DIRE DAWA CITY ADMINISTRATION

ENVIRONMENTAL IMPACT ASSESSMENT
BOREN AREA INFRASTRUCTURE PROJECT

MS CONSULTANCY
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<th>Description</th>
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<tr>
<td>ADLI</td>
<td>Agricultural Development-Led Industrialization</td>
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<td>BWUD</td>
<td>Bureau of Works and Urban Development</td>
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<td>CSE</td>
<td>Conservation strategy of Ethiopia</td>
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<td>DDAC</td>
<td>Dire Dawa Administrative Council</td>
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<tr>
<td>DDEPA</td>
<td>Dire Dawa Environmental Protection Authority</td>
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<tr>
<td>DDWSA</td>
<td>Dire Dawa Water and Sewerage Authority</td>
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<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<td>EIS</td>
<td>Environmental Impact Statement</td>
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<td>Environmental Protection Authority</td>
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<td>Environmental policy of Ethiopia</td>
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<td>ESIA</td>
<td>Environmental and Social Impacts Assessment</td>
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<td>ESMF</td>
<td>Environmental and Social Management Framework ()</td>
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<td>EWRMP</td>
<td>Ethiopian Water Resources Management Policy</td>
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<tr>
<td>FDRE</td>
<td>Federal Democratic Republic of Ethiopia</td>
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<td>IHS</td>
<td>Improved Hygiene and Sanitation</td>
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<td>IDA</td>
<td>International Development Agency</td>
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<td>Ios</td>
<td>Infrastructure Offices</td>
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<td>MUDC</td>
<td>Ministry of Urban Development and Construction</td>
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<tr>
<td>NGOs</td>
<td>None Governmental Organization</td>
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<tr>
<td>PEIA</td>
<td>Partial Environmental Impacts Assessment</td>
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<td>Resettlement Policy Framework</td>
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**UDCBO**  
*Urban Development Capacity Building Office*

**UDP**  
*Urban Development Program*

**ULG**  
*Urban Local Government*

**ULGDP**  
*Urban Local Government Development Project*
1. Executive Summary

1.1 Introduction

The project, “Provision of Infrastructure for Boren area project” is located in the eastern part of Ethiopia within the Dire Dawa City Administration. Diredawa City is found at about 445kms distance from Addis Ababa. Local Development Plan (Boren Area LDP) has been studied to the area under consideration.

Boren LDP area has a low coverage of both economic and social service infrastructure at present and need for development of the infrastructure has been prioritized by the city administration. Road network in the LDP project area accounts only for 7% of the total area. The project is being financed under the Urban Local Government Development Program (ULGDP), financed by the IDA/World Bank program. The ULGDP has been designed to support the government’s Urban Development Program (UDP) and Urban Good Governance Program (UGGP).

The LDP has proposed multiple economic and social infrastructure developments for the Boren area. Among the envisaged development activities are found; road networks, drainages, water supply and sanitation facilities. It is anticipated that provision of these infrastructure for the locality will optimize the operation of infrastructural services, reduces infrastructure costs and create a better business environment, which can enhance socioeconomic development and national competitiveness of the city.

On the Other hand, the implementation of the infrastructure projects is also expected to cause adverse environmental and social impacts on the natural resources and to the surrounding community. There are expected adverse environmental and social impacts owing to the various project characteristics and locations.

As a guiding principle, projects to be implemented under the ULGDP should adhere to acceptable environmental and social safeguards. The projects should, as far as possible, not result in damaging effects of the natural resources, involuntary resettlement and land acquisition and where this is necessary, it is minimized by exploring all viable alternatives and where it is unavoidable, mitigation measures and compensation arrangements are made and implemented.

Therefore, being cognizant of the importance of addressing these environmental and social issues in detail, the DDULG coordinating office has made an environmental screening and has assigned schedule - 1 type EIA study for the Boren area infrastructure development projects.
It is with this background and rational, that the city administration has Commissioned MS - Consultancy to undertake Environmental Impacts Assessment (EIA). The consultant has conducted the EIA study in line with the agreements made, and as per the requirements and objectives set in the Terms-Of-Reference (TOR).

1.2 Objectives of the EIA study

The overall objective of the EIA study is to minimize the likely adverse impacts of the project implementation and ensure that sustainable development objectives are met. Accordingly; the specific objective of the EIA study is;

- To assess the existing environmental condition of the project area
- To identify environmental issues and concerns as relates to the implementation of the envisaged infrastructure development projects
- To identify environmental components likely to be affected by the implementation of the different project components as indicated in the TOR
- To make analyses of the likely positive and adverse impacts of the projects
- To propose appropriate mitigation measures for the adverse impacts and enhancement measures for the positive ones.
- To prepare Environmental Management and Monitoring (EMP).

The EIA study will also consider sites outside of the Boren LDP demarcated area, and that will be influenced by the project implementation. Assessment will be conducted for all project influenced areas including; the Boren LDP area, material production sites, facilities erection sites etc that are likely to experience the direct impacts of the infrastructure development project.

1.3 Environmental scoping

The scoping process has considered and discussed; Need for the project, project location and boundary for the impacts assessment, Project activities, alternatives to address the infrastructure problems and deficiencies, valued environmental components, ROW condition of the project corridor, consultation of stakeholders and has come up with conclusive remarks that project implementation to be pursued by adopting the proper environmental management discipline.

Implementation of the project will alleviate most of the constraints related to lack of social services and facilities; while the no project scenario will keep the status quo. In
fact when viewed from purely natural environmental protection points of view, the no project scenario is preferable, as no adverse impacts will be caused to the natural resources due to project implementation. However, the benefits attainable from provision of improved infrastructure will be forgone and the community’s life style and the planned city activities will be hampered. So, the project implementation will have no alternative, than pursuing the planned objectives.

1.4 Project Description

The Project is located within the Dire Dawa City Administrative area, at a locality known as Boren Jeden. Boren locality is located at the outskirts of Dire Dawa city towards Meleka-jebdu town, where industrial zone of the city administration has been established.

The Vision set for Boren area is described as to create “Modem residential and economically active area with adequate public services and modem urban agriculture”. To bring this vision in to reality, several developments are envisaged that can result in land use changes.

The provision of infrastructure for the Boren LDP project area is designed to provide roads, water supply and drainage lines.

It is anticipated that the Provision of Infrastructure for the Boren area project will optimize the operation of infrastructural services, reduces infrastructure costs and create a better business environment, which can enhance socioeconomic development and national competitiveness of the city. Adverse environmental impacts are also expected to accompany the project implementation.

The EIA study is based on the LDP studied for the Boren Area. It is a study conducted to assess the impacts, both on natural environment as well as socioeconomic environmental resources that are likely to occur as a result of the implementation of the planed visions and missions of the LDP studies.

1.5 Potential environmental impacts of the project

The infrastructure development project will create urban transport facility to those settlement sites away from the existing route, improvements in sanitary conditions and increased water supply coverage of the city. Provision of those services for those communities lacking it at present will significantly contribute positively and creates satisfaction among the community of the Boren kebele.
The efficiency in mobility for vehicles as well as for all other road users, both motorized and none motorized mode of transport and pedestrian will benefit from the improved road standard and conditions.

Adverse environmental impacts likely to accompany the project are also highlighted and discussed in detail. Adverse impacts are likely to occur both to the natural environment and social environment of the project influence area. Areas experiencing direct impacts and indirect impacts are defined and discussed in the main document.

Mitigation measures to be taken are also listed and discussed for each of the adverse impacts suspected to be caused by the project.

1.6 Environmental Management and Monitoring Plan (EMP)

Environmental management plan has been prepared by identifying key issues and impacts to be managed. Management and monitoring actions have been discussed by proposing mitigation actions to be taken, identifying institutional responsibilities for implementation of those measures. Management and monitoring actions have been summarised in a matrix form for ease of the follow ups and to check for compliances.

Costs for implementation of the mitigation measures has also been estimated and included. Apart from the cost of relocation/compensation and the costs already included in the engineering cost estimate for major physical works, the other costs of environmental mitigation measures, monitoring and capacity building costs are estimated and included in this report. This part of the cost is Birr 1,416,000 (one million four hundred sixteen thousand).

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<td><strong>1,416,000</strong> plus compensation costs for damaged properties</td>
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1.7 Conclusion and recommendations

The Boren area is designated as expansion and industrial zone of the DD city administration. Large scale business, institutions, commercial and residential building complexes will be developed and will continue to be expanded in the area.

The provision of infrastructure to the Boren area and upgrading of the existing ones will facilitate such development and the planned vision and missions of the LDP as per the study. The basic social services for the community will be availed. Sanitary condition will improve, transport services will improve, traffic flow will be facilitated in the congested areas, while it will open up vehicular transport facilities for areas lacking public transport in their premises. Some of the segments traverse residential areas where passage to vehicle is difficult at present.

However, adverse impacts will also be significant during the project implementation. Vegetation clearance and land disturbance and related environmental impacts are likely, the densely settled and commercial sites with houses and facilities will definitely experience complication, while ROW clearance and relocation of existing facilities and service utility lines may be requisite. Significant number houses and utility service lines will have to be demolished and relocated at areas of narrow ROW width. Traffic management; mobility and traffic safety issues will also be significant and needs well organized management system.

So it is the recommendation of this study that the mitigation measures proposed at all stages of the project implementation be given due attention and considered during the whole processes. With careful and well planned site management, the project can be implemented with relatively lower adverse impacts.
2. Introduction

2.1 Background to the project

The Provision of Infrastructure for Boren area project is located in the eastern part of Ethiopia within the Dire Dawa City Administration. Diredawa City is found at about 445kms distance from Addis Ababa.

The city administration has total land area of 1,288.02 Km$^2$, Categorized as inner city and suburbs. The suburb area covers 125,847 Km$^2$ (97.73%) while inner city has a share of only 2.27% (29.24 Km$^2$).

The city administration has a plan to expand and develop the suburb areas, and has prepared Local Development Plan (LDP) for a locality Known as Boren Jeden. Boren Jeden LDP area composes of 6 neighborhoods including Adamo, Dengo, kaba Tenkule, Jedneaj, Bealwalti.

Boren LDP area has a low coverage of both economic and social service infrastructure at present and need for development of the infrastructure has been prioritized by the city administration.

The current project is being conducted under the Urban Local Government Development Program (ULGDP), financed by the IDA/ World Bank program. 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 ULGDP projects is to support improved performance in the planning, delivery and sustained provision of priority municipal services and infrastructure by urban local governments. 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.

The LDP has proposed multiple economic and social infrastructure developments for the Boren area. Among the envisaged development activities are found; road networks, drainages, water supply and sanitation facilities. It is anticipated that provision of these Infrastructure for the locality will optimize the operation of infrastructural services, reduces infrastructure costs and create a better business environment, which can enhance socioeconomic development and national competitiveness of the city.

On the Other hand, the implementation of the infrastructure projects is also expected to cause adverse environmental and social impacts on the natural resources and
the surrounding community. There are expected adverse environmental and social impacts owing to the various project characteristics and locations.

As a guiding principle, projects to be implemented under the ULGDP should adhere to acceptable environmental and social safeguards. The projects should, as far as possible, not result in damaging effects of the natural resources, involuntary resettlement and land acquisition and where this is necessary, it is minimized by exploring all viable alternatives and where it is unavoidable, mitigation measures and compensation arrangements are made and implemented.

It is also believed and justified that, 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 in detail, the DDULG coordinating office has made an environmental screening and has assigned category – A type EIA study for the Boren area infrastructure development projects.

It is with this background and rational, that the city administration has Commissioned MS - Consultancy to undertake Environmental Impacts Assessment (EIA), and preparation of Resettlement Action Plan (RAP) for the Boren Area infrastructure development.

The consultant has conducted the EIA study in line with the agreements made, and as per the requirements and objectives set in the Terms – Of – Reference (TOR).

### 2.2 Objectives and scope of the EIA study

The TOR prepared by the client has described the objectives of the consultancy service as to conduct an Environmental Impact Assessment and to conduct a Resettlement Action Plan for project affected persons, due to Provision of Infrastructure for the Boren area Project.

The objectives of the study emanates from overall policies of the ULGDP implementation stated as “Projects to be implemented under the ULGDP should stick on to acceptable environmental and social safeguards”. In this regard, it’s clearly stated in the Environmental and social management framework manual prepared by MUDC; “ that any projects which are funded by World Bank have to carry out appropriate and corresponding EA study to ensure sustainable development objectives”.


The EIA study will cover, environmental scoping, description of the project, description of baseline environmental conditions; Identification of Valued Environmental Components (VEC) for the project, analysis of potential environmental impacts; consideration of alternatives; development of mitigation measures for adverse impacts and enhancement measures for the positive impacts; preparing an environmental Management and Monitoring plan.

Accordingly the specific EIA objectives under this study will be;

- To assess the existing environmental condition of the project area
- To Identify environmental issues and concerns as relates to the implementation of the envisaged infrastructure development projects
- To Identify environmental components likely to be affected by the implementation of the different project components as indicated in the TOR
- To Make analyses of the likely positive and adverse impacts of the projects
- To propose appropriate mitigation measures for the adverse impacts and enhancement measures for the positive ones.
- To prepare Environmental Management and Monitoring (EMP).

The EIA study will also consider sites outside of the Boren LDP demarcated area, and that will be influenced by the project implementation. Assessment will be conducted for all project influenced areas including; the Boren LDP area, material production sites, facilities erection sites etc that are likely to experience the direct impacts of the infrastructure development project.

Accordingly, the EIA study is expected to identify all the adverse environmental and social impacts, and to propose appropriate mitigation measures for those possible negative environmental and social impacts and enhancement measures for the positive impacts.

2.3 Methodology of the EIA study

The assessment study has been undertaken in accordance with the ULGDP’s ESMF and RPF as well as World Bank safeguard policies and procedures, using generally acceptable and recognized assessment techniques and evaluation methods, standards and practices. The national level EIA guidelines, legal and policy frameworks are also the sources and references made to, during the assessment study.
3. **Environmental Scoping**

3.1 **Need for the Project**

The Boren area is planned to be one of the expansion areas and industrial development site for Dire Dawa Administration. It has to have well developed infrastructure and social services to meet the envisaged development requirements. At present, the infrastructure facilities coverage of the LDP area is generally poor, and varies depending on the settlement pattern. The planned area is served with all basic infrastructures such as gravel road, electricity, telephone, potable water, garbage collection container. The scattered informal settlement area has practically no services.

![Figure 3-1 Ongoing Housing developments in the Bore LDP area](image1)

![Figure 3-2 existing Road condition within the Bore LDP area](image2)

Road networks plays significant role in providing access to social services and administrative centers and travel mobility, however, Boren LDP area has a low coverage road network accounting only for 7% of the total area. There are four categories of roads in the area;

- The arterial Gravel road which goes to Melak Jebdu
- The collector roads serving the planned neighborhood.
- Earth road connecting the planned scattered settlement with the planned area.
- Trails used for circulation inside the farm area.

The arterial road and the sub arterial roads serving the planned neighborhood are gravel surfaced adequate width, while the remaining major road segments are earth road, and there is no asphalt road within the project limit.
Water supply line is limited to small proportion, and access to potable water supply is a major constraint to most of the dwellers. These group of people are obliged to fetch water from far distances in the central part of the city, like in Sabian area.

The area has low level of social services such as school, market place, and health facility, road and drainage facilities. The development of the area should therefore address the issues of infrastructure as one of the top priority. To address the key problems of the locality there will be infrastructure development options to be taken. From these options the locality expects to solve all or some of the key problems to some extent.

3.2 Project activities

The project activities include design and construction works of 13km road, 13km drainage and 10km water supply lines as principal works, while ancillary works like material site development, garage and workshops establishment will also be undertaken.

The main works will be implemented within the Boren LDP area, new alignments and partly existing track road route corridor. The extent of new land occupation for the main works will be high in new alignments, while road width widening may be required at some location, and impacts at those sites can be significant. Construction material production will make use of the already designated sites at out skirts of the city, some of which are existing production sites.

The activities under the EIA study include: collection of data on existing environmental settings of the project area, both primary and secondary sources, analyses of the project activities and their respective impacts on the environment, identification of the environmental components that would be most affected by the project, propose feasible measures that would help to avoid and/or minimize the adverse impacts.

The environmental impact of such infrastructure project can extend beyond the limits and influence areas of that of socio-economic impacts.

3.3 Alternative solutions for the infrastructure development of Boren Area LDP project

The possible alternatives are either to implement the infrastructure development project or the no project option. There is no better alternative to solve the deficiencies in social service infrastructure of the project area, other than project implementation.
Implementation of the project will alleviate most of the constraints related to lack of social services and facilities; while the no project scenario will keep the status quo. In fact when viewed from purely natural environmental protection points of view, the no project scenario is preferable, as no adverse impacts will be caused to the natural resources due to project implementation. However, the benefits attainable from provision of improved infrastructure will be forgone and the community’s life style and the planned city activities will be hampered.

So, the project implementation will have no alternative, than pursuing the planned objectives.

### 3.4 Geographical boundary and ROW- conditions of the study area in relation to possible impacts

The project will be implemented in a suburb area of the Dire Dawa city Administration, where the land is partially occupied by population settlement, farmland, institutional and commercial establishments, and open grazing ground.

The study area for the impacts assessment will mainly focus on the Boren LDP project site, where the infrastructure development is expected to be implemented. However, land occupation and disturbance can also occur at sites to be developed for ancillary works like material site development, access roads and for spoil soils disposal. These sites will be outside of the demarcated Boren LDP project site, but in the periphery of the city administration, and outside of the densely settled areas.

### 3.5 Land requirements

The Provision of Infrastructure for Boren LDP project area will be implemented within the demarcated 5 ha of land area by the LDP project. The infrastructure expected include road, drainage and water supply line, all of which will follow road route alignments and will be accommodated within road route corridors. So, the major land requirement will be for the road infrastructure development with adequate provisions for other utility service lines.

Within this demarcated route corridor, different social service infrastructures will be developed as discussed above. Among those planned infrastructure developments are found, road network, drainage lines, water supply line.

Land is also required for construction material production, workshops and garages, for detour roads and accesses, for plants and stockpiling of material and spoil soils.
disposal. These sites, however, will temporarily be occupied during the construction phase of the project.

The extent of new land occupation and land clearance will be significant as most of the works will be done in a newly developing area, with no existing paved route. At some locations, there are track roads used by the community and the impacts of vegetation removal can be minimum at those locations, however, road width widening and upgrading of the road design standard does require additional plots of land on both sides of the road alignment, and also for ancillary works and material production at offset distances.

The project influence areas that experience direct impacts of the project are sites and environmental resources falling within the Right –Of –Way (ROW) of the project; within the LDP demarcated plots of land and the neighboring kebeles of Dire Dawa city and material production sites at the periphery of the city limit.

### 3.6 Land use/land cover of the road route corridor, material sites and camp sites

The dominant land use of the Boren area is agricultural and settlement. Settlement area accounts for 30% of the land area (25% being unplanned informal settlement sites), while farmlands and open spaces account for 63%. Road infrastructure occupies 7% of the land area. The open area is covered by bushes and scrubs including the exotic plant species known as prosopiece juliflora. Big trees are found only at banks of seasonal streams and rivers or as tree hedges and at homesteads. There is no park, no known cultural and historical heritage site, but religious establishments and social service institutions like schools, health and welfare institutions like Cheshire Homes are found at different locations. There are few institutions and commercial establishment, but not developed well.

#### 3.6.1 Potential material sites

Potential material sites are all located outside of the densely settled areas, and are dominantly covered by bushes or degraded road covered land. The mountains and hills surrounding the city will be major sites for construction material extraction.

### 3.7 Consultation of stakeholders

Consultation of stakeholders had been conducted, and discussion forum with high officials of the city administration including the ULDP coordination office staff had been conducted. All consulted people and officials have shown positive reactions towards
the project implementation. Comments and suggestions had been given during the discussions held to assist the good accomplishments of the project. The local administration and community representatives of Boren Locality have emphasized the deficiencies in social and economic services provisions in the area, and reiterated the impacts it has on the developments of their local economic settings. They further urged the immediate implementation of the project, and committed for all assistances to be availed from their side.

4. Policy, legal and administrative frameworks

4.1 General

Development programs and projects should comply with available policies, legislative and institutional frameworks and standards for proper execution and implementation. Knowledge of the policy and legal frameworks within which the project is going to be implemented would facilitate the project performance and helps to ensure sustainable development. There are several policy and legal documents both at federal and regional level as regards to environmental management and development projects.

The discussion in here concerns the National Development and Environmental Policies and Sectoral Strategies, legislations and guidelines, Institutional arrangements, land accusation, tenure rights and expropriation procedures are also indicated in the discussion.

Understanding of available policies and administrative structures, under which the project implementation and the environmental assessment and management study operates, would assist in the efforts made for sustainable development and natural resource conservation measures.

4.2 Policies and strategies

4.2.1 Environmental policy of Ethiopia (EPE)

The environmental policy Ethiopia (EPE) of the Federal Democratic Republic of Ethiopia was approved by the Council of Ministers in April 1997 (EPA/MEDAC 1997). It is based on the CSE which was developed through a consultative process over the period 1989-1995.

The policy has the broad aim of rectifying previous policy failures and deficiencies which, in the past, have led to serious environmental degradation. It is fully integrated and compatible with the overall long-term economic development strategy of the country, known as Agricultural Development-Led Industrialization (ADLI), and other key national policies.
The EPE’s overall policy goal may be summarized in terms of the improvement and enhancement of the health and quality of life of all Ethiopians, and the promotion of sustainable social and economic development through the adoption of sound environmental management principles. Specific policy objectives and key guiding principles are set out clearly in the EPE, and expand on various aspects of the overall goal. The policy contains sectoral and cross-sectoral policies and also has provisions required for the appropriate implementation of the policy itself.

The policy among others seeks to ensure the empowerment and participation of the people and their organizations at all level in environmental management activities and to raise public awareness and promote understanding of the essential linkage between environment and development.

In addition to its guiding principles the environmental policy of Ethiopia provides sectoral and cross-sectoral environmental policies. The EIA policies aim:

- To ensure that EIA’s consider not only physical and biological impacts but also address social, socio-economic, political and cultural conditions.
- To ensure that public and private sector development programs and projects recognize environmental impacts early and incorporate their containment into the development design process.
- To recognize that public consultation is an integral part of EIA and ensure that EIA procedures make provision for both an independent review and public comment before consideration by decision-makers.
- To ensure that the environmental impact statement always includes mitigation plans for environmental management problems and contingency plans in case of accidents.
- To ensure that at specified intervals during project implementation, environmental audits regarding monitoring, inspection and record keeping take place for activities where these have been required by the environmental impact statement (EIS)
- To ensure that preliminary and full EIAs are undertaken by the relevant sectoral ministries or departments if in the public sector, and by the developer if in the private sector;
- To create by law and EIA process this requires appropriate environmental impact statements and environmental audits for private and state development projects.
• To establish the necessary institutional framework and determine the linkages of its parts for undertaking, coordinating and approving EIAs and the subsequent system of environmental audits required to ensure compliance with conditionalities.

• To develop detailed sectoral technical guidelines in EIAs and environmental audits.

• To ensure that social, socioeconomic, political and cultural conditions are considered in EIA procedures & include in sectoral guidelines and

• To develop EIA and environmental audit capacity and capability in the EPA, Sectoral Ministries and Agencies as well as Regions.

4.2.2 Conservation Strategy of Ethiopia

The Conservation strategy of Ethiopia (CSE) was provided in 1996. It is a strategic framework document for integrating environmental planning into new and existing policies, programs and projects. It is an important policy document which views environmental management from several perspectives. In particular it recognizes the importance of incorporating environmental factors into development activities from the outset, so that planners may take into account environmental protection as an essential component of economic, social and cultural development.

4.2.3 Dire Dawa City Administration Regional Conservation Strategy

The conservation strategy of the DDAC was provided in March 2001 based on the national level conservation strategy of Ethiopia.

The overall strategy goal is described as to improve and enhance the health and quality of the life of all people of Dire Dawa Administrative Council and to promote sustainable social and economic development through the sound management and use of natural, human made & cultural resources and the environment as a whole, so as to meet the needs of the present generation without compromising the ability of future generation to meet their own needs.

The strategy seeks to:

a. ensure that appropriate interventions to restore the present impaired regenerative and productive capabilities of renewable natural resources, and ensure that essential ecological process and life support systems are sustained, biological diversity is preserved and renewable resources are used in such a way that their capacity to regenerate and produce is maintained and where
possible enhanced, so that the satisfaction of future generation is not compromised;

b. Ensure that non-renewable resources are exploited in such a way that the benefits are extended as far into the future as can be managed, and minimize the negative impacts of their exploitation on the use and management of other natural resources and the environment;

c. Identify and develop natural resources that are currently under utilized by finding new technologies and/or intensifying existing uses;

d. Incorporate the full economic, social and environmental costs and benefits of natural resources development into planning, implementation and accounting processes by a comprehensive valuation of the environment and the services it provides, and by considering the social and environmental costs and benefits which cannot currently be measured in monetary terms;

e. Improve the environment of human settlements to satisfy the physical, social, economic, cultural and other needs of their inhabitants on a sustainable basis;

f. Prevent the pollution of land, air and water in the most cost effective way so that the cost of effective preventive interventions would not exceed the benefits;

g. Conserve, develop, sustainable manage and support Ethiopia’s rich and diverse cultural heritage;

h. Ensure the empowerment and participation of the people and their organizations at all levels in environmental management activities; and

i. Raise public awareness and promote understanding of the essential linkages between environment and development.

4.2.4 Water resource and sanitation policies and legislatives

Ethiopian Water Resources Management Policy (EWRMP), 1997 deals with the general water resources management policy and different sub sectoral issues; Water supply and sanitation, irrigation development, & hydropower. The policy, under section - 2.2.2 discusses the issue of environment, water shade management and water resources protection and conservation issues.

The policy discusses the sanitation policy under the water supply and sanitation sub sector. The policy among other issues emphasizes the adoption and promotion of
affordable and culturally acceptable low cost sanitation technology options, setting of frameworks, coordination of efforts and encouraging involvement of stakeholders both government and non-government institutions, the integration of water supply and sanitation, need for setting frameworks affirming the inseparable nature of water supply and sanitation activities and need for decentralized approaches for sanitation projects implementation and management are some of the guiding principles indicated in the policy.

The Health Policy of Ethiopia

The health policy under its articles; Article 3.4 reads developing safe disposal of human, household, agricultural, and industrial wastes, and encouragement of recycling. Article 5.3 reads prevention of environmental pollution with hazardous chemical wastes.

National Hygiene and Sanitation Strategy for Ethiopia

The strategy is set as a road map which leads to 100% adoption of improved sanitation and hygiene in Ethiopia. The 100% adoption of improved sanitation and hygiene is defined from Ethiopia’s perspective as the process where people demand, develop and sustain a hygienic and healthy environment for themselves by erecting barriers to prevent the transmission of diseases, primarily from fecal contamination. The strategy paper further elaborates that improved sanitation and hygiene is about erecting physical and behavioral barriers to stop contamination, and emphasizes that the primary barriers have the biggest preventive impacts and concentrate on the safe management of faeces to prevent contact with fields, fluids, fingers, feet, flies and food.

National Hygiene and On-site Sanitation Protocol

The protocol is designed to follow the national strategy for universal access (100% hygienic and sanitized households) of hygiene and sanitation. It is primarily concerned with the safe ‘On-site’ containment and management of human excreta in the domestic, institutional and public context.

The objective of the protocol is described as to improve implementation of the National Strategy for Hygiene and ‘on-site’ Sanitation improvement at Local Authority level. The protocol gives a clear set of guidelines for all stakeholders promoting Improved Hygiene and Sanitation (HIS), leading to better co-ordination and clearer lines for responsibility at the national, regional, zonal and woreda (district) levels.

- Strengthen the integration of all programs with an HIS components within woreda development plans and the health extension services program.
provide the basis for a comprehensive budgeting and investment framework

- Improve sector co-ordination with all HIS stakeholders working from one set of guidelines
- Define minimum standards and a framework for information management and monitoring to ensure adequate sub sector performance evaluation.

The protocol will be applied in all aspects of hygiene and sanitation promotion. It will ensure that all development partners and NGOs adhere to the protocol when promoting improved hygiene and ‘on-site’ sanitation in each locality.

The protocol is a simple eight step guide to the improved hygiene and on-site sanitation program cycle. These steps are to be followed by all those engaged in promoting hygiene and on-site sanitation improvements in Ethiopia. The eight steps are briefly outlined as:

1) Participatory situation analyses,
2) Advocacy,
3) Inter-sectoral broad based planning (reflecting mandates),
4) Human resource development, supervision, reporting,
5) Financing Improved Hygiene and Sanitation,
6) HIS promotion, empowerment and enforcement,
7) Access to hardware for latrines and
8) Monitoring and evaluation linked Information management system.

4.2.5 The National Population Strategy

The national population strategy which was issued in 1993, aims to reduce population growth by reducing the number of children per woman from 7.5 to 4.0 by 2015. The policy also recognizes that if economic and social development is to be sustainable it must be compatible with the limits of the existing natural resource base.

4.2.6 The National Policy on Ethiopian Women

The National policy on Ethiopian women, 1993, which ensures the equality of women in every aspect of life and the removal of gender based discrimination.

4.2.7 The Social Welfare Policy

The Social Welfare policy, 1994, which addresses problems of famine, illiteracy and disease within a social framework that is equitable for all people and aims to develop human resource especially in the rural areas so that the delivery of services is sustainable, development oriented and involves the community in their planning and
implementation. The policy recognizes that agents for change will be government, private and both local and foreign NGO's.

4.2.8 Environmental and Social Management Framework of MUDC

The Ministry of Urban Development and Construction (MUDC) has prepared and provided ESMF in year 2008.

This document provides an Environmental and Social Management Framework (ESMF) for the Urban Local Government Development Project (ULGDP).

Environmental and Social Management Framework (ESMF) is a safeguard instrument (document) which establishes a system for determining and assessing future potential environmental and social impacts of the ULGDP investment project activities and other activities associated with this ULGDP investment project regardless of funding agency. The framework sets out mitigation, monitoring and institutional measures to be taken during design, implementation and operation of the project activities to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels.

The main purpose of the ESMF is described as to:

- Establish clear procedures and methodologies for the environmental and social assessment, review, approval and implementation of investments to be financed under the ULGDP;
- Specify appropriate roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring environmental and social concerns related to ULGDP investments;
- Determine the training, capacity building and technical assistance needed to
- successfully implement the provisions of the ESMF; and
- Provide practical information resources for implementing the ESMF.

This ESMF document is to be used by all implementing agencies of the ULGDP in order to ensure that all environmental and social safeguards are adequately addressed and that the relevant capacity and training needs are established in order for the recommended measures to be implemented effectively.
4.2.9 Resettlement Policy Framework (RPF) of MUDC

The Ministry of Urban Development and Construction (MUDC) has prepared and provided RPF in November 2008.

This document provides a Resettlement Policy Framework (RPF) for the Urban Local Government Development Project (ULGDP). The RPF document is to be used by all implementing agencies of the ULGDP in order to ensure that all environmental and social safeguards are adequately addressed and that the relevant capacity and training needs are established in order for the recommended measures to be implemented effectively.

The use of this Resettlement Policy Framework will be triggered when a proposed ULGDP investment project needs to acquire land and people or property is affected. The objectives of this Resettlement Policy Framework are described as to:

- As far as possible ensure that involuntary resettlement and land acquisition is avoided or where it is necessary, is minimized, by exploring all viable alternatives.
- Where involuntary resettlement and land acquisition is unavoidable, resettlement and compensation activities are prepared and implemented by providing sufficient investment resources according to GOE Proclamation and Regulations.
- Persons displaced by the ULGDP will be meaningfully consulted.

This policy is not triggered for the current project, as the work is limited to the existing corridors and water supply systems of existing facilities. No significant new land size and property loss is expected.

World Bank Safe guard policies

The World Bank provides guidance on requirements in the Environmental Assessment Sourcebook, which includes recent versions of the World Bank Operational Policies as well as the updates. The World Bank has ten “Safeguard Policies” whose primary objective is to ensure that Bank operations do not cause adverse impacts and that they “do no harm”. The ten safeguard policies are grouped into Environment, Rural Development, Social Development and International Law.

These ten safeguard policies are; OP 4.01 Environmental Assessment, OP 4.04 Natural Habitats, OP 4.09 Pest Management, OP 4.10 Indigenous Peoples, and OP 4.11 Physical Cultural Resources, OP 4.12 Involuntary Resettlement, OP/BP 4.36 Forests, OP/BP 4.37 Safety of Dams and OP 7.50 Projects on International Waterways, OP 7.60 Projects in Disputed Areas. Some but not all of these safeguard policies are applicable to the subject project.
4.3 Legislative framework

There are several proclamations provided by the FDRE related to Environmental protection issues. Among these are:

4.3.1 Federal level Proclamations

The Federal Constitution

The Federal Constitution of 1995 sets out important articles related to Development and Environmental rights. Article 43 discusses the right to development.

The Constitution under Article 44 highlights about environmental rights as follows:

- All persons have the right to a clean environment.

- All persons who have been displaced or whose livelihoods have been adversely affected as a result of state programs have the right to commensurate monetary or alternative means of compensation, including relocation with adequate state assistance.

- Under Article 92 the constitution discusses about environmental objectives as:
  - Government shall endeavor to ensure that all Ethiopians live in a clean and healthy environment.
  - The design and implementation of Programs and Projects of development 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.
  - Governments and citizens have the duty to protect the environment.

Proclamation NO. 197/2000 deals with Ethiopian water resources management.

Proclamations NO. 300/2002 Proclamation on Environmental pollution control; sets rules on control of pollution, management of hazardous waste, chemical and radioactive substances, management of municipal wastes, outlines sectors that require environmental standard, environmental inspectors, incentives, rights to appeal, Offences and penalty.

Environmental impact assessment Proclamation No. 299/2002 is promulgated in December 2002. The primary objectives of this proclamation are to make EIA mandatory for defined Categories of activities undertaken either by the public or
private sector. The proclamation under its General provision Article -3, sub article-1 states that without authorization from the Authority (EPA), or from the relevant regional environmental agency, no person shall commence implementation of any project that requires environmental impact assessment as determined in a directive issued pursuant to Article-5 of the proclamation. Article - 5 describes projects requiring Environmental Impact Assessment as follows:

- Every project, which falls in any category listed in any directive issued pursuant to this proclamation, shall be subject to Environmental Impact Assessment.
- Any directive provided under sub- article-1 of Article -5 should among other things, determine categories of; a) Projects not likely to have negative impacts and so do not require EIA, b) Projects likely have negative impacts and thus require environmental impact assessment.
- EIA-Guide lines have been prepared both at federal & regional level. These guidelines follow the conventional procedures adopted elsewhere in the world.

**Proclamation No 200/2000** refers to public health issues.

The proclamation was promulgated by the Federal Republic of Ethiopia on 9th March 2000. The proclamation is meant to promote the participation of the society in the health sector and enforce the objectives of the health policy of Ethiopia. The proclamation under its part –II discusses public health issues including; Food quality control, water quality control, waste handling and disposal, Availability of toilet facilities, control of bathing places and pools etc.

The article which deals with waste handling and disposal further elaborates that;

- Any person shall collect waste in a specially designated place and in a manner which does not affect the health of the society.
- No person shall dispose solid, liquid or another waste in a manner which contaminates the environment or affects the health of the society.
- Any solid, liquid and other wastes generated from hospitals should be handled with special care and their disposal procedures should meet the standards set by the public health authorities.

**Proclamation No.4/1995** which defines powers and duties of the executive organs of the Federal Democratic Republic of Ethiopia.

**Proclamation No. 9/1995** establishes the Federal Environmental Protection Authority (EPA). EPA prepares environmental protection proclamations and does the federal government approve it.
Environmental Protection Organs Re-Establishment proclamation No. 295/2002 was provided in October 2002. The proclamation differentiated responsibilities among environmental agencies at Federal and Regional states. By this proclamation the EPA is Re-established as an autonomous public institution at the Federal Government. EPA has among others powers and duties to coordinate measures to ensure that the environmental objectives provided under the constitution and the basic principles set out in the Environmental policy of Ethiopia and the conservation strategy of Ethiopia are realized.

Article-15 of the proclamation states the power & duties of the Regional Environment Agencies. Powers and duties are also proposed in relation to Zonal, Woreda and community Environmental Coordinating Committees.

Environmental pollution control proclamations NO. 300/2002 sets rules on control of pollution, management of hazardous waste, chemical and radioactive substances, management of municipal wastes, outlines sectors that require environmental standard, environmental inspectors, incentives, rights to appeal, Offences and penalty.

Proclamation No. 94/1994, Proclamation on Conservation, Development and Utilization of Forests, was issued in 1994 to provide for the Conservation, Development and Utilization of Forests. The objective of this Proclamation is to provide the basis for sustainable utilization of the country’s forest resources. The Proclamation categorizes types of forest ownership (State, Regional and Private Forests). It provides the power for designation, demarcation, and registration of forests to the Ministry of Agriculture and Regional Governments. According to this proclamation, state and regional forests shall be utilized in accordance with approved management plans. The Proclamation then goes on to give some specific direction for the utilization of State and Regional Forests, and lists prohibited activities within protected forests.

The proclamation, however, has not been enforced and did not help for the sustained utilization of the remaining forest resources. Policies such as Bio-diversity conservation and development, EPE, Energy policy and population policy are in place but could not bring significant change in forest development and use.

Proclamations NO.94/1994 deals with conservation, development and utilization of forests

Proclamation No.209/2000, a proclamation to provide for research and conservation of cultural heritage

4.3.2 Regional level Environmental Proclamations
The environmental organ establishment proclamation, Proclamation No 2/2004 enacted in 2004 establishes the regional EPA (DDAC – EPA).
Regional Environmental Regulations: Two draft regulations namely the environmental impact assessment (EIA) regulation and pollution control regulations are prepared by the environmental Protection Authority of Dire Dawa City Administration and is ready for ratification.

Regional EIA Guidelines

Regional level environmental impact assessment (EIA) guideline was developed in the year 2005 by the Dire Dawa regional EPA.

4.3.3 Rural Land Administration & Tenure Rights

Regarding land tenure issues;

Proclamations No. 31/1975 and 47/1975 State that land in Ethiopia is state owned. The constitution of 1995 also retained land ownership under the people. It is stated in the constitution that the right to ownership of rural and urban land as well as all natural resources, is exclusively vested in the state and in people of Ethiopia. Buying, selling or exchanging to other means is prohibited, however, tenure rights and leasing of use rights to or from others is ensured.

Proclamation NO/455/2005: Proclamation to provide for expropriation of land holding for public purposes and payment of compensation; discusses on expropriation of land holding, determination of compensation, base and amount of compensation, displacement compensation valuation of property,

Rural land use and Administration Proclamation NO.456/2005 describes; the right to hold and use rural land, acquisition and use of rural land, transfer and duration of rural land use right, obligation of rural land users. Restrictions on rural land use (land use planning and proper use of sloppy, galley and wetland/marshlands.

4.4 Administrative framework

4.4.1 Federal Democratic republic of Ethiopia (FDRE)

The Federal Democratic Republic of Ethiopia (FDRE) has two levels of administrative structures, Federal level Government and Regional Governments. There are nine regional governments under the Federal Government. Roles and responsibilities of governments at different levels (Federal, Regional, Zonal & Woreda) have been defined by the constitution and proclamations Nos. 33 of 1992, 41 of 1993 and No. 41 of 1995. Under these proclamations, duties and responsibilities of regional states are included.
The current project shall be implemented in the Dire Dawa city administration under the ULGDP. The regional council is structured as regional administrative council, zonal, Woreda (District) and Kebele (sub district) administrative organs, while the ULGDP projects have also specific organizational setups as discussed here under.

4.4.2 The Dire Dawa City Administration

The Dire Dawa Administrative Council comprises of 34 Peasant associations and 9 urban kebeles organized under 4 kefitegnas??. The Council is directly accountable to the Prime Minister's office and; it is the highest body in the region consisting of a chairperson and four sectoral development heads. The four sectors are the Economic Development Sector, the Economic Service Sector, the Administrative and the Social Affairs Sector. These sectors are mandated to guide, follow and supervise the activities of their respective sectoral and cross-sectoral offices in the administrative council.

Each of the sector office is responsible to develop and implement their own sector specific plans. The overall integration and coordination of the regional socio-economic development plans is done by the Regional Planning and Economic Development Office and approved by the Administrative Council.

4.4.3 Federal & regional environmental protection authorities

The Environmental Protection Authority (EPA), the main agency responsible for environmental management, was established in 1995 under Proclamation 9/1995, as an independent agency reporting to the Council of Ministers. The EPA is required to provide regional authorities with guidance, technical support, and capacity building; support the development of various guidelines, including procedures appropriate to local projects; undertake awareness creation in other federal agencies; and provide technical support to those agencies. Its key objectives are outlined below.

4.4.4 Dire Dawa Environmental Protection Authority

The Federal EPA has devolved responsibility to the Regional equivalent of the EPA. The Regional authorities should ideally establish an EPA-type institution to deal with environmental issues at the Regional level. Accordingly the Dire Dawa Administrative Council Environmental Protection Authority (DDAC EPA) has been established through proclamation No 2/2004 in year 2004.

This is one of the most relevant institutions when it comes to the control of water resources pollution problems in and around the city of DireDawa. It is a regulatory
government body, authorized to prepare and issue regional environmental protection and related laws in accordance with the provision of national environmental policy.

The DDEPAs operates independently of the Federal EPA and reports directly to the regional state governments. It is the responsibility of DireDawa EPA to inform the Federal EPA of projects that may be of national significance.

4.4.5 EPAs’ Role in the Implementation of the ESMF

The EPA will be responsible for ensuring that all ULG investment projects under the ULGDP comply with national EIA regulations and the requirements of the ESMF. Following screening by the ULG responsible, where relevant, the Regional Environmental Protection Authorities (REPAs) will review and approve project EIAs and will issue an environmental permit/license where applicable.

The federal EPA will undertake environmental audits where required to ensure that ULGs are complying with their Environmental Management Plans (EMPs) and their commitments to environmental management, mitigation and monitoring.

4.4.6 Organizational responsibilities for ulgdp implementation

The ULGDP is administered by intuitually organized structure both at federal and regional levels. The following figure describes the organizational responsibilities for ULGDP implementation.
Federal and regional level organizational responsibilities

The implementation of ULGDP will use existing government structures with MUDC having overall implementation responsibility in accordance with its federal mandate. No new organizational structures will be established at the Federal or Regional levels.

Ministry of Urban Development and Construction

At the federal level, the Ministry of Urban Development and Construction (MUDC) in general, and its Urban Development and Capacity Building Office (UDCBO) in particular, is responsible for the ULGDP as a whole. MUDC has overall responsibility for the oversight, coordination, and monitoring and evaluation of project activities. It will ensure the overall quality and timeliness of project implementation, including compliance with all aspects of the ULGDP Operational Manual. It would also be responsible for determining re-allocations between regions based on assessments of performance.

The UDCBO is responsible for:
(a) Ensuring that the ULGs operate according to the operational manual,
(b) Preparing annually for the Government and IDA review of ULGDP performance,
(c) Consolidating annual plans and budgets based on the pipeline of investment plans and budgets received from regions and cities,
(d) Supervising and monitoring the activities of ULGs (including compliance with the operational manual and environmental safeguards frameworks), and reporting on a quarterly basis to oversight authorities and IDA,
(e) Determining re-allocations between regions, AACG and DDCA,
(f) Managing all international procurement for ULGDP, and
(g) Proposing changes to the operational manual in consultation with regions and ULGs.

The MWUD will assign specific responsibility for day to day management of the Ministry’s responsibilities to the Urban Development Capacity Building Office (UDCBO). UDCBO will serve as the coordinating body across federal, regional and local agencies. If needed, additional staff may be recruited to complement or strengthen existing capacity.

UDCBO will hire an Environmental and Social Specialist whose responsibility will include supervising the overall implementation of the ESMF and RPF, providing support to agencies with a role in the ESMF such as the Environmental Council, the Environmental Protection Authority, BWUDs/RUPIs and ULGs.

Bureaus of works and urban development

At the regional level, the Bureau of Works and Urban Development (BWUD) will be responsible for (i) coordinating project implementation, and providing technical assistance to cities in the preparation of capital investment plans, (ii) ensuring the overall quality and timeliness of project implementation for the ULGs within their respective jurisdiction, (iii) supporting and motivating cities to meet their access and performance criteria (themselves incentivized by inter-regional reallocations determined by the performance of their participating cities), (iv) facilitating the ULGs access to PSCAP and other capacity building support mechanisms, (v) determining reallocations between cities based on assessments of city performance, (vi) reviewing and consolidating annual plans and budgets of ULGs within the region and (vi) ensuring that the ULGs follow the requirements of the operational manual and ESMF and RPF.
Urban local governments (ULG)

The operational framework for planning and implementing ULGDP investment projects will be through a consultative process with the appropriate stakeholders at the local government level. At an executive level, ULG Mayors will assign a ULGDP Coordinator, who will report directly to the Mayor, to have overall responsibility for ULGDP implementation, and will be of office head authority or higher. Within each ULG, Infrastructure Offices (IOs) will be responsible for implementation of the ULGDP.

Urban Local Governments will be the highest body that will oversee, coordinate and implement ULGDP activities through their Council.

Participating Urban Local Governments will establish “Infrastructure Offices” not specifically for ULGDP implementation but as part of a wider, parallel and ongoing initiative to strengthen ULG organizational focus and capacity for integrated infrastructure planning and management.

ULGs will determine the allocation of the tasks for which they are responsible, as listed below, to ULG Bureaus, departments or units, including Infrastructure Offices:

a) Include in ULG CIPs, Annual Plans and budgets 20% ULG contribution to ULGDP Performance Grants received and provide contribution;

b) Manage the implementation of the ULGDP investment projects and planning in advance for the sustainable operation and maintenance of ULGDP investment after project completion;

c) Undertake OM, ESMF, RPF and overall ULGDP training. Identify capacity Building needs and inform BWUDs/MWUD of these needs.

d) Implement and follow OM, ESMF and RPF procedures, including ESMF and RPF reporting requirements;

e) Assist communities in undertaking planning and implementation exercises, and mobilize needed local resources and monitor their use;

f) Organize joint reviews and evaluate the ULGDP activities and results;

g) Consult and report regularly to the ULG City council regarding the progress of ULGDP implementation;
h) Implementing actions to satisfy reforms/performance requirements;

i) Ensuring adequate staffing;

5. Project Description

5.1 General

The EIA study is based on the LDP studied for the Boren Area. It is a study conducted to assess the impacts, both on natural environment as well as socioeconomic environmental resources that are likely to occur as a result of the implementation of the planned visions and missions of the LDP studies.

The Vision set for Boren area is described as to create “Modern residential and economically active area with adequate public services and modern urban agriculture”. To bring this vision into reality, several developments are envisaged that can result in land use changes. Accordingly it is planned that the current sub optimal land utilization has to be altered in a manner that can address the shortage of residential areas in the city, expands social service infrastructures, deters illegal settlements, promotes private investment, and provision of adequate public services to satisfy the increasing inflow of people. In so doing there are impacts having either of beneficial or adverse consequences that can occur.

It is anticipated that the Provision of Infrastructure for the Boren area project will optimize the operation of infrastructural services, reduces infrastructure costs and create a better business environment, which can enhance socioeconomic development and national competitiveness of the city. Adverse environmental impacts are also expected to accompany the project implementation.

5.2 Project Location

Dire Dawa Administrative Council is located between 9º27’-9º49’ north latitude and 41º38’-42º19’ east longitude. It is found in the eastern part of Ethiopia at 445 kms distance from Addis Ababa, and has an estimated land area of 128,802 ha.

The Project is located within the Dire Dawa City Administrative area, at a locality known as Boren Jeden. Boren locality is located at the outskirts of Dire Dawa city towards Meleka-jebdu town, where industrial zone of the city administration has been established.
Boren is one of the former rural kebeles of the city administration of Dire Dawa. The kebele is located between the inner city and Melka Jebdu town. It is surrounded by Sabiyan kebele (02) from the East, Industry Village from the West, Shinile zone of Somali region from the North and Gende Rige from South.

According to the recently studied Local Development Plan (LDP), Boren locality encompasses the whole of kebele 38 (Boren Jeden) and part of kebele 37 (Gende Rige).

![Figure 5-1 Boren LDP project Location Map](image)

### 5.3 Project Components

The provision of infrastructure for the Boren LDP project area is designed to provide roads, water supply and drainage lines to the Boren area. These are briefly described as follows.

**Component - 1: Construction of Roads**

The Construction of Roads sub-project intends to reduce the problem of public transport service and accessibility problems in the area. The construction of roads will lead to a reduction in transport costs and hence enhances trade flows and benefits the
society at large. The sub project will implement construction of 13km length roads of different classes.

**Component - 2: Provision of Water Supply Line**

The Provision of Water Supply Line will have networks of 10km length. The sub-project aims at providing clean and safe water supply for the Boren area community.

**Component - 3: Construction of Drainage Lines**

The Drainage Lines Construction sub-project is meant to mitigate flooding effects of the Boren Industrial Sites and residential areas. It involves construction of about 13 KM drainage lines.

The Boren area LDP study of April 2010 proposes road infrastructure development as depicted on the figure below. It is assumed that all of the three planned infrastructure development activities (road sub project, water supply sub project and drainage line project) will mainly fall within these road route corridors and Right – Of – Way width. Both the water supply line and drainage lines will more or less follow and share the road route alignment.

These route corridors are, therefore, considered among the major recipients of the direct impacts of the infrastructure development project, and will be dealt with in detail for the detail impacts analyses.
The road, drainage and water supply project work comprise of, design, construction, maintenance and operation activities. The design and feasibility study works mainly focus on site investigation and site surveying, material investigations, quarry and borrow site determination.

The construction work activities include site clearing for the road carriage width, water supply lines and facilities installation, excavation and grading, filling, compacting, provision of drainage structures, waterway crossing, paving, and quarry and borrow material development, establishing garage site and material storage sites, temporary detour roads construction and maintenances.
6. Baseline Environmental conditions

6.1 Topography and climate

Dire Dawa city administration is situated in the Eastern Lowlands of Ethiopia and has altitude ranges between 950 - 2260 m.a.s.l. The Urban area lies in the depressed land as compared to the surrounding hills and mountains and altitude within the city ranges between 1130 and 1335 masl. Generally the city is surrounded by a semicircular ridge of hills and mountains. It is surrounded by hills and steep slopes in the south eastern part, while moderate and gentle sloped mountains boarders in the north.

The general catchments of the Boren area are inclined from south to north with altitude range of 1180m to 1127m above sea level. The average slope of the area is gentle except the hilly area in the north western part.

Climate

Dire Dawa has generally semi-arid (kola) climatic condition. Temperature is hot throughout the year with minor seasonal variations. November, December and January are the coldest months, while June and July are the hottest months of the year. The average annual temperature is about 26°C. Mean minimum and maximum temperature ranges from 28.1°C in the winter months to 34.6°C in the summer months.

The area receives a bimodal rainfall. A small rainfall occurring in spring & the big rain fall in summer; with an average annual rainfall of 604 mm. Evapo-transpiration exceeds precipitation in all months except in July and August.

6.2 Geology and soils

The geology of DDAC comprises metamorphic, volcanic and sedimentary rocks. On the other hand, Fluvisols and vertisols are generally dominant soil types of the area. The soil types of the Administrative Council vary according to the topography of the land forms; altitude and slopes.

6.3 Water Resources

The major water source for the administrative council is ground water resource. Surface water sources are scarce in general, while most of them do not flow during the dry seasons. As a result the population of Dire Dawa mainly depends on the ground water source, and few of the springs that emanate from the surrounding mountains.
The major streams that drain the Dire Dawa Administrative Council are Detchatu, Butijii, Legahare, Dube, Goro & Elbah. The first three pass through the town of Dire Dawa and the others are mainly at western part of the town. The Boren area is bounded by the Goro Seasonal river to the north eastern side.

The intermittent streams start from the escarpment zone and flow north wards into the alluvial plain. Secondary streams join them both from east and west. There are also a number of Wades & oasis in the administrative Council.

Detchatu is the major one, among the intermittent streams in the Dire Dawa city administrative area, where most of the precipitation as runoff from the south (escarpment zone) drains into it. Although this stream is dry for the most part of the year, it carries very large flow in the rainy season which sometimes causes flash flooding that result in some damage in the downstream towns. Most of the run of from Detchatu and the other streams spread in the low lying and flat topographic areas north of the town recharging the ground water.

6.4 Flora and fauna Resources of the area

**Flora**

Acacia woodlands, bushes, open shrub lands and grass lands are typical features of the region’s vegetation cover. Patches of junipers trees are also seen in the upper mountain ranges. Plantation trees and tree hedges within the city proper are significant and are providing shades and aesthetic values to the area. List of some of the plant species of the area are included under the annex section.

The Boren site is sparsely occupied by pastoralist settlements, which temporarily stay at a location. The vast area is open grazing land covered by grass and bushes. The area is dominated by the invasive plant species Prosopies juliflora. At few locations, crop cultivation (maize crop) is practiced by the pastoralists, in addition to their livestock keeping.

**Fauna**

As there is no forest cover that suit for wild life habitat, one cannot expect much wild life species in the DDAC. But, there are still some wild lives that have managed to survive in such disturbed environment. Some of these wildlife include; Hyena, baboon, Warthog, Leopard, Common fox, Gazelle, Dikdik, Porcupine, Zebra and Lion. List of some of wild life species found in the administrative council are included under the annex section.
**Avifauna**

According to the Dire Dawa Master plan study of 2002, the following are bird species found in the area include: Tropical Bouboou (*Laniarius ferrugineus*), Vultrine guineafowl (*Acryllium vulturinum*), Coqui francoline (*Francolineus coqui*), Lilac-breasted roller (*Coracias abyssinica*), Ring-necked dove (*Streptopelia cristata*), Black headed oriole (*Oriolus larvatus*), Blue-eared glossy starling (*Lamprotornis chalybeaus*), Paradise flycatcher (*Terpsiphone viridis*), Yellow-billed ox pecker (*Buphagus africanus*), Black-headed weaver (*Ploceus cucullatus*), African citril (*Serinus citrinelloides*) and Yellow-billed hornbill (*Tockus flavirostris*).

### 6.5 Land use/land cover characteristics

Dire Dawa has an estimated land area of 128,802 ha. According to the existing land use map of the DDAC bush lands, scrub lands and shrub lands cover 38.2% of the total area of the DD administrative council. The cultivated land with shrubs and grasses account about 18.7% of the total area of the region. The largest portion of the region is bare land, where rock out crops and bare land are the main components and account for about 36.1% of the total area of the Council.

On the other hand Boren LDP area is dominantly agricultural and residential with very few economic activities and services. The major land use composition of Boren LDP area is as presented in Table 5-1 below.

**Table 6-1 Land use/land cover of Boren locality**

<table>
<thead>
<tr>
<th>Land use type</th>
<th>Area in ha</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>18.5</td>
<td>5</td>
</tr>
<tr>
<td>Scattered settlement</td>
<td>91.0</td>
<td>25</td>
</tr>
<tr>
<td>Health service</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Cheshier community center</td>
<td>25</td>
<td>1.0</td>
</tr>
<tr>
<td>Farmland and bush cover</td>
<td>232.6</td>
<td>63</td>
</tr>
<tr>
<td>Road</td>
<td>24.4</td>
<td>7.0</td>
</tr>
<tr>
<td>Total</td>
<td>367</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Boren LDP study, 2010

The land use/land cover of the Boren area is categorized as 63% agricultural land, 25% scattered settlement, 18% planned residential area. Other infrastructure and facilities occupy the remaining percentage, out of which the existing road network occupies 7% of the land area.
6.6 Population settlement and social service infrastructure

The infrastructure facilities coverage of the LDP area varies depending on the settlement pattern. The planned area is served with all basic infrastructures such as gravel road, electricity, telephone, potable water, garbage collection container.

The scattered residential area has no adequate services. They are obliged to fetch water up to Sabian kebele. The area has no adequate services such as school, market place, health facility. The development of the area should therefore address the issues of infrastructure.

There are obstructions that encounter within the command area of the LDP project area. The major obstructions are the high tension traversing within the plots of land at different location that can cause constraints for ROW and land acquisition for the project activities. The area covered by the electric lines is significant and can interfere with the development project including the provision of infrastructure facilities in the area.
6.7 Road infrastructure

Boren LDP area has a low level of road network coverage accounting only for 7% of the total area. The existing road network of the area is as summarized in Table below. The total road length is estimated at 32.7km covering land area of 243,985m². However, most of the existing roads are none engineered earth track roads without drainage facility.

Table 6-2 Existing road infrastructure in Boren LDP area

<table>
<thead>
<tr>
<th>Road type</th>
<th>Length in m</th>
<th>Average width in m</th>
<th>area in m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial road</td>
<td>1646</td>
<td>30</td>
<td>49380</td>
</tr>
<tr>
<td>Collector road</td>
<td>14479</td>
<td>10</td>
<td>144790</td>
</tr>
<tr>
<td>Trail</td>
<td>16605</td>
<td>3</td>
<td>49815</td>
</tr>
<tr>
<td></td>
<td>32,730</td>
<td></td>
<td>243985</td>
</tr>
</tbody>
</table>

Source: Boren LDP study report, April 2010
7. **Potential Environmental Impacts**

Discussion of impacts of the project relates to the infrastructure developments planned to be implemented in the project area. These infrastructure developments include; road, drainage and water supply lines construction within the Boren Local Development area.

### 7.1 General

The potential significant impacts of the proposed project on the environment are discussed in this section of the report. The discussion also identifies and recommends appropriate benefit enhancement measures or mitigation measures for the adverse impacts.

**Impact Category**

Environmental impacts caused by infrastructure development projects can be categorized into three major impact types. They are either of; direct impact, indirect impact or cumulative impact types. Those impacts of the road project that will be felt within the influence areas of the project have direct consequences, while it also has regional and national level significance.

**Direct Impacts of the Project**

Direct impacts of the infrastructure development include impacts that can be caused by the construction activities like soil and land surface disturbances, tree hedges clearance and material removal activity at borrow and quarry development sites, dust and noise pollution due to the excavation activities and machinery operation, property losses within the ROW, interferences with traffic flow and interferences with the business and trade activities, interruption of social services etc. in the highly congested and busy urban settings of the city.

**Indirect Impacts of the Project**

These are chain effects or impacts that result due to the road, drainage and water supply line construction indirectly and at distant locations from the construction corridor. These include induced water quality deterioration as a consequence of the spoil soils and soil erosion at up stream of water sources, increased induced developments due to improvements in the road standard at some locations that were inaccessible for smooth transportation facilities etc. These impacts are normally observed during the operation phase of road projects.
**Influence Areas with Direct Impact**

The direct influence area covers the route corridors of all of the road segments within the LDP project area that are planned for improvements. The impact can also be felt at all other areas that fall within 15-kms radius on both sides of the road segments to be provided with the infrastructure planned under this project.

The major sites experiencing direct adverse impacts of the project will be;

- Areas in the road ROW and falling within 30-40meters width of the road.
- The rivers and streams crossed by the road route, and those at immediate downstream sides
- Material production sites; quarry, borrow material and sand extraction points,
- Garage sites, and material storage sites, detour and access roads created due to the projects.

**Influence Areas with Indirect Impacts**

Adjacent areas beyond the 15-kms width of the road alignment will be areas that can indirectly benefit and/or experience adverse impacts of the infrastructure development project. These areas include neighbouring localities of the project route corridor. A significant number of the population in these areas would also use and benefit from the road construction.

The implementation of the infrastructure project also enhances the overall road network and water supply performances at Dire Dawa city. The infrastructure coverage would proportionately be increased as an indicator of socio-economic development of the city as well as that of the country.

**Duration and Scale of Impacts**

Major direct environmental impacts on the natural environmental components are caused mainly during the construction phase. Adverse impacts like; soil and water resources degradation, soil erosion and clearance of tree hedges and ornamental plants, material removal and consumption from quarry and borrow pits are caused during the construction period. Socio-economic impacts like displacement of people, damages to properties and conflicts between the construction works and local people’s activities, interferences with the on-going business activities, interruption of social services and blockages of accesses to shops and service rendering houses etc. can happen during the construction phase of the project.
7.2 Positive impacts of the project

The infrastructure development project will create urban transport facility to those settlement sites away from the existing route, improvements in sanitary conditions and increased water supply coverage of the city. Provision of those services for those communities lacking it at present will significantly contribute positively and creates satisfaction among the community of the Boren kebele. The efficiency in mobility for vehicles as well as for all other road users, both motorized and none motorized mode of transport and pedestrian will benefit from the improved road standard and conditions.

The upgrading will avail standard vehicular and public transport in the premises of those that are lacking the services at places like the informal settlement areas and the expansion areas. The other roads will also benefit from the upgrading by relieving of the traffic congestions and route corridor traffic accidents on the main Dire Dawa – Melka Jebdu road.

7.3 Adverse Environmental Impacts of the project

In this section potential adverse impacts have been identified and mitigation measures that should be adopted to avoid or minimize adverse impacts are recommended. Of which, some involve good engineering practices while others are viewed from socio-economic as well as administrative points of view. The impacts described in this section are potentially the most important as far as the overall impact of the project is concerned. In all cases, there is a relatively high probability of occurrence of these significant impacts if no mitigation measures are adopted. The adverse impacts of the project shall be experienced most at those sites and locations described and on environmental resources within the road route ROW as described below.

7.3.1 Impact on Land Resources and Soil

The construction work involves site clearance, excavation, paving and grading activities, all of which involve disturbance of the land surface and loss of productive soil along the road route alignment, at quarry and borrow pit development sites, along detours, and along access roads to material production.

Road side ditches and drainage lines to be constructed to divert surface drainages to adjacent lands are major contributors to soil erosion. Erosion effects can be enhanced especially at steep slopes due to; cuts in soil and rock and widening of the road widths, drainage line construction, water supply line construction, road embankment
construction, and excavation of foundations for replacement or for additional bridges and culverts, and due to loosely compacted soil piles.

The impacts due to excavation are relatively low as the entire road route follows the existing alignment. But impact can still be significant with major improvements in design and expansion of the road widths. The topography of the area traversed by some of the road segments is flat and rolling terrain and there won’t be steep slope cut and soil disturbances due to terrain characteristics.

The excavation, paving and grading of surfaces accelerates erosion effects. The eroded soil that is transported to the nearby water body can cause sedimentation and change in the ecosystem, and on the quality of the water. Excavation is conducted for the expanded road pavement section in this project case.

Soil contamination and soil quality deterioration can result from spills and leakage of fuel and lubricants used for works, and also from mismanagement of used and waste oils. During the service period of the road, soil contamination in the corridors can arise from traffic operation and from transportation of hazardous products all of which have already been experienced by the existing infrastructure. These impacts have been in place with the existing road operation, and the road standard improvement will rather reduce the adverse effect.

**Proposed Mitigation measure**

Proper mitigation measures should be implemented to minimize the adverse impacts on land resource and soil erosion effects. The following measures are proposed for inclusion both in the design and to be implemented during the construction and operation phases;

- Planning the excavation works during the dry season especially around river crossings and at road side ditches and drainage line construction.
- Limiting the area of soil disturbance within the widths delineated for the road pavement and detour road.
- Rehabilitation of excavated and paved land surface at material production and access roads to be done as soon as possible.
- Removal and cart away of excess material from sensitive sites as soon as possible, and in parallel with the excavation activities. Dispose the excess soil material at designated & approved site.
- Exercise proper work discipline and waste management practices.
7.3.2 Adverse impacts on tree hedges and grass cover

The construction work will be implemented partly in an urban environment where major land use and land cover is occupied by housing establishments and paved surfaces. However, at the informal settlement sites and at the open fields planned for expansion areas, bushes and tree hedge do exist. Trees and grass cover also encounter at offset distances in the premises of project areas along all segments.

Tree hedges along the roads might have to be removed for the construction of the road, drainage line and water supply line in some areas, where the width of the road is narrow and where no provisions are left for expansions. These trees have significant contribution to the city beautification and to regulate the local climatic conditions. They are serving as shades and facilitate wind circulation in the city. Hence, at most precautions have to be taken to minimize the damage to those trees both during the design and construction phases.

Mitigation measure should be planned prior to construction commencement. The design should make the at most effort and find alternative alignments and alternative routes to avoid tree removal. In case avoidance is found impossible, adequate compensation should be paid for replacement of the trees. At least 15 tree seedlings of indigenous species (of similar type as those damaged if possible) should be planted for every tree cut by the project. Adequate compensation to enable the tree plantation and care until it grows to a reasonable height needs to be paid to the owner/ institution in charge of the city greenery and park development.

7.3.3 Adverse Impact on Air Quality

The assessment and monitoring of air pollution level depends on the traffic volume, traffic composition, and speed and road surface. Improvement in the road conditions shall encourage motorized vehicles and industrial development along the road alignments including those areas that used to be inaccessible for continuous vehicle movement. This can contribute to the pollution effect of the local atmosphere of the residential areas during the operation phases of the road.

The major air pollution comes from dust particles during the construction phase. The dust particle of excavated soil and from the sandy clay soil of the area can easily be exposed to wind action.

Air pollution shall also be caused by particles produced by smoke from vehicle and machinery motor exhaust, and all can contribute to the adverse impacts. The air pollution effects shall have significant adverse impacts during construction as the
surface is excavated and spoil soils is either stock piled or transported to disposal sites at this stage.

**Proposed Mitigation Measures**

The construction period air pollution impacts can be mitigated by:

- Avoiding long period of stockpiling excess excavated material on site.
- Dust suppression measures like water spraying on the paved and excavated surfaces can minimize the impact of pollution due to dust particles.
- Regular maintenances of vehicles and machinery motors for better performances. Installation of dust suppression accessories to machinery exhausts.
- Trucks carrying fine material that can easily be windblown should be covered while transporting.
- Sprinkle water to the road so that it could minimize the dust created by the road construction works.
- Install dust suppression accessories at crusher plants, for machineries producing excessive smoke.
- Air pollution prevention measures should be incorporated in the construction work specifications and contract agreements.

### 7.3.4 Noise and vibration impacts

Noise and vibration result from construction activities in general but particularly from operation of heavy machinery. Other operations generating significant noise include concrete mixing plants and stone crushing. Sustained noise levels during construction are expected to be much higher than the ambient noise level in the project area. If blasting of quarry sites and at other construction works are carried at night, it may affect/disturb the sleeping of the local community. Therefore, to minimize noise disturbance to the population around the sites, it is recommended not to undertake activities producing nuisance noise level during rest hours and during night time; and Locate quarry site in faraway places from settlements areas.

### 7.3.5 Adverse Impact on Water Resources

There are seasonal rivers and streams like Goro River that are crossed by the road routes and in the road drainage basins. The road embankments may interfere with the
natural run off flow and pose impacts on recharge rate of the local ground water sources.

The drainage line facilities to be provided carry and discharge all pollutant loads collected from their respective watershed and discharge at the downstream water courses.

Degradation of water quality can be caused by entry of excavated soil material into the downstream river courses, during construction activities, oil and fuel spillages from leaking machinery parts and upon refilling equipment. During the operation phase the drainage line to be provided will continuously and during the rainy season collect and concentrate pollutants including; solid and liquid waste from the catchment and discharge into receiving water bodies as point source pollution.

The upkeep of the water resources is, therefore, very crucial both to the health and economic wellbeing of the community in project areas and at downstream sides.

**Proposed mitigation measures**

- Provision of adequate drainage structure so as to maintain the normal flow direction and attempt to maintain uniform water distribution over surfaces at downstream side of catchments. This can reduce flow concentration to specific direction that can result in flooding effects and soil erosion, helps uniform recharge of water sources.

- Avoid stockpiling spoils at river banks, streams and groundwater sources

- Improvement measures in waste management (solid waste and liquid waste collection and treatment) should be exercised to minimize the waste load washed away by runoff into the drainages and ultimately into the water sources.

- Avoid spilling of oil from vehicles and machinery near water points and settlements; and washing of cars in the rivers.

- Cart away spoils soils immediately and regularly while working in the premises of river crossings.

- The water quality deterioration caused by pollution from oil products and chemicals can be minimized by timely maintenance of leaking machinery parts, good housekeeping practices in garages.

- Avoid entry of excavated surplus material into the water body while operation on sites

- Provision of adequate flow dispersal structures following the natural flow regime of the runoff water.
- Energy dissipaters, Stone rip raps or ditches sides protection might be required at the discharge side of culverts to minimize soil erosion and gulley formation.

### 7.3.6 Adverse impacts on properties and social services

The construction of the road will be implemented in densely populated and settled urban settings, where developed Infrastructure and housings exist. The proposed road also traverses through a high traffic loaded city centres like road crossings and round about squares, and several intersections that are heavily loaded with motorized and none motorized transport and pedestrians movements. Some of the adverse impacts likely to occur include;

- Utility service lines; electric lines, existing water pipelines, storm drainages and telecommunication cables might encounter during excavation. Those utility lines falling within the ROW width might be affected, resulting in the disruption of the services; (water supply, electric light, and telecommunication services may be disrupted) until maintenances are done.

- In most of the areas with open ditch drainage, there are concrete slab crossings or pipe culverts at the entrance to each compound. The concrete slab covers and culverts need to be demolished during the road width expansion and drainage upgrading work, resulting in loss of the material to the owner. These facilities have to be either reconstructed or compensated for in monitory terms based on the preferences of the affected people.

- In areas where the width of the route corridor is restricted, partial damage to houses and/or fences might encounter at some sites, while only fences might be affected at other places. This issue is significant for this project, since the available width (open spaces) in the ROW at some locations are restricted due to old aged buildings and houses to fit into the improved road standard.

**Proposed mitigation measures**

The project affected people should be compensated for the damages caused to their properties. Utility service owners should be consulted and their inputs and cooperation be secured prior to commencement of the construction work. Location maps for the utility services can be obtained from the utility owners and/or the municipality. The city master plan may also assist in identifying and guiding the provisions left for utility lines along the road sides.

The cost for relocation of the service lines will be covered by the road project. Interruption of the services should be avoided as far as possible or minimized through immediate repair and maintenances of the defects. Temporary alternative lines should
be arranged in cases where relocation requires longer time, and customers’ complaints should be minimized.

7.3.7 Impacts on public health and traffic safety

Trenches of varying widths are excavated to bury storm sewers and other utility service lines along the project route. Some of the damages related to such activities are:

- Trenches can be a source of health risk and cause accidents to children and old aged people if left open for long.

- There is a potential safety issue associated with construction near to schools, hospitals, public areas. Signs should be erected in the roads where construction is underway to prevent accidents. The open trench areas must be posted and fenced off at all times.

- Solid wastes deposited in the open trench and polluted stagnant water formed is aesthetically unfavourable and become sources of several disease causing organisms. Stagnant water in ditches can be a cause for infectious diseases, and breeding grounds for disease vectors like mosquito.

- Entrance and access to houses might be blocked due to excavated trenches and piled up excavated spoil soil. Road routes in the project areas might also be blocked to traffic passages due to road crossing activities, piles of soil and construction material. This can be risky especially for children and old aged people while crossing to gate in and to gate out of their dwelling houses.

- There is a potential safety issue associated with construction in the vicinity of the residential areas accompanying an increase in traffic. Temporary traffic line blockage may be caused during construction due to road crossings and road construction and due to surplus excavated material deposits. As a result, there will be an increase in traffic volume during construction and this increase is unavoidable.

- There are sensitive noise receptors such as schools, clinics and religious places within the city and along the project area; and consequently noise generated from the site will be a major annoyance to a large number of people in the densely settled urban areas.

Proposed Mitigation Measures

Trench widths should be designed not to cause obstructions or difficulties for crossing, especially in front of dwelling houses. Temporary bridge crossings should be included as
required in the project activity schedule. The crossings should be convenient for disabled people, children and old aged people.

Excavated surplus material should be removed immediately as the construction progresses and no piled up material is kept long along the roads and in the premises of houses to avoid access blockages and traffic congestions. Deep excavated trenches and excessively widened ditches should not be left open for long. Immediate and section by section backfilling of trenches should be arranged as soon as pipe laying works are complete. Back fill material should be compacted well to avoid excessive settlements and further deepening at latter stages.

The contractor is responsible for the safety of residents and he must prepare a safety plan including road signs and agree with the Site Engineer on the proposed safety plan.

To minimize the disturbance to the local population, it is recommended that construction work producing nuisance level noise, be limited to normal working hours.

7.3.8 Impacts due to ancillary works

The ancillary works like material development will require plots of land to be occupied temporarily, either at previously developed site or at new sites. Due to the scarce vegetation cover and limited forest area, even patches of trees and bush covered land has to be preserved to the extent possible, so as to regenerate the flora resources of the area. Activities and site selection for ancillary works, therefore, require careful consideration of resulting environmental consequences.

Some of the proposed material sites that have relatively dense vegetation cover have to be preserved by identifying alternative material site as far as possible.

Material production sites should not be located within or in close proximity of sensitive Physical & Cultural Resources (PCRs) sites like dense forest areas, wild life habitat, settlement sites, and social and cultural service areas and at cultural and historical heritage sites.

The quarry material production area has to be screened /determined/ in consultation and with the approval of the supervision consultant and the client, DD city administration. Also sufficient consultation should be conducted with the local administration (Woredas) prior to commencing excavation activity. The relevant stakeholders including the regional environmental protection offices have to be involved in site selection and screening and to demarcate and fix the boundary of disturbance for quarry and borrow material production.

The left over spoil soil should be collected and kept aside for rehabilitation of the site at later stage of the work. Spoil soil should be shaped and compacted to avoid erosion
and leakage to the river courses, water bodies or stockpiled on dense vegetation covered ground.

Upon completion of the use of the production site, it should be rehabilitated and restored to its original state to a reasonable degree so as to avoid water ponding, soil erosion, aesthetically undesirable situations and disfigured landscape. Back filling, grading and re-vegetation of the site would help to mitigate the impact. Based on the site condition, simple soil retaining structures and runoff water diversion structures might be required to stabilize the soil structure and reduce the effect of soil erosion until it consolidates.

The engineer on site has the responsibility to give instructions and assistance to the contractor in material site management and rehabilitation activities. Site environmental management should also involve the DD environmental protection office, the DDULG project coordination office and also give due consideration for the communities’ opinion and comments.

Rehabilitation works of the abandoned material site be done properly and on timely bases. Subsequent payments should consider the proper site restoration and rehabilitation of abandoned material sites as one of the criteria of work performance. The payments and release of performance bonds will be withhold until rehabilitation commences and tangible effort is seen on site, and should only be effected if proper rehabilitation is done for already abandoned material site along with other activities. This has to be done by the supervising consultant. The project coordination office is expected to specify this condition as payable item upon hiring the consultant and the contractor.

The construction contract has to have a clause to the effect that quarry sites and access roads are deemed to be part of the site, so that the powers and authority of the Engineer extend to them in the same way as to other areas where works are being undertaken.

### 7.3.9 Impact due to spoil soil disposal areas

It is expected that the project works will generate large quantities of spoil material and debris, especially due to widening of the carriage width and due to some minor geometric design adjustments. It is likely that there will be occasions when unsuitable existing road material will need to be removed and disposed of. In addition, material eroded from the spoil itself can be deposited in water courses, with adverse effects on channel morphology and capacity to convey flood flows, deteriorates the water quality of receiving streams.
Mitigation Measures

The construction contract document should include requirements that spoil disposal sites should be officially proposed by the contractor at areas designated by the relevant local administrative organ and permission is obtained accordingly by the contractor. The selected disposal site shall be in unproductive land, with preference being given to backfilling deep gullies, quarry and borrow sites developed and abandoned by the contractor, provided that the requirements of the clause which follows are met.

The construction contract should contain clauses to the effect that all spoil material shall only be disposed at sites which have been approved by the Engineer and in accordance with approved site-specific environmental plans. The side-tipping of spoil in any location shall be specifically prohibited. Prior to the commencement of disposal at any site, the contractor shall prepare a site-specific Site Environmental Plan (SEP) for the approval of the Engineer and the local supervising official.

7.3.10 Impacts due Sexually Transmitted Diseases (STD) and HIV/AIDS

Road and infrastructure construction and other similar type of construction works are considered to be having high potential (due to their mobility) for the spread of communicable diseases, such as Sexually Transmitted Diseases (STD) and HIV/AIDS. The spread could be from the construction workforce to the local population and vice versa.

This is partly true because construction workers are mostly young and sexually active group of the population and are mobile, and have more income than the local population to spend. Hence, the increase in the number of sex workers and alcoholism are believed to contribute to the spread STD and HIV/AIDS.

Proposed Mitigation Measures

- Design awareness creation of projects/programs to address the problem and spread of HIV/AIDS among project workers and local communities
- Provide education for local communities regarding the spread of HIV/AIDS and STDs in public places, schools, and through community clubs and groups
- Work closely with local health service giving institutions to control the spread of STD and HIV/AIDS
- Carry out voluntary testing
- Provide care and support for HIV affected and effected groups
• Free distribution of condoms both male and female type

8. Environmental Management and Monitoring Plan (EMP)

Environmental Management Plan

Environmental management plan specifies mitigation and monitoring actions with time frames, specific responsibilities assigned and follow-up actions defined. Major negative impacts and proposed mitigation measures have been outlined in the above sections. Implementations of these measures have to be carried out at different stages of the road construction & operation phases.

During the design stage the consultant should incorporate proposed mitigation measures in the design and tender documents. The contractual agreement should also include articles to enforce the environmental issues. Construction stage activities are mainly the responsibility of the contractor and that of the construction supervision consultant. The actual physical implementation works are carried out mostly at this stage. The execution of the road construction work should also equally treat the implementation of the physical works of environmental mitigation measures. Environmental issues during the operation phase of the road shall be handled by the owner of the road infrastructure, the relevant department.

8.1 Pre-Construction phase management plan

Prior to contractor mobilization and the commencement of construction, environmental management will be concerned with the following principal groups of activities:

• Ensuring that all government and procedures relating to EIA are complied with.

• Implementation of land and property acquisition procedures including the payment of compensation.

• Relocation & compensation for Utility services in the ROW to avoid service disruptions and complaints from user community.

• Preparation of monitoring action plan and get it approved by the engineer.

• Identification and approval for spoil soils disposal sites.

As the project promoter, the DD ULGDP coordination office will be responsible for submitting the EIS to the DDEPA for evaluation according to internal procedures.
8.2 Construction Phase management plan

Most of the project environmental management activities will be carried out during the construction phase, since this is time when most impacts can be expected to arise. Management will very largely be concerned with controlling impacts which may result from the actions of the Contractor, through enforcement of the construction contract clauses related to protection of the environment as a whole and of the components within it. In this respect, it is important to recognize that successful mitigation of construction impacts can only be achieved if the environmental protection measures, as set out in the EIA document and construction contract, are properly enforced.

Overall primary responsibility for construction supervision and contract management, and, therefore, for environmental management during construction, will lie with the Engineer as defined in the construction contract. However, certain powers and authority relating to day-to-day supervision will be delegated by the Engineer to the Resident Engineer (RE). The RE will have executive responsibility for ensuring that all site environmental management and monitoring aspects are dealt with promptly and properly.

Particular attention will be paid to establishing procedures whereby emergency action can be taken by the site staff in the event of the contractor acting in a manner which may cause immediate and significant environmental damage, for example problems associated with interruptions to water supply, or contamination of land, groundwater or surface water through inappropriate handling of contaminating substances, cause damages to environmental and social resources.

The implementation of proposed mitigation measures will be monitored for compliances to set standards.

8.3 Post-construction phase management plan

Continued enjoyment of the benefits arising from implementation of the project will only be achieved if effective routine and periodic pavement, earthworks and drainage system maintenance is carried out in a timely manner. Environmental management and monitoring in this respect will be the responsibility of the DD municipality, with implementation being carried out either by the delegated departments themselves or by external contractors. The detail of environmental management plan is described as in Table 7-1 below.
### Table 8-1 Schedule of Management and Responsibilities

<table>
<thead>
<tr>
<th>No</th>
<th>Project Phase</th>
<th>Potential Environmental &amp; Social Impacts</th>
<th>Proposed Mitigation Measures</th>
<th>Institutional Responsibility</th>
<th>Cost Estimates (birr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design/Pre-construction Phase</td>
<td>Land acquisition &amp; Right-Of-Way clearance</td>
<td>• Include the environmental and social issues in the design and clauses into the construction contract document</td>
<td>Design consultant and relevant department of DDCA</td>
<td>Part of the design cost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Stimulation of new construction in the ROW to obtain fraudulent compensation</td>
<td>• Prohibit new and additional construction within the ROW agreed up on as of the date considered to be final (cut of date)</td>
<td>Local administration</td>
<td>Normal administrative cost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public doubts regarding land acquisition issue and property loss</td>
<td>• Inform the community about the project objectives, project related impacts and associated planned remedial measures</td>
<td>Compensation committee composing of; DDCA, Local administration, the affected group and Community representatives</td>
<td>Daily allowances for compensation committee.</td>
</tr>
<tr>
<td>No</td>
<td>Project Phase</td>
<td>Potential Environmental &amp; Social Impacts</td>
<td>Proposed Mitigation Measures</td>
<td>Institutional Responsibility</td>
<td>Cost Estimates (birr)</td>
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<td></td>
<td>Construction Phase</td>
<td>Loss of houses,</td>
<td>• Houses falling in ROW width may have to be demolished partially or fully and need to be compensated for.</td>
<td>A committee composing of; DDCA, ROW Agent, Local administration, Affected group(PAPs), Utility owners and service providers, Community representatives</td>
<td>As per compensation cost estimates to be made separately.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loss and/or disruption of other social service infrastructures and social utility service</td>
<td>• The road project may interfere with utility services like water supply, electric line, telecommunication line etc. In such cases, either the design has to consider avoiding the alignment or the water line has to be relocated. Arrangements have to be made for the relocation and compensation. Relocation has to be made prior to mobilizing the construction work or alternative supply line is provided until relocation is done; not to interrupt the services in the sub cities traversed by the road and or on adjacent areas.</td>
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<td>• Compensation to the affected group should be effected according to legal provisions and regulations (proclamations No 455/2000, regulation135/2002 &amp; 456/2000)</td>
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<td></td>
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<td>• Resettlement of displaced people and relocation of properties and utilities should be completed well in advance of commencing the construction work.</td>
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<td>No</td>
<td>Project Phase</td>
<td>Potential Environmental &amp; Social Impacts</td>
<td>Proposed Mitigation Measures</td>
<td>Institutional Responsibility</td>
<td>Cost Estimates (birr)</td>
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</table>
|    |                | Change in landscape at material production sites, Degraded land & soil erosion hazards | • Rehabilitate material production sites; borrow pits, quarries and plant sites up on completion of site works.  
• Surplus excavated top soil shall be stored adjacent to production sites and back filled to rehabilitate degraded grounds.  
• Provide adequate drain pipes to avoid excessive concentrated flow  
• Place drain outlets to avoid cascade effect.  
• Line runoff receiving surfaces or ditches with stone ripraps or concrete  
• Avoid slide susceptible sites for use as construction material extraction area.  
• Re-habilitate and re-plant disfigured and excavated land for quarry and borrow pit, | • Construction contractor  
• Supervising consultant  
• Bureau of agriculture and rural development | Rehabilitation costs will be estimated by the engineering design and included in the BOQ. |
<p>|    |                | Damage to trees and grasses along road sides | • Try to protect and maintain trees as | | 500,000 |</p>
<table>
<thead>
<tr>
<th>No</th>
<th>Project Phase</th>
<th>Potential Environmental &amp; Social Impacts</th>
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<td></td>
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<td>and in medians</td>
<td>far as possible.</td>
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<td>• Liaison with the city sanitation and beautification agency and take inventory and list of all trees including ornamental trees and tree hedges that should be removed due to the project.</td>
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<td>• Check for the trees and plants that can be relocated without significant damage. and arrange for relocation.</td>
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<td>• Plant new seedlings to compensate for those that cannot be directly relocated.</td>
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<td></td>
<td>• Planting of the replacement tree can be done either by subcontracting private foresters or through the SBPA in which case compensation has to be paid to the agency.</td>
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<td>No</td>
<td>Project Phase</td>
<td>Potential Environmental &amp; Social Impacts</td>
<td>Proposed Mitigation Measures</td>
<td>Institutional Responsibility</td>
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</table>
|    |               | Soil and water sources contamination     | • Trees cut at material production sites have to be compensated accordingly.  
• Timely cart away surplus spoil soil, especially in the traffic loaded sites, dump trucks should be online and collect alongside excavation and transport to disposal site, do not allow spoil soils piled up on site in the city.  
• Maintain leaking equipment and vehicle parts, Avoid fuel & oil spillages while refilling, collect and properly treat used oil and garage wastes.  
• Exercise proper waste management and disposal practices at garages and at workplaces. | Contractor | Part of the engineering cost estimates. The engineering design should estimate volume of spoils to be generated and allocate budget for spoil soils management. |
<table>
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<tr>
<th>No</th>
<th>Project Phase</th>
<th>Potential Environmental &amp; Social Impacts</th>
<th>Proposed Mitigation Measures</th>
<th>Institutional Responsibility</th>
<th>Cost Estimates (birr)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Damages to archaeological, religious, cultural and historical resources and burial grounds.</td>
<td>Avoid heritage sites as far as possible by re-alignment; report to the culture and sport bureau immediately any chance findings up on excavation, and arrange onsite preservation or relocation as directed by the bureau or religious leaders as the case may be.</td>
<td>Contractor, Supervision consultants, Bureau of culture and tourism, religious institutions.</td>
<td>70,000 for relocation of burials and/or archaeological findings</td>
</tr>
</tbody>
</table>
|    |               | Impacts on receiving water resources; | • Avoid disposal of excavated materials to river course  
• Maintenance of vehicle to minimize oil spills and prohibit open field waste disposal.  
• Minimize disturbance by the construction works in compliance with works contracts/ specifications  
• Provide adequate flow dispersal structure (culverts, etc.) to maintain the natural flow direction and to avoid flow concentration to specific locations, and flooding risks. | Contractor/ supervising consultant, | Part of the construction cost  
Included in the construction cost estimates |
<table>
<thead>
<tr>
<th>No</th>
<th>Project Phase</th>
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<th>Proposed Mitigation Measures</th>
<th>Institutional Responsibility</th>
<th>Cost Estimates (birr)</th>
</tr>
</thead>
</table>
|    |               | Air pollution from crushers and Dust pollution and noise during construction in the city | • Dust suppression measures like spaying of water, traffic speed control.  
• Regular maintenance of machinery and vehicle to reduce excessive gaseous emissions  
• Install dust and smoke suppression accessories on asphalt plant and crasher equipment  
• Transported soil and fine particle materials should be covered to protect from spread and wind blow in to the atmosphere.  
• Limit construction to normal working hours;  
• Reduce noise and vibration impacts specially while working in the premises of hospitals, schools, residential sites and public institutions where excessive noise is considered to be nuisance and | Contractor  
Supervision consultants, traffic police. | Part of construction cost |
<table>
<thead>
<tr>
<th>No</th>
<th>Project Phase</th>
<th>Potential Environmental &amp; Social Impacts</th>
<th>Proposed Mitigation Measures</th>
<th>Institutional Responsibility</th>
<th>Cost Estimates (birr)</th>
</tr>
</thead>
</table>
|    |               | Traffic jams and traffic accidents due to increased construction vehicle, machinery and non motorized traffic on site. Due to road blockage for construction activities along the existing road while construction is in progress in the densely populated areas. | • Flag men / safety personnel assigned to guide traffic flow at critical locations  
• Traffic signs are provided as required.  
• Adequate detour road shall be provided not to interfere with normal traffic flow.  
• Adequate side roads and shoulders for pedestrian will be left free of debris, material deposits, and free of obstructions.  
• Speed control and traffic management measures put in place  
• Do not leave ditches open for long, properly protect and post warning sign with reflectors,  
• Do not stockpile spoil soils and                                                                 | Contractor, supervision consultant | Included in Engineering cost estimates |
<table>
<thead>
<tr>
<th>No</th>
<th>Project Phase</th>
<th>Potential Environmental &amp; Social Impacts</th>
<th>Proposed Mitigation Measures</th>
<th>Institutional Responsibility</th>
<th>Cost Estimates (birr)</th>
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<td>materials for long along the road sides.</td>
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<td>• Post security guide and traffic sign at critical locations.</td>
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<td></td>
<td></td>
<td>Traffic accidents</td>
<td>• The contractor should ensure that all operators and drivers are fully qualified &amp; are able to handle the responsibility they are assigned to</td>
<td>• Traffic police</td>
<td>Administrative cost</td>
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<td></td>
<td></td>
<td></td>
<td>• Impairment of non motorized transport</td>
<td>• Contractor</td>
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<td></td>
<td></td>
<td></td>
<td>• Traffic congestion due to road blockage</td>
<td>• Contractor</td>
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<td></td>
<td></td>
<td></td>
<td>• Damage to vehicles using un paved detour ways</td>
<td>• Contractor</td>
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<td></td>
<td></td>
<td></td>
<td>• Accidents and delays created to passengers</td>
<td>• Contractor</td>
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<td></td>
<td></td>
<td></td>
<td>• Provide wider road shoulders and separate lane for pedestrian and non-motorized transport</td>
<td>• Supervising Consultant</td>
<td>Part of engineering cost estimate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Provide paved and well-constructed detour road during road construction.</td>
<td>• Contractor</td>
<td></td>
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<td></td>
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<td></td>
<td>• Maintain and apply dust suppression measures to minimize dust pollution and vehicle accidents caused due to distant visibility problem.</td>
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<td>No</td>
<td>Project Phase</td>
<td>Potential Environmental &amp; Social Impacts</td>
<td>Proposed Mitigation Measures</td>
<td>Institutional Responsibility</td>
<td>Cost Estimates (birr)</td>
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</tbody>
</table>
| 3  | Operation Phase | Soil erosion and soil contamination | • Maintain storm drains and ditches regularly  
• Grass cover slopes and graded grounds, and protect livestock grazing at road shoulders and embankments | DDCA | Regular administrative cost |
|    |                | Traffic accidents                        | • Road shoulders have to be kept wide enough as per the design for use by the pedestrian.  
• Maintain traffic posts and traffic signals  
• Organize awareness creation forum on traffic regulations and safety principles both to the community, drivers and to the investors in transport industry of the area. | DDCA | Administrative cost |
|    |                |                                           |                             | Traffic police | Normal Administrative cost |
8.4 Environmental Monitoring Plan

8.4.1 General Considerations

The monitoring program for the present project will be undertaken both as compliance to set and proposed measures to mitigate adverse impacts and/or to enhance the positive ones. It also attempts to check the effects of project implementation. In this regard, the monitoring will try to meet the following objectives:

- To check on whether the proposed mitigation and benefit enhancement measures have actually been adopted, and are proving effective outcomes in practice.
- To provide a means whereby any impacts which were subject to uncertainty at the time of preparation of the EIA, or which were unforeseen, can be identified, and to provide a basis for formulating appropriate additional impact control measures.
- To provide information on the actual nature and extent of key impacts and the effectiveness of mitigation and benefit enhancement measures which, through a feedback mechanism, can improve the planning and execution of future, similar projects.

Compliance monitoring is usually given more emphasis in the case of road projects than is effects monitoring. This is because most impact controls take the form of measures incorporated in project designs and contract documents, and the extent to which recommendations on these matters, as set out in the EIA, are complied with, plays a major part in determining the overall environmental performance of the project.

8.4.2 Project Monitoring Phases

Pre-construction Phase monitoring

Monitoring during the pre-construction phase of the project will be concerned with two aspects:

- Checking that the project designs and specifications incorporate appropriate measures to minimize negative impacts and to enhance beneficial impacts.
- Check that mitigation measures have been included in BOQ as payable items.
• Checking that the appropriate environmental protection clauses have been included in the contract documents to allow control of actions by the contractor, which are potentially damaging to the environment.

These activities have been carried out as part of the preparation of designs and tender documents for the project and the monitoring at the pre-construction phase has to confirm this issues.

**Construction Phase Monitoring**

Environmental monitoring during the construction phase will comprise two principal groups of activities:

• Review of the Contractor’s plans, method statements, temporary works designs, and arrangements relating to obtaining necessary approvals from the Engineer, so as to ensure that environmental protection measures specified in the contract documents are adopted, and that the Contractor’s proposals provide an acceptable level of impact control.

• Systematic observation on a day-to-day basis of all site activities and the Contractor’s offsite facilities including quarry and borrow areas, as a check that the contract requirements relating to environmental matters are in fact being complied with, and that no impacts foreseen and unforeseen are occurring.

These activities will be fully integrated with other construction supervision and monitoring activities carried out by the construction supervision consultant. Primary responsibility for ensuring that an adequate level of environmental monitoring is carried out will lie with the RE, as part of his duties connected with general site supervision. Actual monitoring on a day-to-day basis will be carried out by the site staff/environmentalist from the construction supervision consultant, under the direction of the RE.

The majority of monitoring will comprise visual observations, carried out at the same time as the engineering monitoring activities. Site inspections will take place with emphasis on early identification of any environmental problems and the initiation of suitable remedial action. Where remedial actions have been required on the part of the Contractor, further checks will need to be made to ensure that these are actually being implemented to the agreed schedule and in the required form. Each part of the site where construction is taking place needs to be formally inspected from an environmental viewpoint on a regular basis.

Monthly reports prepared by the RE should contain a brief section referring to environmental matters, which summarizes the results of site monitoring, remedial actions, which have been initiated, and whether or not the resultant action is having
the desired result. The report will also identify any unforeseen environmental problems and will recommend suitable additional actions. Progress meetings with the contractor will also include a review of environmental aspects.

**Post-construction Phase Monitoring**

Post-construction phase monitoring will be concerned with identification of the need for routine and periodic maintenance to pavement, earthworks, drains and drainage structures, together with checking that the maintenance works are being carried out properly and are not resulting in environmental damage. This aspect will be the responsibility of DDRA Maintenance Department and the regional environmental protection departments.
Table 8-2 Environmental Monitoring Plan

<table>
<thead>
<tr>
<th>Project phase</th>
<th>Proposed mitigation measures</th>
<th>Parameters to be monitored</th>
<th>location</th>
<th>Institutional responsibilities</th>
<th>Cost estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre - construction phase</td>
<td>• Ensure that all government policies and EIA procedures are complied with.</td>
<td>Design documents Contract documents</td>
<td>Project office</td>
<td>Project owner consultants</td>
<td>Part of the consultancy service and administrative cost</td>
</tr>
<tr>
<td></td>
<td>• Ensure environmental and social mitigation measures are considered in the design.</td>
<td></td>
<td></td>
<td>Local administration and compensation committee</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Implementation of land and property acquisition procedures including the payment of compensation.</td>
<td></td>
<td></td>
<td>Utility owners</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Relocation &amp; compensation for Utility services in the ROW to avoid service disruptions and complaints from user community.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Preparation of monitoring action plan and get it approved by the engineer.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Identification and approval for spoil soils disposal sites.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Rehabilitate material production sites; borrow pits, quarries and plant sites up</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project phase</td>
<td>Proposed mitigation measures</td>
<td>Parameters to be monitored</td>
<td>location</td>
<td>Institutional responsibilities</td>
<td>Cost estimates</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------</td>
<td>---------------------------</td>
<td>----------</td>
<td>-----------------------------</td>
<td>----------------</td>
</tr>
</tbody>
</table>
| Construction phase | • avoid haphazard vehicle and workers movement in open fields by limiting vehicular movements to only existing track roads  
• avoid tree cutting, and damages  
• loosening of compacted grounds along access roads and detours upon completion of works and  
• replacement tree planting and grassing | • Travel route of construction workforce  
• Material production sites  
• area of land and vegetation damages  
• Number of trees cut and area of grassland | Along access roads, detour roads used during construction  
Local administration  
EPA offices | Contractor Supervision consultant  
Local administration  
EPA offices | Part of the contract amount, and normal administrative costs for the regulatory institutions |

on completion of site works.

• Surplus excavated top soil shall be stored adjacent to production sites and back filled to rehabilitate degraded grounds.
• check adequate drain pipes to avoid excessive concentrated flow
• ensure Drain outlets are Placed to avoid cascade effect.

• Number of trees cut and area of grassland along project routes and

Included under section 7-5
<table>
<thead>
<tr>
<th>Project phase</th>
<th>Proposed mitigation measures</th>
<th>Parameters to be monitored</th>
<th>location</th>
<th>Institutional responsibilities</th>
<th>Cost estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>damages</td>
<td>road sides at construction material production sites</td>
<td>below</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trees planted as replacement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proper spoil soil collection and carting.</td>
<td>Collection and carting efficiency for spoil soils</td>
<td>Construction sites</td>
<td>Part of the contract amount, and normal administrative costs for the regulatory institutions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avoid dumping of spoils at river banks</td>
<td>Availability of designated disposal sites</td>
<td>Dumping sites</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maintenance of vehicle and equipment</td>
<td>Provision of waste collection and disposal facilities at work places</td>
<td>Workshops</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proper waste management at work place, garages and workshops</td>
<td>Awareness creation program conducted</td>
<td>At work places</td>
<td>Contractor and supervision consultant</td>
<td>Part of the construction contract.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>First aid kit availed</td>
<td>Along haulage routes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Awareness creation program Provided to avoid accidental risks and Traffic safety</td>
<td>Availability of Safety devices and protective cloths</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Availability of first aid facilities and protective clothing and devices on site for emergency cases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Road pavement</td>
<td>In the city and</td>
<td>Local</td>
<td>Normal</td>
</tr>
<tr>
<td>Project phase</td>
<td>Proposed mitigation measures</td>
<td>Parameters to be monitored</td>
<td>location</td>
<td>Institutional responsibilities</td>
<td>Cost estimates</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------------</td>
<td>-----------------------------</td>
<td>----------</td>
<td>---------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td></td>
<td>infrastructures; roads, water supply line and drainages etc.</td>
<td>conditions, storm flows and flooding problems, Traffic flow, social services like water supply, waste management efficiencies</td>
<td>along the infrastructure routes.</td>
<td>administration and the respective service providers.</td>
<td>operation cost of the municipality and service provider sectoral institutions</td>
</tr>
</tbody>
</table>
8.5 Environmental Mitigation Management and Monitoring Costs

Apart from the cost of relocation/compensation and the costs already included in the engineering cost estimate, the other costs of environmental mitigation measures, monitoring and capacity building costs are estimated and included in this report. This part of the cost is Birr1,416,000 (one million four hundred sixteen thousand). These measures include; bio-engineering mitigation measures for rehabilitation and landscaping of disturbed grounds and replacement of trees cut, HIV/AIDS Program implementation, training of environmental specialists, supervision and monitoring costs. Major costs related to environmental enhancement measures that require major physical construction works shall be estimated and included in the engineering design and tender documents. Table 7.2 presents estimated costs for the mitigation measures estimated in here.

Table 8.3 Environmental Mitigation Management, Monitoring and Training costs (Birr)

<table>
<thead>
<tr>
<th>No</th>
<th>Description of Activities</th>
<th>Unit</th>
<th>Quantity</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Erosion control measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Engineering measures</td>
<td></td>
<td></td>
<td></td>
<td>Included in engineering cost estimate</td>
</tr>
<tr>
<td>1.2</td>
<td>Bio-Engineering measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Top soiling and grassing of medians and embankments)</td>
<td>M2</td>
<td>-</td>
<td>-</td>
<td>500,000</td>
</tr>
<tr>
<td>1.3</td>
<td>Replacement tree planting</td>
<td>pcs</td>
<td>-</td>
<td>-</td>
<td>400,000</td>
</tr>
<tr>
<td>1.4</td>
<td>Relocation of archaeological findings and burial places (if any)</td>
<td>pcs</td>
<td>-</td>
<td>-</td>
<td>50,000</td>
</tr>
<tr>
<td>3</td>
<td>Site restoration and artificial landscaping</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td>Restoration of land used as detour roads, material production site,</td>
<td></td>
<td></td>
<td></td>
<td>Included in engineering cost estimate</td>
</tr>
<tr>
<td>3.2</td>
<td>Artificial landscaping of quarry and borrow pits, spoil soils disposal site landscaping</td>
<td></td>
<td></td>
<td></td>
<td>Included in engineering cost estimate</td>
</tr>
<tr>
<td>No</td>
<td>Description of Activities</td>
<td>Unit</td>
<td>Quantity</td>
<td>Rate</td>
<td>Amount</td>
</tr>
<tr>
<td>----</td>
<td>---------------------------</td>
<td>------</td>
<td>----------</td>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td>4</td>
<td>Road safety provisions (road and traffic signs etc.)</td>
<td>Included in engineering cost estimate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Environmental Monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2</td>
<td>Routine monitoring and field visit expenses for environmental specialists</td>
<td>LS</td>
<td></td>
<td></td>
<td>30,000</td>
</tr>
<tr>
<td>6.0</td>
<td>Short term training for excavator operators on PCR artefact recognition.</td>
<td>Included in engineering cost estimate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1</td>
<td>Setting up of rapid response system for PCR findings with concerned authorities.</td>
<td>Included in engineering cost estimate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.0</td>
<td>Awareness creation and availing facilities for HIV/AIDS prevention</td>
<td>LS</td>
<td></td>
<td></td>
<td>200,000</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td>1,180,000</td>
</tr>
<tr>
<td></td>
<td>Contingency (20%)</td>
<td></td>
<td></td>
<td></td>
<td>236,000</td>
</tr>
<tr>
<td></td>
<td><strong>Grand Total</strong></td>
<td></td>
<td></td>
<td></td>
<td>1,416,000 plus compensation costs for damaged properties</td>
</tr>
</tbody>
</table>
9. Conclusion and Recommendation

The Boren area is designated as expansion and industrial zone of the DD city administration. Large scale business, institutions, commercial and residential building complexes will be developed and will continue to be expanded in the area.

The provision of infrastructure to the Boren area and upgrading of the existing ones will facilitate such development and the planned vision and missions of the LDP as per the study. The basic social services for the community will be availed. Sanitary condition will improve, transport services will improve, traffic flow will be facilitated in the congested areas, while it will open up vehicular transport facilities for areas lacking public transport in their premises. Some of the segments traverse residential areas where passage to vehicle is difficult at present.

However, adverse impacts will also be significant during the project implementation. Vegetation clearance and land disturbance and related environmental impacts are likely, the densely settled and commercial sites with houses and facilities will definitely experience complication, while ROW clearance and relocation of existing facilities and service utility lines may be requisite. Significant number houses and utility service lines will have to be demolished and relocated at areas of narrow ROW width. Traffic management; mobility and traffic safety issues will also be significant and needs well organized management system.

So it is the recommendation of this study that the mitigation measures proposed at all stages of the project implementation be given due attention and considered during the whole processes.

With careful and well planned site management, the project can be implemented with relatively lower adverse impacts.
10. References

1. Annual Statistical Bulletin of Dire Dawa city administration, DD. BOFED,


ANNEX

Annex 1: List of Consulted office

Annex-2: Clarification and responses to comments on draft EIA report(1)

Annex-3: Terms of Reference TOR

Annex-4: Endorsement letter from the concerned environmental agency or local administration (approval letter of screening report is available with the ULG coordination office)

Annex-6: List of Members of the study Team
## Annex - : List of consulted offices/ persons

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of contacted person</th>
<th>Location</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ato Girum Birhanu</td>
<td>DDLUGDP coordination office</td>
<td>DDLUGDP project coordinator</td>
</tr>
<tr>
<td>2</td>
<td>W/t Tsion</td>
<td>DDLUGDP coordination office</td>
<td>Sociologist</td>
</tr>
<tr>
<td>3</td>
<td>Ato Gezahegn Tadewos Jifar</td>
<td>DD Municipality</td>
<td>Policy and study plan development cooperation office head</td>
</tr>
<tr>
<td>4</td>
<td>Ato Diriye Gored Beshir</td>
<td>Boren Kebele 37/38 Office</td>
<td>Kebele Administrator</td>
</tr>
<tr>
<td>5</td>
<td>Ato Abdul Selam Mohamed Ibrahim</td>
<td>Ditto</td>
<td>Manager/Land Development administration</td>
</tr>
<tr>
<td>6</td>
<td>Ato Immaji Abdela</td>
<td>Ditto</td>
<td>D/ Manager/ Land Development administration,</td>
</tr>
<tr>
<td>7</td>
<td>Ato Nigussu</td>
<td>DDWSA</td>
<td>Planning head</td>
</tr>
<tr>
<td>8</td>
<td>Ato Shimelis</td>
<td>DDWSA</td>
<td>DD Sanitation beautification office</td>
</tr>
</tbody>
</table>
Annex Clarification and Responses to comments of the client

<table>
<thead>
<tr>
<th>section</th>
<th>Comments</th>
<th>clarification</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive summary</td>
<td>Needs rewriting as it is copy paste of paragraphs in the main body.</td>
<td>It is an extract of the main study document. Paragraphs that represent each chapter are adopted from each section.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Executive summary is to briefly represent the findings of the study document and cannot be an independent statement.</td>
<td></td>
</tr>
<tr>
<td>1.1 Introduction</td>
<td>Diredawa or Ethiopia? Not clear?.</td>
<td>This has clearly been indicated. The project is located in eastern Ethiopian within Diredawa city administration.</td>
<td>Section 1.1</td>
</tr>
<tr>
<td></td>
<td>Coverage of road infrastructure, Can it be specified in terms of number or km e.t.c.</td>
<td>It is estimated (by LDP study) that road network coverage is 7% of the land area. This has been included in the final report as per the comment</td>
<td></td>
</tr>
<tr>
<td>1.3 Environmental scoping</td>
<td>Consultation of stakeholders; When, how many participants etc.</td>
<td>During site visit, at the project site and Kebele administration, municipality, and with relevant sectoral offices and officials, list of consulted persons is included under the annex section.</td>
<td></td>
</tr>
<tr>
<td>1.4 Project Description</td>
<td>The location is identified, but there is no description and the nature of the construction and the E&amp;S issues associated with it.</td>
<td>Project activities are described under section 3.2 of the main document. Environmental issues and impacts are also discussed sedately.</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Area? Map that can give the information on the specific location is necessary here.</td>
<td>Ok project location map is included as per the comment in the main document (section 5.2). But this is part of executive summary and will not require separate map.</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>Summary of environment and social impact of the project is not detailed here?</td>
<td>Details are discussed in the main document; this is only extract to be considered as part of the executive summary.</td>
<td></td>
</tr>
<tr>
<td>1.6 Environmental Management Plan</td>
<td>Indicate the summary of detailed activities and respective cost details?</td>
<td>Details are discussed in the main document, however, summary matrix showing impacts and mitigation measure cost estimates is included in the final report as per the comment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Section -8</td>
<td></td>
</tr>
</tbody>
</table>

### Main document

<table>
<thead>
<tr>
<th>2.1 Background to the project</th>
<th>Boren LDP Area?</th>
<th>Discussed in the subsequent /following sentences.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What is the size and dimension of each project? (road networks, drainages, water supply and sanitation facilities)</td>
<td>These data are given in the document and can be referred including in the project description section and executive summary.</td>
</tr>
</tbody>
</table>
### 3.2 Project activities

<table>
<thead>
<tr>
<th>Roads in terms of km, its design (gravel, earth road, cobblestone),</th>
<th>The size/length of each project to be implemented is included as per the comment. The design level of road network in the project area and that are envisaged has already been discussed in the report under section 3.1.</th>
</tr>
</thead>
<tbody>
<tr>
<td>New alignment is it not only upgrading the existing road?</td>
<td>The LDP envisaged road category is discussed in this document section 3.1 and elsewhere, and includes both new and upgrading of existing roads.</td>
</tr>
</tbody>
</table>

### 3.3 Analyses of alternatives

| What are the alternatives other than the planned routes for roads and other utility lines and sanitation facilities? | Project implementation VS the no project is also one of the alternatives/options to be analyzed and that is what has been done in the study document. |

### 3.4 Geographical boundary and ROW-conditions of the study area in relation to possible impacts

| The border? and Could the area be specified? | The area has been indicated to be Boren LDP project site for major works, and at out skirts of the city proper for material production, where no settlement and no sensitive environmental components are located. |

### 3.5 Land requirements

| Is this (5ha) the total area or the land requirement for the project? | It is the area of land demarcated for the Boren LDP project implementation, as indicated in the document. |
Within this demarcated route corridor, different social service infrastructures will be developed as discussed above

<table>
<thead>
<tr>
<th>What are they?</th>
<th>They are the ones listed in the preceding paragraph and also in the following sentence as well. Please proceed forward and you will get the lists of the projects.</th>
</tr>
</thead>
</table>

### 3.6 The open area is covered by bushes---

<table>
<thead>
<tr>
<th>Is it beyond the 100%?</th>
<th>No it is within the 100%</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Where is the specific location? Distance from the project site? What potential impact it will have on the surrounding if there is going to be a quarry?</th>
<th>As responded above for the material sites. Impacts are discussed separately under sections below</th>
</tr>
</thead>
</table>

- Indicates that there will be people and property affected. Where is the RAP?
- People will be affected!

**The project is not affect the property of the peoples. Therefore RAP is not required.**

### 3.7 Consultation of stakeholders

Please attach consultation minutes

### 4.4.2 Dire Dawa city administration

This is an old data. The city is divided in nine kebeles and about 34 rural kebeles

Ok comment accepted and number of kebeles replaced

### 4.4.6 Organizational responsibilities for ulgdp implementation

- Arrange the paragraph?
- Please use name consistently MUDC

- Ok edited as per the comment
- Yes it is to highlight the available institutional set up
<table>
<thead>
<tr>
<th>11. 5. Project Description</th>
<th>The project description does not provide a description of the potential construction, environmental, and social issues it causes. Environmental and social impacts are separately discussed under the following section.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>It is not consistent with the above mentioned number of kebeles.</td>
</tr>
<tr>
<td>5.3 project components</td>
<td>• What kind of road and the distance of the road is not described. The length of the road is already described as 13kms of different classes of road, in the same paragraph of the document pls check.</td>
</tr>
<tr>
<td></td>
<td>• Open ditch or closed pipe? Both type based on specific location.</td>
</tr>
<tr>
<td>5.5 land use/land cover</td>
<td>The figure 5.2 shows the proposal not the actual proposed sites for the construction of roads and drainage. This is adopted from the Boren area LDP study document, which our EIA study is based on.</td>
</tr>
</tbody>
</table>
|                           | The land use/land cover of the Boren area is categorized as 63% agricultural land, 25% scattered settlement, 18% Area in Ha or %, ? in the same paragraph it is already stated as %.
<table>
<thead>
<tr>
<th>planned residential area</th>
<th>6.6 Population settlement and social service infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land acquisition,</td>
<td>The high tension traversing within the plots of land at different location, that can cause constraints for ROW clearance and land acquisition for the project activities.</td>
</tr>
<tr>
<td>Yes, Land acquisition</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7.1 General Direct impacts of the project</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the impacts during construction and operation? It is not clear from the description the type of impact the project will cause. It is general.</td>
</tr>
<tr>
<td>As the heading indicates, this section is simply describing the general category of impacts expected; but the detail impact types are discussed in the following sections of the document. Pls proceed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>-------interuption of social services and blockages of accesses to shops and service rendering houses etc. can happen</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is not clear that the impact will happen or not. What does can happen mean?</td>
</tr>
<tr>
<td>It indicates the likely impacts of the project, as indicated</td>
</tr>
<tr>
<td>during the construction phase of the project.</td>
</tr>
<tr>
<td>11.1.1 7.2 Adverse Impact on Water Resources</td>
</tr>
<tr>
<td>9. conclusion and Recommendations</td>
</tr>
</tbody>
</table>

**Note:**

It is not expected that every information and data will be repeated in every sentence, paragraph and/or section. The document should be understood in its holistic form and flow of information and data should be related.

Information and data specified in one section is assumed to apply and understood for all discussions of the report and should be referred to.
Annex: List of Members of the study Team

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Mebrate Taffese</td>
<td>Team leader</td>
</tr>
<tr>
<td>Ato Gethaun Work</td>
<td>Environmentalist</td>
</tr>
<tr>
<td>Ato Tadess Koyra</td>
<td>Sociologist</td>
</tr>
<tr>
<td>Ato Girma Seyum</td>
<td>Economist</td>
</tr>
<tr>
<td>Urban Planner/Hydrologist</td>
<td>Wogderess Tadess</td>
</tr>
</tbody>
</table>