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FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA



02/25/07

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1209/077

# ETHIOPIAN ROADS AUTHORITY

Review of Feasibility Study, Review of EIA,  
Preparation of Resettlement Action Plan & Review of  
Detailed Engineering Design and Tender Documents  
for

## GEDO-NEKEMTE ROAD UPGRADING PROJECT

## REVIEW OF ENVIRONMENTAL IMPACT ASSESMENT REPORT

(Final)

OCTOBER 2006



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# **PART I**

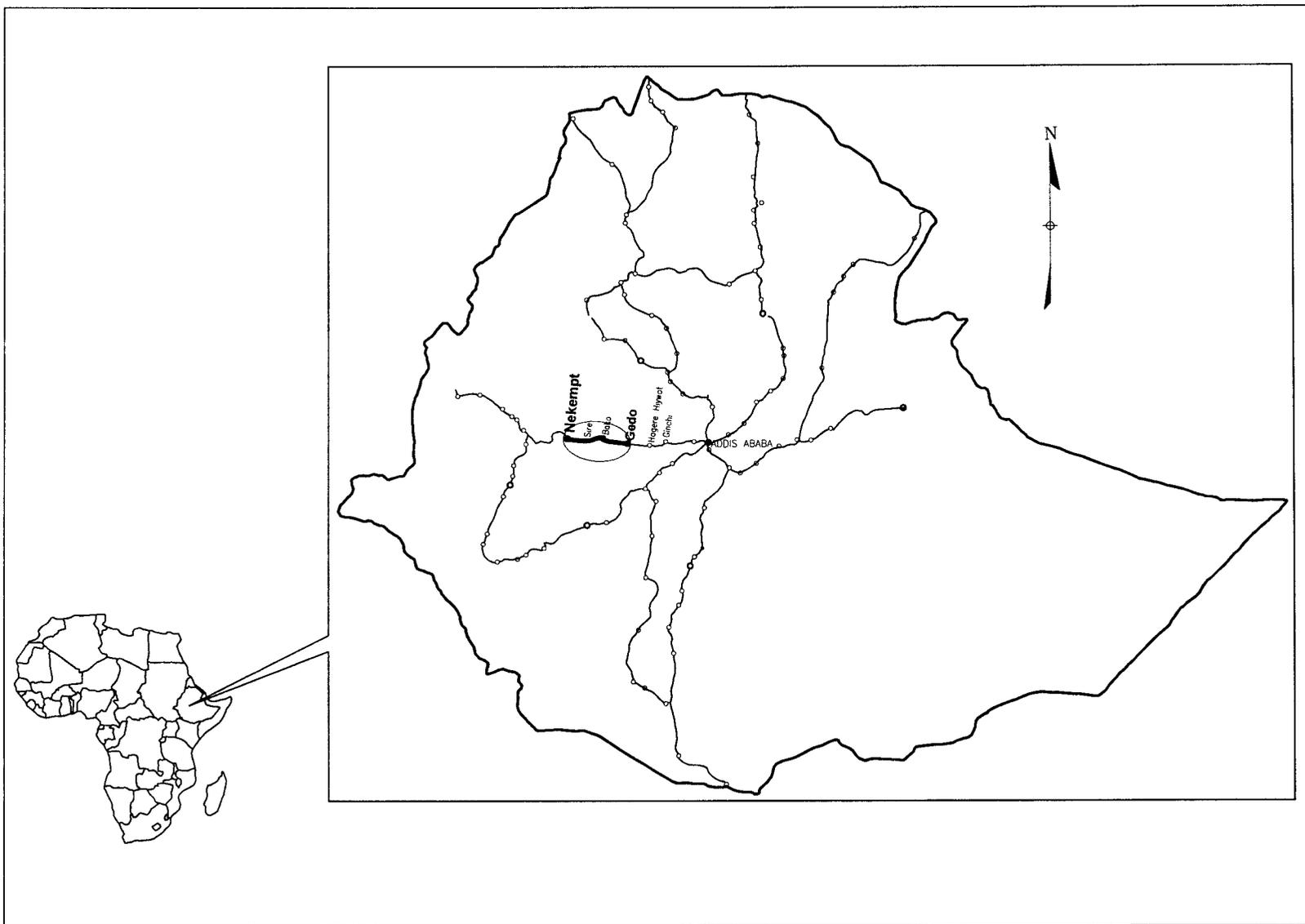
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**ABBREVIATIONS AND ACRONYMS**

<b>AADT</b>	Average Annual Daily Traffic
<b>ADLI</b>	Agricultural Development-Led Industrialisation
<b>a.s.l.</b>	above sea level
<b>BoA</b>	Bureau of Agriculture
<b>Bund</b>	A sealed enclosure under or around a storage facility to contain an spillage
<b>CSA</b>	Central Statistical Authority
<b>CSE</b>	Conservation Strategy of Ethiopia
<b>DBSD</b>	Double Bituminous Surface Dressing
<b>DS</b>	Design Standard
<b>e.g.</b>	exempli gratia = for instance / for example
<b>EIA</b>	Environmental Impact Assessment
<b>EMP</b>	Environmental Management Plan
<b>EMSB</b>	Environmental Monitoring and Safety Branch
<b>EPA</b>	Environmental Protection Authority
<b>EPE</b>	Environmental Policy of Ethiopia
<b>ERA</b>	Ethiopian Roads Authority
<b>ESIA</b>	Environmental and Social Impact Assessment
<b>ETB</b>	Ethiopian Birr, the national currency
<b>FDRE</b>	Federal Democratic Republic of Ethiopia
<b>hr</b>	hour
<b>ICB</b>	International Competitive Bidding
<b>IDA</b>	International Development Association
<b>ITCZ</b>	Inter Tropical Convergence Zone
<b>Km</b>	Kilometre
<b>MEDaC</b>	Ministry of Economic Development and Co-operation
<b>mm</b>	millimetre
<b>MoARD</b>	Ministry of Agriculture and Rural Development
<b>NRS</b>	National Regional State
<b>PA</b>	Peasant Association (Kebele Administration)
<b>PAP</b>	Project Affected People/Person
<b>RAP</b>	Resettlement Action Plan
<b>RE</b>	Resident Engineer
<b>ROW</b>	Right-of-Way
<b>SIA</b>	Social Impact Assessment
<b>TA</b>	Transport Authority
<b>TOR</b>	Terms of Reference
<b>USD</b>	United States of America Dollar (US\$)

## EXECUTIVE SUMMARY

### 1. Introduction

#### ***Background to the Project***

The Ethiopian Roads Authority of the Federal Democratic Republic of Ethiopia (FDRE) is commissioning feasibility study, detailed design and construction of many road projects, amongst which is the Gedo – Nekemt Road Upgrading Project. The FDRE has received a grant from International Development Association to cover the cost of consultancy services for the Review of Feasibility Study, Environmental Impact Assessment, Detailed Engineering Design and Tender Documents for the road project. The road project is located in Western Ethiopia with a total length of 134 km, and is proposed for upgrading from the existing double bituminous surface dressing to an asphalt concrete standard including the improvement of the alignment.

The present study comprises review of the feasibility study, EIA studies, resettlement action plan, detailed engineering design, and tender documents previously undertaken by International Consultants. The implementation of the project will be executed through International Competitive Bidding procedures.

#### ***Objectives of the Environmental Impact Assessment***

The main objective of the EIA study is to identify the environmental effects of the proposed project and integrate preventive and mitigating measures in the project plan, implementation and operation so as to improve the overall environmental performance. It is intended to provide decision-makers with adequate information on the environmental effects of the proposed activities so that they are adequately considered before decisions are taken for the project implementation.

#### ***Study Approach and Methodology***

The findings of this Environmental Impact Assessment are based on review of the EIA studies previously carried out for the road project, secondary data and information obtained from local offices and review of available documents, primary data collected through comprehensive field survey, and consultations with different stakeholders at zone and district levels and with members of the local community. Based on the findings of review of the previous studies and reconnaissance field visit and experience from similar projects, a checklist of important impacts was developed and the impacts characterized in terms of their type, nature, duration, area extent, reversibility, magnitude and significance.

Following the scoping of environmental issues and impacts, a detailed field survey along the road alignment was carried out to collect site specific baseline environmental data and identify possible impacts of the road construction activities. Emphasis was given for the gaps and deficiencies identified in the previous EIA studies, and baseline data collection and potential impacts identification was based on the engineering design prepared by KOCKS Consult et al. (2005).

Practical and cost effective preventive and mitigating measures were identified for the significant potential negative impacts. Some of these are expected to be adopted into the engineering design review such as reconsideration of realignments and alignment improvements, town and village passages, erosion control measures, type and location of drainage facilities, location of quarries and borrow sites, road safety, etc. The mitigation plan also included institutional arrangement for the implementation of the proposed mitigation measures. Furthermore, enhancement measures were considered for the positive impacts.

## 2. Policy, Legal and Administrative Framework

### ***National Policy and Strategies***

As the major binding document for all other derivative national and regional policies, laws and regulations, the Constitution of the FDRE, Proclamation 1/1995, has several provisions, which have direct policy, legal and institutional relevance for the appropriate implementation of environmental protection and rehabilitation action plans to avoid, mitigate or compensate the adverse effects of development actions including road projects.

Since the early 1990s, the Federal Government has undertaken a number of initiatives to develop regional, national and sectoral strategies for environmental conservation and protection. Paramount amongst these was the Conservation Strategy of Ethiopia (CSE, 1996), which provided a strategic framework for integrating environmental planning into new and existing policies, programs and projects.

The Environmental Policy of Ethiopia (EPE) has provisions quite relevant to road and transportation projects concerning impact assessment, resettlement and rehabilitation issues. Several sectoral policies have been issued, including the *Federal Water Resource Policy*, the *Wildlife Policy*, the *National Population Policy*, and the *National Policy on Women*.

### ***Land Tenure***

The land proclamations 31/1975 of rural land and 47/1975 of urban land state that the Government holds the ownership of land; it is the property of the Ethiopian People. Article 7(72) of proclamation 4/1975 states that the Government shall pay fair compensation for property found on the land, but the amount of compensation shall not take any value of the land into account, because land is owned by state.

### ***Environmental Legislation Framework***

The Federal Government has issued five Proclamations that are aimed to foster environmental protection and sustainable use of the Country's natural resources. These represent a framework building on the policies and strategies set out in the CSE and the EPE, which sets out basic and general provisions for the regulation of environmental matters. These are:

- Proclamation No. 298/2002 for re-establishment of the Environmental Protection Authority (EPA), Sectoral and Regional Environmental Units and Agencies;
- Proclamation No. 299/2002 to make an EIA mandatory for specified categories of activities undertaken either by the public or private sectors and as the legal tool for environmental planning, management and monitoring;
- Proclamation No. 300/2002 as the basis from which the relevant ambient environmental standards applicable to Ethiopia can be developed and to make the violation of these standards a punishable act.
- Proclamation No. 94/1994 to provide the basis for the conservation, development and sustainable utilisation of the country's forest resources.
- Proclamation No. 456/2005 to conserve and develop natural resources in rural areas by promoting sustainable land use practices.

### ***Institutional and Administrative Framework***

The FDRE comprises of the Federal States with nine Regional State members. The Federal Government acts from the centre to the regions and localities, and its respective duties and authority including fiscal matters at the different levels (Federal, Regional and Local) have been defined by the Constitution. The duties and responsibilities of the Regional States include planning, directing and developing social and economic programs as well as the administration,

The duty of the Environmental Protection Authority (EPA) is to protect and rehabilitate the fundamental causes that lead to degradation, adverse effects and determine mitigation measures.

The responsibility of the Ethiopian Roads Authority is the construction, improvement and maintenance of the Country's road network with its Environmental Monitoring and Safety Branch (EMSB) for setting and implementing ERA's environmental guidelines in support of the national level requirements, and its Legal Division and Right-of-Way Branch for making available the required land.

### ***Ethiopian Roads Authority's Policy Framework***

In order to standardise environmental procedures the ERA has prepared an Environmental Procedures Manual for the use and technical guidance of design personnel of the ERA and consultants preparing projects for the Authority.

Apart from the broad policy frameworks at national level, the main reference behind the preparation of a Resettlement Action Plan (RAP) is ERA's guiding principles as stipulated in its Resettlement and Rehabilitation Policy Framework.

## **3. Baseline Environmental Condition**

### ***Physical Environment***

The Gedo – Nekemt road is part of the Addis Ababa - Nekemt road, which is one of the Country's oldest trunk roads, originally built in the 1930's. The road starts west of Gedo town, about 195 km west of Addis Ababa, and runs in western direction up to Nekemt town. The road was constructed with an alignment following closely the contours of the natural ground, resulting in a tortuous horizontal alignment with narrow curves on the one hand but also in relatively gentle gradients (vertical alignment) on the other hand. The existing bituminous surfaced carriageway is in general 6.0 m wide with shoulders of 1.0 m each, however, many drainage structures were not extended accordingly during the previous upgrading/widening, and these narrow sections cause extreme hazard. Between Gedo and Nekemt the road passes through 8 towns including Ejaji, Tibe, Sheboka, Bako, Ano, and Sire, and 6 major villages including Kiltu Elala, Kejo, Cheri, Chingi, Konchi and Gute.

The Topography along the road is rolling, hilly and mountainous with altitudes of 2,500 m at Gedo, about 1,600 m at the Gibe river bridge west of Bako, and 2,300 m in Nekemt. The main Geological Formations along the road are Quaternary plateau and Mekonen basalts in the first 10 km and the last 50 km, Alluvial and Lacustrine deposits in the low lying areas, and Alghe type of rocks in km 40 to 70.

The predominant soil type along the Gedo – Nekemt road is well-drained reddish to brown clay with short sections of black cotton soil in km 4.0 - 11.1, km 43.0 - 44.0, and km 50.6 - 51.5. Soil erosion is significant along most part of the project road. In particular serious erosion was caused in roadside ditches and diverting drains as well as on cut slopes along many sections of the existing road.

The Climate in the project area can be described as temperate with average temperature ranging from 9.4 to 27.7°C. The project road runs through one of the highest rainfall areas in the Country with a mean annual rainfall ranging from 1,200 to 2,000 mm.

With regard to Hydrology, the first 78 km of the project road section is located in the upper catchment of Gibe River, while the remaining section lies in Didessa River catchment, which is a sub-catchment of the Blue Nile Basin. About 26 major rivers and streams are crossed by the road, the largest being Gibe River. Almost all of the rivers and streams are used for human and animal water supply, and many of them are diverted for traditional irrigation mostly at or nearby

Most of the land in the road corridor is intensively used for crop cultivation, livestock grazing and settlements. The intensity of land use reflects a high population density. Mixed type of agriculture in which livestock production is closely integrated with crop production is the main stay of the population.

### ***Biological Environment***

Due to intensive land use practices, the natural vegetation in most part of the road project corridor has severely depleted. Only a few remnants of the climax vegetation are remaining. Of particular importance is the Gedo Protected State Forest at km 1.75 – 4.65 and the remnants of riverine forests along a number of rivers and streams. The forests contain naturally growing higher canopy indigenous tree species but some also contain man-made plantations that compose of exotic species mainly eucalyptus.

Regarding wildlife, the forest areas mentioned above provide habitats for some wild animals. These mainly include primate species and smaller antelopes including baboon, monkeys, Colobus money (Gureza), civet cat, bushbuck, wild goat, wild pig, hyena, porcupine, common fox and aardvark. Concerning Protected Areas and Sensitive Habitats, the Gedo Primary Forest is the only protected area along the project.

## **4. Environmental Impacts and Mitigation Measures**

### ***Impacts on the Physical Environment***

#### **Impacts on Land Resources**

Impacts on land resources will arise primarily from land acquisition for realignments, alignment improvements, increasing road width, temporary roads, exploitation of construction materials and establishment of construction camps. It will also result from road construction activities, disposal of excess or spoil materials, and storage and processing of construction materials. The main potential impacts are loss of land under various uses, enhancement of soil erosion, and intrusion on the landscape.

The design of the road upgrading has involved over sixty realignments and improvements as well as increasing road width. This will require acquisition of land under various uses. The total length of the realignments and improvements is estimated to be around 35km requiring a land take of about 70ha, assuming 20m cleared width. Based on the existing land use and land cover patterns, about 37% (26ha) of this land is used for annual crops production and the remaining used for grazing, eucalyptus trees plantation, forestlands, isolated trees or other vegetation cover. Road widening, exploitation of construction materials, disposal of spoil materials and establishment of site facilities will also result in land losses.

Earthworks for the road construction and replacement of bridges and culverts, and land clearing for establishment of the contractor's site facilities will remove the topsoil and expose it to runoff water erosion. Additional loss or impairment of soils will be caused by construction of temporary roads such as detours and access to material sites, exploitation of quarries and borrow pits, and moving heavy equipment. Heavy machinery used in the road construction, operation of borrow pits and quarries will likely cause soil compaction. This will harm the soil's potential for future agricultural use or vegetation.

A few sections of the road including km 0.30, km 2.50 – 3.00, and km 105.60 – 108.75 will likely have slope stability problem. These sections are situated in hilly/mountainous topography mostly with steep slopes, and the road construction will require major cut in soil and/or rock as well as fill for road widening or constructing realigned sections and building cross structures (bridges and culverts). Extraction of quite large quantities of construction materials from quarries and borrow pits and cutting and filling in sloping lands will affect the landscape and

### **Disposal of Construction Spoils**

The road construction activities will require cutting in soils and/or rocks or heavy excavations that will likely generate quite large amounts of spoil materials. Side-casting or improper disposal of such materials will likely cause loss of productive lands and vegetation, and siltation in streams, rivers and structures due to runoff erosion or sliding of loose materials from steep slopes, and deterioration of the aesthetic value of the landscape.

### **Impacts on Water Resources and Irrigation Schemes**

Implementation of the project will cause some adverse effects on the water resources along the road. The likely sources of impacts will include redirecting water courses at bridges and culverts, heavy excavations for foundation of structures, enhanced soil erosion, discharge of sewage and other fluid wastes from contractor's site facilities, and spillage of pollutants. The road may interfere with and modify flow of surface water resulting in concentrated flows at certain points and increasing flow velocities. These changes can contribute to soil erosion, flooding, channel modification, downstream scouring and sedimentation in river and stream courses.

Storage, handling and uncontrolled disposal of waste of hazardous substances (bitumen, oil, fuels, paint, lubricants, etc.) including refuelling operations may, if carried out without precautionary measures or under inadequate technical conditions, entail accidental spills and hence cause the pollution of soil and groundwater. Pollution of the water sources may impair their use for human and animal consumption or the use of polluted water sources may result in detrimental health effects.

The road construction activities will impact on traditional irrigation schemes that are based on streams and rivers diverted at crossing structures on the road. Over 20 streams and rivers are diverted for irrigation at locations that will be affected by the road upgrading project. The total area developed by these schemes and number of beneficiaries was estimated to be over 174 ha and 706 households respectively. Construction of the road and/or crossing structures will most likely damage the diversion structures and interrupt irrigation water flows.

### **Air and Noise Pollution**

During the construction period, localized air and noise pollution will result mainly at the road construction, asphalt and aggregate production plants, quarries and borrow sites. The impacts are mainly related to increased dust and noise levels. These will affect neighbouring residential areas. There are human settlements in the close vicinity of many of the proposed quarries and borrow pits, and along significant part of the road alignment.

During the operation period, noise impacts and exhaust emissions will continue to come from vehicular traffic. Due to an increased vehicular traffic flow, increased emissions will affect the air quality. On the other hand, the road upgrading will reduce the vehicle operating cost, which will reduce the individual vehicle's air and noise pollution.

### ***Impacts on the Biological Environment***

#### **Impacts on Vegetation and Flora**

During construction damages of forests, indigenous trees and other vegetation is rather likely to occur mainly due to increasing the road width, realignment, alignment improvement, replacement or relocation of bridges or culverts. Of particular importance is the Gedo Protected State Forest and the riverine forests along rivers and streams. In several sections, clearing of some vegetation or felling of trees is inevitable. Cutting of higher canopy indigenous trees found at realignments or within the cleared width of the road will occur at several locations. In most cases the impacts on vegetation will not be severe but could be considered important. Two

realignment locations (km 64.67/ Meki R. & km 73.75/ Chekorsa R.) are proposed for reconsideration because of the expected significant damages to riverine forests at those sites.

Upgrading of the road will likely cause significant damages to commercially important tree plantations. Large portion of the road has eucalyptus trees that have infringed upon the right-of-way. Clearing/felling the trees growing by the roadside to widen the carriageway or at realignments to construct new road is unavoidable in several locations.

### **Impacts on Wildlife**

There are rather limited wildlife habitats and wild animals along the project road. The Gedo Forest and riverine forests along rivers and streams are the relatively important habitats for certain wild animals. During construction the increased traffic volume and operation of heavy machinery with the accompanying noise pollution will disturb the wild animals in those habitats. As a result the wild animals may migrate away from the road and disruption of their movement patterns may occur. Mortality rate also will likely increase because of collisions with vehicles.

During the operation phase, an increased number of vehicles operating on the road with increased speed may result in increased accidental killings and disturbance of wildlife due to noise. In addition, disruption of habitat use patterns of wild animals across the road or within the road corridor may occur.

### **Protected Areas and Sensitive Habitats**

The Gedo State Forest located at km 1.75 - 4.65 and the riverine forests along rivers and streams are the important habitats, which deserve special attention. These forests have essential ecological functions such as preservation of flora (esp. indigenous tree species) and fauna, maintaining the micro-climate and river flows, protecting against soil erosion etc. They also have important economic functions such as honey production and forest products like timber and construction woods.

At a number of locations there are wetland spots, which are important sources of human, animal and irrigation water supplies, and important dry season grazing areas. Of particular sites are the ones located at km 50.75 - 51.50 and km 93.75-94.00, which will be affected due to realignment and alignment improvement respectively.

### **Summary of Environmental Impacts and Mitigation Measures**

The summary of main potential environmental impacts and their mitigation measures is provided in the following matrix.

	<b>Main Potential Impacts</b>	<b>Main Mitigation Measures</b>
<b>1</b>	<b>Physical Environment</b>	
1.1	Land acquisition	<ul style="list-style-type: none"> <li>• Utilising the existing road area as much as possible;</li> <li>• Compensation for lost properties and lost income basis;</li> <li>• Arranging Land replacement.</li> </ul>
1.2	Soil erosion, compaction and pollution	<ul style="list-style-type: none"> <li>• Adjusting construction program for dry season;</li> <li>• Road works as half-way construction;</li> <li>• Using existing tracks/roads for materials transport;</li> <li>• Provision of lined drains for sections with vulnerable soils;</li> <li>• Proper storage and handling of hazardous materials</li> <li>• Reinstatement of access roads and detours; and</li> <li>• Planting of exposed areas with vegetation.</li> </ul>
1.3	Slope instability/spot	<ul style="list-style-type: none"> <li>• Avoiding side-tipping of excavation materials on down-slope;</li> </ul>

1.4	Landscape intrusion/deterioration of aesthetic value	<p>walls, gabions etc.</p> <ul style="list-style-type: none"> <li>Restoring of temporarily used land to its original condition.</li> <li>Processing and reuse of existing materials.</li> <li>Removal of waste, debris, scrap metals, etc.</li> <li>Avoid side-tipping of excavation materials on down-slope.</li> </ul>
1.5	Exploitation of material sources	<ul style="list-style-type: none"> <li>Restoration of the exploited sites after completion of works to their initial state</li> <li>Landscaping, draining and replanting with grass seeding and appropriate vegetation</li> <li>Avoidance of exploiting material sources near residential areas.</li> <li>Emission intensive equipment (noise, exhaust gases) has to be repaired / maintained.</li> <li>Restriction of working hours</li> </ul>
1.6	Construction spoils	<ul style="list-style-type: none"> <li>Dumping all spoil materials at approved depots and landscaping and planting with grass and/or tree species.</li> <li>Avoiding side-casting of materials from road cuts on down-slope or onto adjacent productive lands.</li> </ul>
1.7	Drainage, water pollution and sedimentation	<ul style="list-style-type: none"> <li>Provision of suitable river diversion during construction of structures.</li> <li>Avoidance of disposing spoil materials in river courses or river banks.</li> </ul>
1.8	Disruption of traditional irrigation systems	<ul style="list-style-type: none"> <li>Provision of temporary diversion canals for the irrigation water during the road construction period and reconstructing permanent structures when construction is completed.</li> </ul>
1.9	Air and noise pollution	<ul style="list-style-type: none"> <li>Restriction of working hours at night; Periodically watering of unpaved road sections.</li> <li>Site facilities/plants should be at a minimum distance of 3 km from sensitive receptors.</li> <li>Restriction of traffic speeds.</li> <li>Corrective repairs or adjustments of equipment and vehicles with excessive emissions of exhaust gases and noise due to inefficient operating conditions or poor maintenance</li> </ul>
<b>2</b>	<b>Biological Environment</b>	
2.1	Disturbance to primary forests and Cutting of indigenous trees	<ul style="list-style-type: none"> <li>Keeping a minimum distance from trees; adequate protection of trees by use of barriers, fences; widening of the road to one side; shifting of the alignment.</li> <li>Protection of trunks by appropriate means when used for anchorage purposes.</li> <li>Road works as half-way construction.</li> <li>Replanting of removed trees by using appropriate species.</li> </ul>
2.2	Loss of eucalyptus trees at realignments & road widening	<ul style="list-style-type: none"> <li>Widening of the road to one side only at locations with dense plantation trees.</li> <li>Implementing replacement planting</li> </ul>
2.3	Disturbance of wildlife	<ul style="list-style-type: none"> <li>Avoiding encroachment into areas of wildlife habitats during construction activities.</li> <li>Avoiding locating of site facilities in the vicinity of the wildlife habitats.</li> <li>Increasing the awareness of drivers of construction vehicles and equipment operators towards wildlife conservation.</li> <li>Provision of traffic signs and reflective matters/features.</li> </ul>
2.4	Loss of wetland spots	<ul style="list-style-type: none"> <li>Reconsideration of those realignments affecting wetland areas.</li> </ul>

## 5. Consideration of Alternatives

In order to explore any possibilities for avoiding or minimizing potential impacts, intensive investigations were made at the realignments, alignment improvements and relocations of structures made in the detailed engineering design by the Previous Consult. For the locations having severe or significant potential impacts that can not be mitigated to acceptable levels, other possible alternatives with less/acceptable environmental consequences, without significantly compromising the intended improvements, were identified and proposed for consideration in the Engineering Design Review. At present the technical feasibility of the proposed alternatives is being studied by the Highway Engineer who is responsible for reviewing the Detailed Engineering Design.

The realignment or improvement sections proposed for reconsideration are:

- Relocation of the bridge on Racho river (Km 2.75 – 3.00): This will likely disturb a sensitive environment characterized by steep slopes and huge un-stabilized materials disposed on the river banks during the construction of a new bridge replacing the damaged old bridge. Replacing the bridge by box culvert and constructing protecting structures like retaining walls will reduce the impacts.
- Realignment crossing Abuko river (Km 50.75 – 51.60): This will affect a riverine forest and wetland spots and springs that are sources of community and/or irrigation water supplies. Shifting the realignment to right hand side (RHS) will avoid the impacts.
- Realignment crossing Meki river (Km 64.50 – 64.90): This will cause loss of riverine trees, and major disturbance to the river system. Considering the realignment after the existing bridge and improvement to the left hand side (LHS) at about 64+900 - 65+100 will avoid the impacts.
- Realignment crossing Chekorsa river (Km 73.70 – 74.20): This will cause loss of riverine forest, and major disturbance to the river system that has substantial flows. Considering the realignment after the existing bridge will avoid the impacts.
- Alignment improvement at Jalele river (Km 93.75 – 94.00): This will affect part of a wetland spot, which is a source of developed spring used by over 50 households for drinking water. It is also an important dry season grazing spot for livestock. Shifting the realignment to RHS will avoid the impact.

## 6. Environmental Avoidance/Mitigation Planning and Monitoring

The detailed Chapter 6 of the present Report includes tables summarising the major environmental issues/impacts together with the corresponding avoidance and mitigation measures for which corresponding details have to be included in the engineering design and tender document preparation and which have to be closely monitored. These major environmental issues are as follows.

### ***The Land Requirement***

With regards to the dense population and the scarcity of cultivable land, the land requirement is an important and crucial issue of the present Project.

### ***The Construction Activities***

A great number of potential impacts on the physical, biological and socio-economic environment have been identified which may be caused by the various construction activities during the implementation of the project.

### ***The Material Extraction and Transport***

The exploitation of borrow pits and quarries with heavy machinery, and the transport of the construction materials may cause a number of potential impacts on the physical, biological and socio-economic environment.

### **The Spoil Materials Handling, Transport and Disposal**

The road construction activities will produce quite large quantities of spoil materials. Improper disposal of such materials will likely cause several adverse impacts on the biophysical as well as the human environment.

### ***The Establishment, Set-up and Operation of the Work Camp***

The location and operation of the contractor's and the supervising engineers' site facilities is a key environmental issue with potential impacts on the physical, biological and socio-economic environment.

### ***The Road in Operation***

The upgrading of the project road will bring a number of positive effects. However, in order to control or avoid potential problems during operation of the road, maximum attention has to be paid to an adequate road and traffic safety.

### ***Cost Estimate for Environmental Mitigation Measures***

The total cost of environmental mitigation measures is estimated to be 26.3 Million Ethiopian Birr, which is about 4.0% of the estimated project cost. The cost of environmental mitigation measures that are not part of engineering/physical construction items, and Resettlement Action Plan (RAP) is estimated to be 5.5 Million Birr. The cost of resettlement of project affected people is provided in a separate report on RAP.

## **7. Environmental Management Plan**

An Environmental Management Plan (EMP) has been prepared outlining mitigation and monitoring activities/responsibilities that acts as a guide to those planning, preparing, constructing and operating the road project. Environmental management activities will be required for the following subsequent project phases:

- Review of engineering design and tender document;
- Implementation preparation phase;
- Implementation/construction period; and
- Road in operation/service and maintenance phase.

Finally, environmental mitigation measures can only be as good as the management and monitoring capacity and environmental sensitivity of the parties responsible for the implementation of the project. Required expertise is available (ERA's EMSB) but in order to assure that the construction and operation of the road will be environmentally sustainable in the long run, some institutional strengthening is recommended, which can be in the form of advanced training, training on the job/site, provision of additional/supplementary facilities/equipment, etc.

## **8. Conclusion and Recommendation**

The construction and operation of the Gedo – Nekemt Road will bring a number of positive as well as negative impacts on the natural and human environment. Implementation of the project will upgrade the standard of the road and improve the living conditions of the project

economic and social development along the road corridor and its catchment area. It will also have several environmental benefits including increased road safety, reduced air pollution from noise, and remedial of existing gullies and impediment problems created by those gullies. Most of the adverse environmental effects will be of temporary and reversible nature, and can be reduced to acceptable levels with good engineering practices and environmental mitigation measures. The overall conclusion is that there will be no severe or immitigable impacts that will prevent the implementation of the road upgrading project provided that the recommended prevention, mitigation and compensation measures are properly implemented at the right time and their effectiveness followed up through well-planned monitoring activities.

To have minimal and acceptable residual environmental impacts and enhance the potential benefits, it is recommended that the proposed avoidance and mitigation measures are properly implemented by including them in the Tender Document for the Contractor and through an Environmental Management Plan. Monitoring of the effectiveness of the implemented measures is also essential.

The most important activities during the preparation of project implementation, construction and operation phases include the following.

#### ***Preparation of Project Implementation***

Great care has to be taken during the various phases/activities prior to the start of the construction works. The two key activities laying the foundation for the subsequent implementation are:

- **Engineering Designs and the Tender Document(s) Preparation:** The respective engineering and bio-engineering details for avoidance and mitigation of potential negative impacts, and for the benefit enhancement measures have to be designed and quantified as well as to be specified in the conditions of contract and the technical specifications respectively.
- **Land Acquisition:** The land acquisition planning has to be prepared comprising all details of the relocation/dispossession and corresponding appropriate replacement measures for lost land and compensation measures for lost assets, for lost income basis as well as logistical support for moving, relocation grant and other requirements. Further, the relocation and compensation plan has to be implemented well ahead of the start of the construction activities.

#### ***Project Implementation***

The potential negative impacts on the environment will occur mainly in relation to the land acquisition and the execution of the construction works. With a proper implementation of the restoration/replacement and compensation plan, existing means of livelihood will not be disrupted severely. Emphasis shall be given for replacement of the permanently lost land and restoration for the temporary losses as much as possible, together with attractive financial compensation for lost properties from the land taken for the project.

Other potential negative impacts may be avoided or, at least, reduced to an acceptable level by the implementation of the determined mitigation measures as outlined in this Report. Provided that the mitigation and benefit enhancement measures will be strictly implemented, it is expected that positive impacts will outweigh the negative ones.

#### ***Road in Operation***

Once the upgrading of the project road is completed, it will be provided with adequate road and traffic safety measures and the benefits can easily be achieved as they have been planned during the engineering designs phase and implemented in accordance with the tender document(s). However, the considerable upgrading of the physical provisions/conditions may

fail if the so-called human factor comprising all traffic participants, vehicle drivers to pedestrians, is not adequately improved as well.

The County's general problem of poor driving skills (e.g. speeding, cutting curves, risky overtaking) and lack of discipline (e.g. neglecting traffic regulations) of road users, drivers as well as pedestrians, has undoubtedly to be controlled by appropriate enforcement tools based on the legislation in order to raise standards of road user behaviour and to fully achieve the benefits of the Project.

## **1. INTRODUCTION**

### **1.1 Background to the Project**

The Ethiopian Roads Authority (ERA) of the Government of the Federal Democratic Republic of Ethiopia (FDRE) is commissioning feasibility study, detailed design and construction of many road projects in order to improve the Country's road network and meet the requirements of the increased socio-economic activities in the Country. One of such endeavours is the Gedo – Nekemt Road Upgrading Project. The FDRE has received a grant from International Development Association (IDA) towards the cost of consultancy services for the Review of Feasibility Study, Environmental Impact Assessment (EIA), Detailed Engineering Design and Tender Documents for the road project under the Second Phase of the road Sector Development Program.

The Gedo – Nekemt Road Project is located in Western Ethiopia in Oromia National Regional State, specifically in West Shewa and East Wollega zones, with a total length of 134 km. The road is part of the trunk road that connects the city of Addis Ababa via Gedo with Nekemt town, which is a zonal capital. It is a paved road with six meters driveway with a double surface dressing, which is constructed on a Telford layer. The road is proposed for upgrading from the existing double bituminous surface dressing to an asphalt concrete standard including the improvement of the alignment.

Feasibility and EIA studies were carried out by an International Consultant, SYSTRA in Association with SPT and PANAF Consult. In addition, detailed Engineering Design, Tender Documents and EIA were prepared by KOCKS GmbH Consult in joint venture with Metaferia Consulting Engineers and Galander Engineering Consultant. The present services comprise carrying out (i) the review of the feasibility study, (ii) the review of EIA, and the preparation of resettlement action plan (RAP), and the necessary field investigations and review of the detailed engineering design, and tender documents for the construction of the proposed road project. ERA has entrusted SABA Engineering Plc. to undertake the mentioned consultancy services. The implementation of the project will be executed through International Competitive Bidding (ICB) procedures.

### **1.2 Structure of the EIA Report**

The findings of the Environmental and Social Impact Assessment (ESIA) study have been organized in two main parts: Part I - Environmental Impact Assessment (EIA), and Part II - Social Impact Assessment (SIA). Part I basically presents details of issues related to the Physical and Natural Environment but also includes some key issues related to the Human Environment. Part II deals with details of Socio-economic issues.

The EIA report (Part I of the ESIA) is structured in eight Chapters. Chapter 1 briefly describes background to the project, objectives of the EIA study and the approach and methodology adopted to carry out the environmental impact study. Based on review of existing policies and legislations, Chapter 2 discusses policy, legal and administrative issues pertinent to environmental protection, while Chapter 3 provides a description of the existing condition of the project environment. On the basis of evaluation of the baseline condition, experiences gained from similar projects and project features, Chapter 4 presents the details on potential environmental effects of the proposed road upgrading project and the proposed corresponding avoidance or mitigation measures for the adverse impacts.

Chapter 5 of the Report discusses the alternatives considered during the previous EIA studies as well as the present review in order to improve the environmental performance of the project. In line with the impacts predicted in Chapter 4, Chapter 6 presents a summary of the major environmental issues/impacts and their corresponding avoidance

and mitigation measures which have to be included in the engineering design and tender document preparation. Chapter 7 provides an environmental management plan that outlines mitigation and monitoring activities which acts as a guide to those planning, preparing, constructing and operating the road project. The report concludes with Chapter 8, which presents the conclusions drawn from the study and recommendations for the most important activities during the preparation of project implementation, construction and operation phases.

### 1.3 Objectives of the Environmental Impact Assessment

The main objective of the EIA study is to identify the environmental effects of the proposed project and integrate avoidance and mitigation measures in the project plan, implementation and operation so as to improve the overall environmental performance. It is intended to provide decision-makers with adequate information on the environmental impacts of the proposed activities so that they are adequately considered before decisions are taken for the project implementation. The specific objectives are:

- Identification and description of the current state of the environment of the project area including environmental components/issues/constraints that will be affected by or will affect the proposed road upgrading project.
- Identification and, as far as possible, quantification of the potential beneficial and adverse environmental impacts arising from project implementation and subsequent operation;
- Identification/Determination of appropriate/suitable avoidance measures to protect as far as possible the environment from adverse impacts;
- Identification/Determination of appropriate as well as cost-effective measures to minimise, offset or compensate for adverse impacts, which cannot be avoided, and to enhance beneficial impacts;
- Review of the existing policy, institutional and administrative capability related to environmental matters; and
- Identification of the most appropriate environmental management and monitoring framework, which will ensure that benefit enhancement and adverse impact mitigation measures are fully adopted.

### 1.4 Study Approach and Methodology

#### 1.4.1 General

The findings of this Environmental Impact Assessment (EIA) are based on review of the EIA studies previously carried out for the road project, secondary data and information obtained from local offices and review of available documents, primary data collected through comprehensive field surveys, and consultations with different stakeholders at zone and wereda (district) levels and with members of the local community.

In order to identify and describe the baseline environmental conditions of the project site and to verify the possible impacts identified during the previous EIA studies as well as to identify any other issues not addressed in the previous studies, two field surveys were conducted. Based on the findings of the field surveys and review of the previous studies, a description of the current environment was made to specify the nature and dimensions of the physical, biological and socio-cultural aspects of the environment which could be affected by the implementation of the project. In addition, a comprehensive assessment of the potential environmental impacts of the proposed project was conducted, and appropriate environmental mitigation and management plan prepared and presented.

### **Scoping and Evaluation of Potential Impacts**

Based on the findings of review of the previous EIA studies and reconnaissance field visit and experience from similar projects, a checklist of important impacts was developed and the impacts qualitatively characterized in terms of their type, nature, duration, area extent, reversibility, magnitude and significance. The checklist and characterization of the impacts was refined based on the findings of the detailed field survey and stakeholders consultation (the impact scoping matrix is given in Appendix 2).

The significance, and hence acceptability, of potential impacts has been determined by the evaluation of the assessed impacts against environmental standards, public opinion, and expert judgement. Criteria for identifying the significance of impacts include compliance with any relevant laws or regulations, environmental standards or guidelines, and if any long term or permanent damage to ecological systems occur.

### **Mitigation and Benefit Enhancement Measures**

Practical and cost effective preventive and mitigating measures were identified for the significant potential negative impacts. Some of these are expected to be adopted into the engineering design review such as reconsideration of realignments and alignment improvements, town and village passages, erosion control measures, type and location of drainage facilities, location of quarries and borrow sites, road safety, etc. The mitigation plan also included institutional arrangement for the implementation of the proposed mitigation measures. Furthermore, enhancement measures were considered for the positive impacts.

It should be mentioned that, wherever possible, emphasis was put on a preventive approach in order to avoid or reduce potential impacts already during the design review of the project.

## **1.4.2 Review of the Previous EIA Studies**

Prior to conducting field surveys for data collection and stakeholders consultation, the EIA studies previously undertaken for the Gedo–Nekemte–Bedele Road by SYSTRA *et al.* (2003) and KOCKS Consult *et al.* (2004) were reviewed and evaluated. All important data and analytical information were extracted, and these verified and amended or supplemented where necessary through review of relevant documents, collection of up-to-date data from local offices and intensive field surveys. Those data and information have been combined with the data collected during the present study and used for the baseline description, determination and significance analysis of the potential environmental effects and development of environmental mitigation measures. In addition, important data gaps were identified and filled through the aforementioned methodologies and through consultation with key stakeholders.

### **The EIA Study Conducted by SYSTRA *et al.* (2003)**

The review of the EIA study made by SYSTRA *et al.* (2003) indicated that some sections/components including the following were satisfactorily covered and some need updating, supplements or filling of omissions.

- General overview on the Ethiopian Environment and socio-economic condition;
- Review of policy, legal and administrative framework but the then draft proclamations need to be updated and new ones reviewed and included;
- Potential environmental impacts including impacts on soils, air pollution, nuisance noise, impacts on water resources and land take; but most of them with certain

- Mitigation measures for the identified impacts; and
- Environmental management plan.

However, the report has significant gaps and lack site specific considerations for most of the issues/components included in the assessment. The deficiencies are partly due to the shortcomings of the engineering part of the feasibility study, which does not include any details of realignments and required relocation or replacement of river crossing structures. The inadequacies and gaps identified were noted and considered during this review study.

### ***The EIA Study Undertaken by KOCKS Consult et al. (2004)***

The very recent EIA study of the Gedo–Nekemt–Bedele Road conducted by KOCKS Consult et al. (2004) has incorporated the basic elements of EIA by disclosing the approach and methodology adopted for the assessment, reviewing relevant policies, legislations and institutional framework, describing the baseline environmental condition of the project area, assessing the possible environmental impacts of the proposed project and proposing corresponding avoidance and mitigation measures for the negative impacts. In addition, it included the main environmental issues for which detailed avoidance/mitigation measures have to be prepared during the engineering design and tender document preparation and which have to be closely monitored. Furthermore, it presented environmental management activities that will be required during the subsequent project phases. Therefore, the present study has referred to many sections of the mentioned EIA study and has adopted some sections with certain additions, supplements or modifications.

In summary, the review of the EIA study showed that the following components/sections were sufficiently assessed and some need updating and supplements:

- Review of relevant policy, legal and administrative framework;
- Description of some components of the baseline environmental conditions;
- Some sections on potential environmental impacts and avoidance and mitigation measures;
- Key environmental issues for which detailed avoidance/mitigation measures must be prepared during the engineering design and tender document preparation; and
- Environmental management activities that will be required during the subsequent phases.

However, several sections particularly under the baseline condition and potential impacts and mitigation have important deficiencies and gaps that must be tackled in the present review. Most of the shortcomings are related to lack of details and particularity to site, while others are mainly overlooked issues. The deficiencies and gaps identified were noted and well considered during the present study. Details of the gaps identified and measures taken to fill the gaps are given in Appendix 7.

### **1.4.3 Field Surveys, Data Collection and Stakeholders Consultation**

Following the scoping of environmental issues and impacts, a detailed field survey along the road alignment was carried out to collect site specific baseline environmental data and identify possible impacts of the road construction activities. Emphasis was given for the gaps and deficiencies identified in the previous EIA studies, and baseline data collection and potential impacts identification was based on the engineering design prepared by KOCKS Consult et al. (2005).

Important primary data collected include land use and land cover, topography, soils, soil erosion water resources, irrigation schemes, water supplies for human and animals

vegetation, wildlife, wetlands etc. Site specific information on each issue or component was collected to enable site specific assessment of potential impacts and development of feasible mitigation measures. Particular emphasis was given for the realignment sites due to the significance of potential impacts related to land take and construction of new road and river crossing structures or drainage structures.

In addition, possible environmental impacts were identified, where ever possible indicating the magnitude and significance of those impacts. The key environmental issues identified include enhancement of soil erosion, loss of productive (esp. farm) lands due to land take, loss of indigenous and eucalyptus trees, sedimentation and water pollution, interference with traditional irrigation schemes, dust pollution, nuisance noise, disturbance of community and animal water supply points, and impacts on wetland spots.

During the field survey, relevant zonal and district offices were contacted to consult officials and professionals as well as to collect important secondary data. The contacted offices include Administration, Agriculture and Rural Development, Health and Education Offices of West Shewa and East Wellega Zones and Woredas along the road. The data collected include land use/land cover of the Woredas, natural resources, irrigation schemes, health and education facilities, and DA and Farmers Training Centres within the impact zones. The list of persons and organisations contacted and consulted during the field survey is presented in Appendix 1.

On the basis of the data collected through the field surveys, from local offices and those data extracted from the previous EIA studies, a clear description of the existing environmental set up of the road environment was made. The baseline description was synthesized in three main environmental components, namely the Physical Environment, Natural/Biological Environment and Socio-Cultural Environment.

The key environmental components or issues were analyzed and described relative to their site specific conditions and importance. This helped to undertake site specific assessment of potential impacts and to determine the magnitude and significance of those impacts as well as to develop feasible mitigation measures.

The baseline data and main potential adverse environmental impacts arising from project design and implementation have been identified and summarised in an inventory, which is presented in Appendix 4.

## **2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

### **2.1 National Policy and Strategies**

#### **2.1.1 Constitution of the FDRE**

As the major binding document for all other derivative national and regional policies, laws and regulations, the Constitution of the Federal Democratic Republic of Ethiopia, Proclamation 1/1995, has several provisions, which have direct policy, legal and institutional relevance for the appropriate implementation of environmental protection and resettlement or rehabilitation action plans to avoid, mitigate or compensate the adverse effects of development actions including road projects.

Article 40.3 of the Constitution states the public ownership of both rural and urban land as well as all natural resources. It further states that land is the common property of the Ethiopian people and cannot be subject to sale or to other means of exchange. Moreover, ownership of land is vested in the State and the people while rural and urban dwellers have only use rights over land. A use right gives the user of the land the right to use the land and the right to benefit from the fruits of her/his labour which may be crops, trees, etc. found on the land or any permanent works such as buildings etc.

Article 44 provides that all persons have the right to a clean healthy environment and further emphasises that the pollutant shall pay in violating the basic right. Article 92 states that all Ethiopians shall live in clean and healthy environment; no damage or destruction happened to those basic environmental rights. People have the right to full consultation and the community has the right to express its views in the planning and implementation of environment policies and deals with the projects that directly affect them. The Government and citizens shall have the duty to protect the environment and mitigate the affected parts. All those aspects have to be considered in infrastructure development and road projects respectively as explicitly stated in the Road Transport Guidelines (EPA, 1996, Environmental Law, 2003 and the Conservation Strategies of Ethiopia I, II and III).

Further, Article 44.2 of the Constitution indicates that interventions for public goods that cause the displacement of people or adversely affect the livelihood of the local population shall give the right to commensurate monetary or other means of compensation including relocation (resettlement) with adequate State assistance.

This provision has a strong relevance to the resettlement action plan that ERA undertakes while involved in road projects. The provisions in the constitution clearly states Government's obligation not only to compensate for the works on land created by the labour and capital of land users but also to compensate for the lost land through resettling the affected individuals/communities by the State programmes with adequate assistance.

#### **2.1.2 Conservation Strategy of Ethiopia (CSE)**

Since the early 1990s, the Federal Government has undertaken a number of initiatives to develop regional, national and sectoral strategies for environmental conservation and protection. Paramount amongst these was the Conservation Strategy of Ethiopia (CSE, 1996), which provided a strategic framework for integrating environmental planning into new and existing policies, programs and projects.

The CSE is an important policy document which views environmental management from several perspectives, particularly recognising 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.

### 2.1.3 The Environmental Policy of Ethiopia

The Environmental Policy of Ethiopia (EPE) has provisions quite relevant to road and transportation projects concerning impact assessment, resettlement and rehabilitation issues. The major elements are to:

- ensure that environmental impact assessments (EIA) consider not only physical and biological impacts but also address social, socio-economic, political and cultural conditions;
- recognise that public consultation is an integral part of an EIA and ensure that EIA procedures make provision for both an independent review and public comment before consideration of decision makers;
- ensure that an environmental impact statement (EIA report) always includes mitigation plans for environmental management problems and contingency plans in case of accidents;
- ensure that, at specified intervals during the project implementation, environmental audits regarding monitoring, inspection and record keeping take place for activities where these have been required by the Environmental Impact Statement (Proclamation 299/2002, Part Four-Article12, Implementation Monitoring);
- 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, in accordance with Proclamation No. 299/2002 in order to predict and manage the environmental effects of proposed development activities and resulting in modification or termination of its design or ongoing construction/operation;
- create by law an EIA process which requires appropriate environmental impact statements and environmental audits for private and state development projects;
- establish the necessary institutional framework and determine the linkages of its parts for undertaking, co-ordinating and approving EIAs and the subsequent system of environmental audits required to ensure compliance with conditionalities;
- develop detailed sectoral technical guidelines in EIAs and environmental audits;
- ensure that social, socio-economic, political and cultural conditions are considered in environmental impact assessment procedures and included in sectoral guidelines; and
- develop EIA and environmental audit capacity and capability in the Environmental Protection Authority, sectoral ministries and agencies as well as in the regions.

### 2.1.4 Sectoral Policies

Several sectoral policies have been issued, including the following:

#### ***Water Resource Policy***

The Ministry of Water Resources has formulated the Federal Water Resource Policy for a comprehensive and integrated water resource management. The overall goal of the water resources policy is to enhance and promote all national efforts towards the efficient and optimum utilisation of the available water resources for socio-economic development on sustainable bases. The document includes policies to establish and institutionalise environment conservation and protection requirements as integral parts of water resources planning and project development.

### ***Wildlife Policy***

The Wildlife Policy was developed by the Ministry of Agriculture whose prime objective is the preservation, development and sustainable utilisation of Ethiopia's wildlife resources for social and economic development and for the integrity of the biosphere/biodiversity. It covers a wide range of policies and strategies relating, amongst others, to wildlife conservation and protected areas with four categories from the highest protection ranking 'National Park', followed by 'Game Reserve' and 'Sanctuary' to 'Controlled Hunting Area'.

### ***National Population Policy***

This Policy was issued in April 1993 and aims at closing the gap between high population growth and low economic productivity through a planned reduction in population growth combined with an increase in economic returns. With specific reference to natural resources, the main objectives of National Population Policy are:

- Making population and economic growth compatible and the over-exploitation of natural resources unnecessary;
- Ensuring spatially balanced population distribution patterns, with a view to maintaining environmental security and extending the scope of development activities;
- Improving productivity of agriculture and introducing off-farm/non-agricultural activities for the purpose of employment diversification; and
- Maintaining and improving the carrying capacity of the environment by taking appropriate environmental protection and conservation measures.

### ***National Policy on Women***

This Policy was issued in March 1993 emphasising that all economic and social programs and activities should ensure equal access of men and women to the Country's resources and in the decision making process so that they can benefit equally from all activities carried out by the Federal and Regional Institutions.

## **2.1.5 Land Tenure**

Land is the property of the state/public and does not require compensation. The land proclamations 31/1975 of rural land and 47/1975 of urban land state that the Government holds the ownership of land, it is the property of the Ethiopian People. Article 7(72) of proclamation 4/1975 states that the Government shall pay fair compensation for property found on the land, but the amount of compensation shall not take any value of the land into account, because land is owned by state.

Proclamation No.55/1993, article 5, 2(k), states that ERA shall use, free of charge, land and such other resources and quarry substances for the purpose of construction of highways, camps, storage of equipment and other required services, provided, however, that it shall pay compensation in accordance with the law for properties on the land it uses.

The Right-of-Way (ROW) is the land allocated and preserved by the law for the public use in road construction, rehabilitation and maintenance work. For example in the RR50 standard 15m width on either side of the road centreline fall into the legal ROW. Thus, property within those limits could be removed/demolished by the road authority without public consultation.

## **2.2 Environmental Legislation Framework**

The Federal Government issued five Proclamations that are aimed to foster environmental protection and sustainable use of the Country's natural resources. These represent a framework building on the policies and strategies set out in the CSE and the EPE, which sets out basic and general provisions for the regulation of environmental matters and is proposed to be supplemented in due course by more sector-specific legislation. Three of the proclamations are directly related to general environmental protection and are currently enforced by the EPA, while the remaining two are related to forest conservation and development, and rural land administration and use and are executed by the Ministry of Agriculture and Rural Development (MoARD). In addition, there is one Proclamation issued by the Oromia NRS and is relevant for the Gedo-Nekemt Road Project. These Proclamations are briefly described below.

### **2.2.1 Proclamation on Establishment of Environmental Protection Organs**

This Proclamation (Proc. No. 298/2002) re-established the Environmental Protection Authority (EPA), Sectoral Environmental Units and Regional Environmental Agencies.

The objective of this Proclamation is to formally lay down the institutional arrangements necessary to ensure environmentally sustainable management and development, both at Federal and at Regional level. A series of institutional mandates, which extend the powers and duties of the EPA beyond those defined in the enabling legislation, which established this body.

### **2.2.2 Proclamation on Environmental Impact Assessment**

The aim of this Proclamation (Proc. No. 299/2002) is to make an EIA mandatory for specified categories of activities undertaken either by the public or private sectors and is the legal tool for environmental planning, management and monitoring.

The Proclamation elaborates on considerations with respect to the assessment of positive and negative impacts and states that the impact of a project shall be assessed on the basis of the size, location, nature, cumulative effect with other concurrent impacts or phenomena, trans-regional context, duration, reversibility or irreversibility or other related effects of a project. Categories of projects that will require full EIA (given in an Annex to the Proclamation), not full EIA (some negative impacts expected but not too serious) or no EIA (for reasons of "special" or "overriding interests").

To effect the requirements of this Proclamation, the EPA has issued a Procedural and Technical EIA Guidelines, which provide details of the EIA process and its requirements. The Guidelines follow the conventional pattern adopted in many other countries and make provision for screening, scoping, identification and evaluation of impacts, the development of environmental management and monitoring plans, consideration of alternatives, EIA report structure and information requirements, etc.

### **2.2.3 Proclamation on Environmental Pollution Control**

This Proclamation, Proc. No. 300/2002, is mainly based on the right of each citizen to have a healthy environment, as well as on the obligation to protect the environment of the Country and its primary objective is to provide the basis from which the relevant ambient environmental standards applicable to Ethiopia can be developed, and to make the violation of these standards a punishable act. The Proclamation states that the "polluter pays" principle will be applied to all persons. Under this proclamation, the EPA is given the mandate for the creation of the function of Environmental Inspectors. These inspectors (to

be assigned by EPA or regional environmental agencies) are given the authority to ensure implementation and enforcement of environmental standards and related requirements.

#### **2.2.4 Proclamation on Conservation, Development and Utilisation of Forests**

This Proclamation, Proc. No. 94/1994, was issued in 1994 to provide for the Conservation, Development and Utilisation of Forests. The objective of this Proclamation is to provide the basis for sustainable utilisation of the country's forest resources. The Proclamation categorises 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 (now MoARD) and Regional Governments. The Proclamation then goes on to give some specific direction for the utilisation of State and Regional Forests, and lists prohibited activities within protected forests.

#### **2.2.5 Proclamation on Rural Land Administration and Land Use**

This Proclamation, Proc. No. 456/2005, came into effect very recently, in July 2005. The objective of the Proclamation is to conserve and develop natural resources in rural areas by promoting sustainable land use practices. In order to encourage farmers and pastoralists to implement measures to guard against soil erosion, the Proclamation introduces a Rural Land Holding Certificate, which provides a level of security of tenure.

The MoARD is charged with executing the Proclamation by providing support and co-ordinating the activities of the regional authorities. Regional governments have an obligation to establish a competent organization to implement the rural land administration and land use law.

According to the Proclamation where land, which has already been registered, is to be acquired for public works, compensation commensurate with the improvements made to the land shall be paid to the land use holder or substitute land shall be offered. The Proclamation imposes restrictions on the use of various categories of land, for example wetland areas, steep slopes, land dissected by gullies, etc.

#### **2.2.6 Proclamation on Oromia Rural Land Use and Administration**

The objective of this Proclamation, Procl. No. 55/2002, is to promote proper management and utilization of the land and land resources for sustainable agriculture and other uses in the Oromia NRS. The Proclamation determines the use, right, security and obligation of the land users in accordance with the land use and administration policy.

The Proclamation provides the right to get rural land free of payment for any resident of the region, whose life depends on agriculture; whereas, governmental and non-governmental organizations, private investors and social organizations have the right to use rural land through legal process.

The Proclamation encompasses articles for environmental protection including prohibition of mismanagement and misuse of environmental resources such as wetlands and any activities that may cause deleterious effects on those resources. It also provides the Government, with the participation of the local community, the right to demarcate priority forest areas, wildlife parks and sanctuaries to protect with all the components of its natural ecosystem for sustainable use. Furthermore, any individual or organization engaged in mining quarry development activities shall be obliged to rehabilitate the sites.

## **2.3 Institutional and Administrative Framework**

### **2.3.1 Federal and Regional Administration**

The Federal Democratic Republic of Ethiopia comprises of the Federal states with nine Regional State members. The Federal Government acts from the centre to the regions and localities, and its respective duties and authority including fiscal matters at the different levels (Federal, Regional and Local) have been defined by the Constitution.

The duties and responsibilities of the Regional States include planning, directing and developing social and economic programs as well as the administration, development and protection of natural resources of their respective regions. The basic administrative units in each Regional Government are the Woredas, which sub-units are the Kebeles in urban areas and farmers associations in rural areas. Further, based on their authority and responsibilities the regional governments have established Sectoral Bureau, Commissions and Authorities.

### **2.3.2 Environmental Protection Authority**

The National Environmental Protection Authority (EPA) was re-established under Proclamation No. 295/2002 as an autonomous public institution of the Federal Government of Ethiopia entrusted with the protection and conservation of natural resources in Ethiopia. The general role of the EPA is to provide for the protection and conservation of the broad environment, through formulation of policies, strategies, laws and standards, which foster social and economic development in a manner that enhance the welfare of humans and the safety of the environment sustainable.

One of the environmental policies of the EPA is to protect and rehabilitate the fundamental causes that lead to degradation, adverse effects and determine mitigation measures. The policy is usually integrated and compatible to fit to a long term economic development strategy known as agricultural development-led industrialisation (ADLI) and other key policies. As per sub-article 2 of article 6 of Proclamation No.9 of 1995, environmental development and management as well as protection in Ethiopia are designated. In this case the socio-environmental assessment needs to be reviewed and incorporated into different road project phases: at designing & planning, construction, monitoring, post-project evaluation and maintenance phases.

The EPA is the Competent Agency at the Federal level in Ethiopia. It is, therefore, the responsibility of this authority in the EIA process to:

- ensure that the proponent complies with requirements of the EIA process;
- maintain co-operation and consultation between the different sectoral agencies throughout the EIA process;
- maintain a close relationship with the proponent and to provide guidance on the process; and
- evaluate and take decisions on the documents that arise from the EIA process.

### **2.3.3 Environmental Protection Unit**

The above described Proclamation No. 295/2002 requires at the Federal level each sectoral ministry to establish in-house Environmental Protection Unit to ensure harmony with respect to implementation of the environmental proclamations and other environmental protection requirements. This Unit will form a lower level inter-sectoral co-ordination structure.

### 2.3.4 Regional Environmental Agencies

In accordance with the principles of government decentralisation and the Proclamation No. 295/2002, each national regional state shall establish an independent regional environmental agency or designate an existing agency that shall, based on the Ethiopian Environmental Policy and Conservation strategy and ensuring public participation in the decision making process, be responsible for:

- coordinating the formulation, implementation, review and revision of regional conservation strategies, and
- environmental monitoring, protection and regulation.

In addition, the regional environmental agencies shall ensure the implementation of federal environmental standards or, as may be appropriate, issue and implement their own no less stringent standards. These are expected to reflect the environmental management requirements at local level.

### 2.3.5 Ethiopian Roads Authority

The Ethiopian Roads Authority (ERA) was established in 1951 through proclamation No.63/1963 with responsibilities for the construction, improvement and maintenance of the Country's road network. The highest body in the management hierarchy is the board.

#### ***Environmental Monitoring and Safety Branch (EMSB)***

ERA's Environmental Monitoring and Safety Branch (EMSB) was established in January 1998 as Environmental Management Branch (EMB) under the Planning and Programme Division of the Engineering and Regulatory Department. EMSB major responsibilities are setting and implementing ERA's environmental guidelines in support of the national level requirements. The EMSB holds the capacity of advisory, co-ordination and supervision aspects that are pertinent to the road environmental impacts and implication assessment as well as co-ordination with the respective ERA district offices.

#### ***Right-of-Way (ROW) Branch***

The Right-of-Way Branch, which is under the Contract Administration Division, is responsible for making available the required land for road/highway construction and maintenance, the establishment of materials sources (borrow pits and quarries) and camp sites and for implementation of Resettlement Action Plans (RAP).

Right-of-Way Branch in liaison with the respective regional/local authorities, Woreda councils, Kebele administrations and community representatives establishes the required compensation for structures, crop, vegetation and others, and effects payments to the PAPs.

## 2.4 Ethiopian Roads Authority's Policy Framework

### 2.4.1 ERA Environmental Procedures Manual

In order to standardise environmental procedures for design of new roads and rehabilitation of existing roads the ERA, in consultation with the Ethiopian Environmental Protection Authority (EPA), has prepared an Environmental Procedures Manual for the use and technical guidance of design personnel of the ERA and consultants preparing projects for the Authority.

The Manual outlines standard methods and procedures for a step-by-step approach to environmental management activities to be conducted during each phase of the road project cycle, including the preparation and supervision of works contracts as well as the execution of road construction, rehabilitation and maintenance works.

#### 2.4.2 ERA Resettlement/Rehabilitation Policy Framework

Apart from the broad policy frameworks at national level, the main reference behind the preparation of a Resettlement Action Plan (RAP) is ERA's guiding principles as stipulated in its Resettlement and Rehabilitation Policy Framework. The principles in the framework are adopted basically from the World Bank's policy on resettlement and rehabilitation. The following statement is quoted from the ERA's Resettlement and Rehabilitation Framework to show when and where a RAP is required or not.

At project identification, social screening/social impact assessment (SIA) of the subprojects will be conducted with the aim to determine whether or not a subproject would require detailed resettlement action plans as specified in World Bank policy. The principles of compensation/rehabilitation will be triggered wherever there will be land acquisition and adverse social impacts. Should, however, the SIA findings reveal that more than 200 persons are affected by a subproject, a resettlement action plan will have to be prepared. The World Bank OP 4.12, which replaces OD 4.30, is on *Involuntary Resettlement* and states:

*Where large-scale of population displacement is unavoidable, a detailed resettlement plan, timetable and budget are required. Resettlement plans should be built around a development strategy and package aimed at improving or at least restoring the economic base for those relocated. Experience indicates that cash compensation alone is normally inadequate. Voluntary settlement may form part of a resettlement plan, provided measures to address the special circumstances of involuntary resettlers are included. Preference should be given to land-based resettlement strategies for people dislocated from agricultural settings. If suitable land is unavailable, non-land-based strategies built around opportunities for employment or self-employment may be used.*

And the OP 4.12 specifies:

*Where only a few people (e.g. less than 100-200 individuals) are to be relocated, appropriate compensation for assets, logistical support for moving and relocation grant may be the only requirements. However, the principles on which compensation is to be based are the same as for larger groups (ERA, 2002).*

As per the Framework, a threshold has been set whether or not to proceed with a detail RAP once a social screening is done on any proposed road development project. Road development that entails the relocation of more than 200 individuals or about 40 households are expected to draw up a resettlement action plan. Those road projects that would displace less than 200 individuals are not expected to come up with a detailed/full scale RAP and instead appropriate compensation measures for lost assets, arrangements for logistical support and a relocation grant have to be determined.

## 2.5 Multilateral Environmental Related Agreements

The Federal Democratic Republic of Ethiopia has ratified within its own legislative framework the following international conventions and protocols.

- Convention concerning the Protection of World Cultural and Natural Heritage, ratified in 1972.
- International Plant Protection Convention.
- Convention on International Trade in Endangered Species (CITES), ratified in 1989.
- Vienna Convention on Ozone Layer Protection (1990);
- Montreal Protocol for Substances Depleting the Ozone Layer (1990);
- United Nations Convention on the Law of the Sea.
- Framework Convention on the Law of the Sea.
- Framework Convention of Climate, ratified in 1994.
- Convention on Biological Diversity, ratified in 1994.
- African Convention on the Conservation on Natural Resources.
- Convention on Desertification, ratified 1997.
- Convention on Biodiversity (Rio convention) (1997);
- Framework Convention of United Nations on Climate Change (1997);
- Convention on the Control of Transboundary Movement of Hazardous Substance;

### 3. EXISTING ENVIRONMENTAL CONDITION OF THE PROJECT AREA

#### 3.1 Physical Environment

##### 3.1.1 The Project Road

The Gedo – Nekemt road is part of the Addis Ababa to Nekemt road, which is one of the Country's oldest trunk roads, originally built during the Italian occupation in the 1930's. The project road starts west of Gedo town (location 9°01' N and 37°27' E), about 195 km west of the capital city Addis Ababa, and runs in western direction up to Nekemt town and ends after about 137 km at the Y-shaped road junction (location 9°05' N and 36°33' E), some 1.3 km east of the roundabout in the centre of the town. Between Gedo and Nekemt the road passes through about 8 towns including Ejaji (km 20), Tibe (km 38.5), Sheboka (km 48), Bako (km 56), Ano (km 70), and Sire (km 83), and about 6 villages including Kiltu Elala (km 27.5), Kejo (km 59.75), Cheri (km 90.5), Chingi (km 103), Konchi (km 113) and Gute (km 118.5) (the kilometer locations are according the new chainage). In some of the villages and towns there are a number of houses very close to the road or within the right of way. Total population size of the towns on the road as estimated by the Central Statistical Agency (CSA) for July 2006 is given in Table 3.1.

**Table 3.1: Total population of towns on the road, estimated for July 2006.**

Zone	Wereda	Town	Total Population
West Shewa	Cheliya	Gedo	10,213
		Ejaji	12,397
	Bako Tibe	Tibe	3,945
		Sheboka	5,708
		Bako	18,641
East Wellega	Gobu Seyo	Ano	4,416
	Sibu Sire	Sire	13,710
	Guto Wayu	Gute	1,131
		Nekemt	84,506
		<b>Total</b>	<b>154,667</b>

Source: Statistical Abstract 2005 (CSA, 2005).

The road was rehabilitated in the 1950's and was upgraded with some improvements by the road authority's task force to the existing standard in the late 1980's. With the aim to limit the size/height of major drainage structures as well as to minimise earthworks, the road was constructed with an alignment following closely the contours of the natural ground, resulting in a tortuous horizontal alignment with narrow curves on the one hand but also in relatively gentle gradients (vertical alignment) on the other hand.

The width of the existing bituminous surfaced carriageway is in general 6.0 m with shoulders of about 1.0 m each. However, during the previous upgrading/widening of the road many drainage structures were not extended accordingly. Since the width between the culvert headwalls and the bridge parapets respectively is less than the width of the carriageway and there are no warning signs or road markings, these narrow sections cause extreme hazard, which is evidenced by the many broken/damaged headwalls and parapets, the signs of accidents.

The existing pavement shows signs of severe distress, since it has reached the end of its service life, but also due to maintenance deficiencies. The road condition changes within short distances from fair sections to poor sections with potholes, deep rutting, severe cracking, etc. allowing a speed of only 40 km/h or below. Some sections of the road have

already disintegrated and the destroyed / failed pavement causes hazard and extreme discomfort to the road users.

### 3.1.2 Topography

The topography along the Gedo – Nekemt road is rolling, hilly and mountainous, which can be summarised as 9 km or 7% mountainous, 61 km or 44% hilly, 55 km or 40% rolling to hilly, 12 km or 9% rolling.

The start of the road at Gedo is at an altitude of 2,500 m, it descends to about 1,600 m at the Gibe river bridge (new chainage km 57.75) 2km west of Bako town and its end in Nekemt is at an altitude of 2,300 m.

### 3.1.3 Geology

The following four types of geological formations along the Gedo – Nekemt road have been identified on the geological map of Ethiopia, 1996 edition, and during an assessment of the road corridor:

- (i) Quaternary plateau basalt (Qb1), alkaline basalt and trachyte is found at about the first 10 km from Gedo and the last about 50 km before Nekemt.
- (ii) Alluvial and lacustrine deposits (Q) in the low lying areas, usually consisting of sand, silt, clay, diatomite, limestone and beach sands, between 10 and 40 km from Gedo.
- (iii) Alghe group (ARI) formation, which includes biotite, hornblende, gneiss, granulite and migmatite with minor meta sedimentary gneiss, extends around Bako town and km 40 to 70 respectively.
- (iv) Mekonen basalts (PNmb), flood basalts, commonly overlying the crystalline basement, is encountered at two locations around km 80 and the end of the project road section in the Nekemt area respectively.

### 3.1.4 Soils and Erosion

#### Soils

According the observations made on the natural soils surface and on exposed soils of cut slopes as well as investigations and testing for sub-grade and materials study, the predominant soil type along the Gedo – Nekemt road is well-drained reddish to brown clay with short sections of black cotton soil at and near river crossings. The sections with predominantly dark clay soils include km 4.0 - 11.1, km 43.0 - 44.0 (around Mara River), and km 50.6 - 51.5 (around Abuko River) (these stations are according the chainage of the improved/new road). Most of the soils along the roadside appear suitable for the use in the proposed road construction works.

#### Soil Erosion

Soil erosion is significant along most part of the project road. In particular serious erosion was caused in roadside ditches and diverting drains as well as on cut slopes along many sections of the existing road. The erosion problem is mainly related to high intensities of rainfall, steepness of slope, poor protective (vegetation) cover or lack of physical or engineering structures, and in some cases due to the trampling effect of domestic animals breaking down the soil structure and exposing to water and wind erosion. The sections of the road having serious erosion and gully formations were identified during the environmental field survey and are summarized in Table 3.2. The total length of the road sections having serious erosion problem is estimated to be about 11.40km. Photo 1, 2 and 3 show examples of gully erosion along the road.

The runoff water intercepted by the road and concentrated in side ditches and ultimately in diverting drains has caused severe erosion and formed severe gullies particularly along the sections with steeper slopes. In several cases the gullies are deeper, longer and wider to the extent that they have created impediment to movements of people and animals. In some places the local people have constructed wooden-made foot crossings in order to overcome obstruction problems; Photo 3 depicts such situation.

Limited measures have been implemented to control the erosion problem. Some physical and biological soil conservation or rehabilitation measures were recently or are presently implemented in some places but these are far from adequacy in terms of quality and quantity as well as area coverage to prevent soil erosion and formation of gullies. In order to safeguard the road and the natural environment as well as minimize adverse socio-economic consequences, the road upgrading project need to integrate rehabilitation measures through physical, engineering and biological methods to remedy the existing problems. The Woreda Agriculture and Rural Development Offices (Cheliya, Bako Tibe, Gobu Seyo, Sibbu Sire and Gotu Wayu Woredas) can actively participate in the activity by raising tree seedlings and grass strips on their existing nurseries and planting at the recommended sites provided that they are financially supported. They can also participate in the implementation of physical conservation methods such as check dams.

**Table 3.2: Sections with Severe Erosion Problem (Existing)**

	<b>Location (New Chainage)</b>	<b>Length (Km)</b>	<b>Description</b>
1	35+000 - 36+250	1.25	Severe gully in LHS ditch and erosion on cut slope.
2	45+350 - 46+600	1.25	Severe gully in RHS ditch and cut slope erosion.
3	47+ 500 - 47+600 (approximate)	0.1	Severe gully (up to 3m deep) in RHS ditch and severe cut slope erosion, in Sheboka town.
4	49+400 - 50+500	1.1	Severe gully in RHS ditch (on aver. 1.5-2.0m deep & 3-3.5m wide on top) on rolling to hilly terrain. Local people constructed wooden-made foot crossing to overcome the impediment created by the gully.
5	51+600 - 51+900	0.3	Gully erosion in RHS ditch aggravated by the trampling effect of livestock on cut slope.
6	52+700 - 53+800	1.1	Gully erosion in RHS ditch and cut slope erosion aggravated by trampling effect of animals.
7	65+700 - 66+250	0.55	Gully erosion in LHS ditch and cut slope on hilly terrain.
8	67+250 - 67+750	0.5	Severe gully erosion (>2m deep) in RHS ditch and on cut slope; it extends up to Kokono R. along the abandoned section of the road.
9	69+150 - 69+250	0.1	Severe erosion on cut slope/scared slope on RHS.
10	70+500 - 70+550	0.05	Erosion on cut slope on RHS.
11	71+100 - 71+300	0.2	Severe gully erosion and scared cut slope on RHS.
12	72+000 - 72+750	0.75	Severe gully and cut slope erosion on RHS.
13	73+400 - 73+700	0.3	Severe gully in RHS ditch. At 73+650 land-sliding on RHS edge of the road towards deeply eroded diverting drain leading to Chekorsa R.
14	77+610 - 77+900	0.29	Erosion in RHS ditch.
15	80+350 - 80+800	0.45	Erosion in RHS ditch and cut slope erosion.
16	80+950 - 81+340	0.39	Erosion in RHS ditch and cut slope erosion.
17	81+800 - 82+100	0.3	Gully erosion in RHS ditch and cut slope erosion.
18	82+500 - 82+800	0.3	Erosion in RHS ditch.
19	84+170 - 84+350	0.18	Severe gully erosion in both side ditches and wide cut slope on both sides.
20	85+640 - 85+850	0.21	Roadside ditch and cut slope erosion on RHS.
21	86+650 - 87+000	0.35	Severe gully in roadside ditch and cut slope erosion on RHS.
22	87+750 - 87+850	0.1	Erosion in roadside ditch and on a wide cut slope on RHS.
23	88+900 - 89+100	0.2	Gully and cut slope (wide) erosion on RHS.
24	91+100 - 91+200	0.1	Erosion on RHS.
25	91+900 - 92+400	0.5	Severe gully and cut slope erosion on LHS.
26	98+500 - 98+600	0.1	Gully erosion and cut slope erosion on RHS.
27	126+150 - 126+300	0.15	Gully erosion and steep cut slope on LHS.
28	127+160 - 127+350	0.19	Severe gully erosion and sheet erosion on cut slope on LHS.
	<b>Total</b>	<b>11.36</b>	

### 3.1.5 Climate

The climate in the project area can be described as temperate in general. The project road runs through one of the highest rainfall areas in the Country with a mean annual rainfall ranging from 1,200 to 2,000 mm. The project area has a high intensity of rain (16.5 mm/hr) and duration of up to seven months rainy season, which may be a challenge to the Project during construction.

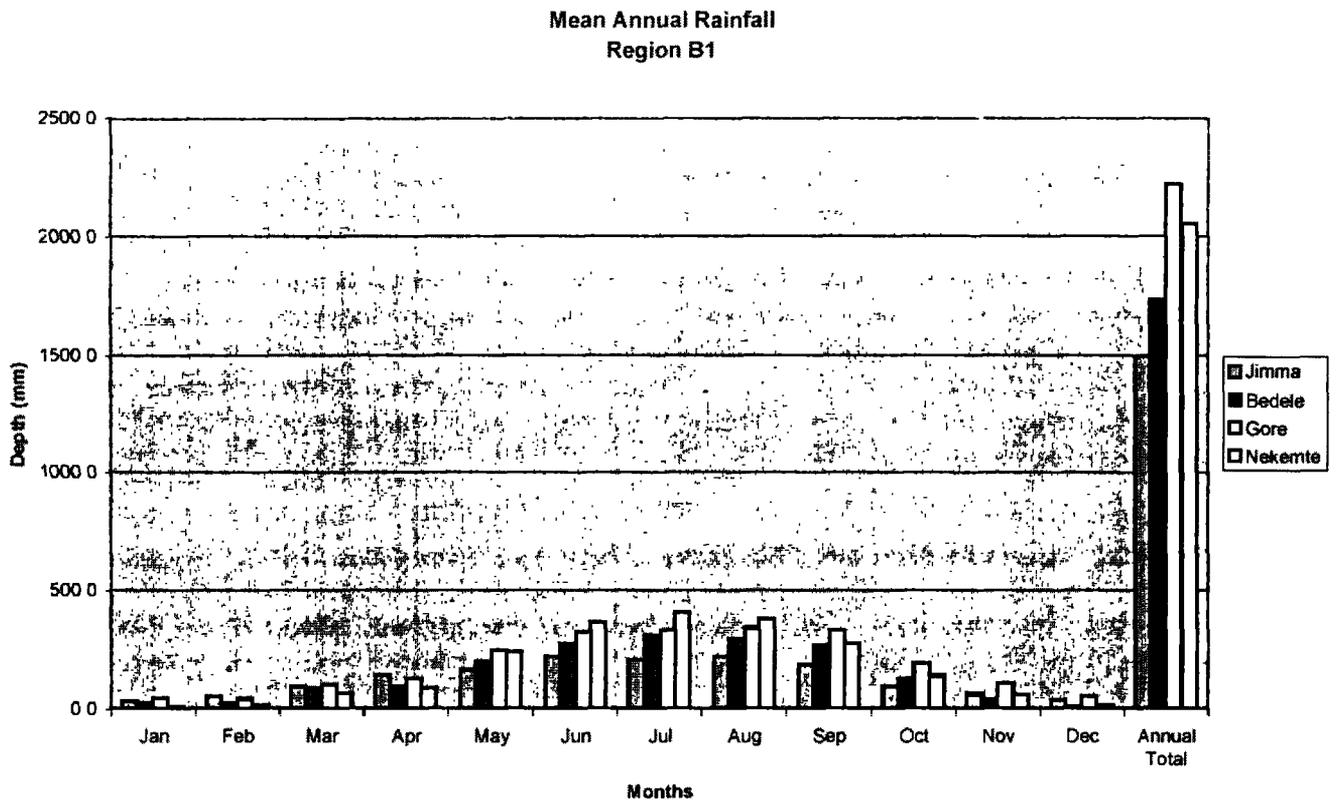
Rainfall in the project area is mainly influenced by its location in the north western highlands of Ethiopia. Rainfall in the project area has a typical uni-modal characteristics with the rainy season extending from May to October. Inter Tropical Convergence Zone (ITCZ) which is a low pressure convergence zone of the moist south-western and dry north-eastern winds is the major rainfall mechanism in the area. During the rainy season, May to October, ITCZ is positioned to the north of the project area and during the dry season its position is in the south.

Temperature is highly dependant on altitude, records of some meteorological stations in the project area show that the average minimum temperature ranges from 9.4°C at Gedo to 13.6°C at Bako and the average maximum temperature respectively is 21.7°C at Gedo and 27.7°C at Bako.

Table 3.3 below shows a summary of the prevailing temperatures with an indication of the general weather condition in the project corridor and the figure below shows the mean annual rainfall including monthly distribution for one location in the project corridor, namely Nekemt.

Table 3.3: General Weather Condition

Months	Mean Precipitation	Mean Temperature	General Weather Condition
Oct - Jan	100 – 300 mm	15 - 21 °C	Dry warm & cool at night, after shower warm-humid
Feb - May	300 – 400 mm	16 - 21 °C	Warm: dry to humid
Jun - Sep	700 - 1,200 mm	15 - 20 °C	Cool ,rainy ,foggy



Source: ERA Drainage Design Manual – 2001

### 3.1.6 Hydrology and Water Resources

The first about 77.50 km of the project road section (according the new chainage) is located in the upper catchment of Gibe River, while the remaining section lies in Didessa River catchment, which is a sub-catchment of the Abbay (Blue Nile) Basin. The drainage in the catchments traversed by the road is generally north-south direction. There are about 26 major rivers and streams crossed by the road, the largest being Gibe River at km 57.75 (new chainage) at only 2km west of Bako town. Gibe River drains a catchment area of nearly 300 km<sup>2</sup> at the bridge. All of the rivers in the second section (km 77.50 to Nekemt) drain to Wama River which is a tributary of Didesa River. Most of the rivers crossing along the road are originating from mountains which are the divides between different watersheds. The highest is Chalchis Mountain near Nekemt at 3,150 m a.s.l. The list of the major rivers and streams in the project area and their location is given in Table 3.4.

Almost all of the rivers and streams are used for human and animal water supply as the availability of developed water supplies particularly for the rural communities is very limited (see Photo 4 and 5 as examples). In addition, many of the rivers and streams are diverted for traditional irrigation, most of them at or nearby the road crossing structures (see Photo 6 as an example). The area developed by these schemes and number of beneficiaries was estimated to be over 174 ha and 706 households respectively. Moreover, some of the rivers are used for modern irrigation at upstream or downstream of the road crossing point. The area developed by the modern schemes and number of users was estimated to be over 414 ha and 1307 households respectively. Details of the irrigation schemes on the rivers and streams crossed by the road and area developed are given in Table 3.5.

**Table 3.4: Major Rivers and Streams along the Project Road**

<b>No</b>	<b>River Name</b>	<b>Location (New Chainage)</b>	<b>Notes</b>
1	Racho	3+000	
2	Tiliku Alenga	18+500	
3	Walshomo	20+500	Used for irrigation, washing & animal water supply (near Ejaji).
4	Kersa	24+800	
5	Sama	36+300	Intensively used for irrigation human and animal water supply.
6	Mara	43+250	Heavily used for animal water supply.
7	Abuko	50+ 800	Used for irrigation , and animal w.s; wet lands & riverine forest
8	Robi	53+700	Diverted for irrigation at the bridge & intensive irrigation in d/s.
9	Gibe	57+750	Used for horti-culture nursery and for animal water supply.
10	Meki	64+700	Riverine forest at realignment.
11	Kokono	67+250	Irrigation diversion & bigger trees at realignment.
12	Akabo	71+350	
13	Chekorsa	73+750	Dense riverine forest along the river.
14	Gawiso	79+160	Dense Primary forest along the river
15	Bello	80+850	Diverted for irrigation at d/s.
16	Gindo	87+380	Heavily used for irrigation.
17	Indris	82+220	Used for trad.& modern irrigation; riverine forest along the river.
18	Jalele	93+800	Wetland on right bank; diverted for irrigation.
19	Kersa	97+250	Diverted for irrigation
20	Mechara	100+600	Diverted for irrigation at d/s
21	Tinishu Oda	105+200	Diverted for irrigation
22	Tiliku Oda	107+160	Dense forest u/s of the bridge; diverted for irrig. at bridge & d/s.
23	Fitte	111+450	
24	Jambie	114+450	Dense primary forest along the river.
25	Tato	116+702	Riverine & plantation forest & forest nursery sites along the river.
26	Hadiya	125+750	Source of Nekemt Water Supply.

**Table 3.5: Irrigation Schemes based on Rivers and Streams crossed by the Project Road.**

Area	River Name	Location (New Chainage)	Diversion at bridges on the road or canal crossing the road		Diversion at downstream of bridge		Notes
			Area developed (ha)	No of beneficiaries	Area developed (ha)	No of beneficiaries	
Iliya	Racho	3+300	4.00	7	-	-	Runs in RHS ditch and crosses through culvert.
	Alenga	18+500	15.00	60	-	-	S. cane & fruit trees (mango, banana) irrigated on both sides of the road.
	Walshamo	20+500	-	-	14.00	12	Modern hard work 1.5km u/s of the bridge ; 50 ha area developed
	Kersa	24+800	15.00	60	-	-	The div. canal will be damaged due to relocation of the bridge (to LHS).
	Bachaku	30+900	1.00	1	-	-	Canal & mango, cane & onion farms affected due to realignment to LHS.
Osho	Sama	36+ 300	15.00	54	-	-	Currently the intake is not working due to low water level; river water diverted at 7 points in upstream.
	Abuko	50+800	4.00	13	-	-	Also the marshland at 51+400 supplies water for irrigation scheme
	Robi	53+700	5.13	10	-	-	Diverted on both banks and construction of the new bridge will damage the intake structures.
Uso	Finchewa	60+277	N.K.	Bako A.R.C.	-	-	The canal crosses through pipe culvert and is used by the Bako Agricultural Research Center.
	Kokono	67+250	50*	150	150.00**	500	*The diversion is located at the new bridge. **Modern scheme & its headwork is after the confluence of Kokono R. with another stream.
	?	72+750	2.50	10	-	-	Canal crossing the road through a pipe culvert.
U Sire	Chekorsa	73+750	-	-	14.00	28	
	Bello	80+850	-	-	24.50	142	Cane, fruits, vegetables & maize are grown.
	Gindo	82+380	18.00	138			Diverted on both banks at the bridge. Cane, coffee, fruits grown.
	Nora Aba-Muz	?	5.00	18			Coffee, mango, 'Gesho' & cane are grown.

**Table 3.5: Irrigation Schemes based on Rivers and Streams crossed by the Project Road, Continued.**

Woreda	River Name	Location (New Chainage)	Diversion at bridges on the road		Diversion at downstream of bridge		Notes
			Area developed (ha)	No of beneficiaries	Area developed (ha)	No of beneficiaries	
Woreda Sire	Indris	87+220	5.00	52	40.00*	129	*Modern scheme constructed by Oromia Irrigation Authority. Diversion weir at 150m downstream of the new bridge.
	Buko	?	8.00	14	-	-	Maize 'chat', 'Gesho', mango, coffee grown
	Ambelta	90+500-90+650	3.00	25	-	-	Water diverted at u/s crosses the road through culvert after running through RHS ditch for 150m. Fruits, coffee, 'chat', & maize are grown.
	Jalele	93+ 800	-	-	?	?	Traditional diversion exists on both banks at d/s but could not be quantified. Modern irrigation (66 ha for 200 HHS) is planned for construction by the Regional Irrigation Authority.
	Kore	95+380	2	8	-	-	Vegetables (onion, tomatoes) & fruit trees are grown.
	Dabo	96+150	?	3	-	-	Diverted at u/s and crosses the road through pipe culvert at about 96+550 after running along RHS ditch for 150m.
	Kersa	97+250	14	40	-	-	The diversion is on the left bank at the new bridge. Fruit trees, coffee, and cane are grown.
	Mechara	100+620			7	63	Diverted at about 100m downstream of the bridge.
	Tinishu Oda	105+250	6.5	38	-	-	On the right bank, diverted at u/s & crosses the road through culvert; on left bank, diverted below the bridge.
	Tiliku Oda	107+160	1.0*	5	39	86	*Diverted at the foot of the bridge on the left bank.
Woreda Uda	Fitte	111+450					Totally 50ha developed at u/s & d/s. The data could not be quantified for u/s & d/s separately. Cane and potatoes are irrigated.
	Tato	116+702	*		114.0**	347	*The diversion at the bridge is used for forest and horti-crops nursery site run by Agriculture Office. **It is a modern scheme.
	Hadiya	125+750			12	N.K	The stream is a force of water supply for Nekemt town and its intake and power house is very close to the bridge.
<b>Total</b>			<b>174.14</b>	<b>706</b>	<b>414.5</b>	<b>1307</b>	N.K. = Not known/data not available.

**Source:** Woreda Agriculture and Rural Development Offices supplemented by field survey along the Project Road.

### 3.1.7 Land Use and Land Cover

Most of the land in the road corridor is intensively used for crop cultivation, livestock grazing and settlements. The intensity of land use reflects a high population density. Mixed type of agriculture in which livestock production is closely integrated with crop production is the main stay of the population. Cereals including maize, teff and sorghum dominate the crop production, with Niger seed ('Nug', oil crop) covering a significant proportion. Pulses are also cultivated in the area. In addition, coffee which is an important cash crop is grown in some parts of the project area.

The agriculturally used land portion is >95% with about 75% cropland, 20% grazing shrubs lands and a remaining approximately 5% portion is covered by forest (KOCKS, 2003). Due to the dense population, cultivable land holding is small, on average ranging between 0.5 and 1.5 ha/HH. Details on land use and land cover along the road and in the Woredas of the project area are given in Appendix 4 and Appendix 3 respectively.

An important feature of the project area is the presence of significant cover of commercially important eucalyptus tree plantations and remnants of indigenous trees. The eucalyptus trees are usually planted along roads, farm boundaries and around homesteads. Along significant part of the road there are dense eucalyptus trees/plantations, most of which are within the right of way. In many stretches the extent of infringement is to the level that the trees were planted on road embankments and in side ditches as alignment plantation (see Photo 7 as an example). In such sections shifting/widening of the road to the other side, if not occupied, will be required or removing of the trees will be a must. In many places significant stands of indigenous trees are maintained within farmlands, grazing areas and around homesteads treated as agro-forestry practice (see Photo 8 as an example). Of particular importance is the presence of a strip of riverine forests or trees along many of the rivers and streams crossed by the road.

The trees have vital economic as well as ecological values. Their economic functions include provision of construction materials, fuel wood, timber for agricultural tools, furniture and utensils, and pollen grain for honey production. While their ecological functions particularly the indigenous species include protecting the soil against erosion, maintaining soil fertility by fixing nitrogen, conserving water, flora and fauna, and stabilizing the climate.

Cattle are the dominant livestock followed by shots (sheep and goats). Overgrazing is a prominent problem due to shortage of grazing lands. It was observed that large livestock populations mainly cattle are congregated on drainage impeded flat plains (with dark clay soils) mainly along rivers.

## 3.2 Biological Environment

### 3.2.1 Vegetation and Wildlife

Due to intensive land use practices particularly for cultivation, grazing and settlements, the natural vegetation in most part of the road project corridor has severely depleted. Only a few remnants of the climax vegetation are remaining particularly along the sections listed in Table 3.6. Of particular importance is the Gedo Protected State Forest at km 1+750 – 4+650 and the remnants of riparian/riverine forests along a number of rivers and streams such as Chekorsa R. (km 73+750), Gawiso R. (km 78+270), Jambie R. (km 114+450) and Tato R. (116+700).

The Gedo Forest contains both naturally growing indigenous tree species and man-made plantations that compose of both indigenous as well as exotic species. Higher canopy

tree species in the forest include *Podocarpus gracilior*, *Juniperus procera*, *Hagenia abyssinica*, *Ekebergia capensis*, *Albizia gurmifera*, *Apodytes dimidiata*, *Croton macrostachyus*, *Ficus sur*, *Cordia africana*, *Acacia abyssinica*, *Olea africana*, *Syzygium guineense*, *Prunus africana*, and *Phoenix reclinata*. The dominant exotic tree species are *Eucalyptus* spp. (*E. camandulensis*, *E. globulus* and *Eucalyptus* sp.). The forest area also contains a variety of small tree species and shrubs including *Millettia ferruginea*, *Vernonia amygdalina*, *Dombeya torrida*, *Carissa edulis*, *Maytenus senegalensis*, *Maesa lanceolata* etc.

The major tree species in the riverine and primary forests elsewhere along the road include *Ekebergia capensis*, *Croton macrostachyus*, *Cordia africana*, *Ficus vasta*, *Ficus sur*, *Albizia schimperiana*, *Sapium ellipticum*, *Syzygium guineense*, *Acacia abyssinica*, and *Millettia ferruginea*. The dominant tree species in the remnants of woodland vegetation include *Terminalia browni*, *Combretum molle*, *Acacia abyssinica*, *Croton macrostachyus*, *Ficus* sp. ('Oda'), *Piliostigma thonningi*, and *Markhamia lutea*. Photo 9 Shows part of the Gedo Forest around Km 4.50, while Photo 10 depicts riverine forest along Jambie R. as an example.

The vegetation has essential ecological as well as economic functions. Its ecological functions include conservation of biodiversity (conserving a variety of flora and fauna), protecting the soil against erosion, water conservation and stabilizing the climate including preventing desertification.

Of particular concern with the road upgrading project is the presence of significant indigenous trees at some of the realignments and at locations of new crossing structures and nearby those to be extended/widened and maintained.

Regarding wildlife, the pocket forest areas and woodlands discussed above provide habitats for some wild animals. These mainly include primate species and smaller antelopes. The major wild animals reported to be present in the project area include baboon, common monkey, Colobus monkey (Gureza), civet cat ('Trigne'), bushbuck, wild goat (*Dukula*), wild pig, hyena, porcupine, common fox and aardvark.

**Table 3.6: Locations with Significant Vegetation Cover and Wildlife**

Location	Description	Major Spp. ( Species Composition)
1+750 - 4+650	Protected State Forest containing a mixture of natural/primary forest and man-made plantation	<p><b>Natural Trees:</b> <i>Acacia abyssinica</i>, <i>Apodytes dimidiata</i>, <i>Cordia africana</i>, <i>Ekebergia capensis</i>, <i>Juniperus procera</i>, <i>Olea africana</i>, <i>Albizia gurmifera</i>, <i>Podocarpus gracilior</i>, <i>Croton macrostachyus</i>, <i>Prunus africana</i>, <i>Ficus sur</i>, <i>vernonia amygdalina</i>, <i>Syzygium guineense</i>, <i>Millettia ferruginea</i>, <i>Dombeya torrida</i> &amp; <i>Phoenix reclinata</i>.</p> <p><b>Planted Trees:</b> <i>Hagenia abyssinica</i>, <i>Eucalyptus</i> spp, <i>Cuppressus lustanica</i>.</p> <p>* Widening of the road will likely affect some trees mainly eucalyptus, <i>Acacia</i>, <i>Croton</i> and <i>Vernonia</i>, and shrubs.</p> <p><b>Wildlife:</b> Baboons, common monkeys, Colobus monkey, bushbuck, wild goat, wild pig, hyena, civet cat, porcupine, common fox, aardvark.</p>
58+500 - 59+000	Woodland Vegetation	<p><b>Trees:</b> <i>Ficus vasta</i>, <i>Ficus</i> sp. ('Oda'), <i>Cordia africana</i>, <i>Acacia</i> spp., <i>Terminalia brownii</i>.</p> <p><b>Shrubs:</b> <i>Carissa edulis</i>, <i>Capparis tomentosa</i>, <i>Cassia</i> sp., <i>Vernonia</i>, <i>Pterolobium</i> sp.</p>

**Table 3.6: Locations with Significant Vegetation Cover and Wildlife, Continued.**

Location	Description	Major Spp. ( Species Composition)
64+600-66+250	Riverine Forest along Meki River and Woodland	<b>Trees:</b> <i>Syzygium</i> (dominant), <i>Albizia</i> , <i>Croton</i> , <i>Accaica</i> , <i>Cordia</i> , <i>F. vasta</i> , <i>Milletia</i> , <i>Terminalia</i> , <i>Combretum</i> , <i>Vernonia</i> , <i>Sapium</i> , <i>Maesa lanceolata</i> . <b>Shrubs:</b> <i>Carissa</i> , <i>Acanthus</i> , <i>Rubus</i> , <i>Calpurnia aura</i> , <i>Hypericum</i> sp. <i>Rhus</i> sp., <i>Pterolobium</i> <b>Wildlife:</b> Colobus monkey, common monkeys.
66+450 - 67+450 (Realigned)	Remnant trees along Kokono R. and with in farm- and grazing- lands	<b>Trees:</b> <i>Syzygium</i> , <i>Sapium</i> , <i>F. vasta</i> , <i>Combretum</i> , <i>Markhamia</i> , <i>Terminalia</i> found in the area including at the realignment.
73+200	Dense riverine forest along Kella R.	<b>Trees:</b> <i>Sapium</i> , <i>Syzygium</i> , <i>F. sur</i> , <i>Cordia</i> , <i>Milletia</i> , and <i>Celtis Africana</i> . <b>Fruit Tree:</b> Mango
73+750	Dense riverine forest along Chekorsa R.	<b>Trees:</b> <i>F. vasta</i> , <i>Sapium</i> , <i>Cordia</i> , <i>Celtis</i> , <i>Ekerbergia</i> , <i>F. sur</i> , <i>Syzygium</i> , <i>Milletia</i> . * Several trees will be affected due to relocation of the bridge on the river to downstream.
76+450	Dense forest along Ejersa R. d/s of the bridge	<b>Trees:</b> <i>Milletia</i> , <i>F. sur</i> , <i>Syzygium</i> .
78+270	Dense riverine forest covering wider area along Gawiso R.	<b>Trees:</b> <i>Albizia</i> , <i>Syzygium</i> , <i>Croton</i> , <i>Acacia</i> , <i>F. sur</i> , <i>F. vasta</i> , <i>Milletia</i> , <i>Cordia</i> , <i>Ekebergia</i> . <b>Wildlife:</b> C. monkey, monkey, baboon, hyena, wild pig, bushbuck, wild goat.
86+900-87+440	Riverine forest along Indris R. and woodland adjacent to the forest ( it is disturbed forest)	<b>Trees:</b> <i>Ekebergia</i> , <i>Sapium</i> , <i>Albizia</i> , <i>F. sur</i> , <i>Syzygium</i> , <i>Croton</i> , <i>F. vasta</i> . * This section is realigned and runs through the forest.
105+600 - 108+750	Remnant woodlands interspersed with cultivated lands, on mountainous terrain; dense forest along Tiliku Oda R. upstream of the bridge.	<b>Trees:</b> <i>Cordia</i> , <i>Croton</i> , <i>Terminalia</i> , <i>Celtis</i> , <i>Sapium</i> , <i>Syzygium</i> , <i>Markhamia</i> , <i>F. vasta</i> , <i>Ficus</i> sp. ('Oda'), <i>Acacia</i> , <i>Combretum</i> , <i>Ficus sur</i> , <i>Albizia lebbeck</i> . <b>Shrubs:</b> <i>Grewia</i> , <i>Rhus</i> , <i>Capparis</i> , <i>Vernonia</i> , <i>Acanthus</i> , <i>Calpurnia</i> .
109+250-109 +750	Woodland and riverine forest.	<b>Trees:</b> <i>Acacia</i> , <i>F. vasta</i> , <i>Croton</i> , <i>Celtis</i> , <i>Albizia</i> , <i>Cardia</i> . * About 17 trees will likely be affected due to the realignment.
114+450	Dense Primary forest along Jambie R.	<b>Trees:</b> <i>F. vasta</i> , <i>Albizia schimperiana</i> , <i>Croton</i> , <i>Cordia</i> , <i>Celtis</i> , <i>F. sur</i> , <i>Podocarpus</i> , <i>Milletia</i> , <i>Acacia</i> , <i>Syzygium</i> , <i>Sapium</i> , <i>Ehretia cymosa</i> , <i>Dombeya</i> , <i>Schefflera abyssinica</i> , <i>Calpurnia</i> , 'Dembi'. <b>Wildlife:</b> Colobus monkey, common monkeys, baboons, Cheetah, hyena, bushbuck, wild goat, and aardvark.
116+500-118 +400	A mixture of natural and plantation forest; forest horti-crops and coffee nursery sites along Tato R. u/s & d/s of the bridge.	<b>Trees:</b> <i>Podocarpus</i> , <i>Acacia</i> , <i>Croton</i> , <i>Cordia</i> , <i>Milletia</i> , <i>Syzygium</i> , <i>F. vasta</i> , <i>Cuppressus</i> , <i>Eucalyptus</i> . <b>Wildlife:</b> Colobus monkey, monkey, baboon, hyena, bushbuck, wild goat, aardvark.

### 3.2.2 Protected Areas and Sensitive Habitats

The Gedo Primary Forest is an area protected by the State Forest Authority and guards are actively patrolling the area. Although officially not designated as protected areas, the primary forests along rivers and streams such as Chekorsa R. (km 73+750), Gawiso R. (km 78+270), Jambie R. (km 114+450) and Tato R. (116+700) are protected by Woreda Agriculture and Rural Development Offices. Peasant Association (local level administration) officials and development agents play major roles in guarding the forest areas, and thus major cutting is not observed in the forest areas.

There is no any area designated as National Park, Sanctuary or Wildlife Reserve in the project route corridor, and there is no area having potential for such purposes. However, because of their particular importance for ecological and hydrological functions, the Gedo forest and the riverine forests discussed above could be considered as sensitive or important habitats that should not be subject to significant damages by human activities including road projects.



Photo 1: Severe gully in LHS ditch & scaring on steep cut-slope at km 35.



Photo 2: Severe gully in RHS roadside ditch at km 49.



Photo 3: Foot crossing constructed by locals to overcome impediment created by deep gully (km 49.90)



Photo 4: River water used for washing clothes and bathing (Walshamo R. near Ijaji)



Photo 5: Mara R. used for livestock watering, km 43.25.

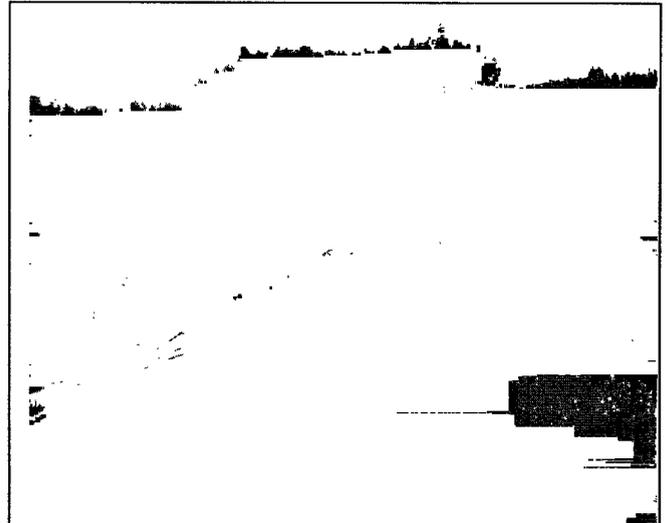


Photo 6: River Diversion at Robi R. for Traditional Irrigation, km 53.8

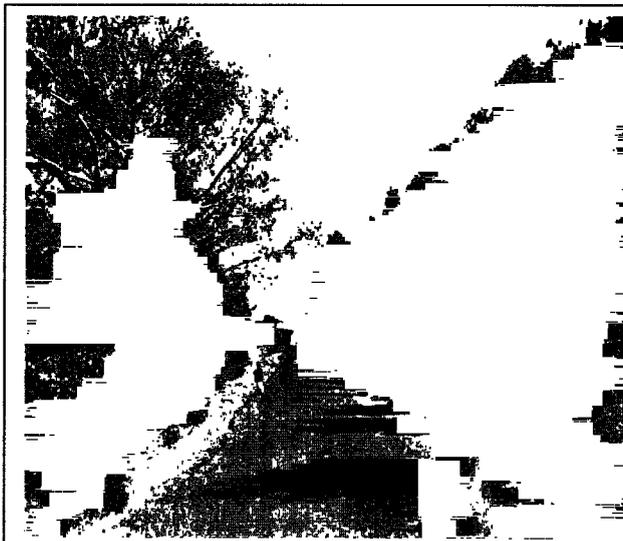


Photo 7: Dense eucalyptus trees & a Ficus tree (Warka) along the road around km 17.00.

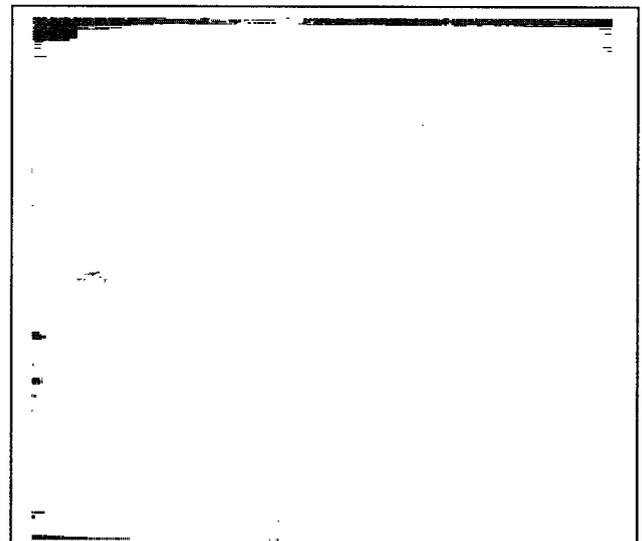
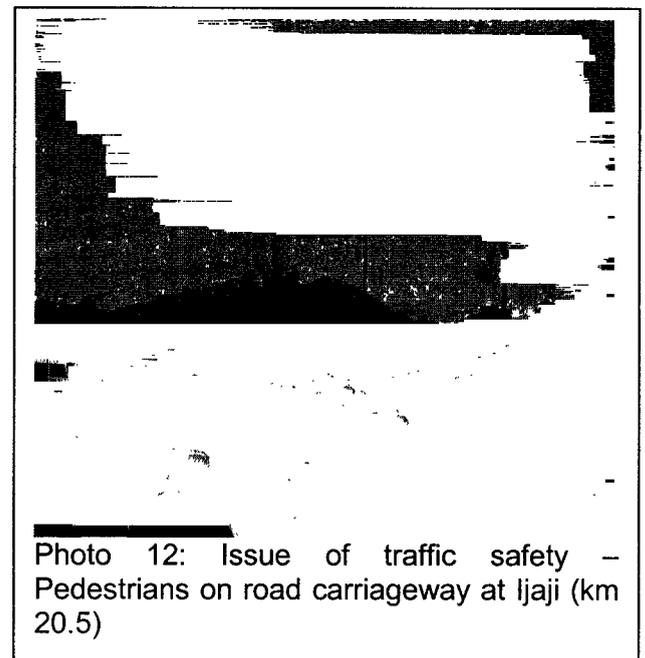
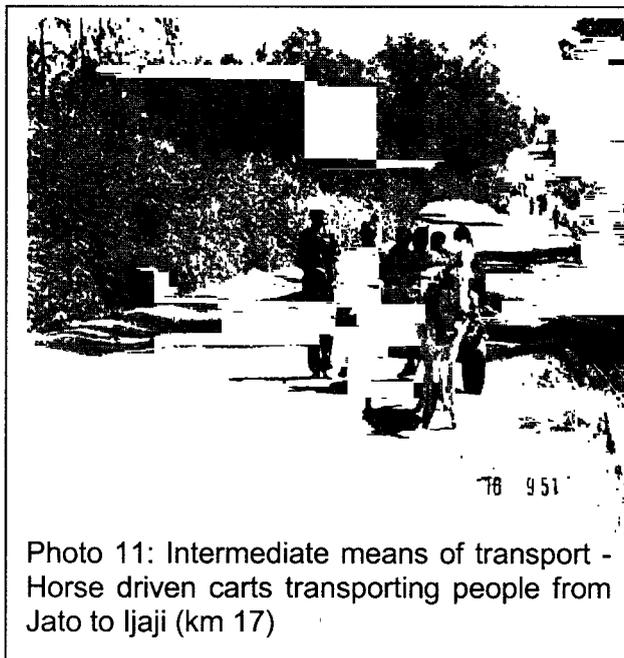
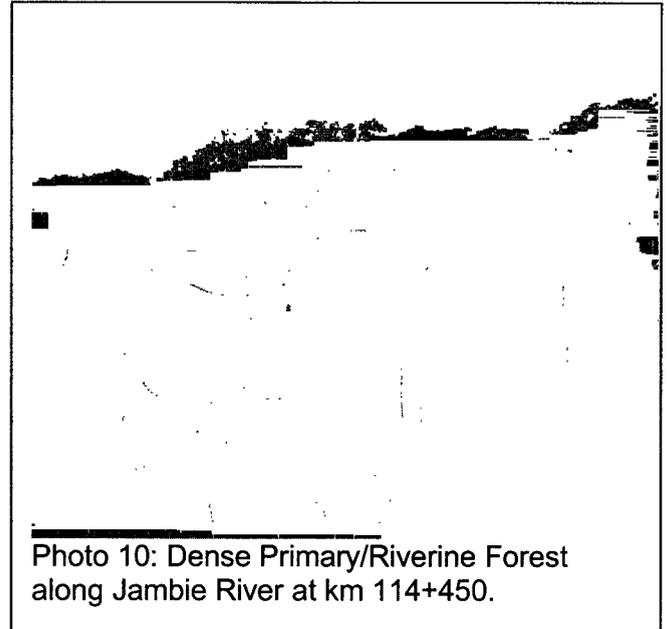
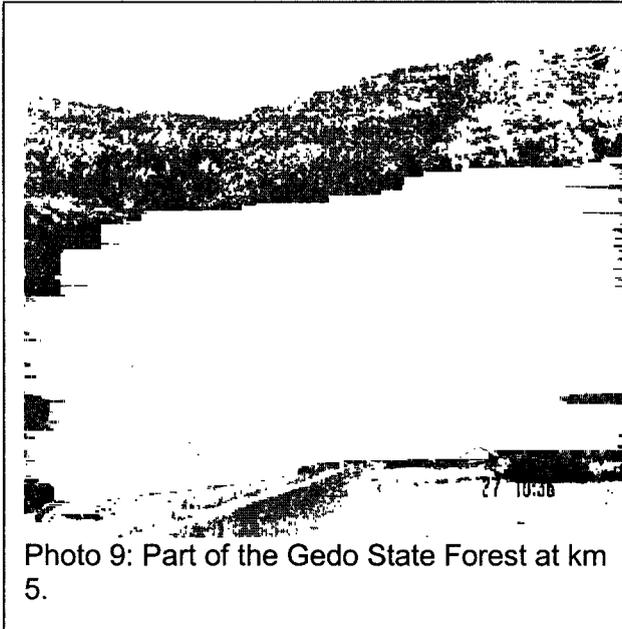


Photo 8: Land use & l. cover; isolated trees in farmlands & around homesteads; existing quarry site, km 100.



## 4. POTENTIAL ENVIRONMENTAL IMPACTS, AND AVOIDANCE AND MITIGATION MEASURES

### 4.1 General Considerations of Impact Assessment and Impact Analysis

#### 4.1.1 Road Upgrading Requirements

The function in the road network of Ethiopia and the traffic volume (AADT) define the classification of the project road and road sections respectively. With regards to traffic growth/forecast and according to the ERA Geometric Design Manual - 2001 the following road classification applies:

***Trunk road with >1,000 (to 5,000) AADT and the applicable design standard is DS3.***

In order to meet the above requirements the following main measures for the proposed road upgrading need to be implemented entailing potential environmental impacts:

***Widening of the existing about 8.0 m (6.0 m wide carriageway and 2 x 1.0 m shoulders) wide road to 10.00 m width in general (2 x 3.50 m = 7.00 m wide carriageway and 2 x 1.50 m shoulders). Considerable improvement of horizontal and vertical alignments including a great number of realignment (new construction) sections.***

#### 4.1.2 Field Surveys for Assessment of potential Impacts

As described in sub-chapters 1.4.1 and 1.4.3, based on the outcome of the scoping process, during detailed field surveys potential significant environmental and social impacts associated with the design, construction and operation of the project were assessed including their magnitude and significance, as much as possible. Particular emphasis was given for on-site or direct impacts because of the extent and significance of the impacts and the assessment was made by road section depending on the existing biophysical and socio-economic condition (e.g. land use & land cover, terrain, erosion, settlement etc.) and the extent of expected changes to the baseline situation. Environmental surveys were made both for the road alignment/corridor and proposed construction material sites, i.e. quarries and borrow sites.

The significance of potential impacts was assessed subjectively, taking into account extent, duration, reversibility, likelihood of occurrence and severity. It should be noted that the significance of a potential impact was determined based on the assumption that nothing will be done to prevent the impact occurring, or to minimise occurrence. In this respect, the assessment presents a “worst case” scenario. Provided that the specified mitigation/benefit enhancement measures are adopted, residual impact will be, in most cases, at an acceptable level.

The proposed road upgrading project will cause a number of negative impacts. Most of the significant negative impacts are related to project design (realignments/alignment improvements, widening of road width, relocation or replacement of structures – all involving acquisition of new land), construction activities (earthworks, operation of construction vehicles & equipment, etc.), construction materials extraction and transport (quarries & borrow pits), and establishment of construction camps and plants. There will also be several positive impacts in form of an improvement of the general living condition in the influence zone during the project operation. Details on the description of existing situation, proposed road improvements and potential impacts are given in Appendix 4.

### 4.1.3 Emphasis on Avoidance of negative Impacts

As already mentioned in sub-chapter 1.4.1 emphasis was put on measures for avoidance of negative impacts rather than to tolerate negative impacts and to mitigate/compensate them afterwards. For those potential negative impacts which cannot be avoided a concept of suitable mitigation measures was developed. In addition enhancement measures were identified for the positive environmental impacts.

### 4.1.4 Influence of Climatic/Environmental and Socio-economic Condition

Most section of the project road is located in higher altitude areas (>1,800m a.s.l.), which are characterized by high rainfall, dense population and scarcity of unoccupied land. This can make the environmental situation more difficult in particular the requirement for land replacement and the relocation process. Heavy rain showers and steep slopes are common in the project area and make soil vulnerable to erosion and gully development, which requires extensive physical protection works as well as careful monitoring and post-project activities respectively.

Therefore, the prevailing biophysical and socio-economic situation and the sensitivity of the environment of the project corridor was taken into consideration in the identification, prediction and significance analysis of the possible impacts of the road upgrading project. Factors taken into account include topography, soil types, climate esp. rainfall, land configuration, population density etc.

## 4.2 Impacts on Physical Environment, and Avoidance and Mitigation Measures

### 4.2.1 Impacts on Land Resources

Impacts on land resources will arise primarily from land acquisition for realignments, alignment improvements, increasing road width, temporary roads (detours and access to material sites), exploitation of construction materials and establishment of construction camps. It will also result from road construction activities, disposal of excess or spoil materials, and storage and processing of construction materials. The main potential impacts are loss of land under various uses, enhancement of soil erosion, and intrusion on the landscape.

#### **Impacts Arising from Land Acquisition**

The design of the road upgrading has involved over sixty realignments and improvements as well as widening of the existing road width. This will require acquisition of land under various uses. The total length of the realignments and improvements is estimated to be around 35km and the area of land to be taken is about 105ha, assuming that 30m right-of-way (ERA's standard for this type of road) will apply for the project. A rough estimate based on the existing land use and land cover patterns has shown that 37% (39ha) of this land is used for annual crops cultivation and the remaining used for grazing, eucalyptus trees plantation, forest lands, isolated trees or other vegetation cover. There are about 15 major realignments with a total length of 15km and 45ha land loss. Of the land loss, about 47% (21ha) is cultivated land, 18% (8ha) grazing land and 35% (16ha) others. Details on the realignments and improvements are given in Appendix 6.

The remaining portion of the project (about 96 km) would follow the existing road alignment where it will involve on average 2m widening in carriageway. The total area of land loss due to land take for widening of the carriage width would be about 20 ha. However, if the 30m ROW standard is applied, the total area of land loss would be higher than 140 ha because the width of the existing ROW is on average not greater than 15m.

Furthermore, loss of productive lands would be related to exploitation of construction materials for the upgrading project. Construction of the realignments, improvements and embankments for the widening will entail quite large quantities of borrow and quarry materials. These will be exploited both from existing material sources and newly opened sites. In total there are 37 sites proposed to be used for the road construction; of which 9 are rock sources and the others are borrow and quarry sites for subbase and subgrade materials. Land take will also be required for construction contractor's and supervising consultant's site facilities.

### **Soil Erosion and Pollution**

Amongst the most significant potential impacts of the road upgrading project are the loss of topsoil and impairment of natural soils caused by earthworks, operation of heavy machinery, quarries and borrow pits, and establishment of construction facilities (workers camps and plant/equipment sites). Earthworks for construction of the realignment and improvement sections, widening of the existing road width to the required standard, and replacement of existing structures like bridges and culverts, and land clearing for establishment of the contractor's site facilities will remove the topsoil and expose it to runoff water erosion. The project comprises over sixty determined realignment and improvement sections and construction of these sections will involve massive excavations and a great number of new drainage structures. Additional loss or impairment of soils will be caused by construction of temporary roads such as detours and access to material sites, exploitation of quarries and borrow pits, and moving heavy equipment. Heavy machinery used in the road construction, operation of borrow pits and quarries will likely cause soil compaction. This will harm the soil's potential for future agricultural use or vegetation.

The climatic and physical characteristics of the area such as heavy rain and sloping topography respectively will aggravate soil erosion and formation of gullies. Details on terrain characteristics, extent of existing erosion problem and potential with construction of the road are given in Appendix 4. Of particular concern is for the locations of realignments, improvements or widening in hilly and mountainous areas and of new structures or replacement of existing structures. These locations are highly vulnerable to erosion and slope instability problems being disturbed by construction activities and exposed to heavy rainfall. For example, the realignment and relocation of the bridge at 2+750 – 3+000 is located at steep slope. The site has huge spoil materials side-tipped on steep sided river banks during the construction of a new bridge (recently constructed), which replaces the old damaged bridge and the temporary Bailey bridge respectively. Unfortunately the new bridge was constructed at an awkward location with hazardous approaches and heavy earthmoving with cut slopes of 15 to 20 m was carried out. The site is highly vulnerable to erosion and sliding problems, and likely there will be a high rate of sedimentation in the river water which is used for community water supply in downstream areas.

Runoff water concentrated in roadside ditches, diversion drains and culverts may cause serious soil erosion if released into farmlands in downstream or in adjacent areas. This may cause significant loss of the productivity of the affected agricultural lands, and consequently loss of incomes of the farmers using the land. This impact could be more significant along the realignment sections where there will be installation of new culverts and modification of the natural drainage. Therefore, care should be taken during the engineering design and construction so that diversion drains and culverts shall not release water into farmlands in order to reduce the risk of erosion. Where such situation is unavoidable, provision of erosion protection measures such as lined drains, retention structures and bioengineering measures should be implemented to minimize the loss of productive soils through water erosion.

Changing the physical conditions of the soil will harm its potential for future agricultural uses or any higher vegetation. The sealing of the soil surface by compaction and asphalt roads leads to the destruction of the soil physical properties and its various functions. It will also lead to an increased volume of surface water. Runoff of waters intercepted and concentrated by the road as well as runoff waters from the road surface may lead to erosion and gullies in roadside ditches and diverting drains.

Besides the loss or impairment of soils due to the above discussed activities, soils in the impact zones can be impacted as a result of disposal of waste materials from road cuts and other excavation works, and disposal of wastes from contractor's camps and used oils and lubricants and spills of oils and fuel from engines of vehicles and diesel operating machinery as well as accidental spillage. Pollution of soils can result from waste waters, sewage and cleaning of equipment, storage and handling of hazardous substances like bitumen, oil, paraffin oil, detergents, fuels, paint and lubricants.

### **Slope Instability and Landscape Intrusion**

The degree of slope instability problem usually depends on topography, geology, rainfall intensity and vegetation cover of the impacted area as well as the extent of infringement in the landscape. In general, areas with weathered rocks, steep slopes, heavy rainfall and scarce vegetation cover could be more susceptible to slope instability.

Along the road only a few sections or localities are expected to have significant slope stability problem. These localities include km 0.30, km 2.50 – 3.00 (discussed above, see Photo 13), and km 105.60 – 108.75. These sections of the road are situated in hilly/mountainous topography mostly with steep slopes, and the road construction will require major cut in soil and/or rock as well as fill for road widening or constructing realigned sections and building crossing structures (bridges and culverts). In addition, in several sections, cutting in soil for widening the road and construction of new road at realignments may trigger land-sliding problem. Furthermore, there is an existing land slip problem at km 73.70, on right hand side of the existing road and left bank of Chekorsa River. The land-sliding event has occurred just between the road and a severely eroded diverting drain leading to the river. The road construction has to include remedial measures in order to maintain the stability of the site and protect the road from damage.

Implementation of the project will also cause changes to the local natural landscape, which will be mainly related to extraction of quite large quantities of construction materials from quarries and borrow pits and cutting and filling in sloping lands that will ultimately end up in marred landscape. Exploitation of quarries and borrow pits for construction and maintenance of the existing road has already caused significant modification of the landscape and impairing of the land use at those sites. The upgrading project will aggravate the problem due to extension of the existing quarries and borrow sites and opening of new ones. The deterioration of visual value of those sites and impediment to movements of people and animals can be minimised through restoration of the material sites upon completion of the road construction. However, because of the topographical condition of those sites and the magnitude of materials extracted, it could be impractical to reinstate most of the sites to their original landscape or land use. Good examples of such cases are the existing quarry sites at Km 5.20, km 100.10, km 103.30, km 110.20, km 121.50, and km 121.80 (according the existing road chainage) which are located on a steep or sloping topography and/or greatly exploited, that is larger areas have been exploited and deeper pits created.

### ***Prevention and Mitigation Measures***

The following measures are proposed in order to avoid or mitigate the anticipated impacts to acceptable level:

- Apply a careful and appropriate engineering design in order to reduce the impacts due to the land required for the construction of the road. In particular the design of realignments, improvements and relocation of structures should consider the magnitude and severity or significance of the impacts and the possibility for mitigation.
- Adjust the road construction programme to make as much use as possible of the dry season thereby reducing soil erosion and sediment loading in streams.
- Apply half-way construction method in order to reduce or avoid the impairment of soils by access or temporary roads or detours.
- Reinstate access roads and detours by removal of existing pavement material, loosening/scarifying of compacted soils, spreading of the stockpiled topsoil, application of appropriate grass seeding, watering and maintenance.
- Provide an efficient drainage system with well designed and constructed ditches and culverts to stop existing and prevent potential soil erosion. Slopes in cut or fill sections have to be covered with grass and other vegetation directly after completion of works (see Photo 16 as a good example).
- Provide lined drains for the sections with existing gully erosion (see Table 3.2 for the major locations) and for those sections with vulnerable soils and slopes.
- To avoid compaction of soils, use existing tracks/roads for the material transport as far as possible and limit works to the imperative area for exploitation, and loosen compacted soils by special ploughs after completion of works.
- Minimize side-casting of excavation materials on down-slope by depositing it only in approved heaps and by landscaping and planting with appropriate tree species to improve the aesthetic value of those sites.
- Restore borrow sites, construction camps and construction materials storage sites through back-filling, landscaping and re-establishing vegetation cover to the extent possible.  
  
*["Restoration" refers to reclamation of areas affected to their original state as far as possible, and even enhancing the quality of the impacted environment. This can be achieved by re-filling of the borrow pits or other excavated/marred areas with excess cut materials, landscaping to the surrounding environment, covering with stockpiled topsoil and planting with appropriate vegetation to prevent erosion and improve the visual quality of the site.]*
- Protect slopes vulnerable to landslides (e.g. km 2.75-3.00 and km 105.6-108.75) by constructing retaining walls, gabions etc.
- Preserve topsoil from the realignments, improvements, road widening, borrow sites and contractor's facilities for re-use on embankment slopes and for re-filling borrow sites and reinstating the land taken for detours and temporary roads.

#### 4.2.2 Exploitation of Materials Sources

Extraction of construction materials from existing quarries and borrow pits especially if it involves extensions into the surrounding areas and from new sites will aggravate existing or cause new environmental and socio-economic impacts. The important existing or potential impacts include air pollution due to generation of dust particles, nuisance noise caused by heavy equipment, deterioration of landscape aesthetics, loss or compaction of topsoil used for crop production, livestock grazing or growing trees, pollution of nearby streams, loss of trees (eucalyptus or indigenous) or other plant life, loss of land under various uses, and obstruction to people or animal movements. The details are given in

Appendix 5. In particular operation of material sites located very close to human settlements (e.g. borrow site at km 63.70, new chainage) could bring severe impacts such as dust and noise nuisance to neighbouring residents (see Photo 8 as an example).

Some of the proposed material sites are located nearby streams or rivers. Examples of such sites are found at km 7.70 (right bank of Racho R.), km 50.7 (right bank of Abuko R.), km 74.4 (left bank of a stream), km 98.40 (left bank of Jalele R.), km 100.10 (spring water originating from marshland in open quarry site), km 121.80 (existing quarry on left bank of Tato R.), and km 131.30 (left bank of Kersa R.). Operation of these sites will likely cause pollution and sedimentation of the rivers and streams. Most of the water sources are used for human as well as animal water supplies.

### **Mitigation Measures**

The following measures are proposed to mitigate the impacts to acceptable level:

- Newly opened material sources as well as the newly used areas of existing sources shall be restored after completion of works to their initial state as far as possible.
- The sites shall be graded, well drained and replanted with grass seeding and appropriate vegetation.
- The topsoil from the newly used areas shall be preserved and used for re-filling the borrow sites and reinstating the land taken for temporary roads to the sites.
- The contractor has to submit a re-cultivation plan for the borrow pits/quarries to the supervising engineer before starting exploitation.

*[The term “reinstatement” or “restoration” refers to reclamation of areas affected due to temporary use of land for detours, access roads, site facilities, exploitation of borrow pits, etc. It also includes re-cultivation of abandoned road sections, which involves the removal of the applied select material (pavement), ploughing and covering with topsoil to bring the land to a productive state. For borrow sites it is the re-filling of the pits with excess cut materials and covering with stockpiled topsoil and planting with appropriate vegetation. It also includes proper grading, draining and landscaping to the surrounding environment.]*

### **4.2.3 Disposal of Construction Spoils**

The road construction activities particularly construction of new road at realignments, increasing the width of carriageway, building of new culverts and bridges or replacement of existing ones, and opening of new quarries and borrow pits or expansion of existing ones will require cutting in soils and/or rocks or heavy excavations that will likely generate quite large amounts of spoil materials. Side-casting or improper disposal of such materials will likely cause loss of productive lands (farm-, grazing- or vegetation- lands), vegetation, siltation in streams, rivers and structures (ditches, culverts and bridges) due to runoff erosion or sliding of loose materials from steep slopes, and deterioration of the aesthetic value of the landscape.

### **Avoidance and Mitigation Measures**

The construction activities should be carefully designed and executed to prevent encroachment into the surrounding landscape and major disruption in land uses, vegetation, watercourse, or drainage channel. All spoil material shall be removed and dumped in areas approved for the purpose, landscaped and planted with appropriate grass and/or tree species to minimize erosion and improve the aesthetic value of those sites. Side-casting of materials from road cuts on down-slope or onto adjacent productive

lands shall be avoided. In addition, dumping of construction materials in the river course or along its banks should be prohibited. The spoil materials can be properly reserved and used for refilling of borrow pits when exploitation of those sites is over.

#### 4.2.4 Impacts on Water Resources and Irrigation Schemes

There are 26 major rivers and streams as well as many smaller streams draining the area traversed by the project road. The road-upgrading project will likely cause some adverse effects on the water resources. The likely sources of impacts will include redirecting water courses at bridges and culverts, heavy excavations for foundation of structures (bridges and culverts), enhanced soil erosion due to earthworks for construction of the road and temporary roads, and removal of overburden soils at quarries and borrow pits, discharge of sewage and other fluid wastes from contractor's site facilities, and spillage of pollutants (fuel, oil). These may interfere with and modify flow of surface water resulting in concentrated flows at certain points and increasing flow velocities. These changes can contribute to soil erosion, flooding, channel modification, downstream scouring and sedimentation in river and stream courses.

The contractor's and the supervising consultant's site facilities may have potential impacts on the quality of surface and ground water as well as on soils in the impact zones. Pollution of soils, and surface and ground water may result from waste waters, sewage and cleaning of equipment. Storage and handling of hazardous substances like bitumen, oil, paraffin oil, detergents, fuels, paint and lubricants etc. can be a considerable source of pollution of groundwater or soil.

Storage, handling and uncontrolled disposal of waste of hazardous substances (bitumen, oil, fuels, paint, lubricants, etc.) including refuelling operations may, if carried out without precautionary measures or under inadequate technical conditions, entail accidental spills and hence cause the pollution of soil and groundwater.

Pollution of the water sources may impair their use for human and animal consumption or the use of polluted water sources may result in detrimental health effects. Also pollution may cause deleterious effects on the aquatic ecology by impacting on the aquatic flora and fauna.

Of particular concern is the Nekemt town water supply works on Hadiya R. at km 125.75. The water intake point is situated at upstream of the bridge on the existing road but in immediate vicinity of the road and thus very vulnerable to any pollution during construction (e.g. dust, silt, and fuel, lubricant, paint, bitumen spillages) and subsequent operation (e.g. fuel spillages). On both banks of the river, the drainage or surface runoff from the road environment can enter the stream water at upstream of the intake point. Another important site is the protected spring water point at km 93.85. The developed spring is recharged by a marshland, part of which will be affected due to realignment of the road. This situation may have an impact on the water point which supplies drinking water for over 50 households residing in the nearby villages.

The other important issue will be the impact on traditional irrigation schemes that are based on streams and rivers diverted at crossing structures on the road. Over 20 streams and rivers are diverted for irrigation at locations that will be affected by the road upgrading project. The total area developed by these schemes and number of beneficiaries was estimated to be over 174 ha and 706 households respectively. Construction of the road and/or crossing structures will most likely damage the diversion structures and interrupt irrigation water flows.

During the operation phase, due to an increased number of vehicles more spillages of petroleum products and chemicals (oil, fuel, lubricants, hydraulic liquids) caused by

leakages, accidents and careless handling can lead to water quality degradation. On the other hand, the proposed road upgrading will include an improvement of the drainage system which was encountered in a generally poor condition.

### ***Avoidance and Mitigation of Negative Impacts***

In order to avoid or minimize pollution of water resources by wastes generated from contractor's site facilities, precautions shall be taken in locating the facilities in terms of distance and drainage conditions. The contractor's site establishment shall have a minimum distance of about 5 km from domestic water supply sources such as protected springs, wells or water pumping stations and totally outside of the watershed of those water points.

In order to prevent impacts on surface/ground water and landscape, obligatory safety provisions, a detailed waste management plan and a plan for the treatment of sewage need to be established for the site establishment by the contractor. On completion of the project the Contractor has to remove all machines and waste material including scrap metal from the site.

The contractor shall be fully responsible for the disposal of all waste materials from the site and has to establish a detailed overall waste management plan. Pollution of soil and groundwater by oil and fuel spillages can be avoided by proper handling and adequate equipment. Dispensing points of fuels and lubricants should have drip pans and for dispensing of petroleum products e.g. fuel funnels shall be used. Leakages of vehicles and construction plant shall be avoided by regular and effective maintenance. Accidental spills (bitumen, oil, fuels, paint, lubricants, etc.) shall be avoided through good practice.

The contractor shall avoid pollution of river or stream water during concreting work from cement slag and oil and fuel spills by providing suitable diversion and/or other appropriate measures and/or executing these works during the dry season when river flow is minimal. In addition, the contractor shall avoid potential conflicts for water between the local people (and their animals) and the construction works. Interference with human water supply points shall be avoided or minimized to the extent possible.

For the impacts on irrigation systems, provisions shall be made in order to let an uninterrupted flow of the irrigation water or the road construction shall be scheduled for the periods when irrigation is not practiced. Possible mitigation measures can include provision of temporary diversion canals for the irrigation water during the road construction period and reconstructing permanent structures when construction is completed. For irrigation water passing through existing culverts, the water flow shall be re-established when the road construction is completed. For irrigation systems with smaller areas and those schemes for which mitigation is not feasible, cash compensation could be made for the production losses during the road construction period and the affected structures shall be re-constructed when the road construction is completed.

### **4.2.5 Air and Noise Pollution**

During the construction period, localized air and noise pollution will result mainly at the road construction, asphalt and crushing/aggregate production plants, quarries and borrow sites. The impacts are mainly related to increased dust/suspended particles and noise levels from excavations for the road construction and extraction of construction materials, blasting of rocks, operation of concrete batching, asphalt and aggregate production plants, loading and unloading of materials, operation of heavy machinery and movements of construction vehicles over unpaved roads. The exploitation of borrow pits and quarries and the transport of construction materials will create noise and dust, which finally leads to nuisance of local residents. In addition, installation and operation of plants and loading

and unloading of materials will cause dust, noise and exhaust emissions that will likely affect neighbouring residential areas. There are human settlements in the close vicinity of many of the proposed quarries and borrow pits, and along significant part of the road alignment.

During the operation period, noise impacts and exhaust emissions will continue to come from vehicular traffic. Due to an increased vehicular traffic flow increased emissions will affect the air quality. On the other hand, the road upgrading will reduce the vehicle operating cost (e.g. less fuel consumption), which will reduce the individual vehicle's air and noise pollution. The main pollutants emanating from vehicle emissions are nitrogen oxides (NO<sub>x</sub>), hydrocarbons, carbon monoxides (CO), sulphur dioxides (SO<sub>2</sub>), particulates, aldehydes and lead. The level of pollution caused by these emissions is dependent on the traffic volume, traffic composition, speed of traffic, technical condition of vehicles and the road surface.

### ***Avoidance and Mitigation Measures***

There are several sensitive noise and dust pollution receptors including residential areas, public health units, schools and religious places near the construction activity areas. Consequently, noise and dust generated from the road construction activities can be a major annoyance to a large number of people, especially in towns and villages along the road. Therefore, good site practices must be followed by the Contractor and other appropriate avoidance and mitigation measures implemented to reduce dust production, nuisance noise and vehicle emissions.

In order to minimise dust and noise levels and its nuisance and health effects to receptors, the following measures are recommended:

- Traffic speeds should be restricted and water regularly applied on the access roads and detours especially for those running through towns, villages and crop lands.
- Diesel powered machinery and vehicles should be well maintained to reduce excessive exhaust emissions.
- The contractor's site establishment should be set up at a minimum distance of 3 km in order to avoid or minimise any form of nuisance to neighbouring areas.
- Construction producing noise pollution should be minimised or rescheduled so as not to occur at night or on locally recognised holidays or religious days.
- All machinery and plants should conform to the applicable noise standards, and plants should be provided with effective noise mufflers.
- Equipment and vehicles that show excessive emissions of exhaust gases and noise due to inefficient operating conditions or poor maintenance shall not be used until appropriate repairs or adjustments are made.
- Construction workers should adhere to health and safety standards pertaining to noise, such as wearing ear protection when operating plant or heavy machinery.
- In order to avoid transport-related disturbances for local residents as well as road users, a well designed traffic management plan shall consider traffic safety and make statements on working hours for materials transport.

#### **4.2.6 Impediment caused by Cut- and Fill- Slopes**

Deep cuts and high fills may cause impediments to movement of people and animals. There are no houses in the close vicinity of the stretches involving deep cuts and high

fills. However, there are many houses along sections of the road that will involve small to moderate cut and/or fill and along sections that will include construction of roadside drainage structures. These sections of the road will likely cause obstruction to movement of people and animals. The sections of the road that will likely cause such potential problem include those listed in Table 4.1 below but not limited to.

**Table 4.1: Sections of the road that will likely cause Impediment Problem**

	Location	Village Name	Level of Cut and/or Fill
1	30+250 – 30+750		Small
2	32+250 – 32+500		Small
3	63+750 – 64+000		Small
4	74+300 – 74+500		Small
5	83+600 – 86+000	Sire & nearby	Small
6	86+500 – 88+000		Moderate
7	90+200 – 91+000	Cheri	Small
8	93+750 – 94+700		Moderate
9	95+500 – 96+250		Moderate to high
10	96+250 – 97+200		Small
11	102+500 – 104+750	Chingi	Small
12	111+300 – 112+000		Moderate to high
13	112+250 – 113+250	Konchi	Small
14	118+350 – 119+000	Gute	Small

In addition, there are many sections of the road that have existing roadside gullies that are causing difficulties for people and animals that have to cross those sections (the list of those locations is given in Table 3.2).

### ***Mitigation Measures***

The design and implementation of the project shall include the installation of crossing structures at appropriate locations or intervals so that people and livestock can easily move across those sections of high cut and/or fill or those with open side drains. In towns and villages, fill sections shall be avoided or minimized as far as possible. Houses located on uphill areas or beneath fill sections should be provided with steps/cascades constructed from concrete or masonry works in order to enable easy movement of people and animals. It should be noted that not only houses along the road have to be provided with crossing structures, but also existing paths have to be provided with crossing structures or embankment with sufficiently gentle slope.

## **4.3 Impacts on Biological Environment, and Avoidance and Mitigation Measures**

### **4.3.1 Impacts on Vegetation and Flora**

Impacts on the vegetation will be mainly related to realignments, improvements, increasing the width of the carriageway, replacement or relocation of bridges and culverts, exploitation of quarry and borrow sites, and establishment of contractor's site facilities. The locations/sections that have significant natural forest or tree cover are given in Table 3.6 so that precautions will be taken during the engineering design review and during construction not to cause significant damages. In addition, site specific assessment of the

potential impacts of the different project activities on vegetation, forests or isolated trees has been made and this summarized in Appendix 4 and Appendix 5, except for locations of site facilities which are not known at this level.

Of particular importance is the Gedo Protected State Forest at km 1+750 – 4+650 and the remnants of riverine forests along rivers and streams such as Meki R. (64+670), Chekorsa R. (km 73+750), Gawiso R. (km 78+270), Jambie R. (km 114+450) and Tato R. (116+700) (see Photo 12 as an example). During construction extensive damages or destruction of forests, indigenous trees and other vegetation is rather likely to occur mainly due to widening of the road, realignment, alignment improvement, replacement or relocation of bridges or culverts. In several sections, clearing of some remnant vegetation or trees is inevitable due to increasing the road width, road construction at realignments and improvements, extraction of construction materials and establishment of site facilities. Cutting of higher canopy indigenous trees (e.g. *F. vasta*/'Warka', *Syzygium*/'Dokima') found at realignments or within cleared width of the road to be upgraded will occur (see Photo 15, 'Warka' tree at km 77.4 as an example). In most cases the impacts on vegetation will not be severe but could be considered important. Two realignment locations (km 64+670, Meki R. & km 73+750, Chekorsa R.) are proposed for reconsideration because of the expected significant damages to riverine forests at those sites.

The developing of new borrow pits and quarries or extension of existing materials sources will result in the damage of vegetation by clearing of the area and the removal of the covering topsoil. The establishment of campsites may bring some impacts on vegetation unless they are carefully sited and exploitation of forest products for construction of houses and fuel is avoided.

The main tree species that will be affected include *Acacia abyssinica*, *Croton macrostachyus*, *Syzygium guineense*, *Cordia africana*, *Ficus vasta*, *Ficus sur*, *Sapium ellipticum*, *Albizia schimperiana*, *Terminalia brownii*, and *Combretum molle*. There are some endemic tree species (e.g. *Milletia ferruginea*) but none of these and other species identified are considered rare or endangered.

Upgrading of the road will also cause significant damages to commercially important tree plantations. Large portion of the road has eucalyptus trees that have infringed upon the right-of-way (see Photo 7 as an example). Clearing/felling the trees growing by the roadside to widen the carriageway or at realignments to construct new road is unavoidable.

### **Avoidance and Mitigation Measures**

Measures proposed to avoid, minimize damages to vegetation and to compensate for the unavoidable losses include the following:

- Designing the road-upgrading project following the existing road alignment as much as possible where forests or important trees exist.
- Confining clearing of vegetation or felling of trees to what is absolutely necessary.
- Careful selection and siting of contractor's site facilities (workers residential camps, materials storage sites and plant/equipment sites) so as to avoid the removal of trees and shrubs growing at or in the immediate vicinity of the selected sites.
- Cutting of vegetation/trees by the work force for fuel wood or construction materials should be strictly controlled or prohibited.
- Replanting appropriate trees and shrubs at suitable locations such as areas adjacent to the road and at areas affected due to construction activities or exploitation of

materials to compensate for the unavoidable losses. Indigenous and/or exotic species, which are environmentally friendly are proposed.

- Providing construction and supervising staff with fuel requirements (gas, paraffin oil, etc.) in order to avoid or reduce any use of charcoal or fuel wood by buying from the local market.
- Where possible, apply half-way construction method in order to reduce the loss of vegetation by temporary roads or detours.
- Widening of the road to one side only at locations with dense or valuable vegetation/trees including the plantation trees.
- Prohibition of the use of trees for anchorage, and where such use is approved, the trunk shall be wrapped with a sufficiently thick protective material (tires, etc.) before any rope, cable or wire is placed.
- Use of existing tracks/roads for materials transport to avoid damage of vegetation as far as possible and works have to be limited to the imperative area for exploitation.
- Removal of trees affected because of construction of the road shall be done in the presence of, in close contact and follow up of the supervising (resident) engineer (RE) and representative of the Woreda Agriculture & Rural Development Office (WARDO), and the RE shall take or keep record of the number, type (species) and size of trees to be affected or removed for the purpose of replacement or replanting. The RE and Contractor should also take photos of the site to evaluate the impacts after completion. Because of the low survival rate of most indigenous trees, for each removed indigenous tree at least ten new seedlings shall be planted. The replacements shall be of the same species, or other approved indigenous species, and of the maximum size that is practicable to plant and sustain growth in the particular environment. The selection of appropriate tree species and locations of planting shall only be done in consultation with the Environmental Protection and Land Use Team of the WARDO.
- Careful siting of construction camps – avoid areas with significant vegetation cover especially indigenous trees.
- Avoid exploitation of forest products for construction of houses and fuel wood by the workforce.
- Contractor/Consultant shall warn their workforces not to engage in transporting forest products in any case.
- The local police shall be informed, if in case of finding contractor's or consultant's vehicles carrying forest products, to let ERA know and take appropriate criminal offensive action.
- The Woreda Agriculture and Rural Development Office shall be consulted on how to integrate any of its afforestation programme for the roadside that may coincide with the contractor's replanting programme to replace the trees removed during the construction activities.

#### 4.3.2 Impacts on Wildlife

There are rather limited wildlife habitats and wild animals along the project road. The Gedo Forest and riverine forests along rivers and streams are the relatively important habitats for certain wild animals mainly primate species and smaller antelopes. During construction the increased traffic volume and operation of heavy machinery with the accompanying noise pollution will disturb the wild animals in those habitats. As a result the wild animals may migrate away from the road and disruption of their movement patterns may occur. Mortality rate also will likely increase because of collisions with vehicles

During the operation phase, an increased number of vehicles operating on the road with increased speed may result in increased accidental killings and disturbance of wildlife due to noise. In addition, disruption of habitat use patterns of wild animals across the road or within the road corridor may occur. Birds could be disturbed by the increased noise (e.g. limited breeding success in the vicinity of roads).

### ***Avoidance and Mitigation Measures***

Mitigation measures proposed to minimise impacts on wildlife and wildlife habitats include:

- Avoiding encroachment into areas of wildlife habitats during construction activities.
- Avoiding locating of site facilities in the vicinity of the wildlife habitats.
- Increasing the awareness of drivers of construction vehicles and equipment operators towards wildlife conservation and to encourage them to give priority to passing animals to minimize the rate of accidental killings of wild animals and unnecessary disturbances.
- Provision of traffic signs and reflective matters/features.

### **4.3.3 Impacts on Protected Areas and Sensitive Habitats**

Along the project road there is only one protected forest land, namely Gedo State Forest, which is situated at km 1.75 - 4.65 (see Photo 9). It mainly contains natural/primary forest but the composition of man-made plantation is also significant. The forest habitat harbours some sensitive wildlife like civet cats and Bushbuck which are often hit by vehicles during the late afternoon to early morning. Three kilometres from the start of the project there is a recently constructed bridge, which replaces the old damaged bridge and the temporary Bailey bridge respectively. Heavy earthmoving with cut slopes of 15 to 20 m was carried out that has already affected part of the protected forest area.

The riverine forests along rivers and streams (the major ones provided in Table 3.6) are also important habitats, which deserve special attention. The forests have essential ecological functions such as preservation of flora (esp. indigenous tree species) and fauna, maintaining the micro-climate and river flows, protecting against soil erosion etc. They also have important economic functions such as honey production and forest products like timber and construction woods.

At a number of locations along the road there are wetland spots (marshlands), which are important sources of human, animal and irrigation water supplies, and important dry season grazing areas. Of particular sites are the ones located at km 50.75-51.50 and km 93.75-94.00 (Photo 14 shows part of this site), which will be affected due to realignment and alignment improvement respectively. In addition, there is a wetland spot at a previously opened quarry site at about km 100 (RHS of the road), which is proposed to be used for the road upgrading project. There is spring water from the site, which is used for livestock water supply.

### ***Avoidance and Mitigation Measures***

The avoidance and mitigation measures proposed for the impacts on vegetation and wildlife (section 4.3.1 and 4.3.2) will also apply for this section. In addition, the realignment at km 50.75-51.50 and improvement at km 93.75-94.00 are recommended for reconsideration so that the wetland areas will not be affected by the road construction. Furthermore, it is recommended that the quarry site at km 100 shall not be further exploited in order to avoid the impacts on the wetland spot.

#### 4.4 Impacts on Social Environment, and Avoidance and Mitigation Measures

The assessment of potential impacts on socio-economic environment is presented in a separate section, i.e. in Part II of the Report. However, assessment of potential impacts and mitigation measures for impacts on traffic safety is given below.

##### 4.4.1 Traffic Safety Issues

###### *(i) Construction Period*

Since construction works will take place during the road is in operation, road hazards may arise from partial closure of lanes and the movement of heavy construction equipment. This may affect both road workers as well as road users (drivers, pedestrians, road side merchants, etc.) who can be put at risk by inadequate traffic management and work zone controls during construction.

The exploitation of borrow pits and quarries with heavy machinery could create safety risks for the worker's. Transport of construction material could lead to disturbances and danger for road users and villagers caused by heavy loaded trucks.

###### ***Avoidance and Mitigation Measures***

With regards to traffic, the safety of workers and local residents, potential risks and disturbances can be avoided if the contractor provides a well designed work and traffic management plan (TMP). TMP may include:

- Provision of necessary information such as speed limits, direction, hazard locations, sensitive sites (e.g. schools, villages, animal crossing paths etc.) by putting appropriate signals.
- Assigning traffic regulators or traffic police to control traffic flows at critical sections or periods where/when traffic safety is a serious issue.
- Awareness training of operators of equipment and construction vehicles in traffic safety measures.
- Establishment of speed limits and controls for construction vehicles and discipline for the drivers.

Appropriate information on the project shall be provided to potentially affected local residents. This information shall be given prior to the beginning of any works in order to allay fears or complaints and should comprise the beginning and planned duration of works as well as points of contact and official responsibilities. The information that must be provided to potentially affected people may include:

- Locations of risky areas e.g. borrow pits and quarries, construction/work sites, and materials storage and processing sites.
- Areas prohibited for safety reasons, e.g. borrow pits and quarries, rock blasting sites, and materials storage and processing places.
- Providing the necessary information in local language.

With respect to workers' safety or health the contractor shall implement corresponding safety requirements and monitor their compliance.

###### *(ii) Operation Period*

The improved/smoothened alignment together with the new pavement will provide a smooth road which may lead to the tendency of drivers using a too high speed. Unfortunately it is very likely that higher driving speeds entail an increasing number of accidents mainly due to poor driving skills associated with lack of discipline as well as inadequate technical condition of the vehicles. Further, particular areas of concern are market places and the schools aside the project road where pedestrians and in particular pupils/children are highly in danger. In addition, areas where livestock frequently move while they are going to and coming back from grazing areas or watering points are important.

It has been experienced that after the improvement/upgrading of a road the number of accidents often surprisingly increases even though the roads were provided with all possible technical safety features (signalisation, road marking, illumination, etc.). Drivers may unintentionally tend to over-speed since a new/improved road is usually much smoother and more comfortable than the existing road which leads to a subjective underestimation of the actual speed. This problem has been observed on a number of recently upgraded roads such as the Addis – Awassa Road and Addis – Awash – Harar/Dire Dawa Road.

### ***Avoidance and Mitigation of negative Impacts***

For this critical issue, detailed mitigation measures are given in the previous EIA Report (KOCKS *et al.* 2004), which are adopted in this report. In order to avoid and control potential problems in the operation of the road maximum attention has to be paid to an adequate road and traffic safety. Road and traffic safety is based on the three 'E' which can be described as:

- E**ngineering (e.g. standards for road/highway design and traffic engineering, control of quality in implementation, supervision of works for and maintenance of a good/safe road condition)
- E**ducation (e.g. education of pedestrians and motorists, training, public promotion)
- E**nforcement (e.g. laws and regulations, police, justice)

and is a complex process where dynamic, visual, geometrical, drainage and psychological requirements need to be optimised.

### **ENGINEERING**

The requirements on the engineering designs for the proposed upgrading of the project road sections were studied and detailed recommendations have been prepared in the Consultant's 'Design Standard Report' of January 2004. The main items of traffic safety in the engineering road/highway design are:

(i) For the moving vehicular Traffic

The road cross section (width of carriageway + shoulders), the horizontal & vertical alignment and the junctions. Under consideration of these defined design elements, the route selection and determination of realignment & alignment improvement was carried out.

Further, for appropriate guidance during the day and especially at night or during adverse weather conditions (e.g. rain, fog) road markings with surface reflectorisation and road studs are proposed.

(ii) For the stopping vehicular and the non-motorised Traffic

A sufficient number of safe lay-bys (bus stops) and parking bays/lanes of adequate size with easy access and egress need to be provided

Widening and paving of shoulders (e.g. width of 2.0 to 2.5 m) in towns/villages and their vicinity need to be provided and, where required/appropriate, kerbed pedestrian walkways to considerably increase safety by a clear separation and channelisation of non-motorised and motorised traffic.

With reference to town master plans, if any, and according to site investigations appropriate supplementary measures have to be determined at market places.

(iii) For Town and Village Passages

Provision of speed calming measures at the entrance of towns/villages and, where required, in addition at long straight sections of town/village passages in order to control the vehicle speed by means of physical features.

Provision of traffic signs indicating school areas, villages and speed limits.

## EDUCATION

The second component of road and traffic safety, which is assumed to be the more difficult one, is the so-called human factor comprising all traffic participants, vehicle drivers to pedestrians. Technical safety measures may not provide the planned results when the human factor fails.

Therefore, a comprehensive public promotion / information programme as an essential component of the pre-operation phase, well ahead of the completion of any section of upgraded road, is strongly recommended in order to provide the necessary background information for understanding of the new/changed road situation/condition and requirements as well as traffic regulations in order to increase traffic safety.

In close liaison with the responsible authorities (e.g. Woreda, town council) and the traffic police this programme should mainly focus on the provision of lessons/lectures in schools and in towns/villages concerning traffic safety in general and the use of special traffic safety features of the project.

To reduce the accident risks related to unintentional over-speed after the road is improved, it is recommended to introduce a general speed limit (e.g. max. 50 km/h) for the first two to three weeks after opening of an improved/upgraded road section so that drivers can become acquainted with the new road situation/condition.

## ENFORCEMENT

Under consideration of a successful implementation of the above described engineering and educational traffic safety programme, it is expected that most of the road users will be aware of the new/changed situation and requirements of the improved/upgraded road and road sections respectively. However, the County's problem in lack of discipline of road users (drivers as well as pedestrians) and their common negligence of traffic regulations results in risky behaviour and is a threat to the other road user's life and limb. This has undoubtedly to be controlled by appropriate enforcement tools based on the legislation.

The proportion of undisciplined drivers seems to be rather high in Ethiopia, most probably a result of insufficient enforcement due to inadequate legislation and/or financial provisions. In order to accommodate the requirements of an improved road system in general with increasing traffic volumes, where the Gedo – Nekemt road is a major part of, a review for "modernisation" of the traffic regulations and corresponding legislation may be required. Subsequently appropriate equipment and training has to be provided to the police forces who will be in charge of control and enforcement of the traffic regulations.

#### 4.5 Summary of identified Potential Environmental Impacts

The potential environmental impacts identified and described in the preceding sub-chapters are summarised in Table 4.2 below.

**Table 4.2: Summary of identified Potential Environmental Impacts**

	MAIN IDENTIFIED POTENTIAL IMPACTS	SIGNIFICANCE	
		Gedo - Bako	Bako - Nekemt
<b>1</b>	<b>Physical Environment</b>		
1.1	Land acquisition	XXX	XXX
1.2	Soil erosion, compaction and pollution	XXX	XXX
1.3	Slope instability/spot sliding	XX	XX
1.4	Landscape intrusion/deterioration of aesthetic value	XX	XX
1.5	Exploitation of material sources	XXX	XXX
1.6	Construction spoils	XX	XX
1.7	Drainage, water pollution and sedimentation	XX	XX
1.8	Disruption of traditional irrigation systems	XX	XX
1.9	Air and noise pollution	XXX	XXX
1.10	Change in land use	XXX	XXX
<b>2</b>	<b>Biological Environment</b>		
2.1	Disturbance to primary forests/riverine forests	XX	XXX
2.2	Cutting of indigenous trees	XX	XXX
2.3	Loss of eucalyptus trees at realignments & road widening	XXX	XXX
2.4	Disturbance of wildlife	XX	X(+)
2.5	Loss of wetland spots	XX	XX
2.6	Disturbance of horti-crops (fruit trees)	X	X(+)
2.7	Disturbance of tree nursery sites	X(-)	X

**Legend:** X(-) = insignificant

X = less significant, requires some attention

X(+) = less significant, but requires observation

XX = significant, requires mitigation

XXX = significant, requires particular attention & mitigation

XXXX = very significant, requires particular attention & mitigation

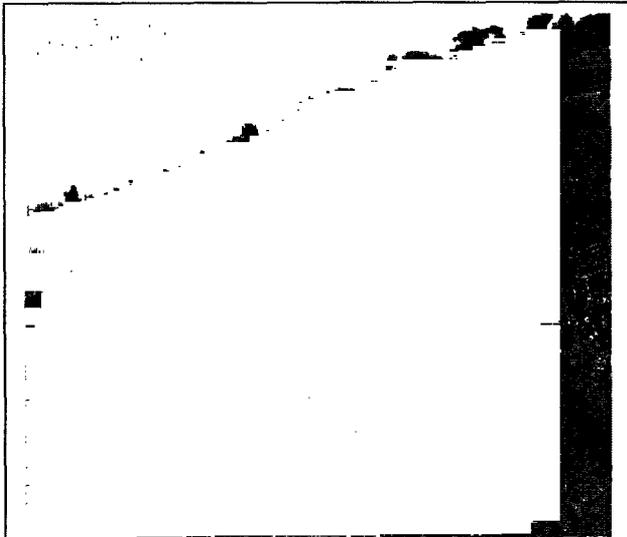


Photo 13: Un-stabilized side-tipped cut material on steep sloping river bank, km 3.0 (at the new culvert)

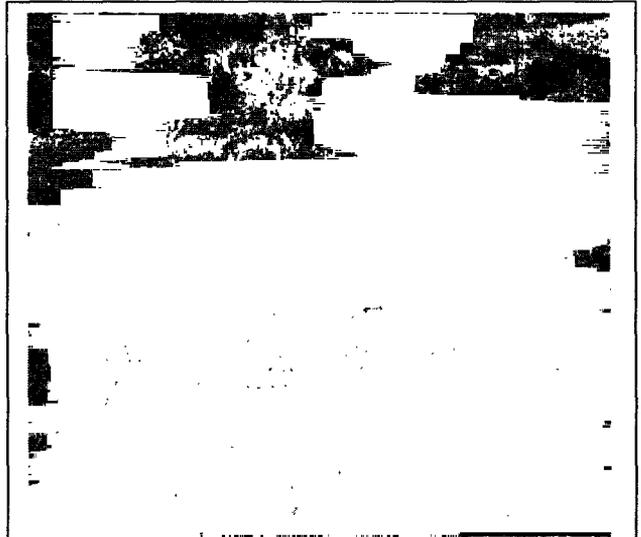


Photo 14: Wetland/Marshland at realignment (km 93.8), nearby there is protected spring used for community water supply.



Photo 15: A big *Ficus vasta* (Warka) tree just at realignment (km 77.4)

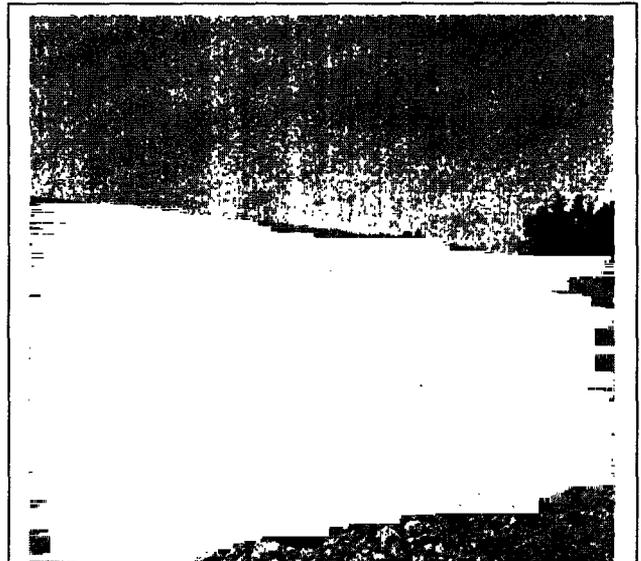


Photo 16: Steep fill slope protected/stabilized by grassing (on Addis-Ambo Road).

## 4.6 Mitigation Cost Estimate

The cost for implementation of the environmental mitigation and benefit enhancement measures is usually estimated as 4.0% of the estimated construction cost of the project. However, a great number of the determined environmental avoidance/mitigation and benefit enhancement measures:

- have no cost implication, like awareness or careful handling; or
- are engineering/physical features, which are part of the construction items, like drainage system, traffic signs, speed calming measures; or
- have to be covered separately, e.g. during the implementation preparation phase, like the resettlement and compensation for loss of livelihood (loss of houses, farmlands, plantation trees).

The information on estimated construction costs has been extracted from the recent Detailed Engineering Design & Tender Document Preparation and Resettlement Action Plan study by KOCKS Consult (2005).

Total net cost	ETB 519,357,136.75
Add 15% tax	ETB 77,903,570.51
<b>Total Works as per Bill of Quantities</b>	<b>ETB 597,260,707.26</b>
Total Works as per Bill of Quantities	ETB 597,260,707.26
Add 10% physical contingencies	ETB 59,726,070.73
Estimated Environmental Cost (4%)	ETB 26,279,471.12
Estimated Cost for HIV/AIDS Prevention	ETB 500,000.00
<b>Total Estimated Cost</b>	<b>ETB 683,766,249.10</b>

A preliminary cost estimate is given in Table 4.3 below for the mitigation measures that are not part of engineering/physical construction items, and Resettlement Action Plan (RAP). This cost estimate is preliminary and is intended to provide an indication of the cost of implementing the proposed environmental mitigation measures or EMP. A separate cost estimate will be provided for compensation and resettlement of the project affected people (PAP) in the RAP.

**Table 4.3: Preliminary Cost Estimate of Environmental Mitigation Measures**

	Description	Unit	Tentative Amount	Tentative Rate (Birr)	Total (Birr)
1	Planting of trees to replace trees removed, prevent erosion & improve landscape	ha	40	20,000	800,000
2	Grassing of primary side slopes				
	2.1 Side slope on fill with 66.67%	m <sup>2</sup>	26244	5	131,220
	2.2 Side slope on fill with 50.00%	m <sup>2</sup>	78731	5	393,655
	2.3 Side slope on cut with 66.67%	m <sup>2</sup>	78731	5	393,655
	2.4 Back slope on cut with 200.00%	m <sup>2</sup>	26244	5	131,220
	2.3 Back slope on cut with 100.00%	m <sup>2</sup>	52487	5	262,435
3	Reinstatement of borrow areas	ha	15*	80,000	1,200,000
4	Construction of crossing structures or steps to houses at high fill sections	Lump sum			800,000
5	Measures for prevention of HIV/AIDS, STDs and malaria through health education or awareness training/ lessons in towns & villages and other measures.	Lump sum			500,000
	Contingency at 20%				922,437
	<b>Total</b>				<b>5,534,622</b>

\* 10 borrow sites are assumed to be exploited, with average 1.5 ha each to be reinstated.

## 5. CONSIDERATION OF ALTERNATIVES

### 5.1 Alternatives Considered by Previous Studies

#### (i) **SYSTRA et. al. (2003)**

The feasibility study of Gedo – Nekemt – Bedele Road made by SYSTRA et. al. (2003) does not include any details of studied and analysed alternative road corridors, alternative alignments, realignments or required alignment improvements nor their potential environmental impacts (e.g. land requirement) and possible benefits (increased road safety, shorter length of upgraded road, etc.).

#### (ii) **KOCKS Consult et. al. (2004)**

The TOR of the study made by KOCKS Consult et. al. (2004) included consideration of new realignments when the existing route is not to the standard in different aspects, and improvement of horizontal and vertical alignments for the existing route in conformity with the design standards.

Accordingly the Consultant carried out comprehensive highway engineering field investigation in order to directly determine the required improvements of the alignment “on the spot”. During this exercise alternative improvement options for the horizontal as well as for the vertical alignment were studied and the most advantageous road alignment in terms of geometry, earthworks quantities as well as environmental impact was finally selected (KOCKS Consult et. al., 2004).

The mentioned EIA report also indicated that in order to minimise/avoid social impact, no changes of the alignment through towns and villages were recommended although some existing curves are slightly below the requirements of the geometric design standard. This is acceptable since vehicle speed has to be low. The same applies for “narrow” curves at the immediate approach/entrance to a town or village, which will support speed calming measures.

The highway engineering field surveys yielded a total of 89 improvements of alignment comprising single/individual curves and sections of realignment of up to 1.6 km length. In addition to these 89 locations further vertical and horizontal curves were recorded for smoothing, which means the construction of a deeper cut section and respectively a moderate increase of the horizontal curve radius shifting the existing centre line in the range of 5 to 15 m. A preliminary calculation resulted in an approximate 4.5 to 5.0 km reduction in length.

Between Chingi and Nekemt, existing road chainage km 110 and km 137 respectively, the road passes through rolling and hilly terrain and crosses many streams and rivers. The determined improvements of the alignment resulted in a reduced number of horizontal curves (less curvature) and improved vertical curves providing the required sight distance. However, the terrain does not allow for a reduction of existing gradients of 8% nor of the many ascents/descents. This was also the result of the highway engineering investigation and study of the following four sections with potential alternative alignments:

Alternative I: Between existing road chainage km 76.0 and km 77.5 an alternative alignment south of the existing road was investigated. However, in comparison to an improved alignment of the existing road ‘Alternative I’ did not show advantages.

Alternative II: This alternative would reduce the length between existing road chainage km 78.1 and km 79.0 by 250 to 300 m. Under consideration of the characteristic of the adjacent road alignment, environmental/social impact

(loss of agricultural land) and the considerable earthworks quantities, preference was given to an improved alignment of the existing road, which results in the reduction of horizontal curves (from 4 to 2 nos.) and also some length.

Alternative III: With 'Alternative III', starting at existing road chainage km 105, some improvement of the vertical alignment (reduced gradient) and reduction in length could be achieved. When weighing these moderate benefits against the environmental/social impact and the construction costs, preference was given to an improved alignment of the existing road.

Alternative IV: The alternative alignment crosses the area of the Nekemt waterworks between a reservoir and the water intake. In order to avoid any conflicts during construction and the subsequent operation of the road, this alternative was not considered further.

During the highway engineering field works observations along the Gedo – Nekemt road and in particular the hilly/mountainous section between Bako and Konchi, existing road chainage km 60 and km 120 respectively, suggest that a more advantageous road corridor may be further south of the existing road. However, such investigations are beyond the scope of the present Project and should have been part of a/the previous feasibility study.

In summary there is no reasonable alternative to this proposed road upgrading project. There is a need to improve the infrastructure as part of the Federal road network to serve the population of all those Woredas directly and by extension the Nation at large. Ultimately the social transformation obtained from this project will be great and significant. This study concluded that there are no environmental grounds for not proceeding to the implementation of the Gedo – Nekemt Road Upgrading Project provided that the recommended environmental avoidance/mitigation measures are strictly implemented.

## 5.2 Alternatives Considered by Present Study

In order to explore any possibilities for avoiding or minimizing potential impacts, during the field survey an intensive investigation was made at the realignments, alignment improvements and relocations of structures made in the detailed engineering design by the KOCKS Consult. For the locations having severe or significant potential impacts that can not be mitigated to acceptable levels, other possible alternatives with less/acceptable environmental consequences, without significantly compromising the intended geometric improvements, were identified and proposed for consideration in the Engineering Design Review, which will be carried out during the Stage II of the project study.

The locations of those realignment or improvement sections, the identified impacts and proposed alternatives are summarised below (the locations are given according to the new chainage):

- (i) St. 2+750 - 3+000: Relocation of the bridge on Racho river will likely cause severe damages to a sensitive environment, steep slopes on river banks with huge un-stabilized materials disposed during the construction of a new bridge replacing the damaged old bridge. Replacing the bridge by box culvert and constructing protecting structures like retaining walls will reduce the impacts.
- (ii) St. 50+750 – 51+600: Realignment crossing Abuko river at downstream of the existing bridge. Implementation of the realignment will affect a riverine forest containing indigenous trees, and wetland spots and springs that are sources of community and/or irrigation water supplies. The wetland spots are also important

dry season grazing areas for livestock and habitat for some birdlife. Shifting the realignment to right hand side (RHS) will avoid the impacts.

- (iii) St. 64+500 - 64+900: Realignment crossing Meki river at upstream of the existing bridge. Implementation of the designed realignment will cause loss of riverine forest containing indigenous trees, and disturbance to the river system as construction of the new bridge will likely require river training to bring two streams into one course or construction of two culverts. Considering the realignment after the existing bridge and improvement to the left hand side (LHS) at about 64+900 - 65+100 will avoid the impacts.
- (iv) St. 73+700 - 74+200: Realignment crossing Chekorsa river at downstream of the existing bridge. Implementation of the designed realignment will cause loss of riverine forest containing indigenous trees, and disturbance to the river system that has substantial flows even during the dry season. Considering the realignment after the existing bridge will avoid the impacts.
- (v) St. 93+750 - 94+000: Alignment improvement at Jalele river affecting part of a wetland (marshland) spot, which is a source of developed spring used by over 50 households for drinking water. It is also an important dry season grazing spot for livestock. Shifting the realignment to RHS will avoid the impact.

## **6. ENVIRONMENTAL MITIGATION PLANNING**

### **6.1 Introductory Notes**

In the preceding chapter the potential impacts on the environment caused by the proposed upgrading of the Gedo - Nekemt road have been identified and corresponding avoidance and mitigation measures are described. The main environmental issues for which detailed avoidance/mitigation measures have to be prepared/specified during the engineering design & tender document preparation and which have to be closely monitored are:

- the Land Acquisition/Requirement;
- the Construction Activities;
- the Material Extraction and Transport;
- the Construction Spoils Disposal;
- the Establishment, Set-up and Operation of the Site Facilities; and
- the Road in Operation.

### **6.2 Land Requirement**

Due to the dense population and the scarcity of cultivable land and the involvement of many realignments and road widening for the road upgrading, the land requirement is an important and crucial issue of concern. As a guideline for the mitigation planning during the review of engineering design and tender document preparation, the land compensation planning and the subsequent monitoring, the major environmental issues and potential impacts respectively have been summarised in Table 6.1 together with the corresponding avoidance and mitigation measures and institutional responsibility for implementation and monitoring.

### **6.3 Construction Activities**

A great number of potential impacts on the physical, biological and socio-economic environment have been identified which may be caused by the various construction activities during the implementation of the project.

As a guideline for the mitigation planning during the review of engineering design and tender document preparation and the subsequent monitoring, the major environmental issues and potential impacts respectively have been summarised in Table 6.2 together with the corresponding avoidance and mitigation measures and institutional responsibility for implementation and monitoring.

### **6.4 Material Extraction and Transport**

The exploitation of borrow pits and quarries with heavy machinery, and the transport of the construction materials may cause a number of potential impacts on the physical, biological and socio-economic environment.

As a guideline for the mitigation planning during the engineering design review and tender document preparation and the subsequent monitoring, the major environmental issues and potential impacts respectively have been summarised in Table 6.3 together with the corresponding avoidance and mitigation measures and institutional responsibility for implementation and monitoring. These avoidance and mitigation measures take into consideration newly opened materials sources as well as the newly used/extension areas of existing sources.

## **6.5 Handling, Transport and Disposal of Spoil Materials**

The road construction activities will produce quite large quantities of spoil materials. Improper disposal of such materials will likely cause several adverse impacts on the biophysical as well as the human environment.

As a guideline for the mitigation planning during the tender document preparation and the subsequent monitoring, the major potential environmental impacts and the corresponding avoidance and mitigation measures are summarised in Table 6.4.

## **6.6 Establishment, Set-up and Operation of the Work Camp**

The location and operation of the contractor's and the supervising consultant's site facilities is a key issue with potential impacts on the physical, biological and socio-economic environment.

As a guideline for the mitigation planning during the engineering design review and tender document preparation and the subsequent monitoring, the major potential environmental impacts and their corresponding avoidance measures are summarised in Table 6.5.

**Table 6.1: Potential Impacts due to Land Requirement and their mitigation Measures**

Potential Impacts	Avoidance/ Mitigation Measures	Implementing Organization/Body	Monitoring Organization/Body
Permanent land acquisition for the upgrading of the project road.	<ul style="list-style-type: none"> <li>Reviewing the engineering design considering the land use/productive land &amp; population density, utilising the existing road area as much as possible.</li> </ul>	Design Consultant (SABA Engineering)	ERA
	<ul style="list-style-type: none"> <li>Compensation for lost houses including logistical support for moving, relocation grant and others.</li> <li>Compensation for lost assets, for lost income basis and others.</li> <li>Land replacement, e.g. from reinstated/re-cultivated abandoned road sections.</li> </ul>	ERA	•
Temporary dispossession of and for the upgrading of the project road.	<ul style="list-style-type: none"> <li>No detours or access roads where permanent crops, trees, houses or buildings or structures, services utilities would be affected.</li> <li>Applying road works as half-way construction to minimize the need of detours.</li> <li>Careful traffic management planning to minimise the need of detours.</li> <li>Compensation for lost assets, for lost income for the respective period of land taking and others.</li> <li>Reinstatement of detours, access roads, materials sources and others to their original condition.]</li> </ul>	Construction Contractor	Resident Engineer (RE) & Environmental Control Officer (ECO)
Existing services utilities)	<ul style="list-style-type: none"> <li>Checking/determination of the exact position of any services.</li> <li>In close consultation with the respective owners (e.g. public utility authorities) relocation/ protection measures to be incorporated in and co-ordinated with the road work activities.</li> </ul>	Contractor	RE & ECO
Failure/ Non-compliance of the contractor	<ul style="list-style-type: none"> <li>Contractor's environmental and safety/health officers.</li> <li>Security (bank guarantee) for protection of the environment, see sub-chapter 7.2.3.</li> </ul>	Contractor	ERA

**Table 6.2: Potential Impacts Related to Construction Activities and their Mitigation Measures**

Potential Impacts	Avoidance/ Mitigation Measures	Implementing Organization/Body	Monitoring Organization/Body
Loss/erosion/impairment of natural soils.	<ul style="list-style-type: none"> <li>• Adjust construction program for dry season.</li> <li>• Road works as half-way construction to avoid soil compaction for access roads/ detours.</li> <li>• Use existing tracks/roads for materials transport.</li> <li>• Provision of lined drains for sections with existing gully erosion &amp; sections with vulnerable soils.</li> <li>• Reinstatement of access roads and detours. Covering of embankment slopes in cut and fill, earth ditches and drains, road shoulders, etc. by grass and other vegetation.</li> </ul>	Contractor	RE & ECO
Appearance of the landscape/ landscape aesthetics.	<ul style="list-style-type: none"> <li>• Processing and reuse of existing materials.</li> <li>• Removal of waste, debris, scrap metals, etc.</li> <li>• Preparing and implementing a waste management plan.</li> <li>• Avoid side-tipping of excavation materials on down-slope.</li> <li>• Protect slopes vulnerable to landslides by constructing retaining walls, gabions etc.</li> <li>• Restoring of temporarily used land to its original condition.</li> </ul>	Contractor	RE & ECO
Pollution of soils, groundwater and surface water.	<ul style="list-style-type: none"> <li>• Contractor has to provide a detailed waste management plan.</li> <li>• Raising of awareness of contractors staff by on site training and briefing.</li> <li>• Proper storage and handling of hazardous materials (bitumen, detergents, lubricants, oil, fuel, paint etc.).</li> <li>• Regular and effective maintenance of vehicles and construction plant.</li> <li>• Stockpiling of topsoil after clearing and re-use in the works.</li> <li>• Proper location of site facilities.</li> <li>• Provision of suitable river diversion during construction of structures.</li> </ul>	Contractor	RE & ECO

Table 6.2: Construction Activities, continued:

Potential Impacts	Avoidance/ Mitigation Measures	Implementing Organization/Body	Monitoring Organization/Body
Noise, emissions and dust development.	<ul style="list-style-type: none"> <li>• Restriction of working hours at night.</li> <li>• Periodically watering of un-paved road sections.</li> <li>• Site facilities/plants should be at a minimum distance of 3 km from sensitive receptors.</li> <li>• Restriction of traffic speeds.</li> <li>• Corrective repairs or adjustments of equipment and vehicles with excessive emissions of exhaust gases and noise due to inefficient operating conditions or poor maintenance</li> </ul>	Contractor	RE & ECO
Destruction / damage of roadside and riparian vegetation.	<ul style="list-style-type: none"> <li>• Keeping a minimum distance from trees.</li> <li>• Adequate protection of trees by use of barriers, fences.</li> <li>• Widening of the road to one side.</li> <li>• Shifting of the alignment.</li> <li>• Protection of trunks by appropriate means when used for anchorage purposes.</li> <li>• Road works as half-way construction.</li> <li>• Replanting of removed trees by using appropriate species.</li> </ul>	Contractor	RE & ECO
Worker's safety and health.	<ul style="list-style-type: none"> <li>• Application of regulations and monitoring of their compliance.</li> <li>• Raising the awareness of workers towards safety and health issues.</li> <li>• Provision of protective clothing.</li> <li>• Good traffic management.</li> <li>• Provision of first aid facilities.</li> <li>• Provision of health clinic.</li> </ul>	Contractor	RE & ECO
Safety risk for road users and residents.	<ul style="list-style-type: none"> <li>• Provision of a well designed traffic management plan.</li> <li>• Provision of sufficient and adequate traffic-control and traffic-safety devices.</li> </ul>	Contractor	RE & ECO
Failure / Non-compliance of the contractor	<ul style="list-style-type: none"> <li>• Contractor's environmental and safety/health officers.</li> <li>• Security (bank guarantee) for protection of the environment, see sub-chapter 7.2.3.</li> </ul>	Contractor	ERA

Table 6.3: Material Extraction and Transport

Potential Impacts	Avoidance/ Mitigation Measures	Implementing Organization/Body	Monitoring Organization/Body
Workers' safety and health	<ul style="list-style-type: none"> <li>Application of regulations and monitoring of their compliance.</li> <li>Provision of protective clothing.</li> <li>Raising the awareness of workers towards safety and health issues.</li> <li>Provision of first aid facilities.</li> <li>Provision of health clinic.</li> </ul>	Contractor	RE & ECO
Disturbance for residents by noise and dust related to operation of material sites.	<ul style="list-style-type: none"> <li>Avoidance of exploiting material sources near residential areas.</li> <li>Emission intensive equipment (noise, exhaust gases) has to be repaired / maintained.</li> <li>Restriction of working hours.</li> </ul>	Contractor	RE & ECO
Transport related disturbance for residents and workers by noise, vibrations and dust.	<ul style="list-style-type: none"> <li>Proper selection of transport/ hauling routes for construction materials.</li> <li>Avoidance of town/village passages.</li> <li>Periodically watering of un-paved roads.</li> <li>Use of covered trucks.</li> <li>Emission intensive equipment has to be repaired.</li> <li>Provision of a sufficiently detailed traffic management plan.</li> <li>Elaboration of a traffic management plan with statements on working hours.</li> <li>Information of local people.</li> </ul>	Contractor	RE & ECO
Deforestation/ loss of vegetation.	<ul style="list-style-type: none"> <li>Use of existing tracks/roads as far as possible.</li> <li>Replanting of vegetation.</li> </ul>	Contractor	RE & ECO
Loss of topsoil.	<ul style="list-style-type: none"> <li>Stockpiling of topsoil before exploiting the site.</li> <li>Spreading of topsoil after completion of works.</li> </ul>	Contractor	RE & ECO
Soil compaction.	<ul style="list-style-type: none"> <li>Use of existing tracks for transport.</li> <li>Limitation to the imperative area for exploitation.</li> <li>Loosening of soil by special ploughs.</li> </ul>	Contractor	RE & ECO
Spread of diseases transmitted by insects.	<ul style="list-style-type: none"> <li>Reinstatement of exploited borrow areas, proper grading and draining of terrain.</li> <li>Grass seeding / planting of original vegetation.</li> </ul>	Contractor	RE & ECO
Contractor's non-compliance	<ul style="list-style-type: none"> <li>Contractor's environmental and safety/health officers.</li> <li>Security (bank guarantee) for protection of the environment, see sub-chapter 7.2.3.</li> </ul>	Contractor	ERA

**Table 6.4: Handling, Transport and Disposal of Spoil Materials**

Potential Impacts	Avoidance/ Mitigation Measures	Implementing Organization/Body	Monitoring Organization/Body
Soil erosion due to tipping of spoils on down-slope.	<ul style="list-style-type: none"> <li>• Avoidance of side-tipping of spoil materials from road cuts on down-slope.</li> <li>• Landscaping of the depot sites and planting with appropriate grass and tree or shrub species.</li> </ul>	Contractor	RE & ECO
Alteration of river flows and increased sediment	<ul style="list-style-type: none"> <li>• Provision of suitable river diversion during construction of structures.</li> <li>• Avoidance of disposing spoil materials in river courses or river banks.</li> </ul>	Contractor	RE & ECO
Contamination of farmlands/ lands.	Stockpiling of the spoil material and transport to properly located depots.	Contractor	RE & ECO
Erosion / damage of soil and riverine vegetation.	<ul style="list-style-type: none"> <li>• Avoidance of damaging roadside and riverine vegetation by side-casting of spoil materials.</li> <li>• Replanting of vegetation.</li> <li>• Loosening of compacted soils by special ploughs.</li> </ul>	Contractor	RE & ECO
Transport related impacts for residents and users by noise, vibrations and dust.	<ul style="list-style-type: none"> <li>• Proper selection of transport/ hauling routes for construction materials.</li> <li>• Avoidance of town/village passages.</li> <li>• Periodically watering of un-paved roads.</li> <li>• Emission intensive equipment (noise, exhaust gases) has to be repaired.</li> <li>• Provision of a sufficiently detailed traffic management plan.</li> <li>• Elaboration of a traffic management plan with statements on working hours.</li> <li>• Information of local people.</li> </ul>	Contractor	RE & ECO
Safety / Non-compliance of the contractor	<ul style="list-style-type: none"> <li>• Contractor's environmental and safety/health officers.</li> <li>• Security (bank guarantee) for protection of the environment, see sub-chapter 7.2.3.</li> </ul>	Contractor	ERA

**Table 6.5: Establishment, Set-up and Operation of the Work Camp**

Potential Impacts	Avoidance Measures	Implementing Organization/ Body	Monitoring Organization/ Body
Location of site facilities	<ul style="list-style-type: none"> <li>• Close liaison of ERA (EMSM &amp; supervising engineer) and contractor with local authorities and community representatives while locating the facilities.</li> <li>• Siting at reasonable distance (minimum of 3km) from sensitive receptors (residential areas, health units, schools, churches &amp; mosques), and water supply sources.</li> <li>• Avoid areas of dense vegetation or areas of valuable trees.</li> <li>• Avoid agriculturally valuable (highly productive) areas.</li> </ul>	Contractor, ERA, Woreda Administration	RE & ECO
Storage and handling of hazardous materials	<ul style="list-style-type: none"> <li>• Storage tanks shall be placed in bunds with sumps with a minimum bund capacity of 110% of the storage capacity.</li> <li>• Asphalt plant shall be located on a concrete platform and is to be enclosed by a bunded wall. After mixing is complete all waste shall be removed from the batching area.</li> <li>• All spilt asphalt shall be promptly removed by the contractor to an approved disposal site.</li> <li>• No storm water is permitted to flow through the plant area.</li> <li>• In the event of a spill, pumping of the product must be done as quickly as possible to reduce the amount being released into the environment.</li> <li>• All drainage water from fuel storage, asphalt plant and concrete plant areas shall be diverted to settling ponds that are provided with oil-skimming device for the removal of any residual oil prior to discharge into the natural environment.</li> <li>• Oils shall be stored in sealed drums in a bunded area.</li> <li>• Used oils shall be stored similarly and shall be recycled or disposed of in a manner approved by the RE.</li> </ul>	Contractor	RE & ECO
Waste management and sewage treatment	<ul style="list-style-type: none"> <li>• The latrines and septic tank system shall be located away from sensitive areas such as streams and springs; and they shall be serviced regularly so as to prevent overflowing.</li> <li>• The contractor's staff shall use only the latrines for excreta disposal or ablution.</li> <li>• Water used for sanitation purposes must be released into the septic tank system.</li> <li>• Proper solid waste management shall be implemented including separation of recyclable or reusable at source, disposal of the biodegradable wastes in a well prepared hole, burning and covering the ashes with a layer of soil.</li> <li>• The contractor's staff shall be informed about the necessity to refrain from littering and about the need to keep hazardous substances separate from the domestic waste.</li> <li>• The contractor shall provide refuse bins on site for disposal of litters and the contractor or its staff shall conduct site clean-ups for litter.</li> </ul>	Contractor	RE & ECO

**Table 6.5: Establishment, Set-up and Operation of the Work Camp, continued.**

Potential Impacts	Avoidance Measures	Implementing Organization/ Body	Monitoring Organization/ Body
al disruption, roversies with munity or local ur.	<ul style="list-style-type: none"> <li>Establishment of a labour and community interaction committee.</li> </ul>	Contractor, Woreda Administration	ECO
imunicable ases and sexually mitted diseases.	<ul style="list-style-type: none"> <li>Information on health problems in the project area (e.g. malaria) and sexually transmitted diseases (e.g. HIV/AIDS) and pre-cautionary measures through educational lesson(s).</li> </ul>	Contractor, Woreda Health Office	ECO
ition of residential s by noise and .	<ul style="list-style-type: none"> <li>Reasonable siting of the site facilities in a distance from villages to avoid nuisance of neighbouring areas.</li> <li>Limitation of working at night.</li> </ul>	Contractor	ECO
ition of soils and ndwater.	<ul style="list-style-type: none"> <li>Contractor has to provide a detailed waste management and sewage treatment plan.</li> <li>Raising of awareness of contractors staff by on site training and briefing.</li> <li>Proper storage and handling of hazardous materials (bitumen, detergents, lubricants, oil, fuel, paint etc.).</li> <li>Stockpiling of topsoil after clearing before installation of site facilities.</li> <li>Spreading of topsoil after completion of works.</li> </ul>	Contractor	RE & ECO
earance of the scape.	<ul style="list-style-type: none"> <li>Removal of machines, waste material after completion of works.</li> <li>Restoration of work areas, work depots and material storage sites to original condition.</li> </ul>	Contractor	RE & ECO
s (damage) of tation by site illation and for fuel d.	<ul style="list-style-type: none"> <li>Avoidance of areas with dense vegetation.</li> <li>Protection of valuable/major trees within or adjacent to the work site / site facilities against damage.</li> <li>Contractor or staff shall not buy any charcoal or wood, he has to provide the staff with gas, paraffin oil etc. (same for Supervising Engineer).</li> </ul>	Contractor	RE & ECO
ire/Non-pliance of the ractor	<ul style="list-style-type: none"> <li>Contractor's environmental and safety/health officers.</li> <li>Security (bank guarantee) for protection of the environment, see sub-chapter 7.2.3.</li> </ul>	Contractor	ERA

## 6.7 Road in Operation

The upgrading of the project road will bring a number of positive effects. However, in order to control or avoid potential problems during operation of the road, maximum attention has to be paid to an adequate road and traffic safety.

As a guideline for the engineering design review and tender document preparation and the subsequent monitoring, the major potential impacts and their corresponding avoidance and mitigation measures are summarised in Table 6.6 below.

**Table 6.6: Road in Operation**

Potential Impacts	Avoidance Measures	Mitigation Measures
Traffic safety	<ul style="list-style-type: none"> <li>• Adequate design details for motorised and non-motorised traffic.</li> <li>• Public promotion/ information programmes.</li> <li>• 50 km/h speed limit for the first 2 to 3 weeks after opening of an improved/upgraded road section.</li> </ul>	<ul style="list-style-type: none"> <li>• Provision of proper traffic signs and speed limits.</li> <li>• “Modernisation” of the traffic regulations and corresponding legislation.</li> <li>• Appropriate equipment and training for the traffic police forces.</li> </ul>
Danger for residents by high traffic speed.	<ul style="list-style-type: none"> <li>• Appliance of a “speed calming measures” especially in school and town/village areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Provision of proper traffic signs and speed limits.</li> <li>• Provision of pedestrian crossings in school areas.</li> <li>• Frequent speed controls by the traffic police.</li> </ul>

## 7. ENVIRONMENTAL MANAGEMENT PLAN

### 7.1 General

An Environmental Management Plan (EMP) provides a link between the impacts predicted and their mitigation measures and implementation and operation activities. An EMP has been prepared outlining mitigation and monitoring activities/responsibilities that acts as a guide to those planning, preparing, constructing and operating the road project. Environmental management activities will be required for the following subsequent project phases:

- Review of engineering design and tender document;
- Implementation preparation phase;
- Implementation/construction period; and
- Road in operation/service and maintenance phase.

Finally, environmental mitigation measures can only be as good as the management and monitoring capacity and environmental sensitivity of the agencies responsible for the implementation of the project. Required expertise is available (ERA's EMSB) but in order to assure that the construction and operation of the road will be environmentally sustainable in the long run, some institutional strengthening is recommended, which can be in the form of advanced training, training on the job/site, provision of additional/supplementary facilities/equipment, etc.

### 7.2 Details for Review of Engineering Design and Tender Document

#### 7.2.1 Engineering Designs

Based on the recommendations of the environmental impact assessment appropriate,

- **avoidance measures** to protect as far as possible the environment from adverse impacts;
- **mitigation measures** to minimise adverse impacts for those negative impacts which cannot be avoided; and
- **benefit enhancement measures**

have to be included in the review of the engineering designs. The designs review should also consider minimising of maintenance cost and maximising the service life as well as the utilisation of locally available materials and skills (for construction and maintenance).

Environmental issues to be considered during the engineering design review include:

- Considering realignments that have severe environmental impacts or have impacts on environmentally sensitive issues like wetlands, primary forests etc., as proposed in Chapter 5, sect. 5.2.
- Avoid (or reduce to the absolute minimum) fill sections in towns and villages, or design proper crossing structures at appropriate locations or intervals or embankments with sufficiently gentle slope for unavoidable sections.

#### 7.2.2 Planning for Relocation and Compensation

Since the engineering design has considered well the town/village sections, the Road Upgrading Project is not expected to cause significant disruption to the inhabitants residing along the project road and that a full and detailed RAP is not required. However, a Compensation/Rehabilitation Planning has to be prepared with details of the relocation/dispossession and that shows the appropriate compensation and/or replacement requirements for lost assets including land, for lost income basis as well as logistical support for moving, relocation grant and other requirements.

The Rehabilitation Planning shall include reinstatement/re-cultivation of the areas of abandoned road sections to use as a possibility for replacement of new land taken for the project. However, it should be noted that reinstatement is possible after the construction of a respective road section of improvement/realignment is completed.

### 7.2.3 Tender Documents

For the various details of the engineering designs corresponding drawings, specifications pay/bill items have to be prepared as part of the tender documents for the works contract.

To ensure the proper implementation of environmental avoidance/mitigation measures as well as all safety/health issues, sufficiently detailed environmental articles and clauses have to be formulated and become an integral part of the works contract, thus providing a contractual basis for an effective supervision and control of the proposed measures.

The contractor's obligations shall include the assignment of at least two of his senior staff as Environmental Officer and Safety/Health Officer, well experienced in their respective assignments, to be monitored/controlled by the supervising consultant. Further, it is assumed, that the contractor's staff has low awareness of the negative impacts arising from operations within the site. Therefore, it is strongly recommended to provide some on site training lessons and briefing of the contractor's staff concerning environmental protection issues including operation and maintenance of plant and equipment.

In order to provide the supervising consultant and the client (ERA) respectively with an appropriate "tool" to enforce the contractor's contractual obligations to follow/implement environmental avoidance/mitigation measures as well as safety/health measures, it is strongly recommended that the contractor provides a security in form of a (bank) guarantee of sufficient amount, e.g. 5% of the contract price, which may be forfeited in part or in total in case of contractor's failure/non-compliance and the money shall be used to repair/mitigate damages/impacts.

The environmental articles and clauses to be formulated and included in the works contract should include the following issues but not limited to:

- Provision of a sufficiently detailed traffic management plan;
- Provision of sufficient traffic control and traffic safety devices;
- Development of waste management plan including those presented in section 6.6;
- Operation and maintenance of construction equipment and materials processing plants;
- Management of construction camps and reinstatement of the sites upon completion of construction works including those measures provided in section 6.6 (Table 6.5);
- Measures for safety and health of workers, road users and residents;
- Measures for restoration of borrow sites, temporary roads & detours, construction materials storage and storage sites;
- Measures for handling, transport and disposal of spoil materials including those outlined in section 6.5 (Table 6.4);
- Measures for material extraction and transport including those provided in section 6.4 (Table 6.3);
- Replanting programme to replace the trees removed during the road construction activities and extraction of construction materials;

- Grassing/soding programme for embankment and cut slopes, as well as other erosion prone areas; and
- Environmental protection measures including those given in Chapter 6, sect. 6.3.

### **7.3 Details for Implementation Preparation Phase**

#### **7.3.1 Implementation of Compensation/Rehabilitation Measures**

It is recommended that a compensation/rehabilitation committee comprising the ERA and relevant local offices such as Wereda Administration and Agriculture and Rural Development, representatives of the Kebele Administration and local community is established and conduct the final valuation of assets and properties for compensation. The activities of the committee will comprise:

- Reviewing/updating of the valuation of permanently lost assets and properties for compensation as included in the compensation plan; and
- Payment of each household/person eligible for compensation as per the final amount/compensation calculated/determined in the aforementioned review/update of the valuation.

The ERA as the client of the project shall take the leading role in establishing the compensation/rehabilitation committee and arranging the financial resource required for the compensation.

#### **7.3.2 Tendering Period**

The environmental monitoring activities during the tender period comprise the following principal activities:

- Preparation of clarification of tenderers' queries, if any, in relation to environmental requirements of the tender document and forwarding the same to all purchasers of the tender documents.
- Examination, request for clarification, evaluation and comparison of the environmental relevant sections of the tenders.

### **7.4 Details for Construction Period**

#### **7.4.1 Compensation for temporary Dispossession of Land**

As described above, the ERA as the client of the project will be a member of the land compensation committee, which will also conduct the final valuation of compensation for temporary land use including affected constructions lying on such areas and finalise/approve the amount(s) to be paid the PAP.

#### **7.4.2 Supervision of Construction**

It is proposed that the ERA assign one experienced staff of the EMSB or appoint a qualified expert as an Environmental Control Officer (ECO) for the duration of the implementation of the project. The ECO is responsible for the monitoring of the implementation of the environmental management plan (EMP) and thus, he must have adequate technical and environmental knowledge to understand and monitor the proper implementation of the recommended EMP. The ECO shall supervise all issues contained in the EMP, as for example:

- Environmental protection measures;
- Safety and health requirements;
- Temporary land requirements and reinstatement:

- Reinstatement/re-cultivation of abandoned road sections after the construction of a respective section of improved/realigned road is completed for compensation of permanent land requirements (replacement of land) as determined during the Implementation Preparation Phase;
- Restoration of irrigation systems;
- Reinstallation of roadside public utilities like water supply pipelines, electric poles and power transmission lines, etc.
- Implementation of benefit enhancement measures;
- Implementation of pre-operation requirements.

#### 7.4.3 Reporting Structure and Schedule during Construction

The ECO will work closely with the Supervising Engineer (SE) in order ensure that the construction works are according the contract obligations including environmental protection measures. The SE oversees that the technical specifications are met during construction while the ECO monitors the implementation of the EMP on site.

It is recommended that an Environmental Management Committee (EMC) established that comprises:

- ERA Representative
- Resident Engineer (RE)
- Environmental Control Officer (ECO)
- Contractor's Environmental Officer (EO)
- Woreda Administration Representative
- Woreda Agriculture and Rural Development Representative
- Woreda Health Office Representative
- Kebele Administration Representative(s)
- Local Community Representatives

Monthly meetings shall be held involving all the members of the EMC, and the purpose of the meetings shall be:

- To establish the suitability of the contractor's methods and machinery in an effort to lower the risk involved for the environment.
- To discuss possible non-conformance to EMP guidelines.
- To assess the general state of the environment on site and discuss any environmental problems which may have materialised.
- To act as a forum for input into the construction phase by the ERA representative.
- To accommodate the local community in the decision-making process regarding social and environmental issues on site.

The ECO shall take minutes of the meetings, conduct monitoring as per the EMP, keep environmental records, compile EMP reports and non-compliance reports and liaison with ERA/the ERA representative.

Two kinds of reports should be compiled by the ECO for study and necessary actions by ERA and/or other concerned institutions.

(i) **A monthly report** which will include:

- Results or status on implementation of the environmental management actions by the contractor in the specific month;
- A description of exceptional conditions on site whether they be meteorological,

- A description of any environmental accident or developments which could potentially develop into a non-conformance event by the contractor;
- exceptional conditions on site whether they be meteorological, personnel related, machinery related, or otherwise stipulated; and
- Minutes from the ECM meeting.

This report will be submitted to ERA's EMSB/representative and relevant local institution(s) like the Land Use & Environmental Protection Unit/Team of the WARDO for study and necessary actions to be taken by them. In addition, it is recommended that a quarterly report will be prepared with more or less similar contents of the monthly report and sent to the National Environmental Protection Authority (EPA) and/or Regional Environmental Agency (REA) for their information and any necessary actions like conducting environmental supervision or auditing. Examples of reporting format are given in Appendix 8.

- (ii) **A non-conformance report** which will describe, in detail, the cause, nature and effects of any environmental non-conformance by the contractor and could stand as evidence should legal action be required. A record sheet with observed data included for each infringement indicating the details of the event including position/location on site, date, if possible, magnitude and significance/importance of the infringement as well as a photo could be included in the report. The report may also suggest mitigation measures to correct the non-conformance (if necessary) and contemplate revisions to any of the strategies used in the construction phase, whether they pertain to monitoring or to construction methods used on site.

## **7.5 Details for Road in Operation/Service and Maintenance Phase**

### **7.5.1 Pre-operation Activities**

Essential activities are required just before the road or a section of the road is taken into operation:

- Provision of lessons/lectures in schools and in towns/villages concerning traffic safety;
- General speed limit of max. 50 km/h for the first two to three weeks after opening of an improved/upgraded road section.

### **7.5.2 Upkeep of the Road**

Proper maintenance for all technical and bio-engineering features will be required to keep the road in a safe and environmentally friendly condition to the benefit of the road users, the residents in the area and the Country in general.

Details of the recommended Environmental Management Plan are provided in Table 7.1

**Table 7.1: Environmental Management Plan for the Road Upgrading Project**

<b>Environmental / Monitoring Issue</b>	<b>Measure to be taken (Tasks, Action)</b>	<b>Implementing / Executing Organisation</b>	<b>Management / Monitoring Organisation</b>	<b>Time Schedule</b>
<b>Engineering Design and Tender Document Preparation Phase</b>				
Recommendations / requirements of the environmental impact assessment (EIA)	Development/determination of appropriate/suitable cost effective avoidance, mitigation, and benefit enhancement measures	Design consultant	ERA / EMSB	Design phase
	Relocation and Land Compensation Planning	Design consultant	ERA / EMSB	Design phase
	Sufficiently detailed environmental articles and clauses of the tender documents including requirement for a security (bank guarantee) for protection of the environment	Design consultant	ERA / EMSB	Design phase
<b>Implementation Preparation Phase</b>				
Location and land compensation to make available the "Site" for the contractor (OTE: Compensation by 'replacement of land' will become available during the implementation/ construction period)	Implementation of the Land Compensation Plan	Land Compensation Committee (ERA, Woredas, Kebeles)	ERA / EMSB	Implementation preparation phase
Ordering	Clarification, evaluation and comparison of the environmental relevant sections of the tenders	ERA / EMSB, Consultant	ERA / EMSB	Implementation preparation phase
<b>Implementation/Construction Period</b>				
Installation of site facilities	Reasonable siting of the site facilities	Contractor	ERA / EMSB, supervising engineer, WA, community representatives	Mobilisation period
Operation of site and site facilities	Waste management and sewage treatment	Contractor	ERA / EMSB, supervising engineer	Duration of contract

**Table 7.1: Environmental Management Plan for the Road Upgrading Project, continued.**

<b>Environmental / Monitoring Issue</b>	<b>Measure to be taken (Tasks, Action)</b>	<b>Implementing / Executing Organisation</b>	<b>Management / Monitoring Organisation</b>	<b>Time Schedule</b>
communicable diseases and sexually transmitted diseases	Information on health problems in the project area (e.g. Malaria) and sexually transmitted diseases (e.g. HIV/AIDS) and pre-cautionary measures through educational lesson(s)	Contractor, Woreda Health Offices	Woreda/Zone Health Offices, ERA / EMSB, supervising engineer	Commencement of contract
safety and health of work force	Protective clothing, first aid facilities	Contractor	ERA / EMSB, supervising engineer	Duration of contract
social disruption, controversies with community or local labour	Establishment of a labour and community interaction committee	Contractor, ERA/EMSB, supervising engineer, Woreda council, community representatives	ERA / EMSB	Duration of contract
graveyards, cemeteries, cultural heritage	Proper marking and/or protection in order to avoid unintentional disturbance	Contractor	ERA / EMSB, supervising engineer	Duration of contract
forestation	The Contractor's work forces shall not buy any firewood nor charcoal and shall bring their own fuel requirements (kerosene, gas etc.)	Contractor	ERA / EMSB, supervising engineer, WARDO	Duration of contract
animals killed by vehicles	Installation of reflectors/reflective strips	Contractor	ERA / EMSB, supervising engineer, WARDO	Duration of contract
disturbance of traditional irrigation systems and nurseries	Installation of crossing pipes and other measures for an uninterrupted flow of water	Contractor	ERA / EMSB, supervising engineer, WARDO	Duration of contract
temporary dispossession of land, e.g. detours, access roads, materials sources	No detours or access roads where permanent crops, trees, houses or buildings or structures, services utilities would be affected, compensation of affected persons, reinstatement of land immediately upon end of use	Contractor, Land Compensation Committee	ERA / EMSB, supervising engineer, WARDO, Woreda Administration (WA)	Duration of contract
relocation of land for compensation of permanent dispossession of land	Reinstatement / re-cultivation of abandoned road sections	Contractor, Land Compensation Committee	ERA / EMSB, supervising engineer	After completion of each realignment
existing services (utilities)	Relocation and or /protection	Contractor and public utility authorities	ERA / EMSB, supervising engineer, WA (Woreda Council)	Duration of contract

**Table 7.1: Environmental Management Plan for the Road Upgrading Project, continued.**

<b>Environmental / Monitoring Issue</b>	<b>Measure to be taken (Tasks, Action)</b>	<b>Implementing / Executing Organisation</b>	<b>Management / Monitoring Organisation</b>	<b>Time Schedule</b>
noise and air pollution	Repair / maintenance of equipment and vehicles, avoidance of town/village passages	Contractor	ERA / EMSB, supervising engineer	Duration of contract
noise	Watering of unpaved roads and road sections, avoidance of town/village passages	Contractor	ERA / EMSB, supervising engineer	Duration of contract
safety risk for road users and residents during construction activities	Traffic management plan, traffic-control and traffic-safety devices	Contractor	ERA / EMSB, supervising engineer, local traffic police	Duration of contract
destruction / damage of roadside and riparian vegetation	Minimum distance, protection, repair or replacement of injured or damaged trees	Contractor, WARDO	ERA / EMSB, supervising engineer, WARDO	Duration of contract
airment/loss/erosion of natural soils	Minimise the extent of ground clearing, construction of drainage and erosion/scour protection, re-vegetation of barren earth surface	Contractor	ERA / EMSB, supervising engineer, WARDO	Duration of contract
contamination of soils and ground water during construction activities	Proper storage and handling of hazardous substances, contractor's yard/workshop area to be surfaced and water drained through fuel/oil separator, maintenance of vehicles and construction plant, proper stockpiling of topsoil	Contractor	ERA / EMSB, supervising engineer	Duration of contract
materials extraction/exploitation and transport	Reuse of existing construction materials	Contractor	ERA / EMSB, supervising engineer	Duration of contract
depletion of materials sources	Reinstatement of exploited areas including proper grading and draining of terrain	Contractor	ERA / EMSB, supervising engineer, WARDO	On respective completion of exploitation
noise/village passages	Construction of drainage crossings and paths linking to existing paths to houses/villages and benefit enhancement measures	Contractor	ERA / EMSB, supervising engineer, Municipalities	Duration of contract

Table 7.1: Environmental Management Plan for the Road Upgrading Project, continued.

Environmental / Monitoring Issue	Measure to be taken (Tasks, Action)	Implementing / Executing Organisation	Management / Monitoring Organisation	Time Schedule
Appearance of the landscape, landscape aesthetics	Removal of waste, debris, scrap metal, etc.; if not handed over, restoration of work areas, work depots and material storage sites to original condition	Contractor	ERA / EMSB, supervising engineer	On completion of a particular road section (taking into operation) and the end of contract respectively
Failure / Non-compliance of the contractor concerning environmental obligations	Contractor's environmental and safety/health officers, forfeiting of security (bank guarantee) for protection of the environment	ERA / EMSB, supervising engineer	ERA/EMSB, supervising engineer	Duration of contract
Use of facilities/camp site	Handing over of the camp complex to the local community	Contractor	ERA/EMSB, supervising engineer, WA	End/completion of contract
<b>Road in Operation/Service and Maintenance Phase</b>				
Traffic safety for pedestrians	Lessons/lectures in schools and in towns/villages concerning traffic safety	ERA /EMSB, Transport Authority(TA), Local Authorities	ERA/EMSB, Transport Authority	Well ahead of the completion/taking into operation of any section of upgraded road
Traffic safety for motorised traffic	General speed limit of max. 50 km/h	Transport Authority(TA)/ Traffic Police	ERA, Transport Authority	The first two to three weeks after opening of an improved/up-graded road section
Comfortability of road users	Maintenance of traffic safety facilities (e.g. traffic signs, road marking) and the road in general	ERA regional offices	ERA/EMSB, TA	Operation of the road
Prevention of soil erosion, impairment/loss/erosion of soils, noise and air pollution	Maintenance of drainage, erosion/scour protection facilities, etc., and the road in general	ERA regional offices	ERA/EMSB, WARDO	Operation of the road

## 7.6 Capacity Building and Institutional Set Up

Environmental mitigation measures can only be as good as the management and monitoring capacity and environmental sensitivity of the agencies responsible for the implementation of the project. Considering the large number of road projects being designed and implemented under the ERA's supervision, the available expertise in the ERA's EMSB may not be sufficient to evaluate all the EIA Reports submitted to ERA, follow up the integration of environmental requirements in construction contract agreements, and supervise/monitor the projects under construction. Therefore, it is recommended that ERA employs a qualified environmental expert that has adequate technical and environmental knowledge to understand and monitor the proper implementation of the recommended EMP. In addition, some institutional strengthening is recommended, which can be in the form of short-term training and training on the job/site for the new expert as well as the existing staff of EMSB on environmental management practices. Furthermore, provision of additional/supplementary facilities/equipment, etc. might be required. The details of the requirements can be arranged through consultation with the senior staff of the EMSB.

The institutional set up or parties that have been allocated responsibility to implement the recommended EMP are summarized in Table 7.2.

**Table 7.2: Institutional Set up/ Responsibilities for Implementing EMP**

	<b>Parties</b>	<b>EMP Responsibility</b>
<b>I</b>	<b>Construction Phase</b>	
1	ERA Representative	<ul style="list-style-type: none"> <li>• Provides guidance/advice on EMP monitoring to ECO.</li> <li>• Member of Environmental Management Committee (EMC).</li> <li>• Member of Compensation Committee (CC)</li> <li>• Liaison with ERA.</li> </ul>
2	Environmental Control Officer (ECO)	<ul style="list-style-type: none"> <li>• Conduct implementation monitoring as per the EMP &amp; contractual agreements.</li> <li>• Environmental record keeping.</li> <li>• Member of the EMC.</li> <li>• Member of Compensation Committee (CC)</li> <li>• Compiling EMP reports &amp; non-conformance reports.</li> <li>• Liaison with the ERA Representative.</li> <li>• Takes minutes at EMC meetings.</li> <li>• Takes minutes at CC meetings.</li> <li>• Reports to the ERA/ERA Representative.</li> </ul>
3	Resident Engineer (RE)	<ul style="list-style-type: none"> <li>• Represents the Supervising Consultant/ Engineer on site.</li> <li>• Oversees that the technical specifications are met during construction including environmental requirements.</li> <li>• Member of the EMC.</li> <li>• Reports to the Supervising Engineer.</li> </ul>
4	Contractor's Environmental Officer (EO)	<ul style="list-style-type: none"> <li>• Represents the Contractor on site regarding environmental &amp; safety matters.</li> <li>• Implements the EMP on site.</li> <li>• Member of the EMC.</li> <li>• Reports to the Contractor.</li> </ul>
5	Woreda Administration Representative	<ul style="list-style-type: none"> <li>• Liaison between the ERA/ECO/Contractor/ RE and the Kebele Administration/local community/PAP (project affected people).</li> <li>• Member of the EMC; Member of the CC.</li> <li>• Reports to the Woreda Administration Office</li> </ul>

**Table 7.2: Institutional Set up/ Responsibilities for Implementing EMP, Continued**

	<b>Parties</b>	<b>EMP Responsibility</b>
6	Woreda Agriculture and Rural Development (WARDO) Representative	<ul style="list-style-type: none"> <li>Coordinates EM activities that could be implemented jointly with or independently by the WARDO such as replanting of trees/ re-forestation.</li> <li>Oversees that the road construction activities are in compliance with environmental protection requirements or legislations.</li> <li>Member of the EMC; Member of the CC.</li> <li>Reports to the WARDO.</li> </ul>
7	Woreda Health Office Representative	<ul style="list-style-type: none"> <li>In coordination with the Contractor's EO or other health educator, provides health awareness training including issues such as STDs, HIV/AIDS and malaria.</li> <li>Oversees that the local health facilities &amp; water supplies are not overloaded due to the construction workforce.</li> <li>Member of the EMC; Member of the CC.</li> <li>Reports to the Woreda Health Office.</li> </ul>
8	Kebele Administration/ Local Community Representatives	<ul style="list-style-type: none"> <li>Member of the Compensation Committee.</li> <li>Member of the EMC.</li> <li>Liaison between the local community/PAP and Woreda Administration/ any other party involved in the implementation of the EMP.</li> <li>Liaison with communities to communicate to them and to communicate the concerns of the community to the EMC/CC.</li> <li>Reports to the communities they are representing.</li> </ul>
<b>II</b>	<b>Operation Phase</b>	
1	ERA (EMSB) Representative (s)	<ul style="list-style-type: none"> <li>Responsible for the follow up of the proper operation of environmental protection measures/structures and take remedial measures for failures.</li> <li>Liaison between ERA and all other parties.</li> <li>Member of the operational EMC.</li> <li>Take minutes at the operational EMC meetings.</li> <li>Reports to ERA.</li> </ul>
2	Woreda Agriculture and Rural Development Office (WARDO) Representative	<ul style="list-style-type: none"> <li>Member of the operational EMC.</li> <li>Responsible for the follow up of the effectiveness of some mitigation measures such as the tree replanting programme, erosion protection measures, resettlement of PAP, etc.</li> <li>Reports the status to the ERA Representative and the WARDO.</li> </ul>
3	Woreda Health Office Representative	<ul style="list-style-type: none"> <li>Member of the operational EMC.</li> <li>Responsible for follow up of the incidence of traffic accidents by collecting statistics from health units and local traffic police offices. Also collects data on STDs, HIV/AIDS and malaria and inspects the presence of disease vector breeding sites along the road and at quarries and borrow pits.</li> <li>Reports the status to the ERA Representative and the Woreda Health Office.</li> </ul>
4	Local Traffic Police Representatives	<ul style="list-style-type: none"> <li>Member of the operational EMC.</li> <li>Responsible for follow up of the compliance of road users including drivers and pedestrians to traffic regulations and the sufficiency of technical safety features such signalisation, road marking, illumination, etc.</li> <li>Keep the records of traffic accidents and other events related to the road and traffic safety.</li> <li>Reports to the Traffic Police Office.</li> </ul>
5	Kebele Administration/ Local Community Representatives	<ul style="list-style-type: none"> <li>Member of the operational EMC.</li> <li>Liaison with communities to communicate to them and to communicate the concerns of the community to the EMC/CC.</li> </ul>

## 8. ENVIRONMENTAL MONITORING PLAN

Environmental monitoring should be one of the main activities during the implementation and operation of the road project if the recommendations of the EIA are to be effectively implemented. Environmental monitoring helps to assess the efficiency of different mitigation measures, to anticipate possible environmental hazards and/or to detect unpredicted impacts over time. Monitoring of environmental parameters will identify potential problems from the road development activities and will allow for prompt implementation of effective corrective measures.

The monitoring programme is scoped to those indicators which are the most relevant for the evaluation of the performance of the environmental protection measures and the well-being of the local communities. Among the major issues that need close monitoring are land acquisition, soil erosion, slope stability, drainage, water and air pollution, waste management or disposal, impacts on roadside trees, extraction and transportation of materials, construction camps and materials storage and processing, loss of farmland and important trees, public health issues and traffic safety. The proposed environmental monitoring plan is provided in Table 8.1.

Table 8.1: Environmental Monitoring Plan

S/N	Environmental Issue/Impact	Indicators to be Monitored	Responsible Body/ Organization	Duration/ Frequency of Monitoring
1	<b>Construction Phase</b>			
1	Land Acquisition, Restoration & Replacement	<ul style="list-style-type: none"> <li>• Number of households affected due to land acquisition</li> <li>• Number of households provided with land replacement or compensation</li> <li>• Area of land taken from crop production or grazing.</li> <li>• Area of land replacement made.</li> <li>• Area of temporarily affected areas restored to productive land.</li> <li>• Area/length of abandoned road sections re-cultivated and restored productive land.</li> </ul>	Environmental Inspector and Site Engineer	Throughout Construction Period
2	Erosion and Slope Stability	<ul style="list-style-type: none"> <li>• Length of roadside ditches and diversion drains vulnerable to erosion.</li> <li>• Length of the vulnerable drains provided with erosion prevention structures and effectively protected.</li> <li>• Area/length of roadside cuts and fills vulnerable to erosion and/or slope instability, and area protected by physical structures/retention walls and/or bioengineering measures.</li> <li>• Area of embankment slopes prone to erosion/requiring grassing and area protected by grassing.</li> <li>• Area of land disturbed by earth moving activities and area of land stabilized/rehabilitated after earth movement has ceased.</li> <li>• Area of productive land taken for quarries and borrow pits and area restored to productive state after completion of construction.</li> </ul>	As above	Until handing over of the project
3	Water Pollution	<ul style="list-style-type: none"> <li>• Distance of the location of contractor's site facilities from domestic water supply sources (5km should be the minimum distance).</li> </ul>	As above	During site establishment
4	Noise and Dust Pollution	<ul style="list-style-type: none"> <li>• Number of sensitive receptors like schools, health care facilities, religious sites and residential places near construction activities or vulnerable to nuisance noise or dust.</li> <li>• Number of the receptors protected by appropriate mitigation measures (e.g. spraying water, traffic speed limitation).</li> <li>• Number of complaints due to nuisance noise or dust pollution.</li> </ul>	As above	Throughout Construction Period
5	Earth Works and Waste Management	<ul style="list-style-type: none"> <li>• Number of waste dumping depots properly located, kept in good shape/landscaped and planted with appropriate vegetation after construction.</li> <li>• Area of temporarily affected areas properly restored and planted with appropriate vegetation.</li> </ul>	Site Engineer	Throughout Construction Period

**Table 8.1: Environmental Monitoring Plan, Continued.**

S/N	Environmental Issue/Impact	Indicators to be Monitored	Responsible Body/ Organization	Duration/ Frequency of Monitoring
6	Flora and Fauna	<ul style="list-style-type: none"> <li>Number of trees affected/removed including outside the road construction areas and material extraction sites.</li> <li>Number of trees replanted and survived.</li> </ul>	Site Engineer (SE) and Environmental Inspector (EI)	As required during the contract period
7	Site Facilities (campsites and materials storage and processing)	<ul style="list-style-type: none"> <li>Location/distance of the site facilities from any ecologically or socially sensitive areas.</li> <li>Number of facilities such as health care, potable water supply, garbage disposal, law enforcement available for the workforce.</li> <li>Number of the campsites and plants properly restored when they are closed.</li> </ul>	Site Engineer and Environmental Inspector	As required during the contract period
8	Extraction & Transport of Materials	<ul style="list-style-type: none"> <li>Distance (location) of borrow pits &amp; quarries from sensitive sites such as residential areas, religious sites, prime agricultural lands, water supply sources, etc.</li> <li>Number of complaints due to disturbances caused by noise and dust pollution from operation of borrow pits and quarries and trucks transporting materials.</li> <li>Number of the sites properly restored when exploitation is completed.</li> </ul>	Site Engineer and Environmental Inspector	Before, during & after operation of the sites.
9	Traditional irrigation systems	<ul style="list-style-type: none"> <li>Number of existing irrigation water conveyance canals affected.</li> <li>Number of existing conveyance canals maintained uninterrupted or replaced by alternative means of transfer.</li> <li>Number of users affected, area of irrigable land put idle, or income lost due to interruption of irrigation water flows.</li> </ul>	SE, EI & Woreda Agriculture Office	Construction period
10	Town/village passages	<ul style="list-style-type: none"> <li>Number of people and/or animals affected by impediment caused by fills, cuts or drainage structures.</li> <li>Number of drainage crossings, paths and cascades constructed to link to existing paths to houses/villages or to enable easy movement of people and/or animals.</li> </ul>	SE & EI	Construction period
11	Public utilities	<ul style="list-style-type: none"> <li>Quantity (number, length) of public utilities like water pipelines, electric poles and telephone lines affected and quantity relocated or protected.</li> </ul>	SE, EI & Public Utility Authorities.	Before commencement & during construction
12	Traffic safety	<ul style="list-style-type: none"> <li>Number of traffic safety devices installed.</li> <li>Number of accidents occurred in the construction area, and damages caused like number of fatalities and properties affected.</li> </ul>	SE, EI and Traffic Police	Throughout the construction period

**Table 8.1: Environmental Monitoring Plan, Continued.**

S/N	Environmental Issue/Impact	Indicators to be Monitored	Responsible Body/ Organization	Duration/ Frequency of Monitoring
II	<b>Operation Phase</b>			
1	Traffic safety for pedestrians	<ul style="list-style-type: none"> <li>Number (percent) of schools &amp; towns/villages covered by lessons/lectures concerning traffic safety.</li> <li>Number of accidents/fatalities occurred after the upgraded road taken into operation.</li> </ul>	EMSB, Traffic Police,	Ahead of taking the upgraded section into operation.
2	Traffic safety for motorised traffic	<ul style="list-style-type: none"> <li>Percent of road users (drivers) complying to traffic safety measures like speed limit;</li> <li>Number and severity of traffic accidents.</li> </ul>	Traffic Police, Transport Authority	During road in operation
3	Safety of road users	<ul style="list-style-type: none"> <li>Number &amp; condition of traffic safety devices/facilities (e.g. traffic signs, road marking) and the road condition in general.</li> </ul>	ERA District Offices, Transport Authority	During road in operation
4	Erosion, impairment of soils, slope stability, landscape and water	<ul style="list-style-type: none"> <li>Percent of the installed roadside drainage/erosion prevention/gully reclamation structures properly performing or percent of failed structures.</li> <li>Area or number of locations of road cut or fill areas affected by slope instability.</li> <li>Length of the road particularly roadside ditches and number of culverts affected by erosion &amp; gully formation.</li> </ul>	ERA District Offices, EMSB, W. Agriculture & Rural Development Office (WARDO)	Twice per year scheduling for the wet season.
5	Flora	<ul style="list-style-type: none"> <li>Number of trees planted/area covered by vegetation at the roadsides, temporary access roads, borrow pits, campsites, etc.</li> <li>Rate of replacement of the removed trees esp. the indigenous trees comparing to pre-project condition.</li> </ul>	WARDO	Twice per year for the first two years.
6	Fauna	<ul style="list-style-type: none"> <li>Number of wild animals killed by vehicular traffic.</li> </ul>	WARDO	During road in operation

## 9. CONCLUSION AND RECOMMENDATION

The construction and operation of the Gedo – Nekemt Road will bring a number of positive as well as negative impacts on the natural and human environment within the area impacted by the road. Implementation of the project will upgrade the standard of the road and improve transport efficiency that will enhance economic and social development along the road corridor and its catchment area. It will also have several environmental benefits including increased road safety, reduced air pollution from noise, and remedial of existing gullies and impediment problems created by those gullies. Most of the adverse environmental effects will be of temporary and reversible nature, and can be reduced to acceptable levels with good engineering practices and environmental mitigation measures. The overall conclusion is that there will be no severe or immitigable impacts that will prevent the implementation of the road upgrading project provided that the recommended avoidance, mitigation and compensation measures are properly implemented at the right time and their effectiveness followed up through well-planned monitoring activities.

To have minimal and acceptable residual environmental impacts and enhance the potential benefits, it is recommended that the proposed avoidance and mitigation measures are properly implemented by including them in the Tender Document for the Contractor and through an Environmental Management Plan. Monitoring of the effectiveness of the implemented measures is also essential. The most important activities during the preparation of project implementation, construction and operation phases include the following.

### 9.1 Preparation of Project Implementation

Great care has to be taken during the various phases/activities prior to the start of the construction works. The two most important activities laying the foundation for the subsequent implementation are:

(i) Engineering Designs and the Tender Document(s)

During this key activity the respective engineering and bio-engineering details according to the recommendations/requirements of the environmental impact assessment for avoidance and mitigation of potential negative impacts, and for the benefit enhancement measures have to be designed and quantified as well as to be specified in the conditions of contract and the technical specifications respectively.

(ii) Land Acquisition Planning

Under consideration of the detailed engineering designs the land acquisition planning has to be prepared comprising all details of the relocation/dispossession and corresponding appropriate replacement measures for lost land and compensation measures for lost assets, for lost income basis as well as logistical support for moving, relocation grant and other requirements.

Well, ahead of the start of the construction activities the relocation and compensation plan has to be implemented.

### 9.2 Project Implementation

In general the potential negative impacts on the environment to be expected from the proposed upgrading of the Gedo – Nekemt Road will occur mainly in relation to the land acquisition and the execution of the construction works.

With a proper implementation of the restoration/replacement and compensation plan, existing means of livelihood will not be disrupted severely as stipulated in the ERA Resettlement / Rehabilitation Policy Framework: *“focus on restoring the income earning*

*capacity of the project-affected persons*". Emphasis shall be given for replacement of the permanently lost land and restoration for the temporary losses as much as possible, together with attractive financial compensation for lost properties from the land taken for the project.

Other potential negative impacts may be avoided or, at least, reduced to an acceptable level by the implementation of the determined mitigation measures as outlined in this Report. Provided that the mitigation and benefit enhancement measures will be strictly implemented, it is expected that positive impacts will outweigh the negative ones.

### 9.3 Road in Operation

Once the upgrading of the project road is completed, it will be provided with adequate road and traffic safety measures and the benefits can easily be achieved as they have been planned during the engineering designs phase and implemented in accordance with the tender document(s). However, the considerable upgrading of the physical provisions/conditions may fail if the so-called human factor comprising all traffic participants, vehicle drivers to pedestrians, is not adequately improved as well.

The County's general problem of poor driving skills (e.g. speeding, cutting curves, risky overtaking) and lack of discipline (e.g. neglecting traffic regulations) of road users, drivers as well as pedestrians, has undoubtedly to be controlled by appropriate enforcement tools based on the legislation in order to raise standards of road user behaviour and to fully achieve the benefits of the Project.

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# APPENDIX

**Appendix 1: List of Consulted Persons and Organizations**

	<b>Name</b>	<b>Position and Organization</b>	<b>Date of Contact</b>
1	Ato Dhaba Jinfessa	Vice Administrator, West Shewa Zone, Oromia Region.	16/01/06
2	Ato Desalegn Senbeta	Team Leader, Agricultural Supply, West Shewa Zone Agriculture and Rural Development Department.	16/01/06
3	Ato Kassu Abebe	Team Leader, Natural Resources Expert as above	16/01/06
4	Ato Teshome Hurissa	Administrator, Cheliya Wereda Administration	16/01/06
5	Ato Gizaw Fikre	Head, Agriculture and Rural Development Office (ARDO), Cheliya Wereda.	16/01/06
6	Ato Samuel Haile	Team Leader, Irrigation Development, ARDO, Cheliya W.	26/01/06
7	Ato W/Yohannes Mekonnen	Agronomist, ARDO, Cheliya Wereda.	26/01/06
8	Ato Gebeyehu Megerssa	Educational Programs Coordinator, Education Office, Cheliya Wereda.	26/01/06
9	Ato Mugzer Asnake	Health Expert, Health Office, Cheliya Wereda.	26/01/06
10	Ato Getachew Muleta	Sanitarian, Health Office, Cheliya Wereda.	26/01/06
11	Ato Jimara Birassa	Administrator, Bako Tibe Werda Administration.	19/01/06
12	Ato Tsegaye Bonsa	Head, ARDO, Bako Tibe Wereda.	19/01/06
13	Ato Imana Megerssa	Expert, Animal Resources, ARDO, Bako Tibe Wereda.	19/01/06
14	Ato Gadissa Fekadu	Team Leader, Land Administration and Use, ARDO, Bako Tibe W.	24/01/06
15	Ato Tadesse Tolessa	Team Leader, Irrigation Development, ARDO, Bako Tibe W.	25/01/06
16	Ato Negussie Jalata	Team Leader, Crop Prod. & Protection, ARDO, Bako Tibe W.	26/01/06
17	Ato Merara Workneh	Head (Nurse), Health Office, Bako Tibe Wereda.	25/01/06
18	Ato Motuma Chale	Head, Education Office, Bako Tibe W.	25/01/06
19	Ato Ragassa Gamada	Education Team Leader, Education Office, Bako Tibe W.	25/01/06
20	Ato Zewdie Mekonnen	Irrigation Expert, East Wellega Zone Agriculture and Rural Development Department.	22/01/06
21	Ato Getacew Geleta	Head, ARDO, Guto Gida Wereda, East Wellega Zone.	22/01/06
22	Ato Temesgen Fayssa	Team Leader, Natural Resource and Rural Land Administration, Guto Gida Wereda.	22/01/06
23	Ato Bekele Amanu	Team Leader, Irrigation Development, Guto Gida Wereda.	22/01/06
24	Ato Asfaw Guyo	Team Leader, Natural Resource, Guto Gida Wereda.	22/01/06
25	S/r Direbe Megerssa	Health Expert, East Wellega Zone Health Department.	23/01/06
26	Ato Getahun Zewdie	Expert, Environmental Health Service, Health Department, East Wellega Zone	23/01/06

**Appendix 1: List of Consulted Persons and Organizations, Continued.**

	<b>Name</b>	<b>Position and Organization</b>	<b>Date of Contact</b>
27	Ato Imiru Kene'a	Team Leader, Education Sector, Education Department, East Wellega Zone.	23/01/06
28	Ato Yadeta Ture	Distance Education Expert, Education Department, East Wellega Zone.	23/01/06
29	Ato Chimdessa Kussa	Head, ARDO, Sibul Sire Wereda.	24/01/06
30	Ato Bekele Abdissa	Extension Team Leader, ARDO, Sibul Sire Wereda.	24/01/06
31	Ato Adugna Gelata	Acting Head, ARDO, Gobu Seyo Wereda.	25/01/06
32	Ato Berhanu Kassahun	Team Leader, Irrigation Development, ARDO, Gobu Seyo W.	25/01/06
33	Ato Gamachissa Yadeta	Team Leader, Natural Resources, ARDO, Gebu Seyo W.	25/01/06
34	Ato Oli Goshu	Team Leader, Land Use and Administration, ARDO, Gobu Seyo W.	25/01/06
35	S/r Gedife Bersissa	Health Worker, Ano Clinic, Gobu Seyo W.	25/01/06
36	Ato Berhanu Meseret	Team Leader, Health Services, Health Office, Sibul Sire W.	25/01/06
37	Ato Oljira Kenei	Educational Programs Coordinator, Education Office, Sibul Sire W.	25/01/06
38	Ato Bekele Abdissa	Team Leader, Irrigation Development, ARDO, Sibul Sire W.	25/01/06
39	Ato Ahmed Yousef	Expert, ARDO, Sibul Sire W.	25/01/06

**Appendix 2: Scoping of Environmental Issues/Impacts**

Environmental Component	Potential Impacts	Type		Nature of Impact		Duration of Impact			Area Extent		Reversibility		Impact Magnitude			Impact Significance			
		Positive	Adverse	Direct	Indirect	Short-term	Medium-term	Long-term	Localized	Widespread	Reversible	Irreversible	Mild	Moderate	Large	Low	Moderate	High	Severe
<b>Physical Environment</b>																			
Sources	Land acquisition/loss of productive lands		X	X		X		X	X		X	X		X					X
	Soil erosion: loss of soils & gully formation		X	X		X		X		X				X					X
	Intrusion of the landscape/visual aesthetic		X	X				X	X		X	X		X				X	
	Slope destabilization/land-sliding		X	X		X		X		X			X			X			
	Visual impact and slope instability		X	X				X		X				X					X
	Soil compaction & dust pollution		X	X		X		X		X				X					X
Water Sources	Changes in hydraulic regime; downstream scouring & sedimentation		X	X		X		X		X				X					X
	Interception & concentration of runoff causing erosion & flooding in downstream		X	X		X		X		X				X					X
	Interference with natural drainage systems		X	X		X		X		X		X		X					X
	Stagnant water at disused material sites	X	X	X		X		X		X			X						X
	Pollution of effluent; degradation of environment		X	X		X		X		X				X					X
	Pollution of nearby streams		X	X		X		X		X				X					X
Quality	Air pollution		X	X		X		X		X				X					X
Noise Level	Noise pollution		X	X		X		X		X				X					X
<b>Biological Environment</b>																			
Sources	Damages of vegetation/forests esp. indigenous trees		X	X		X		X				X		X					X
	Disturbance of wildlife		X	X		X		X		X		X							
	Removal of eucalyptus trees		X	X		X			X		X			X					X
	Impacts on horti-crops/fruit trees		X	X				X				X	X			X			
	Impacts on nursery sites		X	X		X		X			X		X			X			

## Appendix 3: Land Use and Land Cover of Weredas along the Project Road

No	Type	Cheliya		Bako Tibe		Ano		Sibu Sire		Guto Wayu	
		Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%
1	Arable land	66277*	87.4	-	-	-	-	35404	31.26	-	
2	Cultivated land	-	-	34975.36	54.25	22399	66.36	39730	35.08	96154	72.61
3	Grazing land	5463	7.2	15461.24	23.98	6910	20.47	8742	7.72	23138	17.47
4	Forest land (natural & man made)	2266	2.98	3299.22	5.12	1746	5.17	3443	3.04	4281	3.23
5	Land used for settlements and various infrastructure	1283.5	1.69	10733.18	16.65	2015	5.97	6065	5.36	8849	6.68
6	Others	560	0.73			683	2.02	19866	17.54		
	<b>Total</b>	75,849.50	100.00	64469	100	33753	99.99	113251	100	132422	99.99

\* Includes cultivated land.

Source: Woreda Agriculture and Rural Development Offices.

Appendix 4: Baseline Condition and Potential Impacts for the Road Alignment

LOCATION (Km of New Road)		EXISTING SITUATION				POTENTIAL IMPACTS			NOTES
From	To	Land Use/L. Cover		Terrain	Erosion	Impact	Magni-tude	Signifi-cance	
		Dominant	Others						
0.00	0.50	PL (E), Scrubland	C3 (LHS)	E	E <sub>2</sub>	- Soil Erosion - Slope destabilization - Loss of eucalyptus trees - Loss of vegetation	L M L L	L M L L	The improved road totally follows the existing road. Some Ficus ('Shola') trees on LHS on steep slope.
0.50	1.75	C1	Scrub land, G	R-H	E <sub>2</sub>	- Soil erosion - Loss of scrub vegetation - Loss of farmland	M L L	M L M	Involves minor improvement in existing route that involves major cut and some fill.
1.75	4.65	SF*	C2 (LHS)	H	E <sub>1-3</sub>	- Soil erosion - Slope destabilization - Loss of trees** - Disturbance of wildlife - Loss of farmland	H H M M L	H H M M M	Follows existing road except at 2+750-3+000 & 4+350 - 4+670. Severe environment damages for the former realignment. * mixture of natural & plantation forest. Holeta Bee Keeping R.C. at km 1.8-2.9 (LHS). ** Acacia, Eucalyptus, Millettia, Vernonia
1.65	13.30	C1	PL(E), G, V	F-R	E <sub>1</sub>	- Soil erosion - Loss of trees - Loss of farmlands - Loss of electric lines - Loss of grazing land - Relocation of houses	M L H L L L	M L H L L L	
3.30	14.20	BO, PL(E)	G	R	E <sub>1</sub>	- Soil erosion	L	L	Totally follows the existing route.
4.20	16.50	C1	PL(E), V	R	E <sub>1</sub>	- Soil erosion - Loss of eucalyptus - Loss of farmland	M L M	M L M	Follows existing road except the realignment at 15+750 -16+250 running on maize farm.
6.50	19.25	V(Jato), PL (E)	Irrigat ed farm*	R	E <sub>1</sub>	- Soil erosion - Loss of trees ** - Siltation and water poll. - Traffic safety***	L M M M	L M M M	Follows existing road. * S. cane, mango, banana trees along Alenga R. Dense eucalyptus plantation exists along the road including on the road embankment. *** Horse driven carts frequently transport people from Jato to Ejaji & Jaji to Jato.

1 = dominantly cultivated ( > 60% cover)  
 2 = moderately cultivated ( 40 - 60% cover)  
 3= sparsely Cultivated ( <40% Cover)  
 = grazing/grassland

BO = open bush land  
 PL(E) = eucalyptus plantation  
 SF = state forest  
 NF = natural forest      **Erosion:-**

U = urban      **Terrain:-** F= Flat, R= Rolling, H = Hilly,  
 V = village      M = Mountainous, E= Escarpment  
**Magnitude & Significance:-** L=low, M=moderate, H=high.  
 E<sub>1</sub>=insignificant, E<sub>2</sub>=slight, E<sub>3</sub>=significant, E<sub>4</sub>=severe.

pendix 4: Baseline Condition and Potential Impacts for the Road Alignment, Continued.

LOCATION (Km of New Road)		EXISTING SITUATION				POTENTIAL IMPACTS			NOTES
From	To	Land Use/L. Cover		Terrain	Erosion	Impact	Magni-tude	Signifi-cance	
		Dominant	Others						
9.25	20.75	U (Ejaji)		R	E <sub>2</sub>	- Air pollution - Loss of trees - Soil Erosion - Relocation of buildings - Water pollution & siltation -Traffic safety	M M L L M M	M M L M M M	New road totally follows existing road.
0.75	27.40	C1	PL(E), G			- Soil erosion - Water Poll & siltation - Loss of eucalyptus - Loss of farmland - Loss of irrigation canals - Loss of indigenous trees - Relocation of houses	M M M M L L	M M M M L M	Realignments/improvements at 22+70-23+400, 24+150-25+00, 25+800-27+000, 21+500 - 22+000
7.40	27.80	U (Kiltu Ilala)		R-H	E <sub>2</sub>	- Soil erosion - Dust pollution - Loss of trees* - Noise Pollution	L M L H	L M L H	Follows existing road. * Mango (9), Croton (5), Juniperus (1), Cuppressus (2), Eucalyptus (some).
7.80	32.50	C1	PL(E)	F-R	E <sub>2-3</sub>	- Erosion aggravation - Water pollution & siltation - Loss of eucalyptus - Loss of indigenous trees - Loss of farmlands - Loss of irrigation canals - Loss of irrigated farm	M M M M M L L	M M M M M L L	Realignments at 29+500- 29+800, 30+750 - 31+650, 32+250 -32+450. Crosses several streams, some being diverted for irrigation.
2.50	33.55	BD		H	E <sub>3</sub>	- Erosion aggravation - Siltation in stream - Loss of vegetation - Disturbance to wildlife	M L L L	M L L L	Totally runs along the existing alignment.
3.55	37.75	C1	PL(E), V	R	E <sub>3-4</sub>	- Soil erosion - Loss of trees - Siltation & water pollution	M L M	M L M	Follows the existing alignment. Severe gully erosion of 35+000 -36+ 200. Crosses Sama R. at 36 +300.

D = Dense bush land

Appendix 4: Baseline Condition and Potential Impacts for the Road Alignment, Continued.

LOCATION (Km of New Road)		EXISTING SITUATION				POTENTIAL IMPACTS			NOTES
From	To	Land Use/L. Cover		Terrain	Erosion	Impact	Magni-tude	Signifi-cance	
		Dominant	Others						
7.75	39.34	U (Tibe)	PL(E)	R	E <sub>2</sub>	- Dust Pollution - Noise Pollution - Soil Erosion - Loss of trees - Relocation of electric lines	H H M L H	H H M L H	
9.34	41.80	C1	PL (E)	R	E <sub>2</sub>	- Soil erosion - Loss of tree * - Siltation & water pollution	L L M	L L M	* At bridge on Dhoke R. that will relocated to downstream.
1.80	42.45	BO, PL(E)	C2	H	E <sub>2</sub>	- Soil erosion - Loss of trees	M L	M L	Improvement requires cutting in soil on LHS.
2.45	43.40	C1	PL (E) Scrubland	H	E <sub>2</sub>	- Soil erosion - Siltation & water pollution - Loss of farmland - Loss of eucalyptus	M M L L	M M L L	Crosses Mara R.at 43+250
3.40	44.25	C1, GL		F	E <sub>1</sub>	- Loss of maize farm - Loss of grazing land - Loss of Indig. Trees (5)* - Loss of Eucal. trees** - Water poll. & siltation			Realigned section; *Cordia, F. vasta, Syzygium ** Alignment trees along the existing road.
4.25	45.00	PL( E), C1 **	V	R	E <sub>1</sub>	- Loss of Eucal. trees - Soil erosion	H L	H L	*Alignment plantation (dense & or road embankment on LHS) will be affected unless road shifted to RHS. ** Next to alignment plantation.
5.00	45.35	PL( E), C1		R	E <sub>2</sub>	- 2 houses (small) - Eucalyptus trees - Soil erosion			Eucalyptus plantation near bridge.
5.35	46.60	PL(E), C1		H	E <sub>3-4</sub>	- Soil erosion - Water supply pipe*			* Water transmission pipe for Sheboka town crosses that road through pipe culvert.

Appendix 4: Baseline Condition and Potential Impacts for the Road Alignment, Continued.

LOCATION (Km of New Road)		EXISTING SITUATION				POTENTIAL IMPACTS			NOTES
From	To	Land Use/L. Cover		Terrain	Erosion	Impact	Magni-tude	Signifi-cance	
		Dominant	Others						
6.60	47.15	PL(E)	GL	R-H	E2	- Erosion			
7.15	48.15	U (Sheboka)		R	E3	- Erosion - Electric & telephone lines - Houses			
8.15	49.40	C1	PL(E)	R	E2	- Erosion, - Water pollution			Hida R.
9.40	50.50	C2, GL	PL(E)	H	E4	- Erosion aggravation	M	M	Severe gully erosion in RHS ditch is existing, causing impediment to movements of people & animals.
10.50	51.60	GL	C3, NF	F-R	E1	- Loss of grazing land - Loss of forest/ind. trees* - Loss of wetland ** - Loss of farmland - Damage to irrigation diversion	M M L L	M H M M	Realigned section crossing Abuko R. at 50+800. * Ficus, Cordia, Syzygium, Sapium. ** Source of water for animals & irrigation, and habitat for birds.
11.60	52.50	C1	GL,PL(E) ERA Camp	R-H	E3	Erosion			Soil erosion aggravated by trampling effect of animals on cut slopes.
12.50	53.00	PL(E) Scrubland	V	R-H	E3	- Erosion enhancement - Loss of Ficus trees (2)*			Realigned section; *It is Ficus vasta (Warka).
13.00	53.45	C2, PL(E)	V	H	E3	Erosion			Erosion enhanced by trampling effect of animals.
13.45	53.80	V, Cane	PL trees	R	E2	- 1 tukul - Trees (Eucal.& Indigen)* - Diversion canals for irrigation - Cane plantation - Water pollution	L L H L M	L L H L M	Realigned; Bridge on Robi R. relocated to LHS. *Trees mainly eucalyptus. Most of the route goes on depression and drainage impeded area requiring huge excavation and fill.
13.80	56.50	U (Bako)		R	E2	- Traffic Safety* - Electric & telephone lines - Erosion			* Curvature at km 55.10 - 55.20 (dense vegetation on LHS aggravates the problem) and km 55.650 - 55.850

Appendix 4: Baseline Condition and Potential Impacts for the Road Alignment, Continued.

LOCATION (km of New Road)		EXISTING SITUATION				POTENTIAL IMPACTS			NOTES
From	To	Land Use/L. Cover		Terrain	Erosion	Impact	Magnitude	Significance	
		Dominant	Others						
3.5	57.7	Mango PL	C3	R	E2	- Soil erosion - Water Pollution			Gibe R. at km 57.75
7.7	58.3	GSH	C3	R	E2	- Soil erosion			
3.3	59.0	WD		R-H	E2	- Soil erosion			
3.0	59.5	PL (E)	C2	R-H	E2	- Soil erosion			
3.5	60.0	V (Kejo)	PL	R	E2				
3.0	61.0	C2	WO	R-H	E2	- Soil erosion - Loss of eucalyptus - Loss of Farmland			
1.0	64.0	C1	WO,G, PL (E)	R	E2				
4.0	65.4	C1	RF	H	E2-3	- Loss of riverine forest - Water pollution - Disturbance to wildlife - Erosion			RF = Riverine forest/vegetation
5.4	66.2	NF *	C3, G	H/M	E3	- Loss of trees - Loss of farmland			* Riverine forest on LHS
3.2	67.2	C1	RT*	R-H	E3	- Loss of farmland - Loss of grazing land - Erosion - Loss of diversion canal - Water pollution	H L H L M	H L H L M	RT = Remnant trees within farmlands. Major realignment section
7.2	68.0	C1	PL (E.) G, V	H	E3-4	- Erosion	H	H	
3.0	68.5	C1	Trees (Acacia)	F	E1	-Loss of Acacia trees*	L	L	Ano Agro-industry Farm (maize), * located on road sides.

Appendix 4: Baseline Condition and Potential Impacts for the Road Alignment, Continued.

LOCATION (Km New Road)		EXISTING SITUATION				POTENTIAL IMPACTS			NOTES
From	To	Land Use/L. Cover		Terrain	Erosion	Impact	Magni-tude	Signifi-cance	
		Dominant	Others						
68.55	69.00	C1	Farm Camp, Some trees	R	E1	- Erosion - Dust Pollution	L M	L M	
69.00	69.35	BD		R	E2-3	- Erosion - Dust Pollution			Scaring & cut slope erosion.
70.35	70.50	U( Ano)		R	E2-3	- Erosion, air pollution - Indigenous trees	M L	M L	
71.50	71.25	C1	GW	H	E3	- Soil erosion	L	L	
72.25	72.00	GW		H	E2-3	- Loss of RT* & bushes - Loss of grazing land - Erosion - Water pollution	L L M M	L L M M	Realigned section. * Celtis, Acacia, Ficus sur, Markhamia
73.00	73.15	C1	Scrub veg. & trees, eucalyptus	H	E3	- Erosion	M	M	
	74.20	C2	WO, RF* PL,V	R	E3	- Erosion - Loss of indigenous trees - Siltation & water pollution	M L	M L	*Riverine forest along Kella R.
77.20	77.60	C2	WO	R-H	E2-3	- Soil erosion - Siltation & water pollution - Loss of indig. trees - Loss of eucalyptus plant.	H H M M	H H M M	Involves improvements & realignments-major cut & fill.
78.60	78.60	NF/WD	C3, GW	H	E3	- Soil erosion - Loss of indig.& euc. trees - Siltation & water pollution	H M M	H M M	
80.60	80.35	C1		R	E2	- Soil Erosion - Siltation & water pollut. - Loss of eucalyptus trees - Loss of indig. trees	M M H H	M M H H	35% is realigned involving major cut & tail.

Appendix 4: Baseline Condition and Potential Impacts for the Road Alignment, Continued.

80.35	81.00	C2, Wo		H	E3	- Soil erosion - Loss of eucalyptus - Siltation & water poll.	H H M	H H M	Totally realigned involving major cut & fill.
81.00	81.80	C1	PL (E)	R-H	E3	- Soil Erosion	M M	M M	44% realigned; dense eucalyptus plantation on both sides.
81.80	82.30	PL (E)		H	E3	- Soil Erosion - Loss of eucalyptus trees - Siltation & water pollution	H M L	H M L	
82.40	84.30	U(Sire)		R	E2-3	- Erosion - Air Pollution - Loss of trees - Traffic safety	M M L M	M M L M	
84.30	86.50	C1	PL(E) V	R	E3	- Erosion; air pollution. - Loss of eucalypt. trees* - Loss of indigenous trees* - Farmlands** - Relocation of tukuls - Location of 'Kacha'	M M L L L L	M L M L L	* Cordia, Croton, Terminalia. ** Teff and maize farms.
86.50	87.40	NF	C3, G	H	E3	- Loss of indigenous trees* - Erosion - Water poll. & siltation** - Loss of irrigation diver. - Loss of farmland **** - Loss of eucalyptus trees	H H M M L L	H H H H M L	Most of this section is realigned involving major cut in soil & fill in valley. * Riverine forest along Endris R. ** Siltation of irrigation canals at downstream. *** Maize & Nug (Niger seed).
87.40	87.90	C1	PL (E)	R	E3	- Loss of eucalyptus trees - Erosion	M H	M H	Realigned to LHS running on alignment eucalyptus plantation.
87.90	88.50	NF, WO	C2	R	E3	- Loss of indig. trees* - Erosion	L L	L L	Realigned to LHS crossing a depression and requiring a huge fill. *Ekebergia, Croton, Sapium, Acacia, Celtis, Piliostigma.
88.50	89.70	C2, GW		R	E3	- Erosion - Loss of indig. trees* - Loss of thatch grass - Loss of farmland**	H L L L	H L L L	Realignment involving major cut in soil & fill in depression. *Combretum, Croton. ** Maize farm along 150m stretch.
89.70	91.00	U (Cheri)		R	E2	- Erosion - Air pollution - Irrigation canal	L M	L H	The new road follows the existing route. Irrigation water is transferred through road side ditch and pipe culvert.

Appendix 4: Baseline Condition and Potential Impacts for the Road Alignment, Continued.

95.25	C1	WO (remnant) PL (E)	R	E3	- Erosion - Loss of trees - Loss of wetlands* & G. - Relocation of houses.	L	L	Basically follows the existing route except at 93+600-94+250 where it runs on wetland and farmland. * Developed community water supply exists at the marshland (50 HHs depend on it). The wetland is also important grazing ground in dry season.
102.35	C1	PL(E), GW, AF, V	R	E3	- Soil Erosion - Loss of indig. Trees* - Loss of eucalyptus** - Loss of farmlands*** - Loss of diversion canals# - Scaring of cut slopes - Air pollution	H M H L M H M	H M H M M H M	31% is realigned & large portion of the remaining involves some improvement. It involves major cut in soil and huge fill in several stretches. *Trees affected include Cordia, Acacia, Ficus, Croton, Syzgium, Combretum, Terminalia & Markhamia. **Alignment eucalyptus plantation. *** Teff, Maize & Nug farms at realignments. # On Kersa R. (97+250), Kore R. (95+380) & Dabo R. (96 + 500).
104.72	U (Chingi)		R	E2	- Soil Erosion - Air pollution - Traffic safety	L M M	L H H	
105.6	C1	AF*	R	E2-3	- Soil Erosion - Water pollution* - Interference with irrigation canal** - Loss of indig. Trees**	M M M L	L L M L	The road to be upgraded totally follows existing route. * Trees left in farmlands and around homesteads. ** Tinishu Oda R, its bridge relocated at upstream. Trees affected – Cordia, Syzygium & 'Dembi' (totally 4 trees).
108.75	W*, C2		M	E2	- Slope instability ** - Soil erosion - Loss of trees - Water pollution - Irrigation diversion	M L L L L	H M L M L	The road to be upgraded totally follows existing road on mountainous terrain. * Open to dense woodland. ** Cutting in side-slopes & excavation for bridges foundation may trigger slope stability problem.
112.25	C1	PL(E), V	R	E2-3	- Soil erosion - Loss of indig. trees - Loss of eucalyptus trees - Loss of farmland - Siltation in rivers	H M H L L	H M H L L	Basically follows the existing alignment but involves minor realignment and major cut and fill to improve the geometry of the road.
113.22	U (Konchi)	PL(E)	R	E2	- Soil erosion - Air pollution - Traffic safety	L M	L M	The road to be upgraded totally follows existing route.
116.25	C1	PL/AF, NF*	R	E2	- Soil erosion - Siltation in rivers - Loss of trees	M M M	M M M	Follows existing alignment with minor improvements. *Dense riverine forest along Jambie R. at 114+450.

Appendix 4: Baseline Condition and Potential Impacts for the Road Alignment, Continued.

118.40	PL, C2	NF*	H	E2	<ul style="list-style-type: none"> <li>- Soil Erosion</li> <li>- Siltation in river</li> <li>- Loss of indigenous trees</li> <li>- Loss of eucalyptus</li> <li>- Loss of farmland</li> <li>- Interference with diversion canal**</li> </ul>	<p>M M L M L H</p>	<p>M M L M L H</p>	<p>Follows existing alignment with minor improvements at 116+250 - 116+900. *Riverine forest along Tato R. **Used for nursery site.</p>
119.00	U (Gute)	PL(E)	R	E2	<ul style="list-style-type: none"> <li>- Soil erosion</li> <li>- Air pollution</li> </ul>	<p>L M</p>	<p>L M</p>	<p>The new road will follow the existing road alignment.</p>
124.25	C1	PL(E)	F-R	E2	<ul style="list-style-type: none"> <li>-Soil erosion</li> <li>-Loss of eucalyptus</li> <li>-Loss of farm land</li> <li>-Loss trees</li> </ul>	<p>L L L L</p>	<p>L L L L</p>	<p>The new road will follow the existing road with minor realignment at 123+000 -123+250. Roadside eucalyptus plantation dominates the land cover.</p>
128.00	PL(E) C 2	AF	R-H	E3	<ul style="list-style-type: none"> <li>- Soil erosion</li> <li>- Siltation of streams</li> <li>- Loss of indigo. Trees*</li> <li>- Loss of eucalyptus trees</li> <li>- Loss of coffee trees</li> <li>-Loss of Cupressus trees</li> </ul>	<p>M M M M L</p>	<p>M M M M L</p>	<p>Involves 3 small realignment and minor improvements that involve significant cut and fill.  *Albizia &amp; Podocarpus trees that are used as canopy trees for coffee farm.</p>
131.30	U (Nekemt )	PL(E)	R	E2	<ul style="list-style-type: none"> <li>- Soil erosion</li> <li>- Air pollution</li> <li>- Traffic safety</li> <li>- Loss of buildings</li> </ul>	<p>L M M H</p>	<p>L M M H</p>	<p>The new road will totally follow the existing road.</p>

Appendix 5: Baseline Condition and Potential Impacts for Construction Material Sites

LOCATION (km of road)	EXISTINGSITUATION				POTENTIAL IMPACTS			NOTES
	Land Use/L. Cover		Terrain	Erosion	Impact	Magni- tude	Signifi- cance	
	Dominant	Others						
00	SHO	GSH	M	E2	- Loss of Vegetation - Loss of grazing land - Intrusion of landscape - Air pollution	L L H M	L L M M	
00	C1	B	H	E2	- Loss of farmland - Loss of Vegetation - Erosion & landscape intrusion	L L M	M L M	
00	WO/BO		H	E1	- Loss of some trees & shrubs - Landscape damage	L H	M M	Open quarry within a protected forest. Nearby: Olea & Podocarpus trees, and Carisa edulis shrubs.
00	C1		B	E1	- Loss of farmland (if expanded) - Loss of Some trees - Air Pollution - Loss of river diversion* - Impact on electric transmission line	L L M L H	M L H M H	Open quarry nearby stream, some trees, shrubs and farmland. The stream is used for water supply by downstream users. * The diverted water is used for car washing and nursery site.
00	C1		H	E2	- Loss of farmland - Erosion - Air pollution	L L M	M L M	Two tukuls at nearby.
00	C1		R	E1	- Loss of farmland - Air pollution	L M	M M	Nearby there are some houses.
00	C1		R	E2	- Loss of farmland if expanded - Loss of eucalyptus trees - Air Pollution	L L M	M M M	Existing quarry.
50	BA	P*	H	E1	- Air Pollution - Loss of trees - Landscape damage	M L M	M M M	Existing quarry. *Planted trees at nearby - Juniperus & Gravillea.

**Appendix 5: Baseline Condition and Potential Impacts for Construction Material Sites, Continued.**

LOCATION (Km of exis. road)	EXISTINGSITUATION				POTENTIAL IMPACTS			NOTES
	Land Use/L. Cover		Terrain	Erosion	Impact	Magni- tude	Signifi- cance	
	Dominant	Others						
I+800	BD	G	H	E2	-Loss of vegetation - Loss of grazing land - Water pollution	M L L	M L L	
2+500	BO/D	G	H	E2-3	- Loss of vegetation - Air pollution - Landscape damage - Disturbance to wildlife	L M M L	L L M L	
3+800*	PL(E)		R		- Loss of eucalyptus trees - Air pollution	M M	M L	
3+700	SHO		H		-Loss of Vegetation - Air pollution - Landscape damage	L M M	L M M	Existing quarry. One tukul at nearby & FTC between the quarry site & the road/ along access road.
3+000	BA	P(E)	R-H	E3	- Landscape damage - Loss of eucalyptus	M M	M M	Existing quarry about 2 ha already exploited for the road maintenance. Surrounded by eucalyptus plantation.
3+750 #	WO		R	E3	- Loss of indigenous trees - Water pollution & siltation - Loss of grazing land - Soil erosion	M M L M	M M L M	New site on right bank of Abuko R. Trees at site – Ficus vasta, Croton, Cordia.
3+000	BA		F	E2	- Loss of farmland (if expanded) - loss of eucalyptus trees - Loss of some trees - Air pollution	L M L M	M M L H	Existing quarry. Residential houses (4) at nearby)
3+ 100	C1		R	E2	- Loss of farmland* - Dust pollution	L M	M H	Existing quarry. Settlement in the vicinity. * if extended.

**A = Bare land/Open land      PL(E) = Eucalyptus Plantation      # According to the new chainage.**

Appendix 5: Baseline Condition and Potential Impacts for Construction Material Sites, Continued.

LOCATION (Km of exis. road)	EXISTINGSITUATION				POTENTIAL IMPACTS			NOTES
	Land Use/L. Cover		Terrain	Erosion	Impact	Magni- tude	Signifi- cance	
	Dominant	Others						
2+ 300*	WO		R	E2	- Loss of indigenous trees - Soil erosion - Air pollution (dust)	M M M	M L L	Scattered trees at site mainly 'Dokima' (Syzygium).
7+500	BA	C1*, G*	H	E2-3	- Landscape destruction - Air pollution *** - Impediment to people & animals movements - Loss of farmland and grazing land	H M M L	H H M M	Existing quarry about 3 ha area already exploited. *The surrounding area. ERA maintenance has damaged some farmland. ** from the quarry & crushing plant causing nuisance to local residents. If expanded to NW indigenous trees (Cordia and Croton) will be affected.
9+100	BD	C2	H		- Loss of Vegetation - Loss of farmland* - Landscape damage	M L M	M M M	Trees- Acacia, Markhamia & Vernonia. Shrubs - Carisa, Capparis, Rubus. * If expanded.
0+ 300	WO	C2*	H	E3	- Loss of trees (=10) - Landscape intrusion - Erosion	M M M	M M M	Trees- Combretum, Terminalia, Ficus. * Nearby (N) -Teff & Nug farm.
4+400	BA	G	R	E3	- Water Pollution - Landscape disturbance - Disturbance to wildlife	L M L	L M L	At 50 m there is a stream. Colobus monkey in the riverine forest.
7+200	GO	BO	R-H		- Loss of grazing land - Loss of trees - Water pollution - Landscape damage	M L L M	M L L M	* Cluster of immature eucalyptus and Syzygium trees at nearby.
1+000	BA, Scrubland	G	R-H		- Loss of Vegetation - Loss of grazing l. if expected.	L L	L L	>2 ha previously exploited. Stagnant water in rainy season. Trees - Croton, Terminalia, Vernonia, Maesa, Ficus, Carisa.
2 + 650	Scrubland; G		H		- Water pollution - Loss of grazing & scrub veg. - Loss of farmland	M M L	M M L	Stream & farmland at downstream.

**Appendix 5: Baseline Condition and Potential Impacts for Construction Material Sites, Continued.**

LOCATION Km of exis. road)	EXISTINGSITUATION				POTENTIAL IMPACTS			NOTES
	Land Use/L. Cover		Terrain	Erosion	Impact	Magni- tude	Signifi- cance	
	Dominant	Others						
7+000	WO		R	E3	- Loss of indigenous trees - Soil erosion - Air pollution	H M M	H L L	*Trees - F. vasta ('Warka'), Croton (Bisana) Acacia (Grar) The site is at some 200m right of Indris R.
3+400	BD	GB	H	E3	- Landscape intrusion - Water pollution & siltation - Loss of vegetation - Land-sliding	H H M M	H H L M	Located at left bank of Jalele R. with steep slope. River water is highly vulnerable to siltation and pollution. Trees - Vernonia, Croton, Acacia, Cordia, Ficus, Sapium, Calpurnia & Eucalyptus. Dominant grass is Hyparrhenia sp. This site is environmentally not acceptable.
10+100	GO		R	E2	- Landscape Damage - Loss wetland - Loss of grazing land - Water Pollution	M M M M	M H H M	Large open quarry with marshland created in the pit and spring water from the site is used for animal consumption. A few Acacia and shrubs and the site is used for animal grazing.
13+ 000	BA/GO		H	E2	- Loss of grazing land - Loss of farmlands - Loss of trees - Landscape intrusion - Dust pollution	L L L M	L M L M	The open area is small and surrounded by * farmland (maize & Sorghum). A few trees exist Cordia, Combretum, Ficus, Croton , Piliostigma.
13+300	BA, GO	C1 (nearby)	H	E2-3	- Dust pollution - Landscape damage - Loss of farmland if expected to east	M H L	H H M	Existing quarry (>2 ha already exploited). Farmland (maize & teff to east & north); southern part is bare land. Settlement at some distances to north.
10+200	C2, BA		M	E3	- Loss of farmland (teff) - Soil erosion - Landscape destruction	L M H	M M H	Located on mountainous terrain partly bare land & partly cultivated for teff.
11+500	WD/BD		E	E3	- Landscape damage - Slope Stability - Loss of Vegetation	H M M	H H L	Located on mountainous/escarpment, just on the road side.

**Appendix 5: Baseline Condition and Potential Impacts for Construction Material Sites, Continued.**

LOCATION (Km of exis. road)	EXISTINGSITUATION				POTENTIAL IMPACTS			NOTES
	Land Use/L. Cover		Terrain	Erosion	Impact	Magni- tude	Signifi- cance	
	Dominant	Others						
14+000	BA	C1, BO	H	E2	- Soil erosion * - Landscape - Loss of vegetation - Air pollution	M M L M	M M L M	Existing quarry. * Over burden soil stripped and disposed of on hill. Trees at nearby/at expansion area. F. vasta, Acacia, Croton , Ficus sp., bushes & shrubs . Farmland (teff) very close to the existing quarry site.
15+100	BA, WD	P(E)		E2	- Landscape damage -Loss of indig trees - Air Pollution	M M M	M M M	Previously exploited quarry . Surrounding is woodland dominated by Acacia. Other trees, Croton, Sapium: Shrubs -Capparis, Carisa Acantus.
21+500	BA	G	R-H	E3	- Water pollution & siltation - Air pollution - Landscape destruction	H M H	H M H	Existing quarry highly exploited; has crushing plant, located on left bank of Tato R. nearby riverine forest.
21+ 800	WO	GB	H	E2-3	-Soil erosion - Water pollution & siltation - Loss of trees & grazing land	M M L	M H L	Existing quarry being exploited for maintenance. Trees - Croton, Acacia, Podocarpus, Bucea dysentrica. Nearby farmland (Nug)
30 +100	GW		H	E3	-Landscape destruction - Soil erosion - Loss of grazing land - Loss of trees			New site used for grazing and with swame trees, Acacia, Croton, Vernonia, Burea.
31 + 300	G	WO	H	E2	- Water pollution & siltation - Loss of trees & grazing Land	M M	M M	At left bank of Kersa R.; Trees at site - Croton, Albizia, Ficus, Vernonia, Carisa. Eucalyptus trees at nearby.

W = Grazing land with some tree  
over

BO= Open bush land

G= Grazing land.

WD = Dense Woodland

WO = Open Woodland

## Appendix 6: Land Losses due to Realignments and Improvements

No	Station		Length (km)	Area of Land Loss (ha)				Notes
	From	To		Cultivated	Grazing	Others	Total	
1	1+150	1+400	0.25	0.60	-	0.15*	0.75	
2	2+750	3+000	0.25	-	-	0.75*	0.75	Disturbed area with some vegetation.
3	4+350	4+670	0.32	0.6	0.36	-	0.96	
4	5+360	6+450	1.09	2.70	-	0.57	3.27	
5	6+640	6+960	0.32	0.96	-	-	0.94	
6	7+500	8+220	0.72	2.16	-	-	2.16	
7	8+750	9+400	0.65	1.20	0.75	-	1.95	
8	9+750	11+100	1.35	4.05	-	-	4.05	
9	11+300	11+500	0.20	-	-	0.60	0.60	
10	11+750	11+900	0.15	-	-	0.45	0.45	
11	12+970	13+350	0.38	-	1.14	-	1.14	
12	15+790	16+250	0.46	1.38	-	-	1.38	
13	21+550	22+000	0.45	1.05	-	0.30	1.35	
14	22+700	25+00	2.30	3.00	2.10	1.80	6.90	
15	25+800	26+150	0.35	0.60	-	0.45*	1.05	*Eucalyptus trees.
16	26+450	26+970	0.52	0.30	-	1.26	1.56	
17	29+500	29+800	0.34	0.42	-	0.60	1.02	
18	30+750	31+650	0.90	1.80	-	0.90*	2.70	*Eucalyptus & other trees.
19	32+250	32+640	0.39	-	-	1.17	1.17	
20	33+550	33+850	0.30	-	-	0.90*	0.90	*Vegetation
21	34+250	34+400	0.15	-	-	0.45	0.45	
22	39+350	39+500	0.15	-	-	0.45*	0.45	*Vegetation on river banks.
23	41+750	41+900	0.15	0.45	-	-	0.45	
24	42+900	43+000	0.10	0.30	-	-	0.30	
25	43+400	44+250	0.85	1.35	1.20	-	2.55	
26	50+500	51+600	1.10	0.90	1.80*	0.60**	3.30	*includes marshland; ** Indig. Trees.
27	52+500	53+000	0.50	-	0.90	0.60	1.50	
28	53+450	33+850	0.40	0.75	-	0.35*	1.20	* Trees, homesteads.
29	57+500	58+100	0.60	0.90	0.90	-	1.80	
30	64+600	64+880	0.28	-	-	0.84*	0.84	Riverine trees ( Dokima)
31	66+450	67+450	1.00	2.25	0.75	-	3.00	
32	71+250	72+000	0.75	-	0.75	1.50*	2.25	*Shrubs, trees & boreland
33	73+700	74+180	0.48	-	-	1.44	1.44	*Riverine indig. trees
34	74+670	75+450	0.78	0.30	-	2.04*	2.34	*Eucalyptus & indigo. trees scrubland

## Appendix 6: Land Losses due to Realignments and Improvements, Continued.

No	Station		Length (km)	Area of Land Loss (ha)				Notes
	From	To		Cultivated	Grazing	Others	Total	
35	76+150	77+600	1.45	-	-	4.35*	4.35	*Indigenous & eucalyptus trees
36	77+900	79+400	1.50	0.30	1.20	3.00*	4.50	Eucalyptus, isolated & dense riverine trees.
37	80+350	80+950	0.60	-	-	1.80*	1.80	*Eucalyptus & indigenous trees.
38	81+500	81+930	0.33	0.60	-	0.39*	0.99	*Eucalyptus trees.
39	82+00	82+350	0.35	-	0.45	0.60*	1.05	*Eucalyptus & 'Kacha'.
40	84+550	85+200	0.65	1.05	-	0.90*	1.95	*Eucalyptus
41	85+500	86+000	0.50	1.05	-	0.45*	1.50	* Eucalyptus
42	86+420	88+150	1.73	1.50	1.50	2.19*	5.19	*Eucalyptus & indigenous trees
43	88+750	89+300	0.55	0.45	0.75	0.45*	1.65	* Indigenous trees
44	91+730	91+970	0.24	-	-	0.72	0.72	
45	93+600	94+300	0.70	1.20	0.60	0.30	2.10	
46	95+150	96+400	1.25	2.10	-	1.65*	3.75	*Scrubland and trees.
47	97+000	98+000	1.00	0.60	0.90	1.50*	3.00	Isolated trees & scrubland
48	99+030	99+700	0.67	1.50	-	0.51	2.01	
49	100+150	100+300	0.15	-	-	0.45*	0.45	*Eucalyptus trees
50	100+580	100+700	0.12	-	-	0.36*	0.36	* Indigenous trees & eucalyptus.
51	101+800	102+160	0.36	-	-	1.08*	1.08	*Eucalyptus & other trees.
52	109+350	109+750	0.40	0.45	-	0.75*	1.20	Indigenous trees.
53	109+920	110+250	0.33	-	-	0.99*	0.99	*Eucalyptus trees
54	110+400	111+150	0.75	-	-	2.25*	2.25	*Eucalyptus.
55	111+390	111+850	0.46	-	-	1.38*	1.38	*Eucalyptus & indigenous trees.
56	113+800	114+000	0.20	-	-	0.60	0.60	
57	116+250	116+850	0.60	0.30	-	1.50*	1.80	* Eucalyptus & other trees.
58	122+970	123+250	0.28	0.54	-	0.30*	0.84	*Eucalyptus
59	124+500	124+690	0.19	-	-	0.57*	0.57	* Scrub & trees
60	124+800	125+200	0.40	0.60*	-	0.60**	1.20	* Coffee; Indig. & eucalyptus trees
61	125+880	126+420	0.54	-	-	1.62*	1.62	*Scrubland.
	<b>Total</b>		<b>35.07</b>	<b>40.26 (38%)</b>	<b>16.05 (15.2%)</b>	<b>49.51 (46.8%)</b>	<b>105.82 (100%)</b>	

**Appendix 7: Review of the Previous EIA Studies, Major Gaps identified and Measures taken to fill the Gaps**

**1. Review of the EIA Study Conducted by SYSTRA et al.**

	<b>Component</b>	<b>Gaps/Deficiencies Identified</b>	<b>Measures Taken</b>
1	<b>General</b>	The report has significant gaps and lack site specific considerations for most of the issues/components. The deficiencies are partly due to the shortcomings of the engineering part of the feasibility study, which does not include any details of realignments and required relocation or replacement of river crossing structures.	Update secondary & primary data were collected by conducting detailed field surveys, stakeholders consultations and by contacting relevant offices.
2	<b>Policy, Legal and Administrative Framework</b>	The then draft proclamations need to updated and new ones reviewed and included in the revised EIA Report.	The mentioned activities were done under Chapter 2 of the main report.
3	<b>Baseline Description</b>	<p>The baseline environmental condition is poorly described. Most of the important elements were poorly described or not touched at all. The major shortcomings include:</p> <ul style="list-style-type: none"> <li>• Geological formation by road section was not indicated.</li> <li>• Rainfall distribution by road section was not shown.</li> <li>• Description of the vegetation, wildlife, soils, water resources, extent of soil erosion was not given. The data given on some components like chainage, soils and erosion are not for the project road.</li> <li>• Recent data on land use and land cover of the road corridor was not collected and described.</li> </ul>	Relevant data were collected as mentioned above (item 1) and detailed description given for each component under Chapter 3, being supplemented by important data extracted from the EIA study made by KOCKs Consult.
4	<b>Potential Environmental Impacts</b>		
4.1	<b>Impacts on Physical Environment</b>	<p><u>Impacts on Soils</u> - Locations that are vulnerable to erosion were not indicated, i.e. site-specific assessment was lacking.</p> <p><u>Slope Stability</u> - Locations having potential slope stability problem were not identified and indicated.</p> <p><u>Air Pollution</u> - The description given on existing problems related to air quality is not very relevant for the project road.</p> <p><u>Impacts on Water Resources and Water Quality</u> - Site specific consideration of potential impacts was inadequate. Locations of potentially affected water resources that supply water for human and animal consumption as well as irrigation development should have</p>	Detailed assessment of issues mentioned was made under Chapter 4, Sub Chapter 4.2.

		<p>been identified and specified.</p> <p><u>Land Take</u> - The type and extent of properties to be affected due to land take for the road construction was not indicated. The environmental and socio-economic implications of land taking were also not elaborated.</p> <p><u>Spoil Materials</u> - Impacts due to spoil materials were not assessed.</p>	
4.2	<b>Impacts on Biological Environment</b>	<p><u>Impacts on Natural Vegetation</u> - Effects on natural vegetation particularly on remnant trees and forests (especially riverine forests) at realignments and new river crossing structures are not expected to be insignificant as stated in the report.</p> <p><u>Impacts on Wildlife</u> - The presence of some remnant wildlife habitats and wildlife along the project road was not documented, and their locations and possible impacts on these not assessed.</p>	Detailed assessment of the issues mentioned was made under Chapter 4, Sub Chapter 4.3.
5	<b>Mitigation Measures and Recommendations</b>	<p><u>Soil Erosion</u> - A wide range of erosion protection measures were proposed. However, locations requiring specific/special protection measures were not identified and indicated.</p> <p><u>Land Take</u> - Adequate mitigation measures for land taking were not proposed.</p> <p><u>Wildlife and Wildlife Habitats</u> - The presence of some remnant wildlife habitats and wild animals in the road corridor was not recognized and mitigation measures for possible impacts not proposed.</p> <p><u>Construction Camps</u> - mitigation measures for negative impacts related to workforce such as incidence of STDs and conflicts with local population were not proposed.</p>	Detailed mitigation measures for each identified impact are given under Chapter 4.
6	<b>Environmental Management Plan</b>	Environmental management activities that must be implemented during the different phases of the project were not described in the report.	Detailed environmental management activities are given in Chapter 6 and Chapter 7.

## 2. Review of the EIA Study Conducted by KOCKS Consult et al.

	Component	Gaps/Deficiencies Identified	Measures Taken
1	<b>General</b>	In general the report is good and has incorporated the basic elements of EIA. However, several sections particularly under the baseline condition and potential impacts and mitigation have important deficiencies and gaps. Most of the shortcomings are related to lack of details and particularity to site, while others are mainly overlooked issues.	Update secondary & primary data were collected by conducting detailed field surveys, stakeholders consultations and by contacting relevant offices.
2	<b>Policy, Legal and Administrative Framework</b>	<ul style="list-style-type: none"> <li>Relevant existing policy and institution at regional level particularly in Oromia NRS in which the road project is located was not reviewed.</li> <li>Review of the recently (July 2005) issued Proclamation on Rural Land Administration and Land Use is important.</li> </ul>	The mentioned gaps were filled under Chapter 2 of the main report.
3	<b>Baseline Description</b>		
3.1	<b>Physical Environment</b>	<ul style="list-style-type: none"> <li>Topographic features/terrain classification by road section was not given. This is important as the extent of some environment effects such as soil erosion, slope stability etc., among others, largely depends on topography.</li> <li>Soils types and extent of soil erosion along the road were not described.</li> <li>Water resources (streams and rivers) crossed by the road, their location and use were not described.</li> </ul>	Relevant data were collected as mentioned above (item 1) and detailed description given for each component under Chapter 3.
3.2	<b>Biological Environment</b>	<ul style="list-style-type: none"> <li>Vegetation types and their species composition by road section were not described.</li> </ul>	Detailed description is given for under Chapter 3, sec. 3.2.1
3.3	<b>Socio-economic Environment</b>	<ul style="list-style-type: none"> <li>Related to public attitude towards the project, consultations were limited to individual level, i.e. consultations with representatives of key stakeholders and local communities in group were not conducted. In addition, details on problems associated with existing road and expectations and concerns with the road upgrading project were not indicated.</li> </ul>	

**2. Review of the EIA Study Conducted by KOCKS Consult et al., Continued.**

	Component	Gaps/Deficiencies Identified	Measures Taken
	<b>Potential Environmental Impacts</b>		
1.1	<b>Impacts on Physical Environment</b>	<ul style="list-style-type: none"> <li>• Potential impacts and sources of impacts on land/soils and erosion were well described. However, particular locations vulnerable to erosion except some, and proposed sites for materials exploitation were not specified.</li> <li>• Factors responsible for noise, air and water pollution were well addressed. However, impacts of construction activities on local water uses such as the one mentioned for Nekemte town water supply should have been discussed.</li> <li>• Assessment of impacts related to construction spoils and mitigation was not touched.</li> </ul>	The described deficiencies are filled in Chapter 4, sect. 4.2.1, 4.2.2, 4.2.3, 4.2.4, and 4.2.5.
1.2	<b>Impacts on Biological Environment</b>	<ul style="list-style-type: none"> <li>• Locations/stations where irrigation structures might be affected should have been specified.</li> <li>• Potential impacts on natural vegetation and their causes were well described in broad terms. However, particular sites of significance, i.e. areas or sections having significant vegetation cover and important species were not indicated.</li> <li>• Sufficient mitigation measures for impacts on wildlife during the operation period were not given.</li> </ul>	<p>The details of this data are provided in sect. 3.1.6, Table 3.5, and 4.2.4</p> <p>The details of this information are given in Chapter 4, sect. 4.3.1</p> <p>Given in Chapter 4, sect. 4.3.2</p>
	<b>Environmental Avoidance/Mitigation Planning and Monitoring</b>	It is unlikely to avoid all potential impacts as stated under this section. For example, loss of prior land uses, pollution of soils and spread of sexually transmitted diseases. Practically, it is possible to minimize the impacts by applying mitigation measures but not possible to totally avoid them.	Appropriate mitigation measures are proposed for each identified environmental impact under Chapter 6.

**Appendix 8: Reporting Formats for Implementation of Environmental Mitigation Measures**

**(i) Implementation of Physical and Biological Measures for Erosion Control & Slope Stabilization**

Name of the Project \_\_\_\_\_

Reporting Period \_\_\_\_\_ to \_\_\_\_\_

Length of the Project \_\_\_\_\_ km

	Description of Measures	Unit	Total Planned	Accomplished To Date	Remained	Remarks
<b>1</b>	<b>Physical Measures*</b>					
1.1	Rehabilitation/remedial of existing gullies	m/km				
1.2	Construction of side drains (lined/paved)	m/km				
1.3	Construction of check dams	m/km				
1.4	Construction of cut off drains	m/km				
1.5	Construction of artificial waterways	m/km				
1.6	Construction of energy dissipating structures, e.g. cascades	m/km				
1.7	Construction of gabions	m/km/m <sup>2</sup>				
1.8	Construction of retaining walls	m/km/m <sup>2</sup>				
<b>2</b>	<b>Biological Measures**</b>					
2.1	Replanting to replace trees removed	no./m <sup>2</sup>				
2.2	Roadside tree planting to prevent erosion & improve visual value	no./m <sup>2</sup>				
2.3	Grassing of cut/fill slopes and other erosion prone areas	m <sup>2</sup>				

**NB:** \* The contractor can include any additional items/activities other than these mentioned above.

\*\* List the species of the planted trees and grasses

**(ii) Rehabilitation/Reinstatement of Material Sites**

Name of the Project \_\_\_\_\_

Reporting Period \_\_\_\_\_ to \_\_\_\_\_

Length of the Project \_\_\_\_\_ km

Total number of material sites and length of detours as per the road design report:

Borrow \_\_\_\_\_, Quarry \_\_\_\_\_, and Detours \_\_\_\_\_

No.	Components	Established				Rehabilitated			
		This Month		To Date		This Month		To Date	
		Quantity/no.	Area (m <sup>2</sup> )	Quantity/no.	Area (m <sup>2</sup> )	Quantity/no.	Area (m <sup>2</sup> )	Quantity/no.	Area (m <sup>2</sup> )
1	Borrow								
2	Quarry								
3	Detours								
4	Access Roads								

Notes and Detail Information on these Sites:**NB:** Mention all the necessary information regarding the reinstatement of the sites.

**PART II**

**REVIEW OF SOCIAL IMPACT ASSESSMENT**

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## 2. Abbreviations and Acronyms

CBO	Community Based Organizations
CEDC	Children Exceptionally In Difficult Circumstances
CRC	Convention on the Rights of the Child
CSA	Central Statistical Authority
EIA	Environmental Impact Assessment
EMSB	Environmental Monitoring and Safety Branch
EPA	Environmental Protection Authority
ESIA	Environmental and Social Impact Assessment
ERA	Ethiopian Roads Authority
ESDP	Education Sector Development Program
ETP	Education and Training Policy
ERTTP	Ethiopian Rural Travel and Transport Programme
FDRE	Federal Democratic Republic of Ethiopia
FGD	Focus Group Discussion
FHH	Female Headed Households
ha	hectare
HH	House Hold
HIV/AIDS	Human Immuno Virus/Acquired Immuno Deficiency Syndrome
HAPCO	HIV/AIDS Prevention and Control Office
HSDP	Health Sector Development Programme
IEC	Information Education Communication
IMR	Infant Mortality Rate
IMT	Intermediate means of Transport
MDG	Millennium Development Goals
MR	Morbidity Rate
Km	kilometer
masl	meter above sea level
MoFED	Ministry of Finance and Economic Development
NGO	Non Governmental Organization
NMT	Non Motorized Transport
NPA	National Plan of Action
NAP-GE	National Plan of Action for gender Equality
OD	Operational Directive
PAP	Project Affected Persons
PASDEP	Plan for Accelerated Sustainable development to End Poverty
PLWHA	People Living with HIV/AIDS
RAP	Resettlement Action Plan
ROW	Right of Way
SIA	Social Impact Assessment
SDPRP	Sustainable Development & Poverty Reduction Programme
SMP	Social Monitoring Plan
STD	Sexually Transmitted Disease
TB	Tuberculosis
TOR	Terms of Reference
WB	World Bank
VLTT	Village Level Travel and Transport

### 3. Executive Summary

#### 3.1 Introduction

The Social Impact Assessment (SIA) is part of the Environmental and Social Impact Assessment; to a consultancy services for Feasibility Study, Environmental Impact Assessment (EIA) and Detailed Engineering Design for Gedo-Nekemt Road Upgrading Project.

The Gedo – Nekemt project road is located in two administrative zones, namely, in the Western Shewa and Eastern Wollega zones of Oromia National Regional State. The first section of the road, which is from Gedo to Bako is located in West Shewa zone, and the second section, Bako to Nekemt is located in Eastern Wollega zone Administration.

The total length of the project road is 137 km and it is part of the national trunk road network, which will be upgraded from its present double bituminous surface designing to an asphalt concrete standard including the improvement of the alignment.

The population in the influence area of the project road is estimated to be about 806,624 as per to population projection made by Central Statistical Agency. The average population density is about 132.6 persons per square km.

The urban population in the project area is concentrated in eight towns located along the project road. Among the eight towns, are important urban centers with political and administrative significance and comprise about 65percent of the towns' populations along the project road.

The economy of the project area is predominantly based on small scale subsistence and rain fed agriculture, engaging about 85% of the population. Generally, the farming system is characterised by a combination of crop cultivation and livestock keeping.

The major types of agricultural crops that grow in the project area include, Teff, Maize and Coffee. Among the agricultural crops grown in the area, Coffee is considered as a valuable cash crop.

In its infrastructural development, both in road and communication facilities the project area is in its infancy. The majority of the population in the project area mainly uses traditional means of transport and walk on foot for travel and transport. The traditional and non motorized means of transport used both for passenger and goods transports in the area include pack animals, such as, donkey, mule and horse.

Women in the project area and in the region are among the disadvantaged group of the society having very little access to resources and services. It is the men who have access and control over resources and make decisions both at household and community level. The upgraded project road will contribute women in improving their demand and access for travel and transport activities, improve the girl child education, and at the same time create income generating and employment opportunities during the construction work.

The distribution of social services, such as, health and educational services in the project area is at its lowest and are located in the urban sections, away from most of the population.

Malaria is among the top ten diseases in the direct zone of influence, and is also a major cause of mortality. It mainly exists during the peak agricultural season, between the months of June to September making negative impact on agricultural production by attacking the labour force. Infant and child mortality is also high in the region and in the project area.

Existing Federal Government social and development policies, strategies; legal and administrative frameworks (norms, policies, guidelines, statutory and legislative provisions, regulatory framework) for land acquisition, compensation schemes and rehabilitation programmes for PAPs are also discussed analysed.

Public consultation was carried out through formal meetings & public gatherings, through focused group discussions, meeting with women groups, meeting with teachers and health professionals, and also through informal meetings held with different sections of the community. In almost every town and village where public consultations were held the public have actively participated and expressed their feelings openly on those issues related to right of way, resettlement, and compensation payment to the different assets, participation of women and on other related issues.

The project road has a number of positive and negative social impacts that could influence development activities in the project area. The potential positive impacts, include opening up of market opportunities, provide access to improved and better social service facilities, create improved communication, improve the supply of agricultural inputs, create investment and employment opportunities, contribute to income generating activities, and improve the opportunities for women by creating access to transport and other facilities.

Investigations and identification of potential negative social impacts conducted focusing on involuntary resettlement, community severance and vulnerable groups at particular risk of project impacts, loss of productive resources, loss of access to services like markets, education and health facilities, grazing and forest areas, and disruption of social, cultural and economic ties and networks.

The upgrading of the Gedo – Nekemt road might entail the relocation of some houses located along road side towns/villages. The number of Project Affected Persons (PAPs) expected to be displaced in one specific location or town or village is much lesser than 40 households. According to ERA's Resettlement / Rehabilitation Policy Framework and World Bank's Policy on Involuntary Resettlement, the relocation and dispossession issue does not necessitate for a full and detailed Resettlement Action Plan (RAP). However, it may require abbreviated RAP.

### **3.2 Objectives of the Social Impact Assessment**

Social Impact Assessment (SIA) is an important activity in any development project to assess how the benefits are distributed among the local population and other stakeholders. Social Impact Assessment can alert affected communities and residents, as well as planners and decision-makers to the likely consequences of the project and ensure that human values and concerns receive proper attention and consideration during the implementation of the project.

SIA is used to assess how the socio economic benefits are distributed among different stakeholders and overtime; and also assess the adverse impacts to be created due to the upgrading of the project road. It is important to measure and understand the physical and financial assets; human and organizational capabilities; economic and social relations of stakeholders and also to understand Gender issues.

The specific components of SIA include:

- a) Collection and analysis of socio-economic data and background information of the project area,
- b) Review of policy; legal and administrative framework,
- c) Public consultations and meetings with government officials

- d) Identification of Gender issues,
- e) Identification of potential positive and negative social impacts, and
- f) Reinforcement and mitigation measures for the identified positive and negative social impacts,
- g) Social monitoring indicators and management plan.

### **3.3 Approach and Methodology of the Study**

The Social Impact Assessment (SIA) was carried out on the basis of data and information collected from both primary and secondary sources. The study for the social impact assessment has been based on field level data and information gatherings and surveys; public consultations carried out with PAPs, local authorities and population and as well on existing secondary data and information.

The identification of potential positive and negative social impacts was done based on field investigation, consultations with Project Affected Persons (PAPs), Government authorities, Community Based Organizations (CBOs) and other relevant agencies.

The field level investigations and identification of potential social impacts focused on:

- identification of any major social impact issues, such as involuntary resettlement, community severance and vulnerable groups at particular risk of project impacts,
- nature of potential impacts of the proposed project, including loss of productive resources, loss of access to services like markets, education and health facilities, grazing and forest areas, and disruption of social, cultural and economic ties and networks,
- Soliciting the views of local population as how to pragmatically provide for their needs within the basic format of the project, and what beneficial impact they expect from the project.

#### ***Scoping and Evaluation of potential Social Impacts***

The identification of potential significant social impacts associated with the implementation of the project was done by a check list of the Valued Environmental Components (VEC). The assessment of expected social impacts includes short and long-term, direct and indirect, permanent and temporary as well as positive and negative impacts.

The significance, and hence acceptability, of potential impacts has been determined by the evaluation of the assessed impacts against socio – economic standards, public opinion, and expert judgement. Criteria for identifying the significance of impacts include compliance with any relevant laws or regulations, socio - economic standards or guidelines, and if any long term or permanent damage to ecological systems occur.

#### ***Reinforcement and Mitigation Measures***

The baseline socio – economic conditions have been put against the impact assessment for identification of practical and cost effective benefit enhancement measures as well as preventive and mitigating measures, the majority of which could be adopted into the design (such as improvement of alignment, width of the road, town and village passages, road safety, etc.).

### **3.4 Socio Economic Background of the Project Road**

The project road is located in the western part of Ethiopia, specifically in West Shewa and East Wollega Administrative Zones of Oromia National Regional State. It starts from the town of Gedo in West Shewa zone (or about 105 km west of Addis Ababa) and terminating

at the town of Nekemte in East Wollega zone. The project road has strategic importance in terms of linking the country to most parts of West Ethiopia up to the border with the Sudan.

The total length of the project road is 137 km and it is part of Addis Ababa – Nekemt, which is part of the national trunk road network, which will be upgraded from its present double bituminous surface designing to an asphalt concrete standard including the improvement of the alignment.

The topography of the project road corridor is from rolling / hilly to mountainous, of which, 44% (or 61km) is hilly, 40% (or 55km) is rolling to hilly, 9% (or 12km) is rolling and 7% (or 9km) is mountainous. Attitudinally it varies from 2500 meters above sea level (masl) at Gedo and to about 1600 masl in Bako, at Gibe River Bridge (chainage 60.4km).

The project area is densely populated and cultivable land is very scarce (e.g. less than 1.5 ha/HH in the Gedo to Bako/Gibe river area ) and any land requirement due to realignments or construction materials sources over the farm plots will aggravate the land situation in the area and affect fuel and feed security of the area.

#### **3.4.1 Demography**

The total population of the above woredas traversed by the project road is about 806,624 and the average population density is 132.6 persons per square Km in July 2006.

The total area km square of the woredas crossed by the project is about 601.85, and its population density per km square varies from 85 persons per km<sup>2</sup> in Gobu Sayoo woreda to 210 persons per km<sup>2</sup> in Bako Tibe woreda. The average population density is about 132.6 persons per square km in all the woredas located along the project road.

#### **3.4.2 Town population**

There are nine towns located along the project road with a total population about 154,667. Among these eight towns, Nekemt town alone comprises about 54% of the population.

#### **3.4.3 Ethnic Groups, Religion and Language**

The major ethnic group and population in the project are the Oromo. The Oromo are also the major ethnic group in Ethiopia and in Oromia regional state and speak Oromiffa as their first language. Oromiffa is also the official language of the region and spoken as their first language by about 95.4 percent of the population as per the 1994 census report.

Christianity and Islam are the two major religions that are widely practiced by the population in the project area; however, the Christians population is the major religious group in the project area.

#### **3.4.4 Economic Activity**

Agriculture (subsistence farming) is the mainstay for over 85 percent of the population in the project area. The main crops grown in the project area include maize, teff, pulses and coffee. The project area is intensively cultivated mainly practicing mono crop system, except in some areas where they grow twice in a year by adopting small scale irrigation. The area does not have large scale irrigational experience and capacity except traditional irrigation system practiced by a small number of farmers.

Apart from agriculture, there is very small economic activity in the project influence area. In the town sections, non-farm activities, such as, trade and businesses, small scale metal

workshops, wood work, grain marketing, kiosks and local drinking places, hotel and restaurant business are in their embryonic stage.

#### **3.4.5 Educational Services**

There are about 35 primary schools (1-8) of different cycle and four 4 secondary schools in the project road corridor. The distribution of schools also shows that most schools are located in the urban areas.

#### **3.4.6 Health Services**

The distribution of health services in the project area includes one hospital, four health centers, 21 clinics and 33 health posts. The existing health facilities are ill equipped and under staffed and are also not sufficient to reach all the population in the project area.

Generally, health facilities and its services in the project area suffer from a number of problems such as, low number of health professionals, uneven distribution of health institutions and low supply of drug and equipment as well as inadequate quality and efficiency of care.

#### **3.4.7 Travel Pattern and Transport Services**

The travel and transport pattern of the population in the project area and in the region is mainly carried out by non-motorized means of transport, and in particular by walking on foot. It is estimated that more than 70% of households in the project area walk on foot to reach different social services and facilities, such as, administrative centers, courts, police stations, markets, agricultural input stores, sources of drinking water, flour mills, and fuel wood collection places.

Animal drawn carts are also a common means of transport in the town sections and in some of the rural villages located along the project road. Mule and donkey carts are used to transport agricultural produces to market centres, to transport inputs from stores, and also to transport grain to flour mills. The project road has significant contribution to the growth and use of animal drawn carts in the project area. The use animal drawn carts seem to have much widely spread in the project road corridor, and it provides important transport service to rural communities.

In the project area, an estimated small percentage of the population is also dependent on motorized or vehicular transport. Public transport services operate in the major towns and there is a daily schedule of public transport service to major towns. Large buses operate from Addis Ababa, medium buses operate from Ambo and Nekmte towns. There are also mini buses that carry out short distances between the towns located along the project road.

### **3.5 Review of Policy, Legal and Administrative Framework**

The section on the review of policy, legal and administrative framework includes; reviewing constitution of Federal Democratic Republic of Ethiopia (FDRE), analysis of Federal and Regional Government's policies, development strategies; reviewing legal and administrative frameworks (norms, policies, guidelines, statutory and legislative provisions, regulatory framework) for land acquisition, compensation schemes and rehabilitation programmes for PAPs.

The different development strategies and policies reviewed in this section include, such as, Ethiopia's Millennium Development Goals (MDG), Plan for Accelerated and Sustained Development to End Poverty (PASDEP), National policy on Women, National policy on

programmes, National Food security programme, and other relevant social policies and issues are also discussed.

The current usage and ownership of land in the existing width of the road and probable corridor of impact, fixed and movable structures, trees and other assets, areas of significant squatting and/ or encroachment are also discussed and reviewed. Proclamation for the establishment of ERA, the role and responsibility of ERA's different departments responsible for environmental and social issues, compensation payment and Right of Way issues are discussed. ERA's policy on HIV/AIDS, Resettlement and Rehabilitation policy Framework are also discussed.

Federal Government Proclamation for the Expropriation of Land Holdings for Public Purposes and Payment of Compensation (Proclamation No. 455/2005) and proclamation No. 456/2005 on land use is also discussed in relation to the project road.

### **3.6 Potential Positive and Negative Social Impacts**

The potential positive and negative social impacts of the upgrading project road identified through field visits, consultation with public, review of EIA and other studies.

There are a number of potential social impacts that influence the population residing in the direct influence area either positively or negatively. For each of the positive impacts measures of reinforcement are provided separately. Similarly, for each of the negative impacts mitigation measures are also provided.

The upgrading of the project road will also create subsequent increase and utilization of agricultural inputs and services that will result in increased production and, due to lower transport costs and improved and extended market access and opportunities, there will be higher farm gate prices for local produce.

The upgrading of the project road, in the short and medium term will create impacts such as reductions in vehicle operating cost, transport and time costs for public passenger and for freight transports, and for private vehicle users, and improvement in the availability of transport facilities and services. In the long term, it will create development impacts and incentive that will bring about economic growth and changes and improved quality of life for the people residing in the project area.

Some of the major social benefits/impacts due to the upgrading of the project road include;

- The growth of increased / improved trade and market facilities,
- Increased price for agricultural produces,
- Increased and timely availability of agricultural inputs,
- Increased agricultural production per hectare of farmland,
- Development of small business and investment projects,
- Growth of urban centers and communication facilities,
- Improved provision of social services and facilities,
- Employment opportunity created for the local population (women will also benefit working as labourers) in the project road,
- Income generation created by the local population (mainly by women) through sales of goods and services to construction workers.

In addition to the positive impacts created due to the upgrading of the project road a number of adverse negative impacts will also be created. Some of these negative impacts are related to:

- Loss of farm and grazing land,
- Loss of agricultural production and household income,

- Spread of Sexually Transmitted Disease (STD) and HIV/AIDS,
- Growth of squatters & uncontrolled settlements,
- Noise disturbance,
- Impact on women,
- Spoil dumping on farm lands and near water points, and
- Pressure on local services and facilities.

The negative impacts mentioned above could be avoided if appropriate mitigation measures, as suggested in this document, are carried out.

In general, the upgrading of the project road will create better and improved market opportunities for the population residing in the project influence zone. When upgraded it will also create market access for the local farmers and their produce will fetch higher market prices in comparison to the current low prices. Additionally, due to the introduction and availability of improved agricultural inputs, production per hectare would also increase. Hence, with the increment of agricultural prices and increased production, household income level will also be increased and quality of life improved.

The upgrading of the project road will have positive impacts and benefits to the local and regional economy and contribute to the National economic growth and development through;

- Contribute to the promotion and enhancement and for the growth and development of the social and economic development along the project road corridor and in its catchments
- Reduced travel time and great comfort for motorists and passengers using public transport
- Reduced noise and air pollution

The upgrading of the proposed project road if constructed would contribute in improving the livelihood of the local population, through employment creation, introducing improved technologies, improved communication and contact with people living in other parts of the country, and it will create investment and business opportunities; and improved market outlets. It would also reduce travel time and transportation costs for the local population.

### **3.6.1 Health and Occupational Diseases**

Malaria and respiratory tract infections are the major causes of outpatients visit at the health institutions. Malaria is also the major cause of mortality and morbidity in the project road corridor. It is prevalent from June to early November in the project area. There is a high potential for the spread of communicable diseases such Sexually Transmitted Diseases (STD) and HIV/AIDS from the construction workforce to the local population and vice versa.

In Ethiopia, the HIV/AIDS pandemic, in recent years, has emerged as a major health hazard, affecting mainly the age group of 15 to 49 years. HIV / AIDS emerged as a major health hazard in recent years in Ethiopia. About six percent of the population is affected by HIV/AIDS.

HIV/AIDS pandemic is also on the increase in different parts of the country including rural areas. Concerning the pandemic there is no data and information available about its spread and growth in the project area. However, the project road corridor might not have significant difference from other areas that are in a similar situation. It is true that HIV/AIDS will have detrimental effect on the construction work force and the local community unless appropriate measures are not taken to control it. This is partly because construction workers are mostly young and sexually active group of the population and are mobile, and

### **3.6.2 Impact on Land Acquisition**

The major potential impact of the project road on the socio-economic environment and on the livelihood of the communities is due to land acquisition. The land required for the road construction works will affect crop and grazing land as well as trees. Land required for the upgrading of the project road is of two types; namely land which is required permanently for the widening/realignment of the existing road, and land required for temporary works (detours, access roads, quarry sites, borrow pit and camping/camp sites).

The land requirement may entail relocation of some houses located along the project road. However, it may not require for involuntary resettlement of the local population because it will only take strips of land all along its route.

#### **Permanent Dispossession of Farmland**

Land will be permanently required for the upgrading of the project road including widening of road, realignments (new construction), improvements of alignment, construction of structures and associated drainage and protection works. Further land will be required for camping/camp sites, access roads to the same and for materials sources (quarries, borrow pits), where the latter in some cases cannot be reinstated to their original condition. The permanent dispossession of land will affect: agricultural (crop and grazing) land; permanent crops and trees; houses/buildings and other structures (e.g. irrigation schemes, fences).

In the project road corridor, there will not be many households who will be dispossessed from their farmland permanently. However, there will be a small number of households who will lose strip of their land. This shows that there will not be households who may require resettlement as an option because of expropriation of their land by the project road.

#### **Temporary Dispossession of Farmland**

The implementation of the project will require the temporary use of land for temporary roads (e.g. detours, access roads), sub-camps and materials sources (quarries, borrow pits).

The location of contractor's and the supervising engineers' site facilities is a key environmental and social issue. The land required for the camp site(s) is in conflict with the existing land use and the economic activities at locations in or close to towns/villages. Therefore, in previous/other projects there was a tendency to install them in a certain distance or at the outskirts of towns (e.g. the camp site of the previous Ambo – Nekemt road project is located about 3 km outside of Bako town).

### **3.6.3 Impact on Archaeological and Historical sites**

The upgrading of existing roads or the construction of new roads affects archaeological and historical sites that are located along road sides.

In the project road corridor, there are not any archaeological or historical sites that will be affected by its upgrading.

### **3.6.4 Impact on Indigenous Peoples or Indigenous Ethnic Minorities**

Development projects such as the construction or upgrading of roads affect indigenous people and indigenous ethnic minorities by expropriating their traditional resources; and affecting their traditional way of life and culture and sense of identity.

Indigenous people engage in economic activities, such as, shifting cultivation in or near forests, live as hunter and gatherers, and sometimes work as wage laborers or even small-

scale market-oriented activities. They are mostly among the poorest segments of a population and identified in a particular geographic area.

In the project road corridor, there are not any indigenous peoples, indigenous ethnic minorities, or tribal groups that need special attention and qualify the definition of World Bank's (WB) Operational Directive (OD) 4.20 on Indigenous Peoples.

### **3.6.5 Impact on Road Safety**

Road safety aspects are important in all towns and villages traversed due to numerous movements of people and livestock. In the future, improved road and the anticipated increased traffic (or with increasing movement of vehicles) would change safety aspects along the roadside. Road safety is crucial in particular on market days because of the risk of accidents between pedestrians and passing cars /trucks/ could be high.

In Ethiopia, road accidents are recorded to be among the highest in the world, and this is associated to poor road conditions, lack of road signs, lack of awareness on road safety by pedestrian and motorists.

Improvement of sub-standard curves and bridge approaches according to the present and future traffic requirements will have a significant positive impact on traffic safety.

To avoid and control potential problems in the operation of the road maximum attention has to be paid to an adequate road and traffic safety. If appropriate mitigation measures (traffic management) are not taken the project road may also become a cause for fatalities, injuries and death to the community through increased traffic accidents.

### **3.6.6 Impact on Public utilities**

Public utilities, such as, electric poles are affected due to the upgrading of the project road in different locations (mainly in the town sections) along the project road. In total about 874 electric poles will be affected both in the right and left side of the road due to the widening and realignment.

### **3.6.7 Gender Issues**

In Ethiopia, the Gender proportion of men and women shows that women constitute approximately 50% of the population. Having the almost the equal proportion of men and women, the Gender disparity between men and women is believed to be very high in the country and this disparity is also one of the bottlenecks for its development.

In this section, Gender roles and relations and Gender division of labour of labour are discussed. The gender roles and relation shows the different roles and responsibilities performed by either men or women within the community and at household level. The division of labour shows socio political and other activities performed by women and men.

The different roles and responsibilities assumed by women and men in the project road corridor imply that they have differing transport needs and requirements. The demand for travel and transport by women either for household or community activities is very high. Travel and transport related activities carried out by women include: domestic travel and transport, agricultural transport and transport related to social services. A study made to introduce IMT in selected woredas shows that women perform major travel and transport related activities mainly for domestic (fuel wood, water collection, etc), market, agricultural and social purposes.

The upgrading of the project road is expected to provide some sort of assistance and support to women in improving their condition in their productive, reproductive and socio political activities. The magnitude of women's poverty situation is manifested through lack of transport services and facilities. With the upgrading of the project road, it is expected that the poverty situation of women will show improvement and progress.

### **3.7 Public Consultation and Meetings with Different Stakeholders**

Public consultations, Focus Group Discussions (FGD) and Key informant interviews, meetings with different stakeholders, such as, local Government officials, were held with different groups of the population in the project road corridor. Public consultations were carried out at major towns and villages located along the project road.

Public consultations and meetings with different stakeholders were conducted with;

- Project Affected Persons (PAPs),
- Hotel and Restaurant owners, Shopkeepers and farmers,
- Transporters and owners of Non Motorized Transport (NMT),
- Local authorities (woreda and kebele level),
- Experts from different ministries including teachers, health workers, etc,
- Community Based Organizations and Non Governmental organizations (NGO).

The objectives of the public consultations were to share information with the public residing in the project area, to obtain information and data about the needs and priorities of PAPs, to obtain the information about the project implementation, to solicit cooperation and participation during project implementation and ensure transparency in the project implementation.

Meetings and discussions were held with the different stakeholders. The meetings and the discussions held focused on the benefits and possible negative impacts and envisaged problems during the road construction, including involuntary resettlement. The various institutions and organizations contacted include:

1. Woreda Administration offices,
2. Woreda sectoral offices (education and health),
3. Municipalities of major towns, and
4. Kebele Administrations.

### **3.8 Social Monitoring Plan and Indicators**

Social Monitoring Plan has been prepared outlining mitigation and monitoring activities/responsibilities that acts as a guide to those planning, preparing, constructing and operating the proposed project. Social monitoring activities will be required for the engineering design and tender document preparation; Implementation preparation phase; Implementation/construction period; and road in operation/service and maintenance phase.

Social monitoring of the project will be carried out with a view to evaluating the changes and impact created in the life of the local population due to the construction or upgrading of roads.

The social monitoring for the project road will measure changes in social benefits and impacts. The internal monitoring of the ESIA will be carried out by ERA's EMSB and local administrative bodies; and the external monitoring also would be carried out by Federal level Ministries, EPA, NGOs, and the World Bank supervision missions.

### 3.9 Social Mitigation Cost

The cost for implementation of the environmental and social mitigation and benefit enhancement measures is usually estimated as 4.0% of the estimated construction cost of the project. However, there are a great number of the determined social avoidance/mitigation and benefit enhancement measures, and the measure ones include:

- items like awareness creation and education, traffic signs, speed calming measures;
- Cost for the implementation and mitigation of HIV/AIDS activities (1.0% of the total project cost as suggested by ERA's EMSB)

### 3.10 Conclusion and Recommendation

The upgrading of the project road will create better and improved market opportunities for the sale of agricultural produces and consumer goods. When upgraded it will create better market access for the local farmers, and their produces will fetch higher market prices in comparison to the current low prices. Further, due to the introduction and availability of improved agricultural inputs, production per hectare would also increase. Hence, with the increment of agricultural prices and increased production, household income level would also be improved.

On the down side, the construction of the project road would create some negative impacts on the local population. The negative impacts are mainly related to the spread of communicable diseases, the spread of HIV/AIDS, traffic accidents and injuries. The negative impacts could be managed if proper mitigation measures are carried out, as suggested in this report.

ERA in the preparation of its tender document for the construction of the road needs to ensure that clauses both for the environmental and social issues are included as suggested in this study and from other relevant documents. The contractor should also be obliged to implement environmental and social clauses included in the contract document.

The monitoring of the project implementation has to be done on a regular basis by EMSB of ERA, ROW and Sociologist assigned by the supervision consultant. The Sociologist assigned by the supervision consultant has to copy its monitoring report to EMSB and ROW.

In general, there are no socio economic conditions or grounds that will affect the project from not proceeding to its implementation provided that recommended reinforcement and mitigation measures are strictly adhered by all concerned bodies.

## 4. Objective of the Social Impact Assessment, Approach and Methodology

### 4.1 Introduction

The Social Impact Assessment (SIA) summarizes the existing socio-economic condition of the project area using data collected from reconnaissance field survey, and background documents (or secondary sources). The data and information collected from the secondary sources include; socio - economic data and information of the region and Western Shewa and Eastern Wollega zones and the project road.

The SIA discusses and analyses the socio - economic situation and findings from the project area and the region. It also discusses the potential positive impacts and measures of reinforcement; and the negative impacts and its mitigation measures. SIA is used to assess how the costs and benefits (social, economic and cultural) of the upgrading of the project road are distributed among the different stakeholders overtime. It also looks into economic and social relations, the Legal and Policy issues and the Institutional framework in the project area, and how it affects policy issues and outcomes.

The Gedo – Nekemt road is 137 km, which is part of the national trunk road network, and is to be upgraded from its present double bituminous surface designing to an asphalt concrete standard.

The upgrading of the project road, in the short and medium term will create positive impacts such as reductions in vehicle operating cost, transport and time costs for public and freight transports, and for private vehicle users, and improvement in the availability of transport facilities and services. In the long term, it will create development impacts and incentive that will bring about economic growth and changes and improved quality of life for the people residing in the project area.

Some of the major social benefits (or positive impacts) to be created due to the upgrading of the project road include;

- Promotion and enhancement of social and economic development along the project road corridor and in its catchments,
- Creation of employment opportunity for the local population in the project road,
- Income generation created by the local population (mainly by women) through sales of goods and services to construction workers,
- Reductions in vehicle operating costs, ( such as, fuel consumption and maintenance costs),
- Reduced transport cost due to increased number of public and freight transport operating in the area,
- Increased agricultural production and productivity due to timely availability of inputs and extension services,
- Employment opportunity created for women (women will benefit working as labourers),
- Improved/increased girls education,
- Improved provision of social services and facilities, and

In addition to the positive impacts created due to the upgrading of the project road a number of adverse negative impacts would also be created. Some of these negative impacts are related to:

- Exposure to Sexually Transmitted Disease (STD) and HIV/AIDS,
- Pressure on local services and facilities,
- Pressure on local health facilities,
- Impact on women,
- Permanent loss of farmland,
- Temporary loss of farmland,
- Impact due to construction of camps,
- Spoil dumping or disposal of waste matters
- Impact on road safety / Increased traffic accidents/,
- Impact on Archaeological and historical sites, and cultural heritages
- Impact on child labour

The negative impacts mentioned above could be avoided if appropriate mitigation measures, as suggested in this document, are carried out.

In general, the upgrading of the project road will create better and improved market opportunities for the population residing in the project road corridor and its catchments. Since agriculture is the major source of income for most people, when the project road is upgraded it would create market access for the local farmers and their produce would fetch higher market prices in comparison to the current low prices.

In addition to identification of the positive and negative impacts of the project road, the SIA also includes Social monitoring plan and indicators.

#### **4.2 Objectives of the Social Impact Assessment**

Social Impact Assessment (SIA) is an important activity in any development project to assess how the benefits are distributed among the local population and other stakeholders. Social Impact Assessment can alert affected communities and residents, as well as planners and decision-makers to the likely consequences of the project and ensure that human values and concerns receive proper attention and consideration during the implementation of the project.

SIA is used to assess how the socio economic benefits are distributed among different stakeholders and overtime; and also assess the adverse impacts to be created due to the upgrading of the project road. It is important to measure and understand the physical and financial assets; human and organizational capabilities; economic and social relations of stakeholders and also to understand Gender issues.

The SIA also assesses how to strengthen and reinforce the positive impacts created due to the implementation of the project and also on how to mitigate the negative or adverse social impacts.

The key objectives of the Social Impact Assessment in the upgrading of the Gedo – Nekemt road project are;

- identify the existing socio-economic situation of the project influence area,
- determine the magnitude and sensitivity of direct and indirect socio-economic impacts both positive and negative, likely to result from the proposed project,
- recommend appropriate and cost-effective mitigation measures in case of negative social impacts and reinforcement measures in case of positive social impacts,
- carry out public consultation regarding the potential social benefits accruing from the upgrading of the project road,
- review of the existing policies and development strategies, legal and administrative

- identification of the most appropriate social management and monitoring framework, which will ensure that reinforcement measures of positive impacts and mitigation of adverse social impacts are fully addressed.

### **4.3 Approach and Methodology of the Study**

The Social Impact Assessment (SIA) was carried out on the basis of data and information collected from both primary and secondary sources. The study for the social impact assessment has been based on field level data and information gatherings and surveys; public consultations carried out with PAPs, local authorities and population and as well on existing secondary data and information.

Both the reconnaissance field survey and the public consultations were conducted using participatory assessment tools. Considering the importance of public participation in the project as required by the Terms of Reference (TOR), public consultations were carried out in urban and rural sections of the project influence area. Checklists of questions were used for eliciting information during the public consultations.

To understand the socio-economic context of the proposed project and for providing necessary inputs into the social analysis of the project, relevant baseline data on the socio-economic situation of the project area was collected through field investigations and from secondary sources.

The baseline data and information collected include;

- Demographic composition and spatial distribution of the population in the project area,
- Urban sections and population,
- Social composition, settlement patterns, main sources of livelihood,
- Data on existing economic and social infrastructure like markets, education and health services,
- Gender aspects,
- HIV/AIDS and other health aspects,
- Land size and tenure rights,
- Travel patterns and modes of transport, and
- Sociological and cultural aspects.

#### ***Scoping and Evaluation of potential Social Impacts***

The identification and assessment of expected social impacts includes short and long-term, direct and indirect, permanent and temporary as well as positive and negative impacts.

The significance, and hence acceptability, of potential impacts has been determined by the evaluation of the assessed impacts against socio – economic standards, public opinion, and expert judgement. Criteria for identifying the significance of impacts include compliance with any relevant laws or regulations, socio - economic standards or guidelines, and if any long term or permanent damage to ecological systems occur.

#### ***Reinforcement and Mitigation Measures***

The baseline socio – economic conditions have been put against the impact assessment for identification of practical and cost effective reinforcement measures as well as preventive and mitigating measures, the majority of which could be adopted into the

design (such as improvement of alignment, width of the road, town and village passages, road safety, etc.).

## 5. Socio Economic Background of the Project Road

### 5.1 Introduction

The project road is located in the western part of Ethiopia, specifically in West Shewa and East Wollega Administrative Zones of Oromia National Regional State. It starts from the town of Gedo in West Shewa zone (or about 195 km west of Addis Ababa) and terminating at the town of Nekemte in East Wollega zone. The project road has strategic importance in terms of linking the country to most parts of West Ethiopia up to the border with the Sudan.

The total length of the project road is 137 km and it is part of Addis Ababa – Nekemt, which is part of the national trunk road network, which will be upgraded from its present double bituminous surface designing to an asphalt concrete standard including the improvement of the alignment.

The topography of the project road corridor is from rolling / hilly to mountainous, of which, 44% (or 61km) is hilly, 40% (or 55km) is rolling to hilly, 9% (or 12km) is rolling and 7% (or 9km) is mountainous. Attitudinally it varies from 2500 meters above sea level (masl) at Gedo and to about 1600 masl in Bako, at Gibe River Bridge (chainage 60.4km).

The project area is densely populated and cultivable land is very scarce (e.g. less than 1.5 ha/HH in the Gedo to Bako/Gibe river area ) and any land requirement due to realignments or construction materials sources over the farm plots will aggravate the land situation in the area and affect fuel and feed security of the area.

The project road traverses through nine towns and several rural kebeles and other small villages. The towns crossed by the project road include, Gedo, Ijaji, Tibe, Sheboka, Bako, Ano, Sire, Chingi, Gute and Nekemte. Among the above towns crossed by the project road, the town of Nekemte is the largest town in the corridor and as well as zonal capital of East Wollega administration; it is also a major educational and business center. All the other towns crossed by the project road are woreda administrative centers, except the towns Ijaji, Tibe, Sheboka, and Chinigi.

The upgrading of the project road is expected to improve the economic situation, the socio political condition and bring important changes in the livelihood situation of the population crossed by the project. It would also contribute to the growth and development of trade and urban centres, improvement of agricultural production and its marketing network. The natural resource and human resource potentials of the project area are so important to contribute to the development of the area.

### 5.2 Demography

The project road traverses through six woredas; two woredas in West Shewa zone and four woredas in East Wollega zone. The total population of the above woredas traversed by the project road is about 806,624 and the average population density is 132.6 persons per square Km as per to population projection made by Central Statistical Agency in July 2006. The average population growth is also 2.73 % for the country.

Cheliya and Wayu Tuka woredas have a population above 238,000, and the other three woredas a population ranging from 96,000 to 133,000. The male and female ratio shows 49% male and 51% female and over 50% of the population in the project area and the Region is a young age group.

Table 1 shows total population distribution by woreda and sex along the project road.

**Table 1 Population distribution by Woreda and sex in the project area**

Zone	woreda	Total Population	Male	Female
West Shewa	Cheliya	240,055	117,873	122,182
	Bako Tibe	133,799	65,398	68,401
East Wollega	Sibu Sire	97,866	47,564	50,302
	Billa or Gobu Sayoo	96,451	46,827	49,624
	Guto Wayu	238,453	118,311	120,142
<b>Total</b>		<b>806,624</b>	<b>395,973</b>	<b>410,651</b>

Source: CSA Statistical Abstract, January 2006

The total area km square of the woredas crossed by the project is about 601.85, and its population density per km square varies from 85 persons per km<sup>2</sup> in Gobu Sayoo woreda to 210 persons per km<sup>2</sup> in Bako Tibe woreda. The average population density is about 132.6 persons per square km in all the woredas located along the project road. Table 2 shows area for each woreda and its density per square km.

**Table 2 Area size of each woreda and its population density**

Zone	woreda	Area km <sup>2</sup>	Density per km <sup>2</sup>
West Shewa	Cheliya	1,854.07	129.5
	Bako Tibe	637.19	210.0
East Wollega	Sibu Sire	1,132.15	86.4
	Billa or Gobu Sayoo	1,134.22	85.0
	Guto Wayu	1,324.22	180.0
<b>Total</b>		<b>6081.85</b>	<b>132.6</b>

Source: CSA Statistical Abstract, January 2006

[Note: The names for some woredas have been changed recently, and some woredas have also been divided into two woredas. For instance; Billa Sayoo woreda has been renamed as Gobu Sayoo; and Guto Wayu woreda is divided into two woredas named as Guto Gida and Wayu Tuka woredas].

### 5.3 Town population

There are nine towns that are located along the project road. The total population size of the eight towns located along the project road is about 154,667, and among these eight towns, Nekemt town alone comprises about 54% of the population. Table 3 shows the population of towns located along the project road.

**Table 3 Population of towns located along the project road**

Zone	Woreda	Town	Total Population	Male	Female	
West Shewa	Cheliya	Gedo	10,213	5,283	4,930	
		Bako Tibe	Ijaji	12,397	6,192	6,205
			Tibe	3,945	1,916	2,029
			Shoboka	5,708	2,696	3,012
			Bako	18,641	9,370	9,271
East Wollega	Sibu Sire	Sire	13,710	6,592	7,118	
	Gobu Sayoo	Ano	4,416	2,093	2,323	
	Wayu Tuka	Gute	1,131	551	580	

<b>Total</b>	<b>154,667</b>	<b>76,814</b>	<b>78,853</b>
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Source: CSA Statistical Abstract, January 2006

#### **5.4 Ethnic Groups, Religion and Language**

The major ethnic group and population in the project are the Oromo. The Oromo are also the major ethnic group in Ethiopia and in Oromia regional state and speak Oromiffa as their first language. Oromiffa is also the official language of the region and spoken as their first language by about 95.4 percent of the population as per the 1994 census report.

Christianity and Islam are the two major religions that are widely practiced by the population in the project area; however, the Christians population is the major religious group in the project area.

#### **5.5 Economic Activity**

Agriculture (subsistence farming) is the mainstay for over 85 percent of the population in the project area. The main crops grown in the project area include maize, teff, pulses and coffee. Coffee is a good cash crop that grows in parts of the project area. The project area is intensively cultivated mainly practicing mono crop system, except in some areas where they grow twice in a year by adopting small scale irrigation. The area does not have large scale irrigational experience and capacity except traditional irrigation system practiced by a small number of farmers.

The project area is densely populated and cultivable land is very scarce and on average the holding size is less than 1.5 ha/HH in the Gedo to Bako/Gibe river area, and any land requirement due to realignments or for use of construction materials sources over the farm plots will aggravate the land situation in the area and affect fuel and feed security of the area. More than 95% of the land in the project area is used for agriculture and mainly crop production.

Agricultural production, in the project area also has a number of problems; and to mention the main ones;

- a) Lack of credit facility,
- b) Lack of access to market,
- c) Low level of production associated with traditional means of farming practices,
- d) Absence of large scale irrigation system and use,
- e) Limited availability and supply of agricultural inputs,

Apart from agriculture, there is very small economic activity either in the woredas or in the project influence area. In the town sections, non-farm activities, such as, trade and businesses, small scale metal workshops, wood work, grain marketing, kiosks and local drinking places, hotel and restaurant business are in their embryonic stage.

#### **5.6 Educational and Health Services**

##### **5.6.1. Educational Services**

There are about 35 primary schools (1-8) of different cycle and four 4 secondary schools in the project road corridor. The distribution of schools also shows that most schools are located in the urban areas. Table 3 shows presents distribution of schools, by school level for each of the woredas located along the project road corridor.

**Table 4      Distribution of schools along the project road**

Woreda	Primary schools by level		Secondary school by level	
	Cycle	Number	Level	Number
Cheliya	1-4	18	9-12	2
	1-8	21	-	-
Bako Tibe	1-4	20	9-10	1
	1-8	18	11-12	1
Sibu Sire	1-4	7	9-10	1
	5-8	13	11-12	1
Gobu Sayoo	1-4	4	9-10	1
	1-8	8	-	-
Guto Wayu	1-8	2	9-10	1
Guto Gida	1-8	21	9-10	1
	1-5	1	11-12	1
<b>Total</b>		<b>133</b>		<b>10</b>

Source: Woreda Education Offices

### 5.6.2 Health Services

The distribution of health services in the project area includes one hospital, four health centers, 21 clinics and 33 health posts. The existing health facilities are ill equipped and under staffed and are also not sufficient to reach all the population in the project area.

Table 5 shows distribution of health facilities in the project road corridor.

**Table 5 Health facilities located along the project road**

Woreda	Number of health facilities by type			
	Hospital	Health center	Clinic	Health Post
Cheliya	-	1	2	-
Bako Tibe	-	1	10	6
Sibu Sire	-	1	3	3
Guto Gida	1	1	2	16
Gobu Sayoo	-	-	2	4
Wayu Tuka	-	-	2	4
<b>Total</b>	<b>1</b>	<b>4</b>	<b>21</b>	<b>33</b>

Source: Woreda Health offices

Generally, health facilities and its services in the project area suffer from a number of problems such as, low number of health professionals, uneven distribution of health institutions and low supply of drug and equipment as well as inadequate quality and efficiency of care.

## 5.7 Travel Pattern and Transport Services

### 5.7.1 Non-Motorized Transport (NMT)

The travel and transport pattern of the population in the project area and in the region is mainly carried out by non-motorized means of transport, and in particular by walking on foot. It is estimated that more than 70% of households in the project area walk on foot to reach different social services and facilities, such as, administrative centers, courts, police stations, markets, agricultural input stores, sources of drinking water, flour mills, and fuel wood collection places.

The project area lacks sufficient road network and transport services. Due to the absence of road networks and transport services, non-motorized means of transport play significant role in the life of the population. A large number of the population residing in the project area and in the region depend on non-motorized means of transport for travel and transport. The commonly known non-motorized means of transport in the project road corridor include animal transport, such as, donkey and mule which are used for both passenger and goods transport.

Animal drawn carts are also a common means of transport in the town sections and in some of the rural villages located along the project road. Mule and donkey carts are used to transport agricultural produces to market centres, to transport inputs from stores, and also to transport grain to flour mills. The project road has significant contribution to the growth and use of animal drawn carts in the project area. The use animal drawn carts seem to have much widely spread in the project road corridor, and it provides important transport service to rural communities.

The existing road does not have any provision (either for parking or a separate lane) for the high proportion of NMT in the town sections. There are no walkways for pedestrians and in particular for school children, who are the most vulnerable groups.

### **5.7.2 Motorized Transport**

In the project area, an estimated small percentage of the population is also dependent on motorized or vehicular transport. Public transport services operate in the major towns and there is a daily schedule of public transport service to major towns. Large buses operate from Addis Ababa, medium buses operate from Ambo and Nekmte towns. There are also mini buses that carry out short distances between the towns located along the project road.

The traffic volume for public and freight transport goes up during the peak agricultural season (December to April). However, the cost for both passenger and freight transport are relatively high compared to the economic situation of the population.

## **6. Policy, Legal and Administrative Frame Work**

### **6.1 National Policies and Strategies**

This section discusses policies and development strategies of Ethiopia that could influence the social impact assessment of the project road. The policies and development strategies reviewed include Millennium Development Goals (MDG) and Accelerated and Sustained Development to End Poverty, Education policy and sector development program, Health policy and sector development program, HIV/AIDS policy, the National Policy on Women, National Action plan for women, and the National Action plan for children.

#### **6.1.1 Millennium Development Goals (MDG)**

Ethiopia has developed a set of Millennium Development Goals (MDG) in 2003 in line with UN Millennium Development Goals. Ethiopia's Millennium Development Goals comprise eight goals, and these goals are:

- a) Eradicate extreme poverty and hunger,
- b) Achieve universal primary education,
- c) Promote gender equality and empower women,
- d) Reduce child mortality,
- e) Improve maternal health,

- g) Ensure environmental sustainability,
- h) Develop a global partnership for development.

Table 6 presents the six MDG Targets and Indicators for Ethiopia that have direct relevance to social development.

**Table 6 Ethiopia's MDG Targets and Indicators**

<b>Welfare Component</b>	<b>Intermediate/Outcome Indicators</b>	<b>MDG Targets</b>
<b>Poverty and Inequality</b>	Poverty headcount (P <sub>o</sub> )	Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day
<b>Food Security</b>	Percentage of people who are below the poverty line	Halve, between 1990 and 2015, the proportion of people who suffer from hunger
<b>Health</b>	Under-five child mortality rate	Reduce by two thirds, between 1990 and 2015, the under-five mortality rate
	Maternal mortality rate	Reduce by three quarters, between 1990 and 2015, the material mortality ratio
<b>Education</b>	Gross enrollment ratio	Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling
	Girls/boys ratio	Eliminate gender disparity in primary and secondary education, preferably by 2005, and to all levels of education no later than 2015
<b>Water</b>	Access to clean water	Halve by 2015 the proportion of people without sustainable access to safe drinking water
<b>HIV/AIDS</b>	Transmission	Halve halted by 2015 and begun to reverse the spread of HIV/AIDS
	Prevalence	Halve halted by 2015 and begun to reverse, the spread of HIV/AIDS

*Source:* MoFED and United Nations Country Team, Millennium Development Goals Report: Challenges and Prospects for Ethiopia, Volume I: Main Text, 2004

The upgrading of the project road could have its own contribution and influence in achieving the above eight MDG targets. (Detail MDG indicators are shown in the Annexure)

### **6.1.2 Plan for Accelerated and Sustained Development to End Poverty (PASDEP)**

Plan for Accelerated and sustained Development to End Poverty (PASDEP) is Ethiopia's new guiding strategic framework for the five year period from 2005 - 2010. The PASDEP represents the second phase of the Poverty Reduction Strategy Program (PRSP) process which begun under the Sustainable Development and Poverty Reduction Program (SDPRP).

PASDEP forms the overall framework for development planning within Ethiopia. However individual sectoral policies and annual programmes are developed by each sector.

The main strategic elements of PASDEP are:

- a) A massive push to accelerate growth,
- b) A geographically differentiated strategy,
- c) Addressing the population challenge,
- d) Unleashing the potential of Ethiopia's women,
- e) Strengthening the infrastructure backbone,
- f) Managing risk and volatility,
- g) Scaling up to reach the MDG's,
- h) Creating jobs.

PASDEP builds on aims set out in the SDPRP relating to human development, rural development, food security and capacity-building. However increased emphasis is given to commercialisation of agriculture and the role of the private sector.

The challenges facing Ethiopia as outlined in the PASDEP include:

- The land-locked nature of the country,
- Very low productivity,
- Dependence on unreliable rainfall,
- A rapidly growing population,
- Structural bottlenecks.

In PASDEP, the financing of health, education, infrastructure and other services, is seen as essential to enable the MDGs to be realised. PASDEP states that "Ensuring sustained growth and tackling growth variability therefore needs to be a central element in the growth strategy of Ethiopia." The sectors that are seen as important for stimulating growth include: agriculture, the private sector, niche markets, exports, and market links, tapping into the unused potential of women and facilitating slower population growth. The commercialisation of agriculture and non-farm private sector growth is seen highly crucial to boost the development effort.

According to the PASDEP the country is divided into different zones and intends tailored approaches and responses for each. In summary these zones are:

Areas that have significant potential for commercialisation and diversification of agriculture;

- Regions with adequate rainfall;
- Drought-prone areas;
- Pastoral areas.

Under PASDEP, there will be a major expansion of the road network. It targets to construct almost 20,000 km of new roads by 2010, (90% of them in rural areas) and improved maintenance so that 84 % of the network is in good condition.

The road sector primary objective under PASDEP is "to sustain these reforms and to restore and expand Ethiopia's road network and provide a sustainable level of essential road infrastructure to the rural population. Side-by-side the program assists in developing a strong management and technical capacity to manage the road network, and the development of the capacity of the domestic construction industry".

The physical targets are to:

- Reduce the inhabited land area farther than 5 km from a road to 59 percent by the end of 2009/10- from the current 72%;
- Reduce the inhabited land area farther than 2 km from a road to 81 percent by the end of 2009/10- from the current 88%;
- Reduce average walking distance from a road to 3 hrs by the end of 2009/10- from the current 5 hrs.

- Increase the road density to 54.1-km/1000 km<sup>2</sup> and 0.72-km/1000 people by the end of 2009/10 (including low class roads) - from the current 33.6-km/1000km<sup>2</sup> and 0.51 km/1000 people;
- Increase the rate of acceptable (good + fair) roads to 84% for all road types by the end of 2009/10- from the current level of 64%.

PASDEP has put specific targets to achieve between 2005 and 2010, and some of the selected targets are shown in Table 7.

**Table 7 Selected PASDEP Targets for Social service and Infrastructure**

<u>Target/Indicator</u>	<b>Current Level (End of 2004/05)</b>	<b>PASDEP Target (2009/10)</b>
Primary School Completion Rate	40%	85%
Primary School Enrolment	79%	100%
Ratio of Girls to Boys (in Primary School)	0.84	0.97
Percentage of Population with Access to Potable Water (0.5 km.)	42%	84.5%
Infant Mortality Rate	97 per 1000	45 per 1000
Maternal Mortality Rate (per 100,000)	871/100,000	600/100,000
Primary health coverage (within 10 km.)	64%	100%
Average Time to All-weather road (hours)	5.0	3.2
Road Density (km./1,000 sq.km)	33.2	54.1
Percentage of Roads in Acceptable Condition	64%	84%

Source: MoFED, Draft PASDEP, 2005

### **6.1.3 Road Sector Development Programme (RSDP)**

The Road Sector Development Programme (RSDP) was launched in 1997 with significant support from the donor community. The first phase of RSDP was for five years period (1997- 2002). It had the objective of creating adequate capacity in the road sub-sector to facilitate and hasten the economic recovery process and restore the essential road networks to an acceptable condition.

The second phase of RSDP (2002 - 2007) is still on-going. The second phase of the program, focused on network expansion particularly on upgrading and construction of link roads to address the deficiencies in access to potentially rich agricultural areas and mobility in rural areas as part of a broad-based rural development strategy.

The physical target of RSDP II in terms of road condition is to have 45 % of the roads in good condition (from the current 30%) by 2007. It also aims to selectively construct new roads to have 34 km/1000 km<sup>2</sup> including low-class roads and to install regular maintenance on much of the Ethiopian road network. In addition, the road network in terms of density per 1000 population is expected to be 0.50 km/1000 populations by the year 2007.

#### **Road Sector Development Program under PASDEP (2005/06-2009/10)**

The program is prepared under PASDEP with the aim of sustaining the reforms and to restore and expand Ethiopia's road network and provide a sustainable level of essential road infrastructure to the rural population. Side-by-side the program assists in developing a strong management and technical capacity to manage the road network, and the development of the capacity of the domestic construction industry.

The physical targets of RSDP under PASDEP are to:

- Reduce the inhabited land area farther than 5 km from a road to 59 percent by the end of 2009/10- from the current 72%;
- Reduce the inhabited land area farther than 2 km from a road to 81 percent by the end of 2009/10- from the current 88%;
- Reduce average walking distance from a road to 3 hrs by the end of 2009/10- from the current 5 hrs;
- Increase the road density to 54.1-km/1000 km<sup>2</sup> and 0.72-km/1000 people by the end of 2009/10 (including low class roads) - from the current 33.6-km/1000km<sup>2</sup> and 0.51 km/1000 people;
- Increase the rate of acceptable (good + fair) roads to 84% for all road types by the end of 2009/10- from the current level of 64%.

The Ethiopian Rural Travel and Transport Sub-Program (ERTTP) is one of the components of RSDP and will continue to be a key part of the PASDEP. The ERTTP is an approach that focuses on reducing travel and transport burden of the rural population by constructing road infrastructure, providing social and economic infrastructure facilities and enabling the people to utilize the road infrastructure effectively.

#### **6.1.4 National Food Security Programme**

Ethiopia faces both chronic and transitory food insecurity. The main reasons for food insecurity are land degradation, drought, high population pressure, low input subsistence agriculture, small farm size and landlessness. The National Food Security Programme is laid out in November 2003 to address the problem of chronic and transitory food security.

The poor condition of physical market places and roads leading to the markets acts as a barrier to development and in particular agricultural production. The upgrading of these physical structures can contribute to the integration in the market and growth of agricultural production and increased household income.

The major causes of food shortages in Ethiopia include:

- Recurring drought,
- Limited alternative incomes,
- Population pressure,
- Limitations in technology,
- Lack of product diversification and market integration,
- Limited capacity in planning and implementation,
- Environmental degradation,
- Limited access to credit.

The National Food Security Goal is to drastically reduce food insecurity faced by vulnerable households.

Its Objectives are to attain food security of the chronically food insecure five million population and significantly improve and sustain overall food security for ten million additional food insecure people within five years.

The programme has the following pillars in its strategy.

- Increase supply or availability of food;
- Improve access/entitlement to food;
- Strengthening emergency response capabilities.

The key elements of the national food security programme are;

- Enhancement of the agriculture extension services

- Adoption of a participatory planning approach that focuses on households and their socio-economic and physical interactions with complex agro-ecosystems
- The creative and diversified utilization of different resources for households assets creation, protection and promotion
- The creative use of land use certification as a strategy for “investment promotion schemes and access-graduation to incentives”
- Expand market-orientation of rural production
- Coordinated and harmonized modalities for programming and planning food security programmes started with new coalition for food security

#### **6.1.5 Health Policy**

Ethiopia's health policy was issued in 1993, with the aim of giving special attention to women and children, to neglected regions and segments of the population, and to victims of man made disasters.

The priority areas of the policy are in the field of Information Education and Communication (IEC) of health to create awareness and behavioural change of the society towards health issues, emphasis on the control of communicable disease, epidemics, and on diseases that are related to malnutrition and poor living condition, promotion of occupational health and safety, the development of environmental health, rehabilitation of health infrastructures, appropriate health service management system, attention to traditional medicines, carrying out applied health research, provision of essential medicines, and expansion of frontline and middle level health professionals.

The Government in its PASDEP document has reaffirmed its commitment to accelerate progress on maternal and child health and to reduce in child and maternal mortality rates by expanding the provision of essential health and nutrition services to the poor. It is planned that by 2010, infant mortality rate will be 45 per 1000, maternal mortality rate 600 per 100,000 and primary health coverage within 10 km radius will reach 100%.

#### **Health Sector Development Programme (HSDP)**

To translate the health policy into action the Ministry of Health has developed a Health Sector Development Programme (HSDP) to be implemented every five year. At present, HSDP III (2005/06 – 2009/10) is under implementation. HSDP lays an emphasis on service delivery and the quality of service, health facility rehabilitation and expansion, human resource development, pharmaceutical services, Information, Education and Communication (IEC), strengthening health sector management and management information system, monitoring, evaluation and research.

#### **6.1.6 Education and Training Policy**

Ethiopia's Education and Training policy (ETP) aims to achieve universal education by the year 2015. The general objective of the policy is to develop physical and mental potential of individuals who can take care of and utilize their resources, to bring up citizens who respect human rights.

The overall strategy of the ETP is to prepare curriculum with the participation of teachers, and other professionals based on the objectives of the policy, and also creating integrated educational research.

The education service in Ethiopia has several problems and some of the serious problems are: low enrolment ratio, failure to serve rural areas and girls, low educational quality, inefficient system, inadequate funding, and weak capacity for planning and management.

The educational structure is divided into kindergarten, primary (2 cycles), secondary (2 cycles), and higher education at diploma and degree levels. It also focuses on non-formal education and diversified technical and vocational training for school leavers from any level of education, and provides special training for people with special needs.

The policy also stresses on providing education to children in their mother tongue and developing career structure to teachers of all levels, decentralized management, and finally making available educational finance for students' of higher education. The policy aims on expanding equitable access to primary and vocational education to meet the demands of the country and economy.

To translate the policy statement into action the Government has developed Education Sector Development Program (ESDP), which is a 20-year programme divided into 5 year programme each time. The ESDP was launched in 1997/98. The emphasis of the Sector development program are in improving educational quality and expand access to education with special emphasis to primary education, and promotion of education for girls.

#### **Education sector Development Programme (ESDP)**

To translate the education and training policy into action the Ministry of Education has developed Education Sector Development Programme (HSDP) to be implemented every five year. At present, ESDP III (2005/06 – 2010/2011) is under implementation. ESDP has three major components or Goals; General education, Technical and vocational education and training and Tertiary education.

At the end of PASDEP by 2010, primary school completion rate will reach 85%, primary school enrolment 100% and ratio girls to boys 0.97.

#### **6.1.7 The Environmental Policy of Ethiopia**

The overall policy is "to improve and enhance the health and quality of life of all Ethiopians and to promote sustainable social and economic development through the sound management and use of natural, human made and cultural resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs".

It has some nine specific objectives and of which about five of them deal with social issues, public consultation and empowerment. Its first specific objective states "to ensure that environmental impact assessments (EIA) consider not only physical and biological impacts but also address social, socio economic, political and cultural conditions".

#### **6.1.8 National Policy on Population**

Ethiopia developed its Population Policy in 1993. The rationale behind the policy is that with increased human numbers, the population carrying capacity of the land decreases. Forest cover is estimated to have declined from 40 to 3 percent. Large expanses of land with large herds of livestock are said "to play havoc with the environment". The policy has as its major goal:

*"The harmonisation of the rate of population and the capacity of the country for development and rationale utilisation of natural resources to the end that level of welfare of the population is maximised over time".*

The general objectives of the population policy are:

- Closing the gap between high population growth and low economic productivity through planned reduction of population growth and increasing economic returns

- Expediting economic and social development processes through holistic integrated development programmes designed to expediate the structural differentiation of the economy and employment
- Reducing the rate of rural to urban migration
- Maintaining/improving the carrying capacity of the environment by taking appropriate environmental protection/conservation measures
- Raising the economic and social status of women by freeing them from the restrictions and drudgeries of traditional life and making it possible for them to participate productively in the larger community
- Significantly improving the social and economic status of vulnerable groups (women, youth, children and the elderly).

The economic, social and political status of women is seen to have a direct bearing on the level of fertility in society. Early marriage for girls is seen as one of the factors that contributes not only to high fertility rates but also to high maternal, infant and child morbidity and mortality.

Implementation of the Policy is seen as dependent on the functions of other ministries and departments as on the Population Department and the responsibilities of key ministries are given in this policy document.

### **6.1.9 National Policy on Women**

The constitution FDRE recognizes equal rights of women and men; however, the traditional societal structure keeps women in a very low position and vulnerable situation. Women occupy a very small percentage of key political and government decision making positions.

Harmful traditional practices are common about 80 percent of women having undergone Circumcision and other practices. Early marriage of young girls is common occurrences among most cultures in Ethiopia. Some studies and reports suggest that violence against women is quite high and increasing every year.

Ethiopian women also experience heavy work load and mainly domestic work. It is estimated that on average, women work 15-18 hours per day. Women also do not have access and control to resources. According to the 2003 Agricultural census, only 18.6% women among farming communities were able to have ownership of agricultural land. On the contrary, women among the pastoral communities could only own property if they could only have a male guardian.

The National Policy on Women formulated in 1993, aimed to create appropriate structures within government offices and institutions to establish equitable and gender-sensitive public policies.

The policy goals are: to ensure women's right, to create favourable environment for women, to ensure the supply of basic services to women, and to eliminate, gender based discriminations.

The policy has four major objectives and it is stated that these objectives should be part of other policies, plans or laws regarding women.

The Policy objectives are:

- Laws, regulations, systems, policies and policies and development plans that are issued by the Government should ensure the equality of men and women, special emphasis should be given to the participation of rural women

- Economic, social and political policies and programmes, as well as cultural and traditional practices and activities, should ensure equal access of men and women to the country's resources and the decision making process.
- The central government and regional administrations should ensure that women participate in and benefit fully from all activities carried out by central and regional institutions.
- Development institutions, programmes and projects should ensure women's access to and involvement in all interventions and activities.

The policy in its strategy has ensured the establishment of women's affair office at Federal and Regional government levels, and also in sectoral ministries also.

In the past interventions for women were largely carried out in ad hoc and unconnected self-standing projects basis. It seems because of this background that in 2005 the Government has created a separate ministry for women, which is Ministry of Women's Affairs.

The Ministry of Women's Affairs issued National Plan of Action for Gender Equality (NAP-GE) in 2006 for the coming five years, 2006 – 2010. Its goal is "to contribute to the attainment of equality between men and women, in social, political and economic development".

The general objectives are:

- Enhanced rapid economic growth
- Improved human development
- Democratization and governance
- Improved public institutional performance

#### **6.1.10 National Plan of Action for children**

The Ethiopian Population is young population. Out of the total population, children between the ages of 0-14 are about 32,231,760 or 43%, and those between the ages of 0-19 are about 40, 209,964 or 54 percent of the total population. The male female ratio is 50 percent each.

FDRE Constitution Article 36 (rights to Children) states the rights of children, such as the right to life, to name and nationality, to know and be cared by his/her parents or guardians having a name, and not to be subject to exploitative practices, etc. Children in Ethiopia face a number of problems, such as, child abuse, exploitation, lack of access to social services; they are also victims of conflict, family separation, and to other similar and related problems.

It is estimated that 92% of children in rural areas are engaged in unpaid family work, such as, herding cattle, weeding and harvesting, cooking, taking care of siblings and various household chores. It is also estimated that there are 100,000 children working and living on the streets of Ethiopia, 25% of whom are girls. HIV/AIDS is a particular problem for street children and for children in general, it is estimated that there will be 1.8 million orphans by 2010.

To address the plight and problem of children, the Ministry of Labour and Social Affairs issued the National Plan for Action (NPA) for Children for the period 2003 to 2010.

The principle areas for the NPA for children are:

- 1) Promoting healthy lives involves increasing health care coverage to 62%, reduction of maternal and child mortality by one third; improvement of nutrition and sanitation

and water facilities and controlling the major killer diseases such as HIV/AIDS, malaria and TB.

- 2) Providing quality education involves the expansion of early childhood education, providing quality primary education to 90% of Ethiopian children, improving quality of teachers, allocation of larger amounts of resources (budget) and working towards narrowing the disparity gaps between regions and the sexes. Special assistance will be provided to pastoralist areas and those with disabilities. By the end of the plan period, adult literacy is to be 50%.
- 3) Protecting children from abuse, exploitation and violence involves registration of children at birth, revision of laws, raising awareness about harmful traditional practices, and the improvement of juvenile justice system. Also it is planned some assistance to CEDCs (Children in Exceptionally Difficult Circumstances) and to reduce child labour.

The Objectives of NPA are:

- To implement the CRC (Convention of the Rights of the Child) in general and the UN resolution concerning “A World Fit for Children” in specific
- To ensure the rights and needs of children get the priority in national development efforts
- To lay out the principles and objectives concerning strategies and actions relating to children
- To work out specific goals/targets, strategies and actions needed to work towards a better future for children
- To indicate and fill out the gaps in legislation and major activities regarding children
- To link priority areas concerning children with the national development goals and strategies
- To critical review previous NPA and learn from experiences
- To involve key stakeholders in the affairs of children
- To provide/set yardsticks (indicators) to evaluate performances
- To mobilise human financial and material resources
- To provide a better vision to all stakeholders about the present and future concerning Ethiopian children
- To obtain wider and larger support from the internal and external communities.

### **6.1.11 National Policy on HIV/AIDS**

The HIV/AIDS pandemic is spreading worldwide and heating hard poor countries mainly. Sub Saharan Africa, with only 10% of the world population is having 80% of the world HIV infection and AIDS cases. Among the Sub Saharan African countries, Ethiopia stands fifth in HIV/AIDS infection.

According to UNAIDS 2004 report, around 1.5 million people are estimated to be HIV infected in Ethiopia, including 96,000 children under the age of five years. Estimates also show that about 537,000 children are orphaned due to AIDS in Ethiopia. HIV/AIDS surveillance reports also show a steady increase in HIV infections among rural communities in Ethiopia.

The movement of people from place to place, either voluntarily or involuntarily contributes to the spread of HIV/AIDS. HIV/AIDS now is no more health or clinical problem only; it has now become a major social and economic problem of a country.

Having understood the magnitude of the problem as well as the huge resource needed to combat HIV/AIDS, the Ethiopian Government issued a policy, which calls for an integrated effort of multi-sectoral response to control the epidemic. The Federal Democratic Republic

policy urges communities at large, including government ministries, local governments and the civil society to assume responsibility for carrying out HIV/AIDS awareness and prevention campaigns.

In 2000 National AIDS Council was established under the Chairmanship of the country's President; and in 2002 HIV/AIDS Prevention and Control Office (HAPCO) was established to address the problem.

The policy introduces and outlines the large social, psychological, demographic and economic impact that HIV/AIDS will be having and introduces a number of issues relating to HIV/AIDS. These are:

- That HIV/AIDS is not only a health problem but also a developmental problem
- That gender inequality contributes to the further spread of HIV/AIDS
- That women, including women living with HIV/AIDS, need access to information and services regarding HIV/AIDS and to family planning provision to help them make reproductive choices and decisions
- That the magnitude of the problem will need considerable resources and a multi-sectoral effort to control the HIV/AIDS epidemic
- That there is a need for a holistic approach in the provision of care to people living with HIV/AIDS
- That the human rights of people living with HIV/AIDS needs to be recognised
- That HIV/AIDS has the potential for catastrophic impact.

The general objective of the policy is “to provide an enabling environment for the prevention and control of HIV/AIDS in the country”.

### Specific Objectives

The specific objectives of the policy are stated as follows:

- To establish effective HIV/AIDS preventative and control strategies in order to curb the spread of the epidemic
- To promote a broad multi-sectoral response to HIV/AIDS epidemic, coordination of the activities of different sectors and the mobilisation of resources for the control of the epidemic
- To encourage government sectors, non-governmental organisations, the private sector and communities to take measures in order to alleviate the social and economic impact of HIV/AIDS
- To promote proper institutional, home and community based health care and psychological support for people living with HIV/AIDS, orphans and surviving dependents
- To safeguard the human rights of people living with HIV/AIDS and avoid discrimination against them
- To promote and encourage researches and studies on HIV/AIDS and make use of the outcomes for preventative, curative and rehabilitative purposes.

Following the policy, the Government has also issued a strategic plan for intensifying multi sectoral HIV/AIDS response for the period 2004 – 2008. The Vision of the strategy is “to see Ethiopia whereby HIV/AIDS is no more a development problem”.

Its Mission is “to prevent and control the spread of HIV/AIDS and reduce its impact through intensified results-orientated large-scale comprehensive programs with active participation of all partners and with special focus on social mobilisation and community empowerment.

- Reduce the spread of HIV infection
- Reduce the social and economic impact of HIV/AIDS

The guiding principles for the implementation of the strategy are: multi-sectoralism, empowerment, shared sense of urgency, gender sensitivity, together with PLWHA (People Living with HIV/AIDS), result orientated and best use of resources.

The strategy highlights that HIV/AIDS in Ethiopia is a generalised epidemic. However to improve effective use of resources the strategy also intends to focus on special target groups. Special groups detailed in the strategy include:

- The youth population between the ages of 15 and 29 years, those in school and those out of school
- Commercial sex workers, especially those in urban settings
- Long distance truck drivers, migrant labourers and uniformed people should also be addressed with targeted interventions focusing on their mobile nature

#### **6.1.12 Ethiopian Roads Authority Policy for HIV/AIDS**

Ethiopia is one of the countries in the world that is facing HIV/AIDS pandemics, and about 6% of the population is said to be HIV/AIDS positive. The transport and construction sectors are among the most the susceptible sectors for the spread of HIV/AIDS. It is due to this that ERA has issued a policy for HIV/AIDS in the workplaces and a three-year strategic work plan for HIV/AIDS prevention and control in June 2004. The policy acknowledges that HIV/AIDS pandemic is a reality in the workplace, which may have detrimental effects on its work force. The policy is prepared with the objective of developing and implementing an effective workplace programme.

Some of the objectives of ERA's HIV/AIDS policy are to create awareness among its employees and promote effective ways to managing HIV/AIDS, and to create supportive environment for those affected.

The principles of the policy are to ensure that employees living with HIV/AIDS have the same rights and obligations; to avoid discrimination and stigmatization of employees with HIV/AIDS to receive equal treatment; seek to minimize the social, economic and developmental consequences, provide support, counselling and educational services to infected and affected employees; establish and maintain an employee assistance programme, and ensure sustainable resources for the prevention and control.

## **6.2 Institutional and Administrative Framework**

### **6.2.1 The Environmental Protection Authority**

The Environmental Protection Authority (EPA) was established in August 1995, under Proclamation 9/1995, and is an autonomous government body reporting directly to the Council of Ministers. It has a broad mandate covering environmental matters at federal level. EPA's proclamation sets out the main responsibilities and broad organizational structure, which includes : to establish a system for EIA of projects, policies, strategies, laws and programs and to enforce implementation of this EIA process (i.e. Review EIA reports) and the recommendations which result from it for projects that are subject to Federal licensing, execution or supervision. EPA is also responsible to provide advice and technical support to the regions on environmental matters.

### **6.2.2 Ethiopian Roads Authority**

The Ethiopian Roads Authority (ERA) is established as per its revised Proclamation No. 80/1997. ERA is a legally autonomous agency responsible for the administration of the Road Sector Development Programme (RSDP). ERA is in charge of the development and management of the country's road network: planning, construction and maintenance of trunk and major link roads, while responsibility of rural roads has been decentralized to Regional Rural Road Authorities (RRAs).

The construction and upgrading of roads requires land acquisition and issues related to land expropriation. According to proclamation No. 80/1997 ERA has the power to “determine the extent of land required for its activities, in the adjacency as well as surrounding of highways, and the conditions of use of such land by others”.

ERA's establishment proclamation also states that ERA has the power “to use free of charge, land and such other resources and quarry substances required for the purpose of construction and maintenance of highways, ... and other required services; provided, however, that it shall pay compensation in accordance with the law of properties on the land it uses” (Article 6.18).

In ERA, the Environmental Monitoring and Safety Branch (EMSB) and Right of Way (ROW) Branch are two directly responsible bodies for the review, monitoring and implementation of Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plans.

#### **6.2.2.1 Environmental Monitoring and Safety Branch (EMSB)**

ERA's Environmental Monitoring and Safety Branch (EMSB) was established in January 1998 as Environmental Management Branch (EMB) under the Planning and Programming Division of the Engineering and Regulatory Department. EMSB major responsibilities are setting and implementing ERA's environmental guidelines in support of the national level requirements. The EMSB holds the capacity of advisory, co-ordination and supervision aspects that are pertinent to the road environmental impacts and implication assessment as well as co-ordination with the respective ERA district offices.

#### **6.2.2.2 Right-of-Way (ROW) Branch**

ERA's Right-of-Way Branch is responsible for making available the required land for road/highway construction and maintenance, the establishment of materials sources (borrow pits and quarries) and camp sites and for implementation of Resettlement Action Plans (RAP).

It is also responsible for negotiations with property owners in fixing compensation for any building, crop, vegetation and other property. The negotiation process is carried out with woreda administrations, rural and urban kebele administrations to secure right of way for highway maintenance and construction purpose as well as for the establishment of quarry and camp sites.

The Right-of-Way Branch organizes property valuation committee from appropriate Woreda level officials, community elders and introduce the committee with the the standard methodology and procedures of valuation of properties set in the proclamation 455/2005 for affected crop and other assets.

ROW branch investigates claims and disputes arising from land acquisition; recommends acceptance or rejection of compensatory claims and ensures that payments are effected as agreed with claimants or as decided by the competent authority; secures receipts and land transfers for road construction. In consultation and expert opinions or such organizations for the valuation of property or, where appropriate establishes arbitration appraisal

ensures that accepted appraisal methods and techniques are followed in the valuation of property.

### **6.3 Review of Legal Framework on Land ownership, Expropriation and Compensation Payment and ERA's Policy**

#### **6.3.1 General**

In this section, the Constitution of the Federal Democratic Republic of Ethiopia, FDRE Proclamation for the Expropriation of Land Holdings for Public Purposes and Payment of Compensation (Proclamation No. 455/2005); and Rural Land Administration and Land Use (Proclamation No. 456/2005), ERA's Policy Framework for Rehabilitation and Resettlement are reviewed and discussed.

The expropriation of land for different public works causes economic losses, social and psychological disruption for the affected persons. Hence, in order to minimize such problems the Government of Ethiopia has issued proclamations on how to address and treat the appropriation of land for Government works and make compensation payments.

The Ethiopian Roads Authority (ERA) Establishment Proclamation No. 80/1997 gives ERA the power to "to use free of charge, land and such other resources and quarry substances required for the purpose of construction and maintenance of highways, and other required services; provided, however, that it shall pay compensation in accordance with the law of properties on the land it uses" (Article 6.18).

Similarly, Article 6.17 of the proclamation gives power to ERA to "determine the extent of land required for its activities, in the adjacency as well as surrounding of highways, and the conditions of use of such land by others". Similarly, ERA has also developed a policy framework for resettlement and rehabilitation of PAPs and guidelines for appropriate compensatory measures.

Hence, it would be appropriate here to discuss the policy, legal and administrative frameworks for any issue that may arise in relation to land expropriation and compensation payment.

#### **6.3.2 The Constitution of Federal Democratic Republic of Ethiopia (FDRE) on Ownership of Land**

According to the Constitution of Federal Democratic Republic of Ethiopia (FDRE), land is a public property that no individual person has the legal right of ownership. There is no private ownership of land in Ethiopia. As per FDRE constitution, rural or urban land could not be sold or mortgaged or transferred; citizens have usufructuary right over land. A usufructuary right gives the user of the land, the right to use the land and the right to benefit from the fruits of her/his labor which may be crops, trees, etc. found on the land or any permanent works such as buildings etc.

A person has the ownership right for the property he has invested on the land Article 40 No.7 of FDRE Constitution states that:

*"Every Ethiopian shall have the full right to the immovable property he builds and to the permanent improvements he brings about on the land by his labour or capital".*

If the land that is owned by an individual is expropriated by the Government for public use, the person is entitled for compensation. In this regard, article 44 No.2 of the Constitution of the Federal Democratic Republic of Ethiopia states that:

*“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”.*

### **6.3.3 Expropriation of Land Holdings for Public Purposes and Payment of Compensation (Proclamation No. 455/2005)**

FDRE has issued proclamation (No 455/2005), regarding the appropriation of land for government works and payment of compensation for property.

The proclamation is divided into four major parts. Part two deals with expropriation of land holding having sections on power to expropriate landholdings, notification of expropriation order, responsibility for the implementing agency, procedural for removal of utility lines; Part three deals with determination of compensation, having sections which deals with the basis and amount of compensation, displacement compensation, valuation of property, property valuation committee, complaints and appeals in relation to compensations; part four deals with miscellaneous provision including power and duties of the Minister of Federal Affairs, responsibility of woreda and urban administration, power to issues regulations and directives repelled and inapplicable laws.

As per the proclamation no. 455/2005, the power to expropriate landholdings mainly rests on woreda or urban administration authorities. Part two, article 3, no.1 of the proclamation states that:

*“A woreda or an urban administration shall, upon payment in advance of compensation in accordance with this proclamation, have the power to expropriate rural or urban landholdings for public purpose where it believes that it should be used for a better development project to be carried out by public entities, private investors, cooperative societies or other organs, or where such expropriation has been decided by the appropriate higher regional or federal government organ for the same purpose.”*

A land holder whose land has been expropriated for public use by the concerned government authorities is entitled for compensation. Part two; article 7, no.1 states that:

*“A land holder whose holding has been expropriated shall be entitled to payment for compensation for his property situated on the land for permanent improvements he made to such land”.*

The amount compensation to be paid for the property situated on the expropriated land shall be determined or calculated on the basis of replacement cost. For houses in urban areas, the amount of compensation should not be less than the current market value of construction.

In addition to the amount of compensation for the property expropriated, the proclamation also gives a provision for cost of removal, transportation and erection.

Concerning displacement compensation for rural land holdings; part three of article 8 it states that:

*“A rural landholder whose land holding has been permanently expropriated shall, in addition to the compensation payable under article 7 of this proclamation, be paid displacement compensation which shall be equivalent to ten times the average annual income he secured during the five years preceding the expropriation of the*

#### **6.3.4 FDRE Rural Land Administration and Land use proclamation (Proclamation 456/2005)**

FDRE has also issued proclamation on rural land administration and land use (proclamation 456/2005). The proclamation mainly states the right to hold and use of rural land, and rural land use restrictions.

As per to the proclamation; farmers and pastoralists engaged in agriculture for living shall be given land free of charge. Young people above the age of 18 who want to engage in agriculture also have the right use rural land. It also recognizes that women have the right to get and use rural land.

The legislation also recognizes that citizens who have the right to use rural land may get rural land from his family by donation, inheritance or from competent authorities. It also brings new initiatives which were not there in the past, such as, certificate of holding to be prepared by competent authority. It also recognizes transfer of lease through lease to farmers or investors of land.

In relation to compensation payment to be made for a holder in relation public works either by the federal or regional governments, section two, article 7, no. 3 states that:

*“Holder of rural land who is evicted for purpose of public use shall be given compensation proportional to the development he has made on the land and the property acquired or shall be given substitute land thereon. Where the rural land holder is evicted by the federal government, the rate of compensation would be determined based on the federal land administration law. Where the rural land holder is evicted by their regional governments, the rate of compensation would be determined based on the rural land administration laws of regions”.*

#### **6.3.5 ERA’s Resettlement/Rehabilitation Policy Framework**

ERA’s Resettlement/Rehabilitation Policy Framework (RPF), February 2002, contains various elements that ERA should be following regarding compensation procedures; Methods of valuation; consultation and participation process, grievance procedures as well as the institutional framework in the preparation of the resettlement action plans.

The RPF also clarifies the principles of reinforcement measures for the positive social impacts and mitigation measures for addressing negative social impacts induced by road projects. The Policy Framework stresses that Project Affected Persons (PAPs) should be consulted and compensated in relation to resettlement / relocation, and for loss of assets and properties that are affected due to the construction of road projects.

Regarding compensation procedures and establishing compensation rates, ERA establishes compensation committees at project area level by enlisting representatives from government offices and representatives of project affected persons (PAPs). The compensation committees have the function of conducting the registration of affected properties and the number of PAPs and determining the compensation rates.

If a dispute arises regarding the amount of compensation to be paid to the project affected persons, recourse is available to the courts. However, aggrieved PAPs will also have a chance to make their complaints to the Right of Way (ROW) agent, the consultant and finally to the compensation committee.

## **7. Public Consultation and Meeting with Different Stakeholders**

Public consultation and field level investigation was carried out in all the woredas located in the project road corridor, and in the major urban centres and in those villages located along the project road. Public consultations were carried out with the objective of identifying the potential social impacts (positive and negative); and on the implementation of the proposed mitigation measures for the negative impacts and on measures of reinforcement for the positive impacts; to inform the public on the potential impacts and seek the participation and contribution of the public during the upgrading of the project road.

The primary purpose of public consultation is to protect the interest of affected persons/communities, especially the poor and vulnerable groups. It also gives opportunity for the affected people to influence the project to reduce adverse impacts, maximize additional benefits, and ensure that they receive appropriate compensation. Public consultation was carried out through formal meetings & public gatherings, focused group discussions, meeting with women groups, meeting with teachers and health professionals, and also through informal meetings held with different sections of the community.

FDRE Constitution also reaffirms the participation of the public, in policies and projects that affect their livelihood. Article 43 No.2 states that:

*“Nationals have the right to participate in national development and, in particular, to be consulted with respect to policies and projects affecting their community”.*

Stakeholders’ consultation was conducted to increase the participation of all the stakeholders, including people residing in the project area, local government officials, Kebele administrations and Woreda experts and professionals from every sector and in almost all locations where the road traverses. Stakeholders’ consultation was held with the objective of influencing the identified stakeholders in each key stage of upgrading the project road, and that concerns of stakeholders are reflected in the road design and construction works. The consultation was held in every woreda capital located in the project area and in almost every rural kebele where the project road traverses.

Both the public consultations and the stakeholders’ consultations were held in all the nine towns and also in those kebeles (rural and urban) located along the project road with different groups of the community groups residing in the project influence area. The consultations were held in the form of meetings and Focus Group Discussions (FGD).

The different groups of associations, public and private organizations, community groups and Project Affected Persons (PAP), and individuals who participated in the public and stakeholders consultations include;

- Woreda Administration Offices,
- Woreda Agriculture and rural Development Offices,
- Woreda Health Offices,
- Woreda education Offices,
- Municipalities,
- Kebele Administrations (rural and Urban),
- School Teachers, Students and Health Workers,
- Agricultural Development Agents,
- Women’s Associations and Female Headed Households,
- Business men (Hotel and Restaurant owners, Transporters, Traders, etc).
- Community Based Organizations (CBO)
- Project Affected Persons (PAP),
- Elders and informal leaders, and
- Group of farmers.

Data was also enriched by consultations with local administrations, kebele and Woreda administrations; and by consulting different organizations (Governmental and CBOs) responsible for social impact mitigation and involuntary resettlement. The institutional capacity and experience of these organizations in impact mitigation has been studied.

The consultation discussions were focused on:

- Nature of potential social impacts of the project road, including loss of productive resources; improved access to services, like markets, education and health facilities; loss of grazing and forest areas; and its impacts on social, cultural and economic ties and networks during and after construction works.
- Identification of major social impact issues, such as involuntary resettlement, community severance and vulnerable groups at particular risk of project impacts; and compensation for affected properties and assets.
- Data and information on the current usage and ownership of land in existing width of the road, fixed and movable structures, trees, wells and other assets, areas of significant squatting and/ or encroachment.
- Soliciting the views of local population as how to pragmatically provide for their needs within the basic format of the project, and what beneficial impact they expect from the project road.
- Social composition, settlement patterns, main sources of livelihood and past history of displacement of the population, if any.

In almost every town and kebeles (or villages) crossed by the project road public consultations were held and the public have actively participated and expressed their feelings openly on those issues related to right of way, resettlement, and compensation payment to the different assets, on the participation of women during construction works and on other related issues.

Following the consultation process understandings reached and consensus made with the public on the likely positive and negative social impacts that would be created during and after the construction of the project road; and on its proposed reinforcement and mitigation measures.

The results of the public consultations and consensus reached include;

- All the woredas, traversed by the project road have agreed to provide support and assistance for people who will lose their land (farmland or residential land) for the construction of the right of way, detour and other construction purposes, although aware of some inconveniences the community welcome the upgrading of the project road.
- Special support will be made by the woreda and the community for female headed households if affected by the construction of the project road.
- Shall facilitate the smooth implementation of the construction works and provide other routine administrative supports if need be.
- Shall facilitate the employment of labour force from the locality.
- Can create entry points of new innovations in introducing and adopting technologies to the project area.
- Easier access to social service centres (schools, clinics, veterinary centres, etc) and other services.
- The upgrading of the project will enhance development and growth and contribute poverty reduction.

In general, in all the locations where public consultations are held the public are highly supportive and positive about the upgrading of the project road and are happy about the plan; and are looking forward to the commencement of the construction works.

The public have the feeling that with the upgrading of the project road different development endeavours will take place and investment situation will show significant improvement, and business men outside of the area will also be attracted to come in the road corridor once it is upgraded.

## **8. Potential Social Impacts**

There are a number of potential social impacts that influence the population residing in the direct influence area either positively or negatively. Both the potential positive and negative impacts are discussed in the following sections. For each of the positive impacts measures of reinforcement are provided separately. Similarly, for each of the negative impacts mitigation measures are also provided.

### **8.1 Health and Occupational Diseases**

Malaria and respiratory tract infections are the major causes of outpatients visit at the health institutions. Malaria is also the major cause of mortality and morbidity in the project road corridor. It is prevalent from June to early November in the project area. There is a high potential for the spread of communicable diseases such Sexually Transmitted Diseases (STD) and HIV/AIDS from the construction workforce to the local population and vice versa.

In Ethiopia, the HIV/AIDS pandemic, in recent years, has emerged as a major health hazard, affecting mainly the age group of 15 to 49 years. HIV / AIDS emerged as a major health hazard in recent years in Ethiopia. About six percent of the population is affected by HIV/AIDS.

HIV/AIDS pandemic is also on the increase in different parts of the country including rural areas. Concerning the pandemic there is no data and information available about its spread and growth in the project area. However, the project road corridor might not have significant difference from other areas that are in a similar situation. It is true that HIV/AIDS will have detrimental effect on the construction work force and the local community unless appropriate measures are not taken to control it.

Road construction and similar type construction project workers, and truck drivers are considered as having high potential (or good vectors) for the spread of Sexually Transmitted Diseases (STDs) and HIV/AIDS virus due to their mobility. This is partly because construction workers are mostly young and sexually active group of the population and are mobile, and are also forced to live in working camps.

The exploitation of borrow pits and quarries with heavy machinery could create health risks for the worker's and local communities. The use and accidental discharge or spillage caused from inflammable, toxic, explosive and chemical substances could create negative impacts on the work force on the local population. Some of these negative impacts include;

- Hearing impairment,
- Disturbance of sleep at night,
- Pneumonia and related problems caused due to Inhalation of dust in high dose over a long duration,
- Pollute water points,
- Organic materials and chemicals may cause other health problems and damages

Stagnant waters caused by uncompleted construction activities in/near housing areas (or villages) could bother people and create hygienic problems. Quarry sites and borrow pits become breeding sites of water borne vectors (mosquito and others).

## **8.2 Impact on Land Acquisition**

The major potential impact of the project road on the socio-economic environment and on the livelihood of the communities is due to land acquisition. The land required for the road construction works will affect crop and grazing land as well as trees. Land required for the upgrading of the project road is of two types; namely land which is required permanently for the widening/realignment of the existing road, and land required for temporary works (detours, access roads, quarry sites, borrow pit and camping/camp sites).

With regards to the dense population and the scarcity of cultivable land, the land requirement is an important and crucial issue. The land requirement may entail relocation of some houses located along the project road. However, it may not require for involuntary resettlement of the local population because it will only take strips of land all along its route.

According to FDRE constitution land is a public property and hence there will not be any compensation payment attached to land acquisition. However, land required permanently will be compensated for its use value (or affected crops and for income lost) on the basis of the "Proclamation for the Expropriation of Land Holdings for Public Purposes and Payment of Compensation (Proclamation No. 455/2005)".

In general, the dispossession of farmland for the upgrading of the road can be distinguished into two, permanent and temporary dispossession of farmland.

### **8.3.1 Permanent Dispossession of Farmland**

Land will be permanently required for the upgrading of the project road including widening of road, realignments (new construction), improvements of alignment, construction of structures and associated drainage and protection works. Further land will be required for camping/camp sites, access roads to the same and for materials sources (quarries, borrow pits), where the latter in some cases can not be reinstated to their original condition. The permanent dispossession of land will affect:

- Agricultural (crop and grazing) land;
- Permanent crops and trees;
- Houses/buildings and other structures (e.g. irrigation schemes, fences).

In the project road corridor, there will not be many households who will be dispossessed from their farmland permanently. However, there will be a small number of households who will lose strip of land. This shows that there will not be households who may require resettlement as an option because of expropriation of their land by the project road.

The affected households could be able to continue their livelihood in the remaining plot of land; however they need to be compensated as per the law for permanently losing their crops, trees, and perennial crops.

Appropriate compensation has to be provided for lost assets, for lost income basis and other requirements based on the laws and regulations of the major provisions in the FDRE Constitution and as to the Proclamation for the Expropriation of Land Holdings for Public Purposes and Payment of Compensation (Proclamation No. 455/2005).

The preferred compensation for the permanent dispossession of land is the replacement of

provision for redistribution of farmland for replacement is no more applicable. A valuable source of land for compensation/replacement is the area of existing road sections which will be abandoned due to improvements or realignments of the road. These areas will become available upon completion of the construction and the reinstatement/re-cultivation of abandoned road sections in improvements/realignments shall be incorporated in the construction/works contract.

The impact due to the permanent dispossession of land can be avoided and/or considerably reduced by a careful and appropriate engineering design.

### **8.3.2 Temporary Dispossession of Farmland**

The implementation of the project will require the temporary use of land for temporary roads (e.g. detours, access roads), sub-camps and materials sources (quarries, borrow pits).

The location of contractor's and the supervising engineers' site facilities is a key environmental and social issue. The land required for the camp site(s) is in conflict with the existing land use and the economic activities at locations in or close to towns/villages. Therefore, in previous/other projects there was a tendency to install them in a certain distance or at the outskirts of towns (e.g. the camp site of the previous Ambo – Nekemt road project is located about 3 km outside of Bako town).

The details of land acquisition (permanent and temporary dispossessions), number of Project Affected Persons (PAP), Compensation estimates for the affected assets, etc will be presented in the Resettlement Action Plan (RAP).

## **8.4 Impact on Archaeological and Historical sites**

The upgrading of existing roads or the construction of new roads affects archaeological and historical sites that are located along road sides. World Bank Operational Policy (OP 4.11) on physical cultural resources addresses, physical cultural resources defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance.

Physical cultural resources (sometimes known as cultural heritage, cultural patrimony, cultural assets or cultural property) may be located in urban or rural settings, and may be above or below ground, or under water.

In the project road corridor, there are not any archaeological or historical sites that will be affected by its upgrading.

## **8.5 Impact on Indigenous Peoples or Indigenous Ethnic Minorities**

Development projects such as the construction or upgrading of roads affect indigenous people and indigenous ethnic minorities by expropriating their traditional resources; and affecting their traditional way of life and culture and sense of identity.

Indigenous people engage in economic activities, such as, shifting cultivation in or near forests, live as hunter and gatherers, and sometimes work as wage laborers or even small-scale market-oriented activities. They are mostly among the poorest segments of a population and identified in a particular geographic area.

World Bank Directive on Indigenous People OD 4.20, states the term indigenous people or indigenous ethnic minorities as follows: *"Indigenous peoples," "indigenous ethnic minorities," "tribal groups," and "scheduled tribes" describe social groups with a social and cultural identity distinct from the dominant society that makes them vulnerable to being disadvantaged in the development process"*.

Some of the common characteristics of indigenous people and indigenous ethnic minorities include;

- a close attachment to ancestral territories and to the natural resources in these areas;
- self-identification and identification by others as members of a distinct cultural group;
- an indigenous language, often different from the national language; presence of customary social and political institutions; and
- primarily subsistence-oriented production.

In the project road corridor, there are not any indigenous peoples, indigenous ethnic minorities, or tribal groups that need special attention and qualify the definition of World Bank's (WB) Operational Directive (OD) 4.20 on Indigenous Peoples.

## **8.6 Impact on Road Safety**

Road safety aspects are important in all towns and villages traversed due to numerous movements of people and livestock. In the future, improved road and the anticipated increased traffic (or with increasing movement of vehicles) would change safety aspects along the roadside. Road safety is crucial in particular on market days because of the risk of accidents between pedestrians and passing cars /trucks/ could be high.

In Ethiopia, road accidents are recorded to be among the highest in the world, and this is associated to poor road conditions, lack of road signs, lack of awareness on road safety by pedestrian and motorists.

Improvement of sub-standard curves and bridge approaches according to the present and future traffic requirements will have a significant positive impact on traffic safety.

Further, there are not any provisions for the high proportion of non-motorised traffic, especially pedestrians. Not even in Nekemt, the largest town along the project road, walkways are available for pedestrians and in particular for pupils/children, the most vulnerable to traffic accidents.

Chaotic situations prevail at and around market places, where apart from the existing carriageway no other facilities exist (e.g. spaces for parking, bus stop) and due to the badly disciplined motorists, the road is crowded with people and livestock through which heavy vehicles, busses, etc. have to force their way with an extremely high risk of accident.

Site construction works will take place during the road is in operation, road hazards may arise from partial closure of lanes and the movement of heavy construction equipment, which may affect both road workers as well as road users. To avoid and control potential problems in the operation of the road maximum attention has to be paid to an adequate road and traffic safety. If appropriate mitigation measures (traffic management) are not taken the project road may also become a cause for fatalities, injuries and death to the community through increased traffic accidents.

## **8.7 Impact on Public utilities**

Public utilities, such as, electric poles are affected due to the upgrading of the project road in different locations. In total about 874 electric poles will be affected both in the right and left side of the road due to the widening and realignment. The affected electric poles are located in Gedo, Ijaji, Kiltu Ilala, Tibe, Sheboka, Bako, Kejo, Anno, sire, Chari, Chingi, Konchi, Gute, and in Nekemt. The details (km chainage and cost estimates, etc) will be presented in the RAP.

## 8.8 Gender issues

In Ethiopia, the Gender proportion of men and women shows that women constitute approximately 50% of the population. Having almost equal proportion of men and women, the Gender disparity between men and women is believed to be very high in the country and this disparity is believed to be one of the bottlenecks for its development. FDRE Constitution gives women equal right with men, Article 35 (Rights of Women) No.1 states: *“Women shall, in the employment of rights and protections provided for by this Constitution, have equal rights with men”*.

Women make a significant contribution in the area economic and social development of the country. However, women’s contribution to the economy and social development is not recognized as such, mainly because the economy and political power is controlled and dominated by men. Women do not receive equal opportunity in education, employment and in other social development activities. In the Welfare monitoring survey carried out by CSA, it was found that women have low school enrolment rates and are also less literate than men. This and other development indicators show that women do not receive equal opportunity and access to education like that of their men counterparts.

The social impacts that will be created due to the upgrading of the project road affect women more than men. Among the social impacts, resettlement/ relocation of PAPs may lead to the breakdown of community social networks and this has direct impact on women more than men because women rely and depend on community and social networks for their emotional, family and practical supports.

Since the different social impacts affect and are reflected more on women than men, there is a need for women to be consulted concerning the proposed mitigation measures to address those negative impacts. FDRE constitution, on Article 35, No. 6 states that: *“women have the right to full consultation in the formulation of national development policies, the designing and execution of projects, and particularly in the case of projects affecting the interests of women”*.

Women have equal right to ownership of property and enjoy equal treatment in the inheritance of property. Hence, compensation payments and other measures related to resettlement/relocation shall be done equally for women and men; and it will also take into consideration the interest women as enshrined in FDRE constitution on its Article 35, No. 7 that states women have *“... the right to acquire, administer, control, use and transfer property. In particular, they have equal rights with men with respect to use, transfer, administration and control of land. They shall also enjoy equal treatment in the inheritance of property”*.

Women also have different roles and relations and division of labour than men. The gender roles and division of labour is shown in the following paragraphs.

Gender Roles and Relations: Men and women have different roles and responsibilities in the project road corridor and its influence zone. Men traditionally have more socially recognized power and authority in decision-making, control and access over resources.

Women have limited access and control over resources and in decision making either at household or community level.

Gender Division of Labor: Men are mostly engaged in productive (agricultural activity) and also in other socio - political responsibilities also. Women on the contrary play triple roles and responsibilities. Women are mainly responsible for productive, reproductive and also social activities. Women play significant role in agricultural production in the project influence zone and in the corridor generally. This is also true for the country and other parts of Africa. It is estimated that in rural Africa women account for more than 70% of agricultural activity.<sup>1</sup>

The different roles and responsibilities assumed by women and men in the project road corridor imply that they have differing transport needs and requirements. The transport needs of women and men obviously vary in accordance with tasks and roles in their every day life. There is high demand for travel and transport by women both for within and outside their village travel. Hence, it is highly crucial that the construction and upgrading of the project road gives sufficient emphasis and proper attention to Gender related issues and specifically addresses the transport demands of women.

Women play very important role in travel and transport. The demand for travel and transport by women either for household or community activities is very high. Travel and transport related activities carried out by women include: domestic travel and transport, agricultural transport and transport related to social services. In a study carried out by ERA in 1999 on village level travel and transport (VLTT), it is estimated that the women in Ethiopia are responsible for some 76% of the time and about 86% of the effort made for transport (domestic transport is the highest).

A study made to introduce IMT in selected woredas shows that women perform major travel and transport related activities mainly for domestic (fuel wood, water collection, etc), market, agricultural and social purposes. Walking on foot is the common mode of transport followed by pack animals in rural and semi urban parts of Ethiopia. According to the VLTT study “fuel, water, food, etc, accounts 73% of the trips and 61% of the travel time and 93% of the transport effort”.<sup>2</sup>

Women are also responsible to carry out significant transport activities that are related to reproductive and productive activities. In Ethiopia, “women work from 13-17 hours a day grinding grain, fetching water, collecting fire wood, preparing manure for fuel, cooking food, raising children, taking care of domestic animals and managing the family”.<sup>3</sup>

In the project road corridor, women's transport needs are mainly related to:

- *Travel for domestic activities*: This is travel to collect fire wood, travel to water points, travel to grinding mills, etc.
- *Travel for economic activities*: It includes, travel to markets, travel to farm fields, travel to saving and credit associations, cooperatives, etc.
- *Travel to social service facilities*: It includes, travel to health facilities and traditional healers, women associations meetings, etc.
- *Travel for social and communal activities*: This is travel to places of worship, to funerals, visiting the sick, visiting of families and friends, etc.

<sup>1</sup>PREM Notes, January 1999, Gender and Transport, A Rationale for Action.

<sup>2</sup> VLTT study in Ethiopia, September 1999.

<sup>3</sup> A National policy on Ethiopian Women.

The upgrading of the project road is expected to provide some sort of assistance and support to women in improving their condition in their productive, reproductive and socio political activities.

Productive activities: it is expected to provide and introduce women with labour and time saving tools and equipment, and at the same time improve their productive capacity. This could be realised with improved road network and communication. Hence, the upgrading of the project road is expected to contribute towards this.

Reproductive activities: It would also provide women to have enough time to look and take care for their children and other household members.

Socio political activities: In the long term, women would be exposed to improved technologies, tools, create additional income and build confidence in their day-to-day life and work. It would also create opportunity for women to participate in other socio political activities and issues that are related to their community and beyond.

FDRE constitution, on Article 35, No. 6 states that: *“women have the right to full consultation in the formulation of national development policies, the designing and execution of projects, and particularly in the case of projects affecting the interests of women”*.

In the rural sections of the project road corridor, like most other rural areas of Ethiopia, the poverty situation is among women and in particular among female headed households (FHH). The magnitude of women’s poverty situation is manifested through lack of transport services and facilities. With the upgrading of the project road, it is expected that the poverty situation of women will show improvement and progress.

## **8.9 Positive Impacts and Measures of Reinforcement**

### **8.9.1 General**

The main positive impact from the upgrading of the project road will be reduction of costs of transport, facilitate travel and transport within the project area and to/and from other places in the project area and outside the project area. In addition, the improvement of the road will contribute to improved transport services and to increasing levels of travel and transport.

The project road is expected to further improve market opportunities, provide access to improved and better social service facilities, create improved communication, improve the supply of agricultural inputs, enhance investment and employment opportunities, contribute to income generating activities, and improve the situation of women by creating better access to transport and other facilities.

The upgrading of the project road will create subsequent increase and utilization of agricultural inputs and services that will result in increased production, higher farm gate prices for local produce, resulting in higher incomes to the farming households.

It is also expected that employment opportunities for the local labor force will be created; it can be assumed that this will be a significant contribution to the reduction of poverty at the household level.

The project road, in its short and medium term will create impacts such as reductions in vehicle operating, transport and time costs for public passenger and freight transports and for private vehicle users, and improvement in the availability of transport facilities and

In the long term, development impacts and incentive will be created that will bring about economic growth and changes in the livelihood conditions of the people residing in the project area. It is anticipated that due to the upgraded road more new businesses and investment projects would be coming up in the project area. It is also true that qualified personnel will be attracted to work in the project area with the improvement of road accessibility, improved transport service and also with the availability and timely delivery of the required services.

The main advantage of the road would be to bring down the cost of transport service that also could facilitate travel from one town to the other within the project area and its impact zone and outside of the project area. Improved accessibility would contribute to poverty reduction and long term development in the project area through improved access to the provision of social services.

The major social benefits include the development of increased / improved trade and market facilities and improvement in the provision of social services; and employment opportunity created for women to work as labourers in the project road and also income generation through sales of goods and services to construction workers.

The delivery of social services, agricultural inputs, consumer goods will improve due to the upgrading of the project road and availability of better accessibility in the project area. The project road is important for access to health facilities, schools, major market centres, agricultural input supplies stores and other service giving institutions.

### ***8.9.2 Employment opportunities for local communities***

The upgrading of the project road is expected to create employment opportunities and job for the local communities. The youth and women residing in the project area will benefit from the employment opportunities created due to the upgrading of the road. It can be assumed that this will be a significant contribution to the reduction of poverty at the household level.

The participation of the local community in the upgrading of the project road, employment for semi-skilled and unskilled labour force should be encouraged from the project area and more opportunity or priority in employment should also be given for women and in particular to female headed households. If such employment mechanisms are adopted the project would contribute to the creation of jobs and income, and improvement of the local economy; increase the revenue capacity of the project area, and will also bring in skills and knowledge to the locality.

In the process of employment, the contractor is also expected to respect and abide with the Labour code of the country; and give priority to the employment of the local population, and specifically to women.

### **Measures of Reinforcement**

- The contractor should employ large proportion of casual and semi skilled workers and also be able to transfer skills and knowledge to his workforce. In the contractual document a clause should be added to ensure the employment of casual and semi skilled workers has to be made from the people in the project area.
- Ensure women's employment and improve their employment opportunities and working conditions. Develop guidelines and regulations to ensure that women receive equal employment opportunities.

- The contractor needs to observe the Labour code of the country for employment, minimum wage, work safety regulations, and related issues; and should also allow the work force to establish its union as per the law.
- ERA and local authorities should assign inspectors to monitor that appropriate implementation of the labour code and other policies and guidelines of the country are respected; and appropriate standards are maintained.

### **8.9.3 Creation of Income Generating Activities**

Creation of income generating activities is one of the positive impacts of the upgrading of the project road to the local community. There will be temporary income opportunities that will be created to residents in the project area during construction works. Businesses such as, catering services (or small bars and restaurants) located along the project road and near construction camps, etc. could earn additional income due to the presence of large numbers construction workers. More traffic movement could also contribute to an increase in income-generating activities in the major towns and for small towns located along the project road.

Fuel stations, vehicle workshops and tyre repair shops in major urban centers will improve their quality of services with the growth and development of traffic volume. Income also generated due to the development and growth of better and safer parking facilities for public transport vehicles, trucks and others.

### **Measures of Reinforcement**

- Make available micro credit services for small entrepreneurs and in particular for women entrepreneurs who wish to start small income generating activities.
- Provide better parking facilities for taxis, buses and freight transport to avoid traffic jams along the road sides.
- Construct bus terminals for public transport that will facilitate a smooth operation of passengers and their luggage.

### **8.9.4 Reduced Transport Cost**

The main advantage of the road would be to bring down the cost of transport service that also could facilitate travel from one town to the other within the project area and its impact zone and outside of the project area. Improved accessibility would contribute to poverty reduction and long term development in the project area through improved access to the provision of social services.

The project road, in its short and medium term will create impacts such as reductions in vehicle operating, transport and time costs for public passenger and freight transports and for private vehicle users, and improvement in the availability of transport facilities and services.

The availability of public and freight transport could increase with the upgrading of the project road and also due to the economic growth and potential of the project area. The fleet size of medium and mini buses will increase on the road after the upgrading, as it did in other parts of the country. Because of its low prices and less waiting time, more people would prefer to travel in medium and in mini buses instead of long-distance buses. In the longer term, means of transport will increase and travel times and costs will decrease.

With the upgrading of the project road, the fleet size of public transport buses and minibuses, and freight transport will also show increment outside of the project area. Hence, with the increase in the fleet size of public transport and freight the movement of

people and goods from place to place will automatically increase. Through this, improved access would be made to social service delivery and changes will be observed on consumer good prices.

### **Measures of Reinforcement**

- Encourage individual business men to participate in the provision of transport service.
- Maintain regular road maintenance service to avoid dissatisfaction of transporters and public.
- Transport authority and local government authorities should inspect that some transporters do not charge more than the official rate.
- The Regional Road Authority needs to construct feeder and access roads in and around the project area.

#### **8.9.5 Increased Agricultural Production and Productivity**

The upgrading of the project road will create subsequent increase and utilization of agricultural inputs and services that will result in increased production, higher farm gate prices for local produce, resulting in higher incomes to the farming households.

Food production and productivity will show increment with the availability of agricultural inputs and extension services following the upgrading of the road. Household income will also show increment due to lowering of transport costs and improved and extended market access and opportunities, higher farm gate prices for local produce and resulting in higher incomes to the farming households.

In general, with the upgrading of the project road improved and increased market opportunities would be created for crop production and livestock; increased prices for agricultural products would be created and this will contribute to increased household income and expenditure as well.

### **Measures of Reinforcement**

- Ensure timely availability of agricultural inputs and improved technologies for farming households.
- Facilitate the provision of credit facilities for small scale farmers to allow them increase their production.
- Provide different types of incentives for people who want to invest in agricultural activities in the project area.

#### **8.9.6 Access and Opportunity to the Employment of Women**

The positive impacts of the upgrading of the project road on women (female headed households in particular) could be observed by creating employment opportunities in the road construction work. Women in road projects could work as daily labourers, time keepers, store keepers and in similar other activities during the project implementation.

Women could also earn income through sales of goods and services to the construction workers. A number of catering services, coffee and tea shops, kiosks and bars along the road are managed and run by women, in some of the areas it is particularly run and managed by female-headed households. Such type of income generating activities could increase their income with better and safer stopping places for cars, trucks and buses. Bigger volume of traffic can increase these income-generating activities.

Women could also have transport access to the different social services and markets due to the upgrading of the project road. Women also will benefit from the decrease in the prices of goods due to decreasing transport costs. The positive impacts stated above could only be realized if access to services and opportunities, such as, credit, education, health, and etc are equally provided for women.

### **Measures of Reinforcement**

- ERA and local authorities have to set regulations / guidelines to ensure and improve the employment opportunities of women in the road construction works. The guidelines are to ensure that women receive equal chance for employment on construction sites.
- Contractors should create employment opportunities for women in general and give priority for female headed households in particular.
- Women workers should be assigned in those jobs which are fit to their biological and physical conditions.
- The contractor should follow regulations and principles set in the FDRE Constitution and Labour code concerning the rights of women workers.

#### **8.9.7 Improved /Increased Girls Education**

It is anticipated that more school children would enroll in schools or go to higher grades when there exist improved roads, and better means of transport services are offered. The upgrading of roads and better means of transport in the long term could be more beneficial to girls than boys.

Upgrading of the road associated with improved communication system would contribute to the quality of education in the project area.

### **Measures of Reinforcement**

- Construct schools in close proximity to villages and settlement areas so that it could attract children and in particular girl children to attend school
- Provide special privilege for the girl child that would encourage them to attend schools
- Provide awareness creation for parents on the importance and need for the education of the girl child

#### **8.9.8 Improved Health Service Delivery**

Distance of health services located far from main roads affects mothers and children. In most parts of rural areas that are disconnected from roads, mothers face problems during pregnancy as they cannot travel for a medical check up or treatment and cannot also get assistance of health personnel working at health clinics.

It is true that distance of health services causes difficulty to transport patients or seriously ill people. It is because of this difficulty that patient and sick people are transported on mule or donkeys or carried by people on a locally made wooden stretcher (or on bed) to health services. This way of transporting patients to clinics takes several hours and even days to reach the nearby health services. In some places patients referred to the higher health institutions also face similar problems to reach the next higher health service location.

Road construction and upgrading can contribute to improve community health through the provision of access to health services and easier accessibility improving quality of services through better-trained personnel. The supply of medical equipment and medicines will be improved and costs will decrease due to lower transport costs.

## Measures of Reinforcement

- Construct health facilities at close proximity to the villages or at central locations so that it could provide its service to the residents of the locality.
- Give priority to children and mothers in the provision of primary health service system.
- Provide education and awareness about communicable diseases, reproductive health, STD and HIV/AIDS to communities and visitors.

## 8.10 Negative Social Impacts and Mitigation Measures

There are a number of negative impacts that influence the upgrading of the project road, and some of the negative impacts could be avoided if proper mitigation measures are carried out. The negative impacts are related to expropriation of farm land, crop loss, spread of malaria and STD and HIV/AIDS, growth of squatters & uncontrolled settlements, noise disturbance, spoil dumping and pressure on local services and facilities, and impact on settlements.

### *8.10.1 Exposure to Communicable and Occupational Diseases*

There are potential health problems that occur during road construction and upgrading ranging from minor health problems to the more serious ones, such as, the spread of communicable and occupational diseases. Roads are instrumental in facilitating the spread and transmission of diseases in different ways.

The spread and speed of propagation of endemic diseases may also show increase because of the arrival of migrant construction workers to the area.

Some of the potential communicable and occupational health risks in the upgrading of the project road would be related to:

- Quarry sites and borrow pits pose greater risk, after rainy season by retaining water for a longer period and creating favourable condition for the breeding of mosquitoes. The project area is one of those areas highly rampant with mosquito that transmits malaria.
- Contamination of local water supply due to spillage of oil from vehicles, asphalt plants, etc.
- The use of inflammable, toxic, explosive and chemical substances could create negative impacts on the work force on the local population. Some of these negative impacts include;
  - Hearing impairment,
  - Disturbance of sleep at night,
  - Pneumonia and related problems could be caused due to inhalation of dust in high dose over a long duration,
  - Organic materials and chemicals may cause other health problems and damages.

## Mitigation Measures

- Fill up borrow pits and quarry sites immediately after their use to avoid the breeding of mosquitoes that cause malaria.
- Distribute mosquito nets to construction workers to control the spread of malaria and in close collaboration with local health facilities to control the spread of malaria.
- Provide awareness creation and health education for the work force on transmittable, communicable and infectious diseases such as malaria, TB, STD and HIV/AIDS,
- Avoid spillage of oil from vehicles and chemicals from asphalt plant on farm lands,

- Stop dynamite blasting near housing areas and health facilities; and during evening or sleep time.
- Restrict all night time working near sensitive locations, housing areas and hospitals.
- Water detour and access roads during construction to avoid excessive dust intake.
- Do not dispose organic materials near houses (village settlements), farming, grazing, and water points or in other similar locations.

### **8.10.2 Exposure to HIV / AIDS and other Sexually Transmitted Diseases (STD)**

In Ethiopia, the HIV/AIDS pandemic, in recent years, has emerged as a major health hazard, affecting mainly the age group of 15 to 49 years. HIV / AIDS emerged as a major health hazard in recent years in Ethiopia. About six percent of the population is affected by HIV/AIDS.

Road construction and other similar type of project workers, and truck drivers are considered as having high potential (or good vectors) for the spread of Sexually Transmitted Diseases (STDs) and HIV/AIDS virus due to their mobility. This is partly because construction workers are mostly young and sexually active group of the population and are mobile, and are also forced to live in working camps.

Contacts and communications created between local communities and construction workers who have come to the project area from different localities and mainly from major towns will expose the local community to new and alien cultures and behaviours that might be against local cultures and behaviours.

The introduction of new and alien cultures and behaviours may contribute to the spread of communicable diseases such STD and HIV/AIDS. Similarly, other unwanted experiences such as, the coming of sex workers to the project area from major towns and cities will contribute to the increase in the number of sex workers, alcoholism and crime.

### **Mitigation Measures**

As a preventive measure, construction workers and local population must be informed through awareness raising and education campaigns about HIV / AIDS. This has to be done on the one hand by the contractor, responsible for workers and on the other hand by the communities, along the project road, targeting especially women. At the community level, special information campaigns for women should be enhanced.

Condoms can be provided at subsidized rates or for free and health facilities must be supported with supply of condoms and must communicate information about risks. To have an effect in the longer term, schools should include information campaigns and/or special courses, as suggested below.

- Conduct education and awareness creation campaigns on the spread and transmission of STDs and HIV/AIDS for construction workers and local communities living close to the construction camp sites.
- Provide free distribution and provision of condoms to construction workers by the Contractor to avoid the spread of STDs and HIV/AIDS.
- Put educational posters and flyers on HIV/AIDS, using local languages at public gathering locations, bus terminals, schools and by road sides to minimize the spread of HIV/AIDS.
- Adopt FDRE and ERA's Policy on HIV/AIDSs, and provide special care and support to HIV/AIDSs positive staff and AIDS patients.
- Spread education for preventing communicable diseases, STD and HIV/AIDS and for practicing "safe sex" by using condom

- Discourage the influx of sex workers (in some cases young and under aged girls) from major towns and cities to the project area.
- Monitor the above mitigation measures through proper monitoring indicators.

### **8.10.3 Pressure on Local Health Facilities**

The health facilities located in the project area do not have the required number of medical staff, equipment, drug and related services. This being the picture about the local health facilities, the presence of additional population in the area, i.e., the construction workers, will put pressure on local health facilities. Such type of pressure could reduce the effectiveness of the health services as far as the local populations are concerned.

#### **Mitigation Measures**

- Contractor should exercise a duty of care towards his workforce in relation to injuries sustained at work by providing adequate first-aid facilities; and the contract agreement for construction, should include a clause to the effect that the contractor must provide set up a clinic furnished with necessary medical personnel on a full-time basis and equipment that provides its services to the construction workforce.
- Make available ambulance service to provide first aid service and to transport seriously injured or sick members of the work force to major hospitals.

### **8.10.4 Impact on Women**

In Ethiopia, there is high gender disparity and this is also believed to be one of the major bottlenecks for development. This high gender disparity between men and women negatively affects the development of a nation and its wealth distribution.

Among the negative social impacts, resettlement/relocation of PAPs may affect women more than men. Resettlement/relocation leads to the breakdown of community social networks and this has direct impact on women more than men, because women rely and depend on community and social networks for their emotional, family and practical supports.

In road construction works, women always do not receive equal employment opportunities; and the contractors, in most cases, favor to employ men rather than women, and female workers do not obtain particular attention due to their biological and physical condition.

Hence, the discrimination against women will negatively affect those women who want to work in the road construction work. Such discriminatory acts and lack of other employment opportunities may force women to carry out other marginal activities and to be engaged as sex workers for survival, which exposes them to increased risk of sexually transmitted diseases, HIV/AIDs and unwanted pregnancies.

The negative impacts of the project road on women include;

- Increased risk of exposure to sexually transmitted diseases and unwanted pregnancies,
- Price increase of consumer goods due to the coming of large number work force to the area in particular will make FHH vulnerable to economic crisis,
- Most construction companies prefer to employ only men, and this will lead to unequal treatment women during employment of the construction work force.

#### **Mitigation Measures**

The following mitigation measures need to be addressed by the contractor:

- Ensure women's participation and improve their employment opportunities by developing guidelines and regulations to ensure that women receive equal employment opportunities and to avoid discrimination against women.
- Provide education and awareness creation on reproductive health, STD and HIV/AIDS to women residing in the project influence area.
- Support FHH and other women interested or willing to provide catering services to contractors' work force. Such measure will encourage local women be able to generate income to support their families.
- Assign female workers to those works that are accepted to be appropriate for their biological and physical condition.
- Give special attention for female headed households in employment and delivery of other services.
- Since the different types of negative social impacts affect more on women than men, there is a need for women to be consulted concerning the proposed mitigation measures to address those negative impacts.

#### ***8.10.5 Permanent Loss of Farm Land***

The upgrading of the project road mainly follows the existing road and hence, there will not be much farmland that will be lost permanently. However, in some locations there will be losses of strip of farm land for the construction works. The permanent loss of farm land will be mainly for the widening of the ROW and in some locations where there will be realignment.

Since the permanent loss of farm land is distributed all along the project road, there will not be households who will be displaced or relocated to a different location.

#### **Mitigation measures**

- Compensate farmers for loss of crops (perennial or annual), trees as per the Federal legislation (Proclamation 455/2005) based on market prices.
- Consult and involve PAPs in the estimation of costs for lost assets.
- Allow enough time for PAPs to remove their crops (perennial or annual) and trees.
- Give priority in the employment of casual workers for household members of PAPs that have lost their land for the road construction works.

#### ***8.10.6 Temporary Loss of Farm Land***

Because the upgrading mainly follows the existing road, not much farmland will be permanently lost. However, in some locations there will be temporary losses of farm land for the following construction works;

- for facilitating detour roads,
- construction of camps sites,
- storage sites,
- asphalt plants,
- spoil dumping sites, etc.

Hence, the land that has been used for as a detour road for a year or for one of the above purpose would be degraded and compacted, and will become unsuitable for farming immediately. Such land will take some time before the soil gets back its fertility and the land is used for farming. During the above period farmers will be forced to abandon their plot and lose income from their farmland.

#### **Mitigation Measures**

- Provide in writing for PAPs on the usage of farmland either temporarily or permanently for the construction works and commit how long it will be used and about its rehabilitation.
- Compensate farmers for the loss of production due to land being used as detour or for other construction related purposes and also for loss of its fertility.
- Compensate ahead of construction works for the loss of perennial crops/ trees compensate based on market prices and as per the law.
- Avoid creating camp sites, storage sites, asphalt plants, spoil dumping sites, etc on farm land or near farms.
- Give priority in the employment of casual workers for household members of PAPs that have lost their land for the road construction works.
- On the completion of the work clean properly and restore the temporarily occupied land.

#### **8.10.7 Impact due to Construction of Camps**

The establishment of construction camps and residential houses for the construction workers sometimes competes with the limited local resources. The existence of camps for the constructions workers close to settlement areas could influence negatively on local life style and some times may lead to cultural and social conflicts. To avoid such type of conflicts and problems the establishment of the construction camps should be in a planned way without negatively affecting the local resources and society.

Impacts from construction camps will be created if camps are built close to the local settlement areas. The impacts from the construction camps that are constructed close to settlement areas may bring and create noise pollution, competition on the use of local resources.

It would be appropriate and advisable to ensure that construction camps and other temporary work sites do not negatively affect local communities.

#### **Mitigation Measures**

- To limit such type of problems direct contacts between the local community and construction workers could be discouraged by putting up construction camps in distant locations from local people, and if the construction camp is built close to local people, admission to the camp should be limited to workers only.
- The preconditions to choose the location of the construction workers camp should be more or less similar to any planned permanent settlement that is developed for residential purpose. The selection of camp sites should be done in good co-operation with woreda and kebele level administrations.
- Construction camps should also be able to provide some services to its workers, which otherwise would overburden the local public utilities/facilities. Hence, the selection of camp sites should be done in good co-operation with the local population and administration.
- Avoid creating construction camp sites on farm and grazing land or near farms.

#### **8.10.8 Spoil dumping or disposal of waste matters**

Spoil dumping or disposal of waste matters is one of the negative impacts observed in road construction projects. Spoil dumping or disposal of waste matter by any means should not be carried out on farm and grazing land, water points and rivers, near social service giving institutions or near residential areas, and villages. If it is dumped around water points it will contaminate water, and if dumped around residential areas it will also affect the health of people (and children in particular) and domestic animals.

### **Mitigation Measures**

- Avoid spoil dumping or disposal waste matter on farm and grazing land, water points and rivers, near social service giving institutions or near residential areas. Since waste matters sometimes contain chemicals that affect human and livestock health and also the fertility of soil it should be dumped in areas that are far away from humans & water points in a barren land.
- Spoil dumping sites for waste matters, chemicals and other organic materials should be identified and selected with the participation of local authorities and communities. Those sites which did not have approval of local communities should not be used either for spoil dumping or other purposes.

#### **8.10.9 Impact on Road Safety**

Road safety aspects are important in all villages traversed due to numerous movements of people and livestock. Especially on market days the risk of accidents between pedestrians and passing cars /trucks/ could be high. In the future, improved road and the anticipated increased traffic (or with increasing movement of vehicles) would change safety aspects along the roadside. Roadside business and markets would lead to higher risk of accidents due to cars /trucks/ stopping at those points.

Pedestrian walk ways or paths might be interrupted during the road construction works and due to this pedestrians will face problem of walking along the project road.

The project road may also become a cause for fatalities, injuries and death to the community through increased traffic accidents.

Some of the road accidents could occur due to;

- Pavement and shoulder condition,
- The presence of road side poles, trees, ditches, steep slopes, and barriers,
- Poor signs, markings, intersection lay out and control,
- Poor roadside access, absence of zebra crossings, lack of parking and bus stop arrangements,
- Markets and businesses operating on the roads,
- Increased speed of vehicles around major towns, villages and settlement areas,
- Inadequate allocation of road space for non motorized transport.

### **Mitigation Measures**

- The contractor must post warning signs specifying speed limits at the different locations, provide speed bumps and signs about careful driving.
- Provide alternative walk way or path routes during construction works for pedestrians and ensure that walk ways and path routes are not blocked for children and women.
- Provision for pedestrian crossing and improving or widening shoulders for the use by pedestrians and NMT.
- The construction crew needs to pay special attention to child safety during upgrading of the project road.
- Putting traffic signals (signs) at road sides using local languages to minimize accident and death of pedestrians and motorists.
- Improving visibility by removing sight limiting obstacles; provision of reflective studs and painting of zebra crossings.
- Police should enforce speed restriction measures in town sections and mountainous areas.

- ERA and local authorities need to conduct road safety education programs in schools and also in public gathering locations to create awareness among the population before and after the completion of the construction works.
- Prohibiting road side open markets and if such type of markets exist along the project road should be located away from the road side.
- Institutional strengthening and capacity building of traffic police men working along the project road.
- Provide separate locations for the parking of NMT (animal drawn carts and bicycles).

#### **8.10.10 Impact on Archaeological and Historical Sites, and Cultural Heritages**

The upgrading of the project road may negatively affect archaeological and historical sites, and cultural heritages. The archaeological and historical sites could be either movable or immovable objects, sites and structures that have archaeological, palaeontological, historical, architectural, religious (churches, mosques), cultural significance (burial sites, etc). Such sites may be located in urban or rural settings, and may be above or below ground.

In the project road corridor, there are not any registered archaeological or historical sites, however, during construction works sometimes there is a possibility that human remains, fossils and artefacts could be excavated.

#### **Mitigation Measures**

- If human remains, fossils, coins, artefacts and structures are found or detected during construction / excavation works, stop the work and immediately report to the local authorities and to the Authority for Cultural Heritage and Conservation.
- Take appropriate precaution in areas where there are places of worship and cemeteries.
- Realign the road in places where there are places of archaeological or historical sites.
- Consult the public and local authorities before demolishing or removing worship places and cemeteries; and compensate for the removal and transportation.

#### **8.10.11 Impact on Child Labour**

The construction of roads attracts local population and in particular young people seeking for employment opportunities. It is also true that road construction works generate good employment opportunity for the local population. However, sometimes it would negatively influence and attract the young to drop out of school. Similarly, children who are below the age of 15 might also be attracted by the availability of employment opportunity in the locality.

If children below the age of 15 are employed in the construction works it may lead to exploitation of children and at the same time it is violation of FDRE law. Child labour can be harmful and create psychological and social problems in the community.

#### **Mitigation Measures**

- Take strict measures against employment of children.
- Work closely with local authorities to stop employment of under age children in the road construction works.

### **8.10.12 Impact on Public utilities**

Public utilities, such as, electric poles and town water supplies are affected due to the upgrading of the project road in different locations (mainly in the town sections) along the project road. About 874 electric poles will be affected both in the right and left side of the road due to the widening and realignment.

Before the construction work commences the location (overhead and underground) of utilities need to be identified and its removal has to be discussed in advance with the concerned organizations, such as Ethiopian Electric Power Corporation, Ethiopian Telecommunication Corporations and municipalities of each town. The organizations responsible also provide the necessary information and adapt about the location of utilities.

#### **Mitigation Measures**

- Compensate to the owners of utilities lines before the commencement of the construction works and ensure that utility lines are not interrupted due to construction works.

## **9. Social Monitoring Plan**

### **9.1 General**

Social Monitoring Plan has been prepared outlining mitigation and monitoring activities/responsibilities that acts as a guide to those planning, preparing, constructing and operating the proposed project. Social monitoring activities will be required for the following subsequent project phases:

- Engineering design and tender document preparation;
- Implementation preparation phase;
- Implementation/construction period; and
- Road in operation/service and maintenance phase.

The social monitoring measures can only be as good as the management and monitoring capacity and social sensitivity of the agencies responsible for the implementation of the project. Required expertise is available (ERA's EMSB) but in order to ensure that the construction and operation of the project road will be environmentally and socially sustainable in the long run, some institutional strengthening and capacity building is recommended, which can be in the form of advanced training, training on the job/site, provision of additional/supplementary facilities/equipment, etc.

### **9.2 Details for Engineering Design and Tender Document Preparation Phase**

#### **9.2.1 Engineering Designs**

Based on the recommendations/requirements of the social impact assessment:

- appropriate/suitable reinforcement measures should be taken to protect as far as possible the social impacts from adverse negative impacts;
- appropriate/suitable and cost effective mitigation measures should be taken to minimise adverse social impacts for those negative impacts which cannot be avoided; and
- appropriate/suitable and cost effective reinforcement measures should be taken1;

### **9.2.2 Preparation of Resettlement Action Plan**

As indicated in the preceding chapters, the upgrading of the project road is expected not to cause significant disruption to the inhabitants residing along the project road and that a full and detailed RAP is not required.

An abbreviated RAP has to be prepared with details of the relocation/dispossession and that shows the appropriate compensation requirements for lost assets, for lost income basis as well as logistical support for moving, relocation grant and other requirements.

The areas of abandoned road sections will be reinstated/re-cultivated after the construction of a respective road section of improvement/realignment is completed.

### **9.2.3 Preparing Tender Documents**

For the various details of the engineering designs corresponding drawings, specifications pay/bill items have to be prepared as part of the tender documents for the works contract.

To ensure the proper implementation of environmental and social avoidance/mitigation measures as well as all safety/health issues, sufficiently detailed environmental and social articles and clauses have to be formulated and become an integral part of the works contract, thus providing a contractual basis for an effective supervision and control of the proposed measures.

The contractor's obligations shall include the assignment of at least two of his senior staff as Environmental Officer and Safety/Health Officer, well experienced in their respective assignments, to be monitored by the supervising engineer. Further, it is assumed, that the contractor's staff has low awareness of the negative social impacts arising from operations within the site. Therefore, it is strongly recommended to provide on site training, awareness creation, and briefing on social issues to the contractor's staff.

In order to provide the supervising engineer and the client (ERA) respectively with an appropriate "tool" to enforce the contractor's contractual obligations to follow/implement social avoidance/mitigation measures as well as safety/health measures, it is strongly recommended that the contractor provides a security in form of a (bank) guarantee of sufficient amount, e.g. 2.5% of the contract price, which may be forfeited in part or in total in case of contractor's failure/non-compliance and the money shall be used to repair/mitigate damages/impacts.

## **9.3 Details for Implementation Preparation Phase**

### **9.3.1 Implementation of Land Compensation / Relocation**

ERA as the client of the project will act as member of the woreda level compensation committee, the official body for the implementation of the compensation estimates; conduct the final valuation of assets and properties for compensation as per the RAP comprising:

- The review/update of the valuation of permanently and temporarily lost assets and properties for compensation as included in the compensation plan; and
- Payment of each household/person eligible for compensation as per the final amount/compensation calculated/determined in the aforementioned review/update of the valuation.

## **9.4 Tendering Period**

The social monitoring activities during the tender period comprise the following principal activities:

- Preparation of clarification of tenderers' queries, if any, in relation to social issues of the tender document and forwarding the same to all purchasers of the tender documents.
- Examination, request for clarification, evaluation and comparison of the socially relevant sections presented in the tender document.

## **9.5 Details for Implementation/Construction Period**

### **9.5.1 *Relocation, compensation for crops, trees, houses, and etc located on permanently and temporarily dispossessed land***

As described above, the ERA as the client of the project will be a member of the compensation committee, which will also conduct the final valuation of compensation for crops, trees, houses, and etc located on permanent and temporary dispossessed land.

The compensation committee will finalise/approve the relocation, compensation amount(s) to be paid for the PAP as presented in the RAP document.

### **9.5.2 *Supervision of Construction***

It is proposed that the ERA seconds one experienced staff of the EMSB to the supervisory team (supervising engineer) for the duration of the implementation of the project. The ERA/EMSB representative shall supervise all issues contained in the social monitoring indicators and the EMP, as for example:

- Social protection measures;
- Safety and health requirements;
- Temporary land requirements and reinstatement;
- Reinstatement / re-cultivation of abandoned road sections after the construction of a respective section of improved / realigned road is completed for compensation of crops and other assets located on permanently dispossessed land (replacement of land) as determined during the Implementation Preparation Phase;
- Implementation of reinforcement measures /benefit enhancement measures;
- Implementation of pre-operation requirements.

## **9.6 Details for Road in Operation/Service and Maintenance Phase**

### **9.6.1 *Pre-operation Activities***

Essential activities are required just before the road or a section thereof is taken into operation:

- Provision of lessons/Awareness raising in schools and in towns/villages concerning traffic safety;
- General speed limit of maximum 50 km/h for the first two to three weeks after opening of an improved/upgraded road section.

### **9.6.2 *Upkeep of the Road***

Proper maintenance for all technical and bio-engineering features will be required to keep the road in a safe and environmental friendly condition to the benefit of the road users, the residents in the area and the Country in general.

## 9.7 Social Monitoring Indicators

Social monitoring of the project will be carried out with a view to evaluating the changes and impact created in the life of the local population due to the construction or upgrading of roads. Here in the upgrading of the project road we have identified the components for social monitoring and its indicators.

The Ethiopian Roads Authority carries out social monitoring for road projects to measure changes in social benefits and impacts for constructed roads. The internal monitoring of the ESIA will be carried out by ERA's EMSB and local administrative bodies; and the external monitoring also would be carried out by Federal level Ministries, such as, Ministry of Health, Agriculture and Rural Development, Culture and Tourism, Environmental Protection Authority. Similarly, the different Government organizations who would be taking part at Regional State level include Bureaux of Environment, Health, Culture, Agriculture and Rural Development.

In addition to Government agencies, Civil Societies, NGOs, and the World Bank supervision mission will also take part in the social monitoring of the project road.

Table 8 shows the social monitoring components and the indicators that could be used for future monitoring of the project road. The indicators are selected on the basis of potential impacts to be monitored.

**Table 8 Social Monitoring Indicators**

Component	Impact Monitoring Indicators
<b>1. Poverty Reduction</b>	
1.1 Economic development and growth	<ul style="list-style-type: none"> <li>• Number of employment opportunities created directly for both men and women due to the construction of the road</li> <li>• Number of new investment opportunities and businesses created.</li> <li>• Number of businesses (small &amp; big) created by women.</li> <li>• Number of businesses (small &amp; big) created by men.</li> <li>• Number of new employment generated.</li> <li>• Reduction in infant mortality (under 5).</li> <li>• Increase prices for local goods/ production.</li> <li>• Increase on crop and livestock production.</li> <li>• Increase on the use of agricultural inputs.</li> <li>• Relationship and contact created with major market centers outside of the project area.</li> <li>• Growth ratio in the development of trade with the central market.</li> <li>• Availability of service providers, such as hotels, restaurants, etc.</li> </ul>
1.2 Access to Infrastructures & Services	<ul style="list-style-type: none"> <li>• Increase on traffic volume (public and freight).</li> <li>• Number of trips by vehicle carried out by the local population per month/year.</li> <li>• Average time spent to reach social service centers (schools, clinics, etc.)</li> <li>• Average time spent to reach major market and trade centers.</li> <li>• Number of passenger &amp; freight transport providers.</li> <li>• Number of Non Motorized Transport (animal drawn carts, pack animals and bicycles) services.</li> </ul>

Component	Impact Monitoring Indicators
	<ul style="list-style-type: none"> <li>• Number and length of rural roads that link with the project road.</li> </ul>
<b>2. Population Dynamics</b>	
2.1 Demographic trends	<ul style="list-style-type: none"> <li>• Increase of population in the project area.</li> <li>• Increase of migrant population.</li> </ul>
2.2. Project Affected Persons	<ul style="list-style-type: none"> <li>• Number of Project Affected Persons (PAP).</li> <li>• Number of illegal settlements built along the project road.</li> <li>• Measures and principles of compensation payments to PAPs.</li> </ul>
2.3 Impact on quality of life	<ul style="list-style-type: none"> <li>• Problems created on the peace &amp; security of the locality.</li> <li>• Changes in price, goods and services in the market.</li> <li>• Change in quality of life of the local population.</li> </ul>
<b>3. Health outcomes</b>	
3.1 Spread of communicable diseases	<ul style="list-style-type: none"> <li>• Prevalence of diseases, such as malaria.</li> <li>• Number of breeding sites for mosquitoes.</li> <li>• Availability and use of mosquito nets by the local population.</li> <li>• Availability of drugs &amp; medicines in the health clinics.</li> </ul>
3.2 HIV/AIDS	<ul style="list-style-type: none"> <li>• Number of HIV/AIDS infected people before &amp; after the construction of the road among the local population.</li> <li>• Number of deaths occurred due to HIV/AIDS infection.</li> <li>• Level of awareness on the use of condoms.</li> <li>• Availability of condoms and its distribution.</li> <li>• Number of voluntary counselling and treatment centers</li> </ul>
<b>4. Impact on Gender Issues</b>	
4.1 Income generating activities	<ul style="list-style-type: none"> <li>• Proportion of women employed in the road construction and maintenance works.</li> <li>• Number of Female Headed Households (FHH) employed in the road construction and maintenance works.</li> <li>• Average income earned by FHH before and after the construction work.</li> </ul>
4.2 Access to and control over productive factors/assets	<ul style="list-style-type: none"> <li>• Proportion of women having access to transport service and facilities.</li> <li>• Time spent by women for travelling to social service centers, market, water points, and fuel wood collection.</li> <li>• Affordability of transport fares by women and especially by FHH.</li> </ul>
Division of labour	<ul style="list-style-type: none"> <li>• Time allocation of women before and after the construction of the road.</li> <li>• Reduction in women work due to availability &amp; access to transport services.</li> </ul>
<b>5. Participation and Public Consultation</b>	
5.1 Consultation & participation of local population	<ul style="list-style-type: none"> <li>• Involvement of local population in the planning and implementation of road construction and maintenance.</li> <li>• Public consultation in mitigating adverse impacts, involuntary resettlement or relocation.</li> <li>• Consultation with local leaders in mitigating adverse</li> </ul>

Component	Impact Monitoring Indicators
	social and environmental impacts. <ul style="list-style-type: none"> <li>• Contribution of the local population towards the smooth implementation of the construction and maintenance works.</li> </ul>
<b>6. Impact on Education</b>	
6.1 Enrolment of school aged children and quality of education	<ul style="list-style-type: none"> <li>• Number of school children after the upgrading of the project road.</li> <li>• Number of female students before and after the upgrading of the project road.</li> <li>• Number of schools constructed after the upgrading of the project road.</li> <li>• Improvement on the quality and level of education after the upgrading of the project road.</li> <li>• Number of teachers and particularly female teachers after the upgrading of the project road.</li> </ul>
<b>7. Road Safety</b>	
7.1 Injuries and fatalities	<ul style="list-style-type: none"> <li>• Rate of incidence of injuries and fatalities occurred after the road upgrading.</li> <li>• Police and local administration records on injuries and fatalities.</li> <li>• Number of traffic policemen assigned to each woreda.</li> <li>• Number of traffic calming devices and secure crossing points.</li> <li>• Distance between roads and settlements/villages.</li> <li>• Availability of traffic /road signs in all locations it is required.</li> <li>• Replacement mechanism of road signs that are stolen, broken, worn out or damaged.</li> <li>• Education and awareness creating workshops/ seminars conducted for the public.</li> <li>• Education and awareness for school children on road safety.</li> </ul>

## 10. Estimating Social Mitigation Cost

The estimated cost for implementation of the environmental and social mitigation and benefit enhancement measures is provided in Part I of Review of the EIA Report. The cost for compensation/resettlement will be calculated separately in the RAP document which is under preparation at the moment.

## 11. Conclusion and Recommendation

The upgrading of the project road will create better and improved market opportunities for the sale of agricultural produces and consumer goods. When upgraded it will create better market access for the local farmers, and their produces will fetch higher market prices in comparison to the current low prices. Further, due to the introduction and availability of improved agricultural inputs, production per hectare would also increase. Hence, with the increment of agricultural prices and increased production, household income level would also be improved.

The local economy would also show growth with the development of small business, investment projects; growth of urban centers, improved and efficient communication system, exposure to the advancement of technology and science through improved means of production. In general, employment opportunities will be created in the project area with the growth of the economy and improvement in the social services.

The population residing in the project area and in particular those along the project road would like the upgrading of the road to start immediately. In all the public consultations held with different groups of the local community, and government officials as well as professional experts working in the project, it was clear that the local population, PAPs and other stakeholders have expressed positively about the upgrading of the project during public consultations and meetings held in all major towns and woredas located along the project road.

On the down side, the construction of the project road would create some negative impacts on the local population. The negative impacts are mainly related to the spread of communicable diseases, the spread of HIV/AIDS, traffic accidents and injuries. The negative impacts could be managed if proper mitigation measures are carried out, as suggested in this report.

Construction is inherently a relatively dangerous industry, and accidents invariably occur. The presence of even a relatively small number of construction workforces can impose additional strains on the existing weak health services and facilities reducing the effectiveness of the health services and facilities reducing the effectiveness of the health services as far as local populations are concerned.

The upgrading of the project road could be successfully implemented if it properly addresses both the positive and negative social impacts that would be created during the implementation of the project.

ERA in the preparation of its tender document for the construction of the road needs to ensure that clauses both for the environmental and social issues are included as suggested in this study and from other relevant documents. The contractor should also be obliged to implement environmental and social clauses included in the contract document.

The monitoring of the project implementation has to be done on a regular basis by EMSB of ERA, ROW and Sociologist assigned by the supervision consultant. The Sociologist assigned by the supervision consultant has to copy its monitoring report to EMSB and ROW.

Other stakeholders, such as EPA, local authorities and the public also need to be invited and consulted by ERA from time to time and give their opinion and suggestion regarding the implementation of the project. The contractor also has to work in close cooperation with local authorities and strictly adhere to local regulations and ensure to avoid conflict and misunderstanding with local population and government.

In general, there are no socio economic conditions or grounds that will affect the project from not proceeding to its implementation provided that recommended reinforcement and mitigation measures are strictly adhered by all concerned bodies.

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**ANNEXURE**

**Annex One Woreda and Kebele officials met and contacted****Gedo Woreda**

<b>Name</b>	<b>Responsibility</b>
Ato Teshome Murisa	Woreda Administrator
Ato Mekonnen Kebede	Public Service head
Ato W/yohannes Mekonnen	Agriculture and Rural Development Expert
Ato Mesfin Lakew	Natural Resources Expert
Ato Mehib	Municipal Engineer
Ato Derebe Mulatu	Chairman of Ijaji town

**Bako Tibe Woreda**

<b>Name</b>	<b>Responsibility</b>
Ato Jemera Biresa	Woreda Administrator
Ato Adane Arega	Agriculture and Rural Development office Expert
Ato Tsegaye Bonsa	Agriculture and Rural Development Office Head
Ato Tesfaye Zewede	
Ato Yohanes Gudina	Elder
Temesgen Gudeta	Woreda Justice and Security Affairs head

**Gobu Sayo Woreda**

<b>Name</b>	<b>Responsibility</b>
Ato Fikru Ajulu	Woreda Administrator
Ato Adugna Geleta	Agriculture and Rural Development office head
Ato Oli Goshu	Agriculture and Rural Development office Expert
Ato Kumesa Gongga	Elder
Ato Tesfaye Abate	Elder

**Sibu Sire Woreda**

<b>Name</b>	<b>Responsibility</b>
Ato Midekesa Gemehu	Woreda Administrator
Ato Chemedesa Nemera	Agriculture and Rural Development office head
Ato Kinesa Nemera	Natural Resource head
Ato Kumesa Gongga	Elder
Ato Alemu Wakjera	Agriculture and Rural Development office
Ato Melkamu Keen	Elder
Ato Debeli Berkesa	Woreda Administration
Ato Andarge Gameda	
Ato Mulugeta Simon	Member of kebele administration (Chingi)
Ato Girma Wolde Tensaie	Kebele Chairperson (Chingi)

**Gutu Wayo Woreda**

<b>Name</b>	<b>Responsibility</b>
Ato Tesgaye Temesgen	Woreda Administrator

Ato Adisu Bekele	Agriculture and Rural Development Head
Ato Diba Gutu	Natural Ressource head
Ato Chali Kitila	Elder
Ato Gudeta Lemi	Elder
Ato Kaba Mekonen	Nekmte town municipality
Ato Tomas Tekle	Information & public relations head

### Wayo Tuka Woreda

Name	Responsibility
Ato Setotaw Fufa	Woreda Administrator
Ato Getachew Gudeta	Agriculture and Rural Development head
Ato Fekadu Gemechu	Natural Resource head
Ato Takele Hambisa	Elder
Ato Tegegne Jalata	Woreda Administration and Finance head

## Annex Two

## Indicators for the monitoring of Millennium Development Goals

Millennium Development Goals (MDG)	
Goals and Targets	Indicators for monitoring progress
<b>Goal 1: Eradicate extreme poverty and hunger</b>	
Target 1: Halve between 1990 and 2015, the proportion of people whose income is less than one dollar a day	1. Proportion of population below \$1 (PPP) per day 2. Poverty gap ratio (incidence x depth of poverty) 3. Share of poorest quintile in national consumption
Target 2: Halve between 1990 and 2015, the proportion of people who suffer from hunger	4. Prevalence of underweight children under-five years of age 5. Proportion of population below minimum level of dietary energy consumption
<b>Goal 2: Achieve universal primary education</b>	
Target 3: Ensure that by 2015, children every where, boys and girls alike will be able to complete a full of primary schooling	6. Net enrolment ratio in primary education 7. Proportion of pupils starting grade 1 who reach grade 5 8. Literacy rate of 15-24 year-olds
<b>Goal 3: Promote gender equality and empower women</b>	
Target 4: Eliminate gender disparity in primary and secondary education preferably by 2005 and to all levels of education no later than 2015	9. Ratios of girls to boys in primary, secondary and tertiary education 10. Ratio of literate women to men 15-24 years old 11. Share of woman in wage employment in the non-agricultural sector 12. Proportion of seats held by women in national parliament
<b>Goal 4: Reduce child mortality</b>	
Target 5: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate.	13. Under-five mortality rate 14. Infant mortality rate 15. Proportion of 1 year-old children immunized against measles
<b>Goal 5: Improve maternal health</b>	
Target 6: Reduce by three-quarters, between 1990 and 2015 the maternal mortality ratio.	16. Maternal mortality ratio 17. Proportion of births attended by skilled health personnel
<b>Goal 6: Combat HIV/AIDS malaria and other diseases</b>	
Target 7: Have halted by 2015 and begun to reverse the spread to HIV/AIDS	18. HIV prevalence among 15-24 year old pregnant women 19. Condom use rate of the contraceptive prevalence rate 19a. Condom use at last high-risk sex 19b. Percentage of population aged 15-24 with comprehensive connect knowledge of HIV/AIDS 20. Ratio of school attendance of orphans to school attendance of non-orphans aged 10-14
Target 8: Have Halted by 2015 and begun to reverse the incidence of malaria and other major diseases	21. Prevalence and death rates associated with malaria 22. Proportion of population in malaria risk areas using effective malaria prevention and treatment measures 23. Prevalence and death rates associated with tuberculosis 24. Proportion of tuberculosis cases detected and cured under directly observed short course (DOTS)
<b>Goal 7: Ensure environmental sustainability</b>	
Target 9: Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources	25. Proportion of land area covered by forest 26. Ratio of area protected to maintain biological diversity to surface area. 27. Energy use (kg oil equivalent) per \$ 1 GDP (PPP) 28. Carbon dioxide emission (per capita) and consumption of ozone-depleting CFCS (ODP tons)
Target 10: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation	30. Proportion of population with sustainable access to an improved water source, urban and rural 31. Proportion of urban and rural population with

Millennium Development Goals (MDG)	
Target 11: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers	32. Proportion of households with access to secure tenure
<b>Goal 8: Develop a global partnership of for development</b>	
Target 12. Develop further an open, rule-based predictable, non-discriminatory trading and financial system	Some of the indicators listed below are monitored separately for the least developed countries (LDCs), Africa, landlocked countries and small island developing states.
Includes a commitment to good governance, development, and poverty reduction-both nationally and internationally	<u>Official development assistance</u> 33. Net ODA, total and to LDCs, as percentage of OECD/DAC donor's gross national income
Target 13: Address the special needs of the least developed countries includes: tariff and quota free access for least developed countries exports; enhanced program of debt relief for HIPC and cancellation of official bilateral debt, and more generous ODA for countries committed to poverty.	34. Proportion of total bilateral sector-allocable ODA of OECD/DAC donors to basic social services (basic social services (basic education, primary health care, nutrition, safe water and sanitation) 35. Proportions of bilateral ODA of OECD/DAC donors that is untied 36. ODA received in landlocked countries as proportion of their GNLS 37. ODA received in small island developing states as proportion of their GNIS
Target 14: Address the special needs of landlocked countries small island developing states (through the of Action for the Sustainable Development special session of the General Assembly)	<u>Market access</u> 38. Proportion of total developed country imports (by value and excluding arms) from developing countries and LDCs, admitted free of duties. 39. Average tariffs imposed by developed countries on agricultural products and textiles 40. Agricultural support estimate for OECD countries as percentage of their GDP 41. Proportion of ODA provided to help build trade capacity
Target 15: Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term	<u>Debt Sustainability</u> 42. Total number of countries that have reached their HIPC decision points and number that have reached their HIPC completion points (cumulative) 43. Debt relief committed under HIPC initiative, US\$ 44. Debt service as a percentage of exports of goods and services.
Target 16: In co-operation with developing countries, develop and implement strategies for decent and productive work for youth	45. Unemployment rate of 15-24 year-olds, each sex and total
Target 17: In co-operation with pharmaceutical companies, provide access to affordable, essential drugs in developing countries	46. Proportion of population with access to affordable essential drugs on a sustainable basis
Target 18: In co-operation with the private sector make available the benefits to new technologies especially information and communications	47. Telephone lines and cellular subscribers per 100 population 48. Personal computers in use per 100 population and internet users per 100 population

Source: Millennium Development Goals (MDGs); Challenges and prospects for Ethiopia

## Response to the Comments given by ERA on the Draft EIA Review Report

It. No	Reference (page and Section)	Comments	Response
1	Page 16	<ul style="list-style-type: none"> <li>Local community members need to take part in the project planning as well as in the implementation phase and they need to be consulted so that they will get a chance to share their ideas and also participate in the project monitoring and evaluation. Therefore, similarly, the outcomes of the public consultation during the field survey need to be presented in the report, as partly presented on page 16 of the EIA and page 11 of B7</li> </ul>	<p>The discussions and outcomes with local communities are discussed in section 7 of the SIA (Part II of the EIA Review Report) that deals with public consultation and meetings with stakeholders.</p>
2	General	<ul style="list-style-type: none"> <li>Existing experiences from the on-going projects reveals that most projects do not have a provision in the contract for the installation of crossing structures or access roads to houses on the upslope or under fill section areas. These are unforeseen impacts of construction work. There will be places where cuts are expected. Therefore, the likely impacts of construction works in terms of creating impediments, crossing difficulties etc and these where there will be deep cuts requiring crossing need to be assessed and mitigation measures shall be proposed.</li> </ul>	<ul style="list-style-type: none"> <li>The impact has been assessed and mitigation measures proposed under section 4.2.6 (Page 39 and 40) of Part I of the Review of EIA Report.</li> </ul>
3	Page 40 Avoidance and Mitigation Measures.	<ul style="list-style-type: none"> <li>In the mitigation measures for impacts on vegetation, two things need to be applied here. Add the following paragraph in the mitigation measures:               <ol style="list-style-type: none"> <li>1) The removal of trees affected because of construction of the road shall be done in the presence of, in close contact and follow up of the RE and the local Forestry Department and the RE shall take or keep record of the number, type and size of trees to be affected or removed for the purpose of replacement or replanting.</li> <li>2) Because of the low survival rate of the indigenous</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>The proposed mitigation measures are added (see bullet 11, 12 &amp; 13 on page 42) of Part I of the Review of EIA Report.</li> </ul>

It. No	Reference (page and Section)	Comments	Response
		<p>trees, for each removed indigenous trees, for each removed indigenous trees, at least 10 (ten) new seedlings shall be planted. This will also apply for all tree species to be removed. The selection of appropriate tree species and locations of planting shall only be done in consultation with the local Forestry Department.</p> <p>3) Contractor/Consultant shall warn their workforces not to engage in transporting forest product in any case.</p> <p>4) The local police shall be informed, if in case of finding contractor or consultant's vehicle carrying forest products, to let ERA know and take appropriate criminal offensive action.</p>	
4	.....	<p>In all on-going road projects, the word "reinstatement" has become unclear to many construction staff. Therefore, mention all the activities that the word includes.</p>	<p>The term "reinstatement" refers to reclamation of areas affected due to temporary use of land for detours, access roads, borrow pits, site facilities etc. It also includes re-cultivation of abandoned road sections. For roads it includes the removal of the applied select material (pavement), ploughing and covering with topsoil to restore the land to a productive state. For borrow sites it is the re-filling of the pits with topsoil obtained from road cuts and preserved for this purpose and it might include planting with appropriate vegetation to reduce erosion and improve the visual value of the site. The activity also includes proper grading, draining and landscaping to the surrounding environment. In addition see section 4.2.1 (page 35) &amp; 4.2.2 (page 36).</p>
		The health implications of the road-upgrading project	The health implications of the road upgrading

It. No	Reference (page and Section)	Comments	Response
5	.....	have not been mentioned in the report. Therefore, what will be the adverse impacts of the road construction in terms of spreading HIV/AIDS and other disease? What are the appropriate measures? ERA has started incorporating separate costs for the control and prevention HIV/AIDS pandemic in total project cost. Therefore, consider including separate cost for control and prevention activities.	project are presented in the SIA potential negative impacts. These include exposure to communicable diseases on section 14.2.1, exposure to HIV/AIDS and STDs on section 14.2.2, and pressure on health facilities on section 4.2.3. The cost for the control and prevention HIV/AIDS is given in section 4.6 (P. 49) of Part I of the Review of EIA Report.
6	Page 52-54 6.6 Establishment, Set-up and Operation of the Work Camp	<ul style="list-style-type: none"> <li>• Under this section it is advisable to give constructive recommendations on the following critical issues: <ul style="list-style-type: none"> <li>- Possible location options for campsite and batching plant where adverse environmental impacts can be minimized.</li> <li>- Possible proper methods of storage and ways of handling hazardous material (Bitumen, detergents, lubricants, oil, paints, etc)</li> <li>- Your proposal for waste management and sewage treatment plan</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Provided in Table 6.5 (Page 58) of Part I of the Review of EIA Report: <ul style="list-style-type: none"> <li>- Under '<i>Location of site facilities</i>' for the first point;</li> <li>- Under '<i>Storage and handling of hazardous materials</i>' for the second point; and</li> <li>- Under '<i>Waste management and sewage treatment</i>' for the third point.</li> </ul> </li> <li>• Social impact issues that arise from establishment of camps are discussed under the negative impacts and appropriate mitigation measures are also proposed in Part II of the Review Report.</li> </ul>
7	.....	Reporting structure and schedule during implementation of the construction period shall be proposed.	Provided in section 7.4.3 (page 63 & 64) of Part I of the Review of EIA Report.
8		In the " <b>Management and Monitoring plans</b> " part of the report, the different stakeholders or parties who will take part in planning and implementation phases of the construction shall be indicated in the plans. The different activities should not be put only on the ERA, ERA-EMSB, consultant or contractors; rather other Federal or Local level institutions should also implement it.	The institutions that can implement the proposed environmental mitigation/management and monitoring activities have been assigned for the respective activities as given in Table 7.1 (page 65-68), Table 7.2 (page 69 & 70) & Table 8.1 (page 72-74) . These institutions include the Federal and Regional Transport Authorities, Local

It. No	Reference (page and Section)	Comments	Response
			<p>Authorities/ Offices including Woreda Administration/ Council, Agriculture &amp; Rural Devt, Health &amp; Education Offices, and Traffic Police.</p> <p>Under the social monitoring federal, regional and local level government, NGO and civil societies are mentioned.</p>
9	Page 4, under the benefits of the road upgrading	Under the benefits or the road upgrading, please state others like the reduction in transport costs which will be one point of concern and also as how that will be implemented. On the same page, under the negative impacts include the increase in the traffic accidents and other anticipated impacts.	<ul style="list-style-type: none"> <li>• Reduction in transport cost is discussed in the potential positive impacts of the SIA.</li> <li>• Impacts on road safety and increased traffic accidents are discussed under the negative impacts in section 14.2.8 (under road safety section) of the SIA.</li> <li>• Traffic accident is also discussed under road safety section.</li> </ul>
10	.....	The previous EIA study carried by KOCKS was done to a very good quality and any other remaining outstanding issues shall be added by the Consultant to upgrade or enrich the previous studies.	<p>Substantial improvements to the EIA study carried by KOCKS have been made by carrying out site specific and detailed surveys and additional data collection to fill the deficiencies identified (see Appendix 7). In particular emphasis was given for the proposed realignments and some of them are proposed for reconsideration during the engineering design review, including with possible alternatives with less (minimal) environmental impacts.</p> <p>KOCKS report had limited sections on SIA. The present SIA is much broader and includes social impacts that were not discussed in the KOCKS report (see Part II of the EIA Review Report).</p>

It. No	Reference (page and Section)	Comments	Response
<b>New Comments added after the "Presentation" by the Review Consultant</b>			
11	.....	One of the main objectives of carrying out EIA for road projects is to assess and identify the likely impacts of the road construction works on the environment and propose appropriate mitigation measures for each impact. Then these impacts and mitigation measures need to be reflected in the tender documents or should be itemized in the BOQs. Therefore, identify all the key and important environmental issues to be considered during the second phase of the review study by the Design Consultant.	The key environmental issues that would be considered during the RAP preparation and the second phase of the review study are outlined in Chapter 5 (section 5.2) and Chapter 7 [section 7.2 (7.2.1, 7.2.2 & 7.2.3)] of Part I of the Review of EIA Report.
12	.....	Mention in the report, all the key findings of the consultant on the major gaps b/n the previous EIA report and the review study.	Given in section 1.4.2 and Appendix 7 of Part I of the Review of EIA Report. Concerning the social part the major gaps between this report and previous (KOCKS) is that this one details out policy, legal administrative framework. It discusses all relevant policy documents of FDRE, legal aspects of the constitution and different proclamations, identifies the institutional framework and all concerned bodies or stakeholders. It also details out social impacts (reinforcement and mitigation measures) for the impacts, and some of the impacts such indigenous people, etc that were not discussed. It also spells out the social monitoring plan and indicators.
13	.....	The EIA Consultant should consider also the traditional irrigation channel crossings. Propose all possible mitigation measures to the impacts of road upgrading project on these traditional irrigation channels. What type of compensatory measures is applicable to these impacts? What are the possible mitigation measures for the wetlands that are going to be traversed by the road?	Detailed data on the irrigation schemes including their exact location and the impact of the road upgrading activities on the diversion channels are given in section 3.1.6 (including Table 3.5) and sect. 4.2.4 respectively. Possible mitigation measures are also given in sect. 4.2.4 (last Parag.).

It. No	Reference (page and Section)	Comments	Response
			Mitigation measures for the impacts on wetlands are provided in section 3.3.3 (last Para.). All of these are in Part I of the Review of EIA Report.
14	.....	Quantify the impacts of the realigning the road sections at some location all along the road project What number of trees, houses, public utilities and other properties to be affected because of realigning the road section?	The quantification of utilities is worked out and provided in the RAP document.
15	.....	As an independent topic, please present the result of the outcome of "Public Consultation". What are some of the local people commitments? What will be the role of other stakeholders in the project implementation?	The discussions and outcomes with local communities are discussed in section 7 of Part II of the Review Report that deals with public consultation and meetings with stakeholders.
16	.....	What will be the mitigation measures for the possible traffic accident problem? Indicate all the mitigation measures for this problem and recommend in the report that the Contractor should prepare a "Traffic management Plan" during construction period.	Provided under section 4.4.1 of Part I of the Review of EIA Report.
17	ROW Issues	At some road projects, in town sections to reduce the adverse impacts the ROW width are reduced to 20m, while for many safety reasons, the normal 30m ROW width is kept as usual. Consider revising the ROW issue with the ERA ROW Branch.	The analysis involving the width of ROW has been revised as per the Comment, for example section 4.2.1 and Appendix 6 of Part I of the Review of EIA Report.
18	.....	Indicate in the report that fill sections in towns and rural villages should be avoided and the Design Consultant should be aware of this issue during the Design Review Phase.	Provided in section 4.2.6 and section 7.2.1 of Part I of the Review of Environmental Impact Assessment Report.
19	.....	Include capacity building, institutional set up, and mitigation costs in the report.	<ul style="list-style-type: none"> <li>• The proposed capacity building and institutional set up requirements are provided in section 7.6 of Part I of the Review of EIA Report.</li> <li>• The estimated mitigation costs are given in section 4.6 of Part I of the Review of EIA Report.</li> </ul>

**GEDO - NEKEMT ROAD PROJECT**  
**Response to the Comments given by the World bank EIA Review Report**

It. No	Subject	Comments	Response
1	Executive Summary	<p>(a) <i>Absence of Summary (matrix) of environmental and social impact and mitigation measures</i></p> <p>(b) <i>Absence of cost/budget for environmental mitigation measures.</i></p>	<p>(a) Provided under <i>Summary of Environmental Impacts and Mitigation Measures</i> on Page vi and vii..</p> <p>(b) Given on Page ix under <i>Cost Estimate for Environmental Mitigation Measures.</i></p>
2	Policy and Legal Framework	<p><i>Reference to OD 4.30 (pp. 13, 28 etc, ) should be replaced with OP. 4.12. Also, multilateral environmental related agreements signed by the Federal Democratic Republic of Ethiopia (FDRE) absent and should be presented. In addition, the EIA should correct the statement advancing that the ERA right of way branch (p.7.etc.) is part of the legal division; the branch is part of the Contract Administration Division.</i></p>	<ul style="list-style-type: none"> <li>- OD 4.30 is replaced by OP 4.12 on Page 13, section 2.4.2..</li> <li>- Multilateral Environmental Related Agreements are outlined under Sect. 2.5, Page 14.</li> <li>- The Right of Way Branch is corrected as part of Contract administration Division.</li> </ul>
3	Environmental Condition of Project Area	<p>The social environment has been neither described nor analysed. <i>The EIA report should include a description of the social environment, including: population, demography, culture/ethnic groups, socio-economic profile, and cultural heritage.</i></p>	<p>The social environment is described in Part II of the EIA Review Report.</p>
4	Environmental Impacts	<p>(a) Water erosion from culverts is a main source of erosion on farms downstream, and subsequent loss of sources of income, the experience of APL1 and APL2 have shown, particularly in mountain areas. <i>The EIA should highlight this issue and suggest mitigation measures, particularly as water erosion has been identified as an existing problem.</i></p> <p>(b) The social impacts are not quantified. <i>The EIA report would benefit from quantifying, at least, impacts on involuntary</i></p>	<p>(a) The reply to Comment (a) is provided under section 4.2.1 Soil Erosion and Siltation, Parag. 3 Page 34.</p> <p>(b) Social impacts are quantified in the Resettlement Action Plan document.</p>

It. No	Subject	Comments	Response
		<i>resettlement. How many house holds are deemed to be affected by loss of houses and loss of land?</i>	
5	Environmental Mitigation Planning and Monitoring	<p>The plan falls short in making a distinction between internal monitoring and external monitoring.</p> <p><i>The EIA should specify the roles of various actors, the ERA, the national and regional EPA, who will do what, in terms of internal and the external monitoring.</i></p> <p>The subject listed in table 8.1 as indicators, are not quantifiable indicators. <i>The table should be reviewed and quantifiable indicators be introduced.</i></p>	<p>- The environmental mitigation plan including the main impacts, their mitigation measures and institutional arrangement for implementation and monitoring are provided in Chapter 6.</p> <p>- Measurable monitoring indicators are provided in Table 8.1.</p>
6	Institutional Capacity	<p>(a) The EIA report falls short in presenting the organisation of the ERA. (b) There is no institutional analysis of the ERA capacity to address environmental impact assessment issues and carry out a successful implementation of the EMP.</p> <p><i>The EIA should provide a brief overview of ERA's capacity and suggest ways that it can be improved.</i></p>	ERA's capacity to implement the EMP is described under section 7.6 including the suggested additional requirements.
7	Disclosure	<p>Bank disclosure policy not mentioned.</p> <p><i>The EIA should present Bank disclosure policy.</i></p>	The World Bank Disclosure Policy will be presented in the Final Report, possibly together with reply to EPA's comments.
8	Annexes	<p>(a) absence of TOR for the EIA. (b) Absence of OP. 4.01 and key Ethiopian legal texts (c) Absence of minutes from consultations.</p> <p><i>The EIA should incorporate these documents, to the extent possible.</i></p>	The TOR, OP 4.01 and key Ethiopian legal texts will be provided in the Final Report. The minutes of public consultations are provided in the RAP report.