<td>5 mg/l</td>
</tr>
</tbody>
</table>

Table 9 demonstrates that the quality of the wastewater from the operation of the project is below the stated standards after being treated in the lagoons. In this context, operation of the proposed project will actually contribute insignificantly to the overall quality of land and water resources of the surrounding environment.

6.3.2.2.2. Offals, blood and other by products

**QUANTITIES**

Table 10 gives the division of cattle and goats & sheep into various by-product categories as estimated by IPCC (2007). While Table 11 shows the amount of by product to be created by the facility when the project starts operating with a daily slaughtering capacity of 200 cattle and 400 goats and sheep.

Table 10: Division of slaughtered animals into product categories

| product categories | Cattle | Sheep and |
Table 11: Quintiles of by product to be created by the facility

<table>
<thead>
<tr>
<th>No</th>
<th>Specifications</th>
<th>Types of animals processed</th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>cattle</td>
<td>Sheep &amp; goats</td>
<td>&amp;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Daily slaughtering capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Number</td>
<td>200</td>
<td>400</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>Average live weight in kg</td>
<td>300</td>
<td>20</td>
<td>320</td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>Total live weight kg/day</td>
<td>60000</td>
<td>8000</td>
<td>68000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Quantity of By product available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Blood</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.1</td>
<td>percentage of live weight</td>
<td>2.10%</td>
<td>3.30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.2</td>
<td>Kg/day</td>
<td>1260</td>
<td>264</td>
<td>1524</td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>Soft offal and bones</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2.1</td>
<td>percentage of live weight</td>
<td>15%</td>
<td>5.50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2.2</td>
<td>Kg/day</td>
<td>9000</td>
<td>440</td>
<td>9440</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td>Leaf fat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3.1</td>
<td>percentage of live weight</td>
<td>1.20%</td>
<td>2.20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3.2</td>
<td>Kg/day</td>
<td>720</td>
<td>264</td>
<td>984</td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td>Paunch and manure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4.1</td>
<td>percentage of live weight</td>
<td>8%</td>
<td>6.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4.2</td>
<td>Kg/day</td>
<td>4800</td>
<td>520</td>
<td>5320</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Total quantity of by product available</td>
<td></td>
<td></td>
<td></td>
<td>17268</td>
</tr>
</tbody>
</table>

*: different sources
As can be seen from the table above, it is expected that the proposed project will generate 1524 Kg per day of Blood, 9440 Kg per day of soft offal and bones, 984 Kg per day of Leaf fat and 5320 Kg per day of Paunch and manure. These byproduct wastes, if not subjected to appropriate treatment or disposal arrangement will generate serious adverse impact to the environment in the form of air, liquid and/or solid.

**MITIGATION MEASURE**

As the project has already incorporated a rendering plant with a deodorizing unit to cook, crush and process the waste and convert them to a useful product, it is expected that all excess byproduct wastes described above will be turned into a range of useful products like meat meal, meat-cum-bone meal, bone meal and fat.

6.3.2.2.3. Air Emissions

Operations at slaughterhouses may cause problems with unpleasant odors. Discharges of Unpleasant odours come primarily from the disposal of offal and waste, but can also come from parts of the internal waste water treatment and the holding pens.

Generally, almost all activities in an Abattoir projects would have a potential to release bad odors if not well managed by using appropriate mitigation measures. However, the impact of odours on sensitive receptors will also vary depending on the location of the slaughterhouse.

**A. RENDERING**

In rendering plants, odour is the most important air pollution issue which results in public nuisance and pollution of the environment.
MITIGATION MEASURE

An air cooled condenser, with deodorizing system and a capacity of reducing at least 60 % of the volatile Organic compounds, should be incorporated in the rendering design. This equipment will prevent the problem by condensing vapours coming out of the plan.

B. LIVESTOCK MANURE

The portion of manure that can generate methane is the volatile solids portion (VS). The VS portion depends on livestock type and diet, which also affect the quantity of methane that can be produced per kilogram of volatile solids (VS) in the manure.

MITIGATION MEASURE

Shifts in manure management practices towards dry systems would have a reducing effect on methane emissions. On a weight basis, manure in dry systems produces significantly less methane than liquid systems. Even with increased manure production, shifts toward dry systems could decrease methane emissions dramatically.

C. OTHER SLAUGHTERHOUSE FACILITIES

The odour generated from the waste water treatment plant, lairage, blood coagulation plant and animal unloading areas of the slaughterhouse is also very high.

MITIGATION MEASURE

To minimize this problem to acceptable levels, Water scrubber has been suggested to be incorporated into the design:
Gas emission from chimney provided for emergency generator and boiler exhaust is designed to comply with the air control standard.

Water hose points are provided for floor cleansing of the lairages and external unloading and holding areas to reduce odour.

Collection skips and containers for transporting coagulated blood, condemned carcasses and sludge are of enclosed design to minimize odour emission.

Chutes are provided for direct dumping of manure into the collection skips to reduce odour.
D. COMBUSTION PROCESS

Slaughtering is an activity that requires great amounts of hot water and steam for sterilization and cleaning purposes. In the process of generating the energy for heating, gasses are emitted (CO₂, CO, NOₓ and SO₂).

MITIGATION MEASURES

Reducing the formation of CO, NO₂, and SO₂ during the combustion process is the primary measure to mitigate air quality impact from the combustion process of the project.

Approaches recommended to minimize the generation of these gases include:
- Use automated fuel feed controlling valves and pumps
- Use an efficient air-fuel mixing device
- Use air deficiency indicating alarms
- Using fuel having less SO₂ content & revise the specification fuel quality
- Operate the boiler keeping suppliers specified air: fuel ratio
- Programmed boiler operation to reduce startup and shutdown of boiler
- Control boiler temperature in order to prevent unwanted side reactions

6.3.2.2.4. Solid Wastes

Here, solid wastes refer to those wastes which are not submitted for rendering. These include:
- Hide and skin and
- Dead or infected animal bodies

Hide and skin are strictly needed to be daily removed from site. The management of the facility shall arrange this with micro enterprises, to assist
them in income generation. However a temporary shed to store some hides are provided incase an immediate daily removal could be interrupted.

Dead or Infected animals are rarely encountered in a day to day activity of the abattoir during veterinary inspection. They need to be destroyed either by burying or burning. Burying option needs large space. Therefore an incinerator has been provided on the design.

**MITIGATION MEASURES**

To ensure safe hygienic disposal of solid wastes, the following facilities should be provided:

- Vehicles with close containers should be provided for the disposal of various solid wastes.
- Sludge and coagulated blood are de-watered to meet with 30% solid content requirements before being disposed to designated landfill site.
- Condemned carcasses and meat should be stored in chilled room and put in plastic bags before being disposed to designated landfill site.

6.3.2.2.4. Noise Emission

Transport to and from the slaughterhouse as well as loading and unloading may cause noise disturbances. Fans, refrigeration equipment and similar machines may also cause this kind of disturbance. Noise disturbances may also occur from the holding pens.

The operation hours of the slaughterhouse are mainly from midnight to early morning. The main generators of noise are plant noise, unloading area noise, traffic noise, slaughter operation noise and human activities.
MITIGATION MEASURES

To minimize the nuisance factors to the local residents, noise control measures should be adopted to meet with statutory requirement for night time in the rural areas at the sensitive receivers.

These include acoustic louvres for lairages, acoustic enclosures and silencers for plant, acoustic linings for plant rooms, and enclosed building fabric design with double glazed glass panels for slaughter hall.

6.3.2.2.5. Energy Resources Depletion

The operation stage of the proposed project requires high amount of steam. In order to full fill this steam requirement the factory consumes heavy furnace fuels as energy source for the boiler unit. As furnace fuel is low grade crude oil product, the proposed project has nonrenewable energy resource depletion impact.

The operation of the proposed project requires a considerable electrical energy resource for: running of machines, power for the facility, buildings, etc. As the project uses a renewable energy source hydroelectric power the impact is not significant. However, from economical point of view the issue requires attention.

MITIGATION MEASURES

Measures that reduce furnace fuel use related impacts include but not limited to:

- Reduce boiler startup and shutdown frequencies by programming the operation
- Provide the burner system an automated furnace fuel flow controller, solenoids valves, pump and alarms
• Install overflow alarms for furnace fuel tank
• Construct impermeable secondary tanker for collecting and reuse of furnace fuel spills and leakages
• Setup written procedures for burner startup, operate and shutdown.

Avoiding ideal operation of machineries and implementation of proper power use practices are the mitigation measure for reducing electrical power consumption. Installation of less energy intensive equipments (like using florescent light rather than bulbs) reduces the energy consumption.

Training and reminding workers to switch off lights when leaving offices is the other managerial proposed option for minimizing the problem. Generally, the following measures help to reduce the impact:
• Train operators operation of equipment in efficient to minimize energy
• Supervise production processes in order to improve production efficiency
• Switch-off ideal machines and unused bulbs, heaters
• Construct buildings in a position where rooms easily get sunlight
• Provide interlocked control system for the generator to sawed-off itself when external power returned
• Setup written procedures for production operations
• Avoid reprocessing and reworks

6.3.2.2.6. Socio –Economics

Slaughterhouses in providing for the disposal of otherwise potentially harmful and unsanitary waste has some beneficial advantages such as :
• Creating local employment;
• Collection and disposal system can allow for waste recovery activities which can be of economic benefit ( mainly to knackers );
• Methane can be recovered for energy generation

The main problems associated with slaughterhouse are as follows:
• Local nuisances such as odours from poorly maintained slaughterhouses operations;
• Health risks – poor hygiene practices at operational and waste management level;
• Land use conflicts and depreciation in land values;

MITIGATION MEASURES

• Control of times for delivery and vehicle operations, and animal control;
• Provision of good slaughterhouses site management, lairage, parking areas, vehicle wheel cleaning prior to departing site, covering loads;
• Implementation of good site management on a daily basis and vermin control;
• Management operations should aim to minimize disturbance to adjacent residential areas
• Develop with communities an influx management plan
• Safety concerns should be addressed by such measures as implementing strict health and safety procedures for staff, and
• Installation of adequate fencing and other site security to prevent trespass and vandalism;

7. Public Participation

A round of public meetings has been held to discuss the issue of environmental impact, compensation, rehabilitation etc with the administration, elderly, the land owners, local administration body. The proceedings of the meetings are annexed to this report.

8. Environmental and Social Management Plan

The Negative environmental Impacts that are anticipated mainly originate from the waste disposed from the abattoir. Unless treated in a proper way, They create a sever environmental pollution and become nuisance to the area.
8.1 Environmental Management Plan (EMP)

The EMP covers institutional responsibilities and monitoring plan for the mitigation measures which have been identified to ensure that the defined objectives of the project are achieved whilst preventing and reducing any adverse environmental impacts. The mitigation measures are to be executed by the construction contractor (construction phase) and the plant operators (operation phase) with the supervisions by the City Administration and Regional Environmental Agency. If the mitigation and benefit enhancement measures identified in the previous section are entirely implemented, they will provide a basis for enhancing the overall environmental performance of the project. With this intention the environmental management must be fully incorporated with the overall project management efforts at construction and operation phases which is leading to a project that has been properly designed and constructed and functions efficiently throughout its life.

This section of the report identifies the responsible institutions assigned to implement mitigating measures and monitoring requirements. Mitigating measures for the impacts that are likely to arise from implementing the project are specified in the previous chapter. It is believed that the Diredawa City Administration, which is the project proponent in this particular case, the construction supervisor and the regional environmental agency will take the key responsibility in supervising the implementation of the environmental mitigation measures and monitoring plans. Their responsibilities are exercised in the construction and operation phases.

To a considerable degree, construction contractors will be responsible for implementing mitigation measures during construction phase but the ultimate responsibility to ensure the proposed mitigation measures are taken properly is the city administration and regional environmental agency.

Most of the impacts to be occurred in the construction phase can be reduced or avoided through the application of sound construction principles. The contractor is expected to implement the mitigation measures specified for
construction phase, the construction supervisor and the Diredawa City Administration should ensure the proper implementation of the mitigation measures at construction phase.

During operation phase, environmental management and monitoring will be the responsibility of the city administration and the slaughterhouse management, with the implementation being carried out either by their own professionals or by contractors. The environmental and social wing of city administration is expected to take on a general overall advisory role during the operational phase.

The slaughterhouse will have a Health, Safety and Environment (HSE) unit delegated with sufficient authority. The HSE will be responsible to look after the implementation of the proposed mitigation measures and to enhance the positive impacts. The unit will be composed of an environmentalist and a health and safety officer. The unit will work on occupational health and safety issues and it will train and raise the awareness of the workers periodically. It will also be its responsibility to enforce the proper use of personal protective equipments, observation of safety rules by all workers of the factory and regular monitoring of effluents.

The City Administration shall pay full compensation for each lost property by the PAP as per the Federal Proclamation No 455/2005 and regional regulation. The compensation shall be completed before the commencement of the construction activities. For the successful compensation implementation, there will be a property valuation committee designated by the administration of the specific project areas. The committee would consist of different experts with relevant qualifications to value the properties thereon.

The affected people will be adequately compensated considering the assets and opportunities they leave behind and expenses that are required for the support of their livelihood.
8.1.1. Environmental Monitoring Plan

The purpose of the monitoring plan will be to monitor compliance with the mitigation measures identified above and to identify actions to be taken should there be non-compliance with the EMP. Progress on implementation would be reviewed regularly by the city administration and during World Bank supervision mission.

Monitoring of construction activities will have to ensure that mitigation measures of construction impacts are being implemented properly, while monitoring of operation activities is to ensure that no unforeseen negative impacts are arising.

During construction, the monitoring program will include dust, noise, runoff sediment load, solid waste management, land restoration and habitat protection. During operation phase, the monitoring program will include odour, noise, wastewater, and soil and groundwater contamination. Monitoring of the wastewater during operation phase will include biological, physical and chemical parameters. The wastewater monitoring will include data on BOD, COD, suspended solids, total ammonia, total nitrogen, total phosphorous, pH, total coliform bacteria and temperature.

During operation the treated effluent should be of acceptable quality so that it can be safely discharged into water bodies. This means that the effluent quality should meet the standards for discharge into water bodies (Refer table 9.). Regular monitoring of these variables will be required to ensure strict adherence to the prevailing standards.

It is necessary to establish and maintain environmental monitoring system to assess the efficiency of different mitigation measures, to perceive possible environmental hazards or to detect unpredicted impacts in time.

Due to capacity and resource limitations monitoring should be scoped to those indicators that are most relevant for evaluation of the performance of the
environmental mitigating measures. The selection of the issues to be monitored must be based on the severity, extent and intensity of the impacts. For this particular project the proposed environmental monitoring indicators, frequency of measurement and responsibilities are indicated in table below.

8.2 SOCIAL MANAGEMENT PLAN

No residential settlers are found to be in the project site, though the land is being used by the land owners for agricultural, wood collection and cattle feeding activities. A part from that no religious, historical or cultural site is present in the proposed area for the abattoir. The proposed land for the abattoir is obtained combining the land of five different owners. The issue of compensation for the land owners has been discussed and agreed upon.
### Table 12: The current status of the land owners and the proposed compensation

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Name of land owner</th>
<th>Total land area owned</th>
<th>Land use</th>
<th>Land area taken for the abattoir</th>
<th>Compensation provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Adewe Yesuf Abdul</td>
<td>1.8 hectare</td>
<td>Agricultural activity</td>
<td>0.513 hectare</td>
<td>Birr 29,950.56</td>
</tr>
<tr>
<td>2.</td>
<td>Usman Ahemed Yesuf</td>
<td>5.457 hectare</td>
<td>Agricultural activity, cattle feeding</td>
<td>All/ 100%</td>
<td>Birr 136,425</td>
</tr>
<tr>
<td>3.</td>
<td>Tukale Umer Aynange</td>
<td>0.54 hectare</td>
<td>Tree plantation</td>
<td>All/ 100%</td>
<td>Birr 30,724.0</td>
</tr>
<tr>
<td>4.</td>
<td>Sadiqu Abdurahmen</td>
<td>0.58 hectare</td>
<td>Agricultural activity, cattle feeding, Tree plantation collection</td>
<td>All/ 100%</td>
<td>Birr 125,169.50</td>
</tr>
<tr>
<td>5.</td>
<td>Abdi Ahemed Abdi</td>
<td>3.99 hectare</td>
<td>cattle feeding</td>
<td>2.64 hectare</td>
<td>Birr 66,000</td>
</tr>
</tbody>
</table>
A part from the compensation provided to the owners of the land, the Dire Dawa Administration Council has planed to organize the owners in to small and medium enterprise association so as to enable them engage in productive activity and make a sustainable income. It has also been planned to provide employment opportunity to the families of the land owners during the construction as well as operation of the abattoir.
<table>
<thead>
<tr>
<th>Project Stage</th>
<th>Project Activity</th>
<th>Potential Environmental Impacts</th>
<th>Proposed MEM</th>
<th>Institutional Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Construction Phase</td>
<td>Site clearing</td>
<td>None</td>
<td>None</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dust impacts during excavation, material handlings sight runoff</td>
<td>adopting dust suppression measures drainage</td>
<td>Consultant City Administration</td>
</tr>
<tr>
<td>• Construction Phase</td>
<td>construction activities</td>
<td></td>
<td></td>
<td>Consultant City Administration</td>
</tr>
<tr>
<td></td>
<td>Waste to be discharged from the abattoir and the cattle market</td>
<td>polluting river and underground water, soil degradation, Air emissions</td>
<td>put in place standard waste treatment work, emission permit and control the air emission, Ground water monitoring point, Employing An environmental health safety officer</td>
<td>City Administration Consultant environmental health safety officer EA</td>
</tr>
<tr>
<td>• Operation and Maintenance Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 14: Monitoring Requirement Plan

<table>
<thead>
<tr>
<th>Project Stage</th>
<th>Mitigation Measure</th>
<th>Parameters To be Monitored</th>
<th>Location</th>
<th>Measurements</th>
<th>Frequency</th>
<th>Responsibility</th>
<th>Cost estimated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Construction</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Construction</td>
<td>➢ adopting dust suppression measures</td>
<td>➢ Level of dust</td>
<td>Project site</td>
<td></td>
<td>weekly</td>
<td>➢ Consultant&lt;br&gt;➢ EA</td>
<td>Included in the contract agreement</td>
</tr>
<tr>
<td></td>
<td>➢ drainage</td>
<td>➢ Level of runoff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation and Maintenance</td>
<td>➢ put in place standard west treatment work&lt;br&gt;➢ emission permit and control the air emission&lt;br&gt;➢ Ground water monitoring&lt;br&gt;➢ Employing An environmental health safety officer</td>
<td>➢ Please Refer to Limit Values for Discharges and emission chapter 6</td>
<td>Abattoir</td>
<td>Please Refer to Limit Values for Discharges and emission on chapter 6</td>
<td>Quarterly for the first year then yearly</td>
<td>➢ City Administration&lt;br&gt;➢ Environmental health safety officer&lt;br&gt;➢ Regional Environmental Authority</td>
<td>120,000 Eth.Birr</td>
</tr>
<tr>
<td>Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 15: Scheduling and Reporting

<table>
<thead>
<tr>
<th>Activity</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>..........</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitigation Measures</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institutional Strengthening</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
9. Conclusion and Recommendations

The proposed abattoir project is economically feasible in regard to opening up of the abattoir project area to the rest of the neighbor regional states. It also has the potential to increase business activities to the area; provision of social services to the area and besides that, the abattoir will effectively increase fresh meat between the project area and its key trading partners in other districts. The proposed project has also been seen not to trigger the World Bank of the development partners and mitigation measures have been proposed in areas of likely/potential impacts. Development of this magnitude has negative environmental and social implications that need to be addressed. While there is a general acceptability of the abattoir by the local community, interference with water points, increased incidences of accidents and exposure to risks and general safety are among concerns of the local communities. In conclusion the following are recommended.

- Integrate suitable mitigation measures as outlined in this report in the designs for all sections of the project abattoir for implementation during construction and use of the abattoir.
- Consult the communities and other stakeholders, particularly property owners, to the extent possible on planning the works, especially where property, inhabitations and other aspects of social interest are concerned,
- Collaborate with the Beautification and Sanitation Service Agency in regard to waste considerations during all the phases of the abattoir so as to develop suitable alternatives and ensure safety from waste released and also for management issues among other concerns,
- Institute effective communication, education and awareness towards the project beneficiaries for enhanced acceptability and social harmony. This is particularly important for the settled areas near and within the abattoir.
- Implement the environmental management plan throughout the project implementation with assistance of appropriate expert including development
and implementation of HIV/AIDS and other communicable diseases program in conjunction with line ministries.

- During the preparation of this report for the development of the proposed project it was observed and established that most of the negative impacts on the environment are rated low and short term thus can be abated through the proposed mitigation measures. The positive impacts are highly rated and will benefit all stakeholders and the country at large. The project proponents should aim to prudently implement the Environmental Management Plan.
Annex I. Summary of consultation meetings on Abattoir Construction Project

**Minute-1**

**Meeting place:** Jelo-belina rural kebele

**Date:** 09/2/2012

**Participants of the meeting**

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization/ responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mss. Tsion Getachew</td>
<td>ULGDP, social management expert</td>
</tr>
<tr>
<td>Mss. Muna Mohamed</td>
<td>Representative of the rural</td>
</tr>
<tr>
<td>Mr. Asebe Koran</td>
<td>Abattoir Service enterprise</td>
</tr>
<tr>
<td>Mr. Mohamed Ahemed</td>
<td>Jelo-belina rural kebele Manager</td>
</tr>
<tr>
<td>Mr. Usman Ahemed</td>
<td>PAP</td>
</tr>
<tr>
<td>Mr. Sadike Abedureman</td>
<td>PAP</td>
</tr>
<tr>
<td>Mr. Abedi Mohamed</td>
<td>PAP</td>
</tr>
<tr>
<td>Mr. Abedosh Usman</td>
<td>PAP</td>
</tr>
<tr>
<td>Mr. Muketar Dugale</td>
<td>Community Representative</td>
</tr>
<tr>
<td>Mr. Adem Mohamed</td>
<td>Community Representative</td>
</tr>
<tr>
<td>Mr. Ibrahim Ahemed</td>
<td>Community Representative</td>
</tr>
<tr>
<td>Mr. Usman Omar</td>
<td>Community Representative</td>
</tr>
<tr>
<td>Mr. Yasin Mohamed</td>
<td>Jelo-belina rural kebele Police</td>
</tr>
<tr>
<td>Mr. Ibrahim Yayu</td>
<td>Community Representative</td>
</tr>
<tr>
<td>Mrs, Sefiya Omar</td>
<td>Community Representative</td>
</tr>
<tr>
<td>Mr. Mussa Adem</td>
<td>Community Representative</td>
</tr>
<tr>
<td>Mr. Usman Abedosh</td>
<td>Community Representative</td>
</tr>
<tr>
<td>Mr. Haji Abedurheman</td>
<td>Community Representative</td>
</tr>
<tr>
<td>Mr. Kedir Mohammed</td>
<td>Community Representative</td>
</tr>
<tr>
<td>Mrs. Raziya Ahmed</td>
<td>Community Representative</td>
</tr>
<tr>
<td>Mr. Jabir Mohammed</td>
<td>Community Representative</td>
</tr>
</tbody>
</table>
Mr. Safi Ahemed ........................................... Community Representative

Subject: - The meeting is conducted to discuss issues related to resettlement caused due to the proposed Abattoir Construction Project and how to implement the compensation process with PAPs and different community representatives.

Key issues rose during the meeting:

- Based on the Administrations` five years growth and transformation plan, there is a plan to construct a new Abattoir at the Jelo-belina rural kebele, «Aditi» locality. Due to land acquisition for this new construction project, five local farmers livelihood will be affected. For this reason, the Administration had prepared compensation and other assistances for the PAPs. The compensation amount was prepared before one year, thus, the Administration wants to know the perception of the PAPs towards the compensation amount and other assistances to be delivered for PAPs and how the PAPs can use the compensation money on feasible economic activity to sustain their livelihood.
- The PAPs had argued that they are unsatisfied about the compensation amount, since the measurement was done before one year and did not fairly considered their concerns.
- Claim on land ownership issue was raised by one Participant, and asked the compensation to be payable to him.
- How can PAPs and their families benefit from the new project, even if they are illiterate?

Finally, consensus was made on the following major points:

- In order to help PAPs benefit from the development activity, facilitation will be done to employ PAPs and their families as wage laborers at the construction phase of the project and also during the operation phase of the Abattoir.
- To decipher the grievance mentioned by some PAPs on the Compensation amount, the participants had agreed to call and ask the committee members, who had measured the compensation amount a year before.
➢ Quarrel between two PAPs due to claim on land ownership will be solved only when the eligible PAP exhibits court decision on his land ownership.

➢ The PAPs had also agreed to establish a cooperative union and work together to sustain their and better their livelihoods.

**Minute-2**

**Meeting place:** Dire Dawa Abattoir Service Enterprise

**Date:** 13/3/2012

**Participants of the meeting:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization/ responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mss. Tsion Getachew</td>
<td>ULGDP, social management expert</td>
</tr>
<tr>
<td>Mr. Asebe Koran</td>
<td>Abattoir Service enterprise</td>
</tr>
<tr>
<td>Mr. Kassahun Boki</td>
<td>Compensation Measuring Committee</td>
</tr>
<tr>
<td>Mr. Adane Amenu</td>
<td>Compensation Measuring Committee</td>
</tr>
<tr>
<td>Mr. Mohammed Muketar</td>
<td>Jelo-belina Rural Kebele Administration</td>
</tr>
<tr>
<td>Mr. Usman Ahemed Yusuf</td>
<td>PAP</td>
</tr>
<tr>
<td>Mr. Tukale Omar</td>
<td>PAP</td>
</tr>
<tr>
<td>Mr. Abedoshe Usman</td>
<td>PAP</td>
</tr>
<tr>
<td>Mr. Sadik Abedurheman</td>
<td>PAP</td>
</tr>
</tbody>
</table>
**Subject:** - To reconcile the PAPs grievance regarding the compensation measurement procedures and the proposed compensation amount through discourse with the committee executed the compensation estimate before one year.

The meeting was started with short summary of main issues raised at last time meeting on 09/2/2012 with PAPs and community members.

In addition, the PAPs assert:

- The measurement should be made according to the current market value of their assets.
- Some agricultural products on their farm land were not measured properly.
- The measurement was carried out without the presence of some PAPs.

The Compensation measuring committee on the other hand, had described that the measurement was carried out with the presence of all PAPs and representatives of the rural kebele Administration. And also the compensation amount was fairly estimated without exclusion of any PAP’s asset.

Finally, The ULGDP representative had explained that the PAPs assets should be measured based on their current market value. Thus, re measurement of the PAPs asset will be done according to the current market value of their assets on their land, and still if there is any unsatisfied PAP, he/she can appeal his/her grievance to the Grievance Redress Committee.
Participants at Meetings
Annex II: TOR

Dire Dawa City Administration
City Manager Office

Urban Local Government Development Project (ULGDP)

January/2012
1. INTRODUCTION

The Urban Local Government Development Project (ULGDP) is a continuation of a program of reform by the government of Ethiopia which started with the government’s introduction of formal urban local governments in the early 2000s. The World Bank contributed to the early stages of establishing these urban local governments through the Capacity Building for Decentralized Service Delivery Project (CBDSD) and followed up this support through the Urban Management Sub-program of the larger Public Sector Capacity Building Program (PSCAP). CBDSD and PSCAP were focused on capacity building to enable regions and cities to establish the necessary legislative and fiscal financial frameworks, as well as providing a range of training and other technical assistance activities to establish cities as viable entities that are able to fulfill their mandates. During this period, GTZ and KFW (through the Urban Development Fund) have also played an important role in promoting capacity building at the urban local government levels and improving service delivery.

The ULGDP has been designed to support the government’s Urban Development Program (UDP) and Urban Good Governance Program (UGGP). The specific development objective of the project is to support improved performance in the planning, delivery and sustained provision of priority municipal services and infrastructure by urban local governments.

For participating cities, the expected outcomes of the project are i) effective and responsive planning to meet service delivery priorities identified by citizens; ii) effective implementation of Capital Investment Plans (service delivery improvement objective); iii) improved financial management and mobilization of own resources and more effective operations and maintenance of infrastructure assets (sustainability objective); and iv) improved dissemination to the public of budgets/plans, performance measures, and audited reports (accountability objective).
Projects to be implemented under the ULGDP should adhere to acceptable environmental and social safeguards. The project result in involuntary resettlement and land acquisition and it is minimized by exploring all viable alternatives and compensation activities are prepared and implemented. MWUD has therefore prepared the Environmental and Social Management Framework (ESMF) to be referred to and used by all stakeholders and implementing agencies under the ULGDP. These documents are being made available to all regions, cities and other stakeholders as Annexes to the Project Implementation Plan for ULGDP.

The ULGDP has the potential to provide significant social benefits, and to deliver environmental benefits, depending on the ULGDP investment projects that are put forward by ULGs for performance grant financing. However, there are risks of adverse environmental and social impacts, owing to:

- **Inherent environmental risks** involved in infrastructure projects, including soil erosion risks and deforestation, risks of the depletion, pollution or contamination of waterways and groundwater sources, impacts on people, buildings (houses, shops, kiosks, etc), economic and social activities in the vicinity of the project, and secondary impacts owing to the sourcing of construction materials;

- **Social risks** during construction of projects such as road safety and accidents, dust and noise, an influx of people to certain areas due to better facilities provision and improved access, disruption of livelihoods & services, loss of temporary and/or permanent access to homes, businesses and services, displacement and resettlement of people associated with loss of property and land take, and direct & indirect social impacts from the downstream effects of project such as water diversions;

- **Weak capacity** at the ULG level to integrate measures to prevent or mitigate environmental impacts into the design of projects, and during construction, and operation of the projects;
Difficulty and/or lack of understanding of the Environment & Social Management Frameworks (ESMF) could potentially be a reason why ULGs may overlook the environmental and social impacts of the investments.

These risks are taken seriously by the GOE and MUDC owing to the importance of the environmental & social impacts involved and the pressing need to ensure improvements in people’s well-being. People’s livelihoods are often dependent on a sustainable environment, and hence adverse environmental or social impacts of infrastructure projects will be carefully avoided.

The ESMF has therefore been prepared for use by stakeholders and implementing agencies in addressing these issues.

The ESMF:

- Establishes clear procedures and methodologies for the environmental and social assessment, review, approval and implementation of investments to be financed under the project;
- Specifies appropriate roles and responsibilities, and outlines the necessary reporting procedures, for managing and monitoring environmental and social concerns related to project investments;
- Establishes a community grievance mechanism to resolve conflicts arising out of construction activities;
- Determines the training, capacity building and technical assistance needed to successfully implement the provisions of the ESMF; and
- Provides practical information resources for implementing the ESMF.

The ESMF contains:-

- Steps to be taken for a full ESIA if required, including an application for environmental authorization;
- Terms of reference for an annual environmental and social audit of the ULGDP;
Guidelines on the environmental and social impact of ULG project investments; and
Compliance mechanisms.

Dire Dawa city is located in eastern part of Ethiopia 515 km away from the capital city, Addis Ababa. It is strategically located between Addis Ababa and Djibouti and serves as a transit and terminal both for import and export trading of the country. It has an estimated total land area of 13332km² with an altitude between 950m and 2260m above sea level and it has a bimodal rainfall pattern with small rains from March to April and big rains from August to Mid-September. The average annual rainfall is about 604mm with mean annual temperature of 24.80°C.

To keep in peace with this growing businesses and population, Dire Dawa Administration has been making unwavering effort to improve the existing infrastructure and constructing new infrastructure at different parts of town. To this effect, the municipal has been using fund generating from all possible sources for the development of the town. For example, some of the sources of the fund are fund generated contributed by the Administration, grant from external sources and loan of multilateral organizations like the World Bank to give fund in the form loan.

Dire-Dawa city Administration is one of the 19 participating cities under ULGDP. Among the critical problems identified by the city administration, lack of adequate abattoir services and related infrastructure facilities are remained to be major problems of the city. Although the Dire Dawa city has one abattoir services that is not well organized and sufficient enough to meet the Abattoir services needs of the society. Therefore, the City Administration had intended to upgrade one of the modern abattoir services in the city.

The Abattoir constructions Project is expected to cause adverse environmental and social impacts on the community. However, since any development intervention cannot be sustainable and internalized by the communities which are supposed to be the prime
beneficiary of the initiated intervention unless and otherwise environmental and social issues and concerns are incorporated into the development intervention.

Therefore, being cognizant of the importance of addressing these environmental and social issues, the City Administration had decided to hire a consultant firm which will prepare Environmental Impact Assessment (EIA) for abattoir Construction Project. The EIA study is expected to identify all the adverse environmental and social impacts, future concern, and positive outcomes and for those possible negative environmental and social impacts appropriate mitigations strategies will be designed and for those positive impacts enhancement strategies will be identified. In addition to this, environmental management plan is other expected outcome of the assessment. With these plans, all likely environmental and social negative impacts, their mitigation strategies and enhancement strategies for positive outcomes will be clearly outlined with clear implementation schedule.

Hence, this TOR is prepared; to give a chance, so that independent consultant firms would access detail Information about how the overall task will be executed.

1.1. Description of the Project

The Abattoir Construction Project is expected to assist the city promote economic prosperity, long-term sustainability, social well-being and healthy community. The intent of the new abattoir project is to provide a stable and adequate supply of fresh warm meat to the community of Diredawa Administration and its surrounding areas while ensuring the highest international standards for hygiene, safety and Environmental management. It`\'s eminent that development can cause changes in several community characteristics including demo-graphics, housing, public services, markets, income, and aesthetic quality. During the modern abattoir construction a number of adverse direct and indirect effects are likely to be encountered by people, attributable to the Project. The projects`
direct impacts likely to be experienced by the people are: loss of farm land, loss of livelihood because of loss of farm land, and other adverse environmental effects. Projects to be implemented under the ULGDP should stick onto acceptable environmental and social safeguards. In this regard, it’s clearly stated in the ULGDP Environmental and social management framework manual that any projects which are funded by World Bank first have to be screened and based on the screening result for those fall in schedule A, full EIA should be conducted and for those fall in schedule B category, partial EIA have to be conducted. According to the above context, provision of infrastructure for the Abattoir construction area is environmentally categorized under category “A”. Therefore, the project requires full EIA study. For this reason the City Administration had planned to hire an independent consultant to carry out Environmental Impact Assessment.

2. OBJECTIVE OF THE TOR AND SCOPE OF WORK

2.1 Objective and Scope of the Assignment
The main objectives of this assignment are to conduct an Environmental Impact Assessment of Abattoir construction Project.

2.2. Scope of the Work
The general scope of this assignment hold one major task; conducting EIA. Therefore, the consultant will be responsible for carrying out Environmental Impact Assessment in accordance with the ULGDP’s ESMF as well as World Bank safe guard policies and procedures using generally acceptable and recognized assessment techniques and evaluation methods, standards and practices.

2.3. Specific Tasks
1. Prepare standard document of EIA for the project with the involvement of the City’s counterpart approved by DDEPA and World Bank.
2. Undertake field visits and public consultation at least three times;

3. Conduct validation work-shop with all stakeholders including World Bank,

4. Revisit subsequent activities to be undertaken on the EIA based on feedback.

5. Prepare standard and complete reports for the EIA in SOFT and HARD copies

2.4. Environmental Impact Assessment (EIA)

The consultant is expected to undertake detail EIA under the national and regional policies and legal frameworks as well as the WB’s safeguarding policy frameworks; and come up with standard report accepted and certified by the DDEPA. To this end, the Consultants shall perform exhaustive investigation and observation of the existing project area and its surrounding besides going through all the necessary secondary sources of data and information to understand the overall situation. Moreover, the firm shall undertake public and stakeholders’ consultation with the involvement of the client’s counterpart and Prepare clear and detail environmental impact assessment report for all possibly induced social, biological and physical environmental impacts.

2. SCHEDULING/TIMETABLE

It is expected that the consultancy assignment will start in the February 2012. And will take approximately Eight weeks of time. To keep this dead line the Consultant shall mobilize and commence the service within one week just after signing of contract. The overall assignment shall be completed within 60 days after the agreement is signed. The Consultant shall provide the City Administration with a detailed activity schedule and work plan that will specify all major tasks of the Consultant. This shall be accompanied
by a personnel input schedule that shows the various inputs of his multidisciplinary staff over time. The Consultant shall also show a task distribution schedule of the various tasks and experts to make clear how the tasks and activities are assigned over the team members.

4. ORGANIZATION AND MAN POWER

The consultant’s team members undertaking this assignment shall have a minimum of BA Degree or equivalent in Environmental Engineering, sociology, urban planning and solid professional background in the areas of environmental resources management, community resettlement, community development, public consultation, and familiarity with The World Bank safeguards policies. The team leader shall have adequate experiences at least 10 years of relevance that include practical experience on methodologies and techniques of Environmental Impact Assessment and Resettlement Action plan and basic skills on project coordination and management. The consultant team members shall have very strong interpersonal, analytic, writing and communication skills and able to work independently. On an indicative basis it is estimated that the following level of input is necessary:-

Table 1: Minimum requirement of professionals of the consultant team

<table>
<thead>
<tr>
<th>Position</th>
<th>Number</th>
<th>Profession</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Leader</td>
<td>1</td>
<td>Environmentalist or MA in Social Science field with minimum of 10 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>of tangible experience</td>
</tr>
<tr>
<td>Sociologist</td>
<td>2</td>
<td>BA in Sociology with at least 4 years sound experience</td>
</tr>
<tr>
<td>Economist</td>
<td>2</td>
<td>BA in Economics with at least 4 years sound experience</td>
</tr>
<tr>
<td>Urban Planner/hydrologist/</td>
<td>1</td>
<td>BA in Urban Planning/Hydrology/ with at least 4 years sound experience</td>
</tr>
<tr>
<td>Environmentalists</td>
<td>1</td>
<td>BA in Sanitary/Environmental Management with at least 4 years sound</td>
</tr>
<tr>
<td></td>
<td></td>
<td>experience</td>
</tr>
</tbody>
</table>
The above information is indicative only. The firms are invited to submit proposals and should propose their own team structure, composition and staffing levels, based on their own evaluation of the TOR’s requirements and the resources available to the consultant.

5. OUTPUTS/DELIVERABLES

The EIA report are expected to yield the following outputs.

- Identifying possible environmental and social impacts,
- Identifying best economical mitigation strategies for the likely undesirable impacts
- Identifying enhancement strategies for positive possible outcomes
- Well crafted environmental and social management plan

All reports and deliverables are to be provided, in English, four (4) hard copies and four (4) soft copies on compact disk (Word and Excel).

5.1. Inception Report

- A half day session with the consultants to discuss on how they are planning to accomplish the task will be held prior to submitting an Inception Report
- An Inception Report shall be submitted within seven days of the commencement of the assignment, reflecting the agreed methodology, and an outline of the proposed contents of the EIA Report.

5.2. Draft Environmental Impact Assessment and Abbreviated Resettlement Action Plan

Draft Final EIA Reports, with an Executive Summary, and detail action plans for implementation which incorporates recommendations. The monthly progress report will be submitted within four week of the commencement and the final draft report will be submitted within Eight weeks of the assignment. A copy of the draft report shall be sent to the UGCBB for review & comments.
5.3. Final Environmental Impact Assessment

Final Environmental impact assessment with an executive Summary, and detail action plan for implementation which incorporates recommendations by incorporating comments and suggestions to be made on the Draft Final Environmental impact assessment.

All reports, documents and correspondences shall be in English. Reports, Drawings, Calculations and Documents shall be submitted in draft and/or final form.

**Note:** The consultant will report to the Urban Local Government Project Coordinator in the Dire Dawa City Manager Office, and will be assisted by the projects’ Social management and Environmental Management Experts.

Final report will be received only if the EIA document is submitted with the certificate of compliance issued from DDEPA and World Bank. All the reports and the EIA document shall be submitted in hard copies and in soft copies (CD) in word and PDF formats.

5.4 MANAGEMENT AND ACCOUNTABILITY RELATIONSHIPS

The Dire Dawa City Manager Office is the client for this work. Therefore, in terms of performance and deliverables, the consultant will carry out the assignment, report and be accountable to the City manager office.

6. RESPONSIBILITIES OF THE CONSULTANT
The selected consultant is expected to understand the urgency of the work and commit to accomplish the studies in the agreed time table. On top of this the consultant will have the following responsibilities:

- To provide standard and applicable EIA documents accepted and certified by DDEPA.
- To provide or cover its own stationery material of any kind and quantity like computer paper, plotter paper and plotter cartridge, flash disk and all other office stationeries.
- If the consultant finds any need of diversion from the city plan proposal, he/she is required to present and get the prior approval of the client on the intended diversion with written letter.
- To provide its working time framework prior to the commencement of the assignment.
- To provide progress report.
- To undertake workshops.

7. RESPONSIBILITIES OF THE CLIENT

Being the owner of the project, the client has the following responsibilities:

- Assign the permanent counterpart that will communicate with the consultant on behalf of the client.
- Provide city plan, design and other related documents to the consultant.
- Approve and/or timely deliver comments, opinions and suggestions for the reports submitted by the consultant.
- Assist and facilitate conditions for the consultant in the overall process to accomplish his/her assignment.
Facilitate community meetings and organize progressive evaluation work shops.

8. CONFIDENTIALITY AND DATA OWNERSHIP

The consultant firm will protect the confidentiality of those participating in the Environmental Impact Assessment processes. All data is confidential and it’s the property of the Dire Dawa City Administration. No data or other information from the EIA will be released to third parties without written approval of the City Manager Office. The consultant firm will deliver all data and relevant information to the ULGDP/ City Manager Office.