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Consultancy Service for Design Review of Phase-II Galchet-Sarite Water Supply Project

ENVIROMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT

(Final)

TARN CONSULTANCY

Water Resource and Environmental Engineering

Email: tegegnalex@gmail.com or tegegn.a@tarncon.com
Tel: +251-116928242
Mobile: +251-911492976
Fax: +251-116929192
Web: www.tarncon.com

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ACRONYMS

AfDB	Africa Development Bank
CAW	Climate Action Window
CO	Carbon Monoxide
CSR	Corporate Social Responsibility
dBA	Decibel
EC	Ethiopian Calendar
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ESAP	Environmental and Social Assessment Procedures
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EMP	Monitoring Management Plan
ESOS	Environmental and Social Operational Safeguards
FDRE	Federal Democratic Republic of Ethiopia
GTP	Growth and Transformation Plan
IFC	International Financial Corporation
ILO	International Labor Organization
ISS	Integrated Safeguard System
Km^2	Kilometer Square
KPI	Key Performance Indicators
NBP	National Biodiversity Plan
NBSAP	National Biodiversity Strategy and Action Plan
NOx	Nitrogen Oxide
OHS	Occupational Health and Safety
OP	Operational Policy
OS	Operational Safeguard
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment
PH	Potential Hydrogen
RAP	Resettlement Action Plan

SDG	Sustainable Development Goal
SESA	Strategic Environmental and Social Assessment
ToR	Term of References
UN	United Nation
UNICEF	United Nations International Children's Emergency Fund
WASH	Water, Sanitation and Hygiene
WB	World Bank

EXECUTIVE SUMMARY

0.1 Introduction

The Web Route Water Supply System project is a pivotal initiative under the Borana Resilient Water Development for Improved Livelihood Program Phase II, part of the broader Climate Action Window (CAW) program. This water supply project seeks to address critical water scarcity issues in the Borana Zone, an area heavily impacted by climate change and recurrent droughts. The project involves the construction of essential infrastructure, including reservoirs, transmission pipelines, distribution lines, water points, and cattle troughs. The Environmental and Social Impact Assessment (ESIA) for this project is designed to thoroughly evaluate potential environmental and social risks associated with the construction and operation of the water supply system. The ESIA will identify any adverse impacts on the environment; including water source depletion, habitat disruption, and waste generation, as well as social concerns such as displacement and health and safety risks. By identifying these issues early, the ESIA provides a framework for implementing appropriate mitigation measures to minimize the negative effects and ensure the long-term sustainability of the project. Given that the region is highly vulnerable to droughts, water scarcity, and other climate-related challenges, this assessment is crucial for anticipating and addressing these risks. The project is designed with climate resilience in mind, focusing on sustainable water management and ensuring that the infrastructure is built to withstand future climate shocks. Moreover, the ESIA aligns with national environmental guidelines and adheres to the African Development Bank's (AfDB) Integrated Safeguard System (ISS), which are instrumental in ensuring that the project meets high environmental and social standards. By following these procedures, the project will not only mitigate environmental harm but also enhance community benefits, improve public health, and promote economic development through better access to water The main objective of the ESIA study as stated in the TOR is to identify, assess and mitigate the potential adverse and localized environmental and social impacts of Robe Town water supply and sanitation project, and to recommend appropriate environmental and social management measures to be implemented during construction, operation and maintenance of the project.

0.2 Policy and Legal Framework

The existing national environmental policies and legislations as well as the African Development Bank's (AfDB) Integrated Safeguard System (ISS) and Safeguard Policies that are most relevant for this ESIA study are reviewed.

0.3 Baseline Description Physical Environment

The project area) is characterized by flat to slightly undulating plain topography. The overall topography is smoothly declining towards east and southeast with elevation ranging from 1101 m to 1969m asl.

The project area is characterized as semi-arid climate with mean temperature is between 17.5oC and 17.5oC. The geological formation of Borena area is dominantly covered by Precambrian orogenic deformation and Phanerozoic extensional tectonics. Structural features noted in the area include metamorphic foliation, lineation and folding, primary igneous layering, faults and lineaments. Ten dominant soil groups were also identified in the study area such as Cambisols, Vertisols, Luvisols, Fluvisols, Leptosols, Calcisols, Andosols, and Nitisols. Camisols, Luvisols, Vertisols, and Nitosols.

The Weib Route Water Supply Project is situated within Genale-Dawa River basin. There is no river or streams to be crossed by any of the project component. The drainage orientation is attributed to parallel drainage pattern and joins Genale River at different places.

Biological Environment

The project area has little undistributed natural vegetation. The original vegetation of the project area has been highly modified by human activities (grazing) and currently is covered by some shrubs and shrubs.

Since most part of the project area is highly disturbed and contains heavily degraded habitats, it contains very limited wildlife resources. Nevertheless, some parts of the periphery areas of the town have Plantation/Forest which makes important habitats for some wildlife species. The terrestrial wild animals inhabiting the project area include Hyenas, Anubis baboon, Grivet monkey, Colobus monkey, Bush duiker and Common jackal. In addition, the project area contains a variety of birdlife.

Social Environment

The total population of Dubluk Woreda is 85, 414, with 53% male and 47% female. Approximately 85% of the population resides in rural areas, while the remaining 15% live in urban areas. Table 8 below shows the total population of Dubluk Woreda disaggregated by kebeles, households and sex. The main economic activity in the area is livestock herding and agriculture activities.

0.4 project Description

The Climate Action Window (CAW) project, an extension of the Borana Resilient Water Development for Improved Livelihood program, is set to benefit over 15,000 male and female residents across three kebeles in Dubluk Woreda. The project is also designed to serve more than 18,000 individuals by providing access to sanitation and hygiene infrastructure.

The project includes the installation of a 34-kilometer pipeline and distribution line, along with one reservoir. Additionally, 15 water taps for human use and 15 cattle troughs will be constructed to fully support the project's goals.

Furthermore, the project plans to develop approximately 200 hectares of watershed and landscape management around the source area, creating around 900 direct job opportunities. As part of its climate-smart water infrastructure initiative, the project will also include the construction of 30 biodigesters within the project area.

0.5 Potential Impacts and Mitigation measures

a. Beneficial Impacts

The significant positive impacts of the planned Weib Route water supply system is associated with provision of safe and adequate potable water supply. The most positive effect of the project would be improvement of public health status through reduction of the prevalence of water-borne and water related diseases that may be caused by drinking contaminated water and due to shortage of safe water for cleaning of cooking and eating utensils. Other important positive impacts include promotion of women's welfare, creation of employment opportunities, avoidance of

extra expenditure for buying water from vendors and reduction of school dropout.

b. Adverse Impacts on Physical Environment

***Soil erosion and contamination*:** Installation of the various components of the project would involve cutting in soil and earthmoving works that will cause destruction of the soil structure and ultimately expose it to erosion by runoff water and contamination. The project area has climatic and topographic conditions that can intensify soil erosion. The potential impacts on soils can be minimized through execution of the construction works during the dry season, refilling the exposed soils soon, ploughing the compacted areas, reducing the time surface remains bare following completion of works, and preparing surface for re-vegetation and replanting appropriate grass, shrub and/or tree species as soon as possible.

Landscape Alteration and Aesthetic Impacts: Reservoirs, pipelines and water points could alter the natural landscape. In rural or natural areas, this can affect the visual appeal of the environment. While this is often a less tangible impact, it can still be of significant concern for communities who have cultural or aesthetic attachments to the land.

Impacts on Water Resources and Drainage Line: The Weib Route Water Supply Project construction area is located in the Genale Dawa River Basin system that drains the south eastern part of Ethiopian lowland. There is no river and stream to be directly crossed or affected by any of the project components. Only minor drainage lines and some gullies are observed along the transmission pipeline routes. Construction activities, particularly those that involve land disturbance such as pipeline trenching, reservoir digging, and the installation of water points, can lead to soil erosion. Schedule the construction period impact season to avoid this impact.

***Impacts on Air and noise Quality*:** During the construction phase, there will be short-term and localized impacts on air and noise quality due to dust, exhaust emissions and noise generated by the construction activities. In order to minimize the extent of air and noise pollution and their effects, during construction the Contractor shall follow good site practices by incorporating appropriate mitigation measures to reduce dust production, nuisance noise and vehicle emissions.

0.6 Adverse Impacts on Biological Environment

Impacts on shrub land Vegetation: Activities related to construction of the various components of the project will cause some damage to natural shrub land vegetation. The impacts on natural vegetation and remnant trees can be reduced by restricting clearing or removal of trees to the imperative area needed for the project activities. In addition, a replanting program shall be implemented to compensate for the vegetation or trees lost due to the project activities. In the planting program priority shall be given to indigenous tree species.

Impact on Wildlife: temporary disturbance and no need for separate mitigation plan.

0.7 Adverse Impacts on Socio-Economic Environment

***Impacts on grazing and some farm Lands*:** Installation of the reservoirs, water points, cattle troughs and guard house will affect some plots of communal on permanent basis. On the other hand, grazing and farmlands will be affected on temporary basis due to trenches excavation and compaction by heavy equipment used in the construction works. Recommended mitigation measures include restoration and

reinstatement of the affected grazing and farmlands to productive state.

***Obstruction due to trenching*:** Installation of the new water transmission lines and distribution systems would cause obstruct mobility's of animals and humans temporarily. In addition, the excavation works for pipe trenches and mobilization of materials may cause interruption of vehicular traffic flows and pedestrian movements. Besides, the trench excavated and left open for sometimes could be a danger for local people especially children, women, elderly people and persons with disabilities, as well as for animals while it may cause obstruction to their mobility. Proposed mitigation measures include reinstatement of the damaged sections of the infrastructures to original state as soon as the works are completed, the excavation condition of the trench shall be in such a way that there would be minimum danger for the vehicular traffic, local people and animals, and placing appropriate signals at the excavation sites and prohibiting the sites for people and animals.

Impacts on Health: Potential impacts on public health during the construction phase are related to creation of breeding sites for vector mosquitoes that transmit malaria and spreading of HIV/AIDS and other STDs. During the operation phase, there would be some adverse impacts on public health, which is basically related to increased volume of wastewater that may attract disease vectors and consequently leave people vulnerable to diseases. Mitigation measures include avoiding creation of pools of water where insect vectors of diseases may breed, provision of awareness raising and education programs about HIV/AIDS and other STDs for construction workers and provision of adequate drainage facilities for disposal of wastewater.

0.8 Public and Stakeholders Consultations

The Constitution of Ethiopia through its Articles 43 and the Environmental Policy of the FDRE require the need to involve the interested and affected parties in the planning and implementation of development policies, programs and projects. Also, many donor agencies including the AfDB require different consultations with the concerned public and stakeholders and public comments on the ESIA Report before consideration by decision makers. In line with these policy and legal requirements, different consultations have been carried out with the key stakeholders including the project affected people, and the findings of these consultations are considered in the environmental and social impact analysis and development of mitigation and management plan.

0.9 Project Alternatives

The alternatives considered in this ESIA include alternative water sources and location, alternative construction method, alternative mitigation measures and the alternative "without project". In the feasibility study of alternative water sources for the Weib water supply system, it was determined that ground water is the only feasible alternative to meet the project objective. No other technically and economically feasible alternatives have been found to achieve the functions of the planned water supply system.

In the consideration of alternatives construction methods for the project sections or components located in or nearby environmentally or socially sensitive areas, it was found that use of manual labor and simple equipment instead of heavy-duty machinery would avoid or minimize a number of potential environmental and social impacts. In the alternative "without project" analysis, it was found that the "without

project" option is not acceptable, and it is recommended that the envisaged project would be implemented in order to address the potable water shortage in the area.

0.10 Environmental Management and Monitoring Plan and Costs

The Environmental and Social Management Plan (ESMP) presented in this document links the impacts identified and mitigation measures proposed in the ESIA Report and the responsibilities for implementation and monitoring. Also, it indicates the time horizon over which the mitigation measures to be executed, and where necessary, cost estimates of the mitigation measures. Details of the recommended environmental management activities are synthesized in matrix which is presented in Table 17. Environmental monitoring will be required both during the construction and operation phases of the project in order to check whether the proposed mitigation measures are properly implemented and the performance of the implemented measures, as well as the occurrence of any unforeseen impacts. Details of the proposed monitoring program are provided in Table 18.

The proposed Environmental Management and Monitoring Plan also include indication of the institutions and other bodies responsible for implementation of the proposed environmental and social management and monitoring actions. Further, it comprises the training requirements for the key institutions to strengthen their capacity in environmental management and monitoring activities. Moreover, the EMP included estimates of the costs necessary to implement the recommended environmental mitigation, management, monitoring and training programs, and this was found to be about **10.76 million Ethiopian Birr or 0.86 million USD.**

0.11 Conclusions and Recommendations

Currently Dubluk woreda has a significant shortage of safe drinking water supply and sanitation facilities. The existing water supply system is far from satisfactory particularly in terms of quantity and distribution. Sanitation in the town is also deficient as reflected by inadequate facilities for disposal of human excreta, refuse material and wastewater. There is therefore a pressing need to address the water shortage and sanitation problems in Dubluk in order to improve the quality of life of the people, generate economic development, create employment and reduce poverty.

Implementation of the planned water supply project is expected to alleviate the scarcity of potable water supply in Dubluk, improve public health and women's welfare, enhance investment and economic development, create employment, reduce poverty and ultimately improve the quality of life of the people.

On the contrary, implementation of the project will bring a number of adverse environmental and social impacts during the construction and operation phases. The important impacts during the construction phase include increased soil erosion, loss of plantation forest/trees, air and noise pollution, disruption of residential and business areas, damages of physical infrastructures, obstruction of traffic mobility and safety hazards, increased risks of malaria and HIV/AIDS and other STIs, and interruptions of the existing water supply system during pipeline connections. Nevertheless, most of these and other identified potential problems are temporary and localized impacts that can be minimized to acceptable levels through good construction methods and adoption of appropriate mitigation measures that are specified in this document.

The significant environmental or social issues during the operation phase are water pollution hazards associated with disposal of the residual sludge released from the

water treatment plant, increased risks of malaria transmission related to increased volume of wastewater and lack of drainage facilities for disposal of such wastewater, high sediment loading of the raw water during rainy season, and source water pollution potential from application of agricultural chemicals in the catchment. These potentials problems can be minimized by implementing corresponding mitigation measures including those specified in this ESIA Report.

Therefore, it can be concluded that there are no severe environmental or social impacts, or other grounds that will prevent the planned water supply project from not proceeding to its implementation provided that the mitigation measures shown in this document are strictly implemented and monitored.

In order to have minimal and acceptable residual environmental and social impacts, and enhance the potential benefits, it is recommended that the proposed mitigation measures are properly implemented at the right time and necessarily follow up of their effectiveness is made through well-planned monitoring program.

1. INTRODUCTION

1.1. Background

The Web Route Water Supply System project is a pivotal initiative under the Borana Resilient Water Development for Improved Livelihood Program Phase II, part of the broader Climate Action Window (CAW) program. This water supply project seeks to address critical water scarcity issues in the Borana Zone, an area heavily impacted by climate change and recurrent droughts. The project involves the construction of essential infrastructure, including reservoirs, transmission pipelines, distribution lines, water points, and cattle troughs. Additionally, it will provide vital community and institutional sanitation facilities in Dubluk Woreda, which encompasses several kebeles such as Fulo Bikka, Kersa Dambi, and Higo. These facilities will serve various villages and local settlements, known as olla's, enhancing both human and livestock access to clean water.

The Environmental and Social Impact Assessment (ESIA) for this project is designed to thoroughly evaluate potential environmental and social risks associated with the construction and operation of the water supply system. The ESIA will identify any adverse impacts on the environment, including water source depletion, habitat disruption, and waste generation, as well as social concerns such as displacement and health and safety risks. By identifying these issues early, the ESIA provides a framework for implementing appropriate mitigation measures to minimize the negative effects and ensure the long-term sustainability of the project.

Given that the region is highly vulnerable to droughts, water scarcity, and other climate related challenges, this assessment is crucial for anticipating and addressing these risks. The project is designed with climate resilience in mind, focusing on sustainable water management and ensuring that the infrastructure is built to withstand future climate shocks. Moreover, the ESIA aligns with national environmental guidelines and adheres to the African Development Bank's (AfDB) Integrated Safeguard System (ISS) , which are instrumental in ensuring that the project meets high environmental and social standards. By following these procedures, the project will not only mitigate environmental harm but also enhance community benefits, improve public health, and promote economic development through better access to water.

1.2. Author of the ESIA

This report has been prepared by TARN Consultancy Firm, who conducted the Environmental and Social Impact Assessment (ESIA) for the Web Route Water Supply System sub-project through its senior Environmental and Social Consultants. TARN Consultancy is an Ethiopian private based in Addis Ababa with extensive experience in environmental and social impact assessments in water supply and sanitation projects. The consultancy has successfully carried out Environmental Management Plan (EMP) studies for various development projects across the country. With their in-depth expertise, the team has ensured a comprehensive evaluation of the project's potential environmental and social impacts, offering practical recommendations for the sustainable development of the water supply system while effectively managing any adverse impacts.

1.3. Overview of the Promoter

The Borana Resilient Water Development for Improved Livelihood Program, funded by the African Development Bank, is being implemented under the Bureau of Water and Energy of Oromia. This program focuses on water infrastructure development, integrated watershed management, and the enhancement of institutional and public sanitation and hygiene facilities.

In response to the pressing issues of water scarcity and the impacts of climate change in the Borana region, the Bank has decided to fund a new Climate Action Window Program to further address these challenges. As part of this initiative, an Environmental and Social Impact Assessment (ESIA) for Web Route Water Supply System sub project has been prepared to ensure the project aligns with both national standards and the Bank's environmental and social requirements.

The consultancy responsible for this study is fully committed to the process and is working in close partnership with the assessment team, following the guidelines and Terms of Reference (TOR) established by the project coordination unit.

1.4. Why ESIA

An Environmental and Social Impact Assessment (ESIA) is required to evaluate the potential environmental, social, and health impacts of a proposed project before it is implemented. The primary purpose of an ESIA is to ensure that any negative effects on the environment and local communities are identified, mitigated, and managed. It helps decision-makers understand the potential consequences of a project and make informed choices.

In Ethiopia, the ESIA process is mandated by the government under Proclamation No. 299/2002, particularly for projects that could impact sensitive ecosystems or lead to significant environmental changes. By conducting an ESIA, the project can align with sustainable development goals, ensure legal compliance, meet Banks' integrated safeguard system and minimize adverse effects on both the environment and society.

1.5. Objective of the ESIA

1.5.1 General Objective

The objective of the Environmental and Social Impact Assessment (ESIA) for the Web Route Water Supply System sub-project is to evaluate the potential environmental, social, and health impacts of the proposed water supply project. It aims to identify potential risks and recommend mitigation measures to address any negative effects. The ESIA seeks to support sustainable development, inform decision-making, and ensure compliance with legal and regulatory requirements.

1.5.2 Specific Objectives

The specific objectives of the ESIA for the Web Route Water Supply System sub-project are to:

- Assess environmental impacts, including effects on water resources and ecosystems.
- Evaluate social impacts on local communities, land use, and public health.
- Identify potential health risks and propose mitigation measures.
- Ensure compliance with legal and regulatory requirements.

- Promote sustainable development by balancing economic, social, and environmental factors.
- Engage stakeholders for input and address concerns.
- Propose strategies for monitoring and managing impacts throughout the project lifecycle.

1.6. Scope of the ESIA

The scope of the Environmental and Social Impact Assessment (ESIA) for the Web Route Water Supply System sub-project is located in Borana Zone, Dubluk Woreda, specifically focusing on three Kebeles: Namely Higo (including Dambala Imu and Dambala Dima villages), Fulo Bika (including Dambala Kersa and Olla Dida Fora villages), and Kersa Dambi (from Dof village to Katte village, including Olla Gollicha Guyyoo villages). The assessment will evaluate the potential impacts of water supply infrastructure, including water pipelines, distribution lines, and two booster reservoirs located near Katte village of Kersa Dambii kebele and Dambala Dima village in Higo Kebele.

The ESIA will assess the environmental, social, health, cultural, and legal impacts of the proposed project. It will evaluate the potential effects on local ecosystems, water resources, and biodiversity, as well as the social implications for local communities, such as land use, displacement, and livelihoods. Health risks related to waterborne diseases and sanitation will also be considered. The assessment will ensure compliance with African Development Bank /AfDB/ ISS, national and local regulations and propose mitigation measures to minimize potential negative impacts. Additionally, a framework for ongoing monitoring and adaptive management will be included to address emerging challenges throughout the project's lifecycle.

1.7. Approach and Methodologies

1.7.1. Approach

The approach to the Environmental and Social Impact Assessment (ESIA) study for the Web Route Water Supply System sub-project is built on two key principles: participatory and integrated approaches**.** These approaches ensure that the assessment is comprehensive, inclusive, and grounded in local realities, leading to more effective and sustainable outcomes. The information collected through both participatory and integrated approaches is then analyzed and synthesized into the ESIA report. This ensures that all relevant concerns, risks, and mitigation measures are addressed in the study. The participatory approach allows for a more holistic understanding of community needs and potential project impacts, while the integrated approach ensures that these findings are in line with broader development objectives and legal frameworks.

Together, these approaches help to ensure that the ESIA study not only identifies and mitigates potential risks but also supports sustainable development that benefits local communities and adheres to regulatory requirements. By incorporating community input, the ESIA becomes a tool for fostering trust and ensuring that the water supply project is socially acceptable, environmentally sustainable, and legally compliant.

1.7.1.1. Participatory Approach

The participatory approach is central to the ESIA process, emphasizing the active involvement of local communities, stakeholders, and relevant authorities in the

identification and assessment of potential impacts. This approach helps in gathering firsthand information about local concerns, priorities, and expectations from the project. Through community consultations, public meetings, and surveys, the perspectives of the affected populations, including those in the villages of Higo, Fulo Bika and Kersa Dambi kebeles, were collected from a total 44 participants during the field visit conducted from 12-17 December 2024. These consultations allow communities to voice their concerns regarding potential environmental, social, and health impacts, including issues such as water availability, land use changes, and possible displacement. The input gathered from these interactions is directly integrated into the ESIA report, ensuring that the study reflects the concerns and suggestions of those who will be most affected by the project.

1.7.1.2. Integrated Approach

The integrated approach involves collaboration between various levels of government and relevant stakeholders. This ensures that the ESIA study is conducted thoroughly and that the diverse factors influencing the project's success are considered. At the local level, consultations with community members were complemented by the expertise and oversight of local authorities from the Borana Zone, Dubluk Woreda, and the Kebeles during the field visit conducted from 12-17 December 2024. These stakeholders provided critical input regarding regional development plans, land use patterns, and legal frameworks governing water resources and environmental protection.

The involvement of these local authorities also ensures that the ESIA is aligned with regional and national development goals, environmental regulations, and social policies. By working closely with government agencies, the ESIA study integrates both local knowledge and technical expertise, resulting in a more robust assessment of the potential impacts and risks of the project.

1.7.1.3. Methods of Data Collection

Various data collection tools and techniques were employed in this ESIA study. Key methods included community consultations, stakeholder engagement, desk and document reviews, and field-level observations. These methods helped identify a range of concerns, opinions, and issues raised by stakeholders. Additionally, primary field-level observations and community consent and secondary data were incorporated into the ESIA report, ensuring that the study was both inclusive and relevant.

As a result, desk review was done from 20-November 2024 through 15 December 2024. Data collection from community consultation and stakeholder engagement were conducted during the field visit carried out from 12-17 December 2024. In addition, primary data were collected though observation of the baseline environment during the site visit.

2. ENVIRONMENTAL POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This section briefly describes the policies, legislations and institutional framework that are most relevant to the proposed airfield and access road construction project.

2.1. Environmental and Other Relevant Policies

Ethiopia has different levels of policy and legislative frameworks that cover various aspects of environmental management and sustainable development issues. This includes the Constitution, which provides the foundation for all policies and legislation, the National Environmental Policy (NEP) which provides the framework for

environmental legislation and sectorial policies and legislation that deal with specific sectorial environmental issues.

2.1.1. The Constitution of FDRE

The Constitution of the Federal Republic of Ethiopia (FDRE) provides the overriding principles and legal provisions for all legislative frameworks in the country. The concept of sustainable development and the environmental rights of the people are enshrined in the Constitution's Article 43 and 44. Article 43 gives the right to people to improved living standards and to sustainable development.

Article 44 provides that all people have the right to a clean healthy environment and further emphasizes that the pollutants shall pay in violating the basic right. Article 92 states that the design and implementation of development programs and projects shall not damage or destroy the environment. It also provides people with the right to consult and expression of views on the planning and implementation of environmental policies and projects that affect them directly. The Government and citizens shall have the duty to protect the environment and mitigate the affected parts. Further, Article 44.2 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 strong relevance to the resettlement action plan which will be undertaken while involved in such projects.

According to these provisions of the Constitution, the project has the duty to protect the environment and mitigate the damage caused in relation to the road works and its subsequent operation. In addition, people who have lost their landholdings and properties due to land acquisition for the purpose of the project work and other related activities are entitled to be compensated for similar land and financial compensation for the lost assets. The Resettlement/Rehabilitation Policy also appropriately recognizes that Article 44.2 of the Constitution provides the basis for the compensation procedures and the legal framework for its Resettlement and Rehabilitation Policy.

2.1.2. The Environmental Policy of Ethiopia (EPE)

The Environmental Policy of Ethiopia (EPE) was issued in April 1997. The overall policy goal is to improve and enhance the health and quality of life of all Ethiopians, to promote sustainable social and economic development through sound management and use of natural, human and cultural resources and their 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.

EIA policies are included in the cross-sectoral environmental policies and the policies emphasize the early recognition of environmental issues in project planning, public participation, mitigation and environmental management, and capacity building at all levels of administration.

The policy also establishes the authority of the Environmental Protection Agency (EPA) to harmonize sectorial development plans and to implement an environmental management program for the country. It also imparts political and popular support to sustainable use of natural, human-made and cultural resources at the federal, regional, zonal, Woreda and community levels.

2.2. Sectorial Policies

The Government of Ethiopia has issued several sectorial policies and strategies that are aimed at the protection of environment and promote sustainable development in the country. The pertinent policies and strategies relevant to road development are presented below.

2.2.1. Water Resource Policy

The Ministry of Water and Energy, the then Ministry of Water Resources, formulated the Federal Water Resource Policy in 1998 for 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 utilization of the available water resources for socioeconomic development on a sustainable basis. The document includes policies to establish and institutionalize environment conservation and protection requirements as integral parts of water resources planning and project development. Policy on Public Health

Ethiopia's health policy was first issued in 1993 and revised in April 1998, with the aim of giving special attention to women and children, neglected segments of the population, and to victims of manmade calamities and disasters. The priority areas of the policy are in the field of Information, Education and Communication (IEC) of health to create awareness and behavioral change of the society towards health issues with direct emphasis on the control of communicable disease and epidemics and combating diseases that are related to malnutrition and poor living conditions. Promotion of occupational health and safety as well as the development of environmental health and rehabilitation of health infrastructures, provision of essential medicines, and expansion of frontline and middle level health professionals. Appropriate health service management system, attention to traditional medicines and applied health research.

The policy aims to protect and promote the health of citizens by ensuring friendly and healthy environment through controlling the environmental factors which are directly or indirectly responsible for spread of environmental health related diseases. Some of the important policy frameworks relevant to the proposed road project includes among others ensure that detonators, oils, greases and other chemicals are properly stored, handled, transported, applied and disposed-off in a manner that does not cause health risks and ecological damage. Establish effective monitoring mechanisms for the control of environmental pollution such as water, soil, air, noise and the like. The need to conduct and actively participate in Environmental and Social Impact Assessment (ESIA) of development projects like the one at hand. The presence of quality infrastructure increases public health rather than affecting. Therefore, the proposed project may trigger this particular policy.

2.2.2. Policy on Ethiopian Wildlife

The Wildlife Policy is one of the crosscutting policies issues that were developed in 2006 by the Ministry of Agriculture and Rural Development. The prime objective of the policy is to create conducive environment for the preservation, development and sustainable use 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 as 'National Park', followed by 'Game Reserve' and

'Sanctuary' to 'Controlled Hunting Area'. The project is located in a rural area in which wildlife issues are a serious concern. Therefore, the proposed project may trigger this particular policy.

2.2.3. Biodiversity Conservation and Research and Development Policy

One of the priority areas of national action towards the effective conservation, rational development and sustainable utilization of genetic resources is a national commitment to set out an appropriate government policy and subsequent action. To this end, the national policy on Biodiversity Conservation and Development is formulated based on the rationale that the conservation of biodiversity is one of the conditions of the overall socio-economic development and sustainable environmental management goals. Hence, because of its vital importance in the socio-economic wellbeing of the Ethiopian people, the conservation, proper management and the use of biodiversity need to be supported by policy, legislation and national capacity building. Based on that policy initiative, national biodiversity strategy and action plan was prepared by the Institute of Biodiversity Conservation (IBC) in 2007 to translate the policy objective in to action. The project may affect the biodiversity of the project area and triggers this policy. Policies on Land Tenure, Expropriation and Compensation

The constitution of the FDRE states that the right to ownership of rural and urban land, as well as all-natural resources rests on the state and the public. Land is the property of the state/public and does not require compensation. However, the Constitution gives every person the ownership right for the property he has invested on the land, and in this regard article 40(7) states that every Ethiopian shall have full right to the immovable property he builds and to the permanent improvements he brings about on the land by his labor or capital.

If the land that is owned by an individual is expropriated by the Government for public use like road construction, the person is entitled for compensation. In this regard, article 44(2) of the Constitution states that all people 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. This general principle stated in the Constitution of Ethiopia is further elaborated in the regulation number 135/2007 which was issued by the council of ministers in the year 2007. The policy helps to guide practical actions of compensation on the ground.

2.2.3.1. National Policy on Women

In 1993, the government introduced the National Policy on Women (NPW) for Ethiopia. Among the major objectives of the NPW are creating conducive environments to ensure equality between men and women so that women can participate in the political, social, and economic decisions of their country, and facilitating the necessary condition for rural women to have access to basic social services. The policy is also intended to create appropriate structures within the government offices to establish and monitor the implementation of different gender-sensitive and equitable public policies.

Following the policy recommendation of creating an appropriate government structure at the various tiers of government, there are now ministries/bureaus/offices of women's affairs at Federal/Regional/Organizational levels as appropriate. At the federal level, one of the duties and responsibilities of the ministry for women, youth and

children affairs is conducting and monitoring women's affairs activities at the national level and creating an environment for the implementation of the NPW in different sectors. At Regional, Zonal, District, and Kebele levels, there are respective offices (at Kebele level, usually individuals are assigned in lieu of an office). On the other hand, those situated in line sectors/ministries are mandated to identify issues of gender gaps and develop strategies to address inequalities in the respective line ministries and their sub-sectors. The Women's Affairs Offices are formally accountable to their respective councils, many of which have women's affairs or social affairs committees that are engaged in oversight activities. The plans included steps to enhance rural women's access to and control over productive resources like land, extension, and credit. The project need to empower women and triggers this particular policy.

2.2.3.2. Cultural Policy of Ethiopia

Article 51/3 of the constitution of the FDRE declares that the Federal Government "shall establish and implement national standards and basic policy criteria for the protection and preservation of cultural and historical heritage". Based on this, the Council of Ministers of FDRE endorsed the cultural policy of Ethiopia in October 1997 and subsequently issued the Research and Conservation of Cultural Heritage Proclamation (Pro.No.209/2000). Protection and conservation of cultural heritage from manmade and natural hazards is one of the goals of the Authority for Research and Conservation of Cultural Heritage. Article 42 of the same proclamation states under "Reserved Area" that the Authority has the power of issuing building permission for any work to be carried out in an area declared reserve by the Council of Ministers. There is also an article that states the removal of any cultural ruins is to be carried out under strict supervision of the responsible authority, ARCCH in this case.

2.2.3.3. Education Policy of Ethiopia

The structure of the Ethiopian education system encompasses formal and non-formal education. Non-formal education covers wide areas of training both for primary school age children as well as adults who have either dropped out and/or beginners. For this reason, it is viewed as open-ended in terms of training program, and, to some extent, in terms of institutional arrangement. The formal program has further been divided into kindergarten (preschool education), general education (grades 1-12), and technicalvocational and tertiary education (college and university training) programs. The current curriculum offers 10 years of general education consisting of 8 years of primary education and 2 years of general secondary education (9-10) with the second cycle of secondary education (11-12) which prepares students for continuing higher education. Primary education is divided into two cycles comprising grades 1 through 4 of basic education and second cycle of grades 5 through 8 of general primary education. According to the New Education and training policy of 1994, there will also be a system of technical vocational training which will be offered to the graduates of each cycle.

The educational policy of Ethiopia mainly strives for access, equity (ideal of being just, impartial, and fair) and quality of education. Access and equity of education across regions and ethnic groups as well as women's access to education has been recognized as a fundamental right and increasing their access to education is among the educational goals of Ethiopia. Complicating the problem of Ethiopian education is the recent erosion of educational quality. While one may appreciate the attempts

made to expand access across all regions, the progress so far made to improve quality is limited. Quality in education is relative and not easy to measure. Many educators, however, measure the quality of education in terms of input, process and output.

The input category includes material resources (textbooks, learning materials, classrooms, libraries, school facilities) and human resources (managers, supervisors, inspectors and, most importantly, teachers). The indicators most widely used to measure these inputs are pupil/teacher ratios, teacher qualification and salaries, public current expenditure per pupil and proportion of Gross Domestic Product (GDP) spent on education. Inadequate facilities, insufficient training of teachers, shortage of books and other teaching materials observed in most rural settings still indicate the low quality of education provided in the Country. Moreover, the performance of most university graduates at work places is not up to expectations.

2.2.3.4. National HIV/AIDS Policy

Having understood the magnitude of the HIV/AIDS pandemic and its paramount impacts on the socio-economic development of the country, the FDRE issued a Policy on HIV/AIDS in 1998, which calls for an integrated effort of multi-sectorial response to control the epidemic. The National HIV/AIDS Policy urges communities at large, including government ministries, local governments and civil society to assume responsibility for carrying out HIV/AIDS awareness and prevention campaigns. The general objective of the policy is to provide an enabling environment for the prevention and control of HIV/AIDS in the country.

The National HIV/AIDS Policy triggered by the road project since it is likely to contribute to the spread of HIV/AIDS. Therefore, the gas field development project should implement measures that would help to minimize the risk of infection by HIV/AIDS and other sexually transmitted diseases.

2.3. Environmental Framework Legislations

2.3.1. Proclamation on Institutional Arrangement

Establishment of Environmental Protection Organs is stipulated by the Proclamation No. 295/2002. The major objective of this Proclamation is to formally lay down the institutional arrangements necessary to ensure environmentally sustainable management and development both at Federal, Sectorial and Regional levels. The proclamation therefore re-establishes the Environmental Protection Authority (EPA is recently upgraded and reorganized as Commission of Environment, Forest and Climate Change whereby the rights and obligations of the EPA, which was stated under proclamation No. 295/2002, will be transferred to the newly proposed Commission of Environment and Forest), sectorial Environmental Units and Regional Environmental Agencies with a series of respective mandates, powers and duties at Federal, sectorial and Regional levels in the same order.

Accordingly, the new EPA which is recently established under proclamation No. 916/2015 is responsible for environmental issues associated with projects being implemented by Federal Government or under the licenses given by the Federal Government. By the same saying, sectorial Environmental Units are responsible for projects being implemented by the Ministries/Authorities themselves or projects being implemented by proponents acquiring the implementation licenses from the Ministry

while Regional Environmental Agencies are responsible for all the rest environmental issues within the boundaries of the respective Regions.

2.3.2. Proclamation on Environmental Impact Assessment

The Federal Government has issued a Proclamation on Environmental Impact Assessment (Proclamation No. 299/2002) and the primary aim of this Proclamation is to make EIA mandatory for specified categories of activities undertaken either by the public or private sectors, and possibly, the extension of EIA to policies, plans and programs in addition to projects.

2.3.3. Proclamation on Environmental Pollution Control

The Proclamation on Environmental Pollution Control (Proclamation 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. 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.

Proclamation on Rural Land Administration and Land Use, Proc. No. 456/2005, came into effect 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 coordinating 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 use holder 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.

This legislation is triggered by the subject of the project since it involves expropriation of lands under individual use, which would affect the livelihood of the land holders. Thus, the project proponent has the responsibility to pay compensation according to this Proclamation and other applicable laws and regulations.

2.3.4. Proclamation on Land Holdings and Payment of Compensation

This Proclamation, Proc. No. 455/2005, issued in July 2005, deals with appropriation of land for development works carried out by the government and determination of compensation for a person whose landholding has been expropriated. It includes provisions on power to expropriate landholdings, notification of expropriation order, responsibility for the implementing agency, and procedures for removal of utility lines. According to the Proclamation, the power to expropriate landholdings mainly rests on Woreda or urban administration authorities. Article 3 (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.

2.3.5. Proclamation on Research and Conservation of Cultural Heritage

Proclamation No. 209/2000 provides legal framework for Research and Conservation of Cultural Heritage. The Proclamation establishes the Authority for Research and Conservation of Cultural Heritage (ARCCH) as a government institution with a juridical personality. In addition, it has provisions for management, exploration, discovery and study of Cultural Heritage and miscellaneous provisions.

Article 41 of the Proclamation has provision on Fortuitous Discovery of Cultural Heritage and Sub-Article (1) states that, any person who discovers any Cultural Heritage in the course of an excavation connected to mining explorations, building works, road construction or other similar activities or in the course of any other fortuitous event, shall forthwith report same to the Authority, and shall protect and keep same intact, until the Authority (ARCCH) takes delivery thereof. Connected to this, Sub-Article (2) states that the Authority shall, upon receipt of a report submitted pursuant to Sub-Article (1) hereof, take all appropriate measures to examine, take delivery of, and register the Cultural Heritage so discovered.

2.3.6. Proclamation on Solid Waste Management

This Proclamation (No. 513/2007) is aimed at enhancing at all levels capacities to prevent the possible adverse impacts of solid waste management whilst creating economically and socially beneficial assets. Activities associated with the road construction project have the potential to generate waste and pollute the environment. Therefore, assessment of the impacts related to waste generation and the required waste management activities are part of the ESIA and ESMP for the project.

2.3.7. Regulations on Payment of Compensation for Property Situated on Landholdings Expropriated for Public Purposes

Regulations No. 135/2007 came into effect in July 2007 and dealt with payment of compensation for property situated on landholdings expropriated for public purposes. These Regulations were issued by the Council of Ministers pursuant to Article 5 of the Definition of Powers and Duties of the Executive Organs of the FDRE Proclamation No. 471/2005 and Article 14(1) of Proclamation No. 455/2005 (discussed under 2.3.8) with an objective of not only paying compensation but also to assist displaced persons to restore their livelihood.

The Regulations contain provisions on assessment of compensation for various property types (including buildings, fences, crops, trees and protected grass), permanent improvement of rural land, relocation of property, mining license, burial ground, and formula for calculating the amount of compensation. In addition, it has provisions for replacement of urban land and rural land, displacement compensation for land used for crops, protected grass or grazing, and provisional expropriation of rural land. Further, the Regulations contain provisions that specify properties for which compensation is not payable and regarding furnishing of data to compensation committee, records of property, evidence of possession and ownership, and valuation costs.

This Regulation is triggered by the subject project since it involves expropriation of lands under individual holdings and the lands are under crop production, residential areas, livestock grazing, etc. Thus, the project not only expropriates the land, but also affects different properties invested in the land. Therefore, the project owner has the responsibility to pay compensation according to this Regulation and other relevant government laws.

2.3.8. Proclamation on Rural Land Administration and Land Use

The objective of this Proclamation (Proc. No. 456/2005) is to conserve and develop natural resources in rural areas by promoting sustainable land use practices. In order to encourage farmers and pastoralists as well as government institutions and private investors to implement measures to guard against soil erosion. The Proclamation also introduces a Rural Land Holding Certificate, which provides a level of security of tenure to farmers. Then MoARD was charged with power to execute the Proclamation by providing support and coordinating 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 use holder 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.

2.3.9. Proclamation on Research and Conservation of Cultural Heritage

Proclamation No. 209/2000 provides legal framework for Research and Conservation of Cultural Heritage. The Proclamation establishes the Authority for Research and Conservation of Cultural Heritage (ARCCH) as a government institution with a juridical personality. The Proclamation defines "Cultural Heritage" as anything tangible or intangible which is the product of creativity and labor of man in the pre-history and history times, that describes and witnesses to the evolution of nature and which has a major value in its scientific, historical, cultural, artistic and handicraft contents. According to the same Proclamation, "Cultural Heritage" is divided into tangible and intangible heritage. Tangible cultural heritage means cultural heritage that can be seen and felt, which further divides into moveable and Immovable Cultural Heritage.

According to Proclamation 209/2000, Protection and conservation of cultural heritage from manmade and natural hazards is one of the duties and responsibilities of the Authority. Article 42 of the same proclamation states under 'Reserved Area':

1. The Council of Ministers may, upon the recommendation of the Minister, declare any area as a reserved area and publish same in the Negarit Gazeta, where an assemblage of immovable Cultural Heritage is situated or where such an area is deemed archaeological site.
2. Unless otherwise specifically decided by the Council of Ministers, no person may, without a permit issued by the Authority, carry out building or construction, excavations of any type or any operation that may cause ground disturbance in an area declared reserved pursuant to Sub-Article (1) of this Article.

3. Any person who holds permit to conduct construction works in a reserved area and who discovers Cultural Heritage in the course of construction activities shall stop construction and shall report it in writing to the Authority.

These indicate that the Authority has the power of issuing building permission for any work to be carried out in an area declared reserved by the Council of Ministers. The removal of any cultural ruins is to be carried out under strict supervision of the responsible authority, the Authority for Research and Conservation of Cultural Heritage (ARCCH). This proclamation is likely to be triggered by the Water supply project as there is small burial (cemetery) yard at the edge of the substation site.

2.3.10. Proclamation on Ethiopian Water Resource Management

This Proclamation (Proc. No. 197/2000) was issued in March 2000 and provides legal requirements for Ethiopian Water Resources Management, Protection and Utilization. The aim of the proclamation is to ensure that water resources of the country are protected and utilized for the highest social and economic benefits, to follow up and supervise that they are duly conserved, ensure that harmful effects of water use are prevented, and that the management of water resources is carried out properly. As stated in the Proclamation, the Supervising Body (the Ministry pertaining to water resources at central level, or any organ delegated by the Ministry) shall be responsible for the planning, management, utilization and protection of water resources.

According to Sub-Article 1 of the Article 11, no person shall perform the following activities without a permit from the supervising body without prejudice to the exceptions specified under Article 12: construct water works; supply water, whether for his own use or for others; transfer water which he/she abstracted from a water resource or received from another supplier; and release or discharge waste into water resources unless otherwise provided in the water resource management regulation. As per this proclamation, whenever there is a need to prioritize the available water resources, first priority is given for domestic water supply, livestock watering and ecosystem conservation in that order of importance. Water resources rationing for development actions like irrigation, industry, power generation and construction was put at the tail of the list.

2.3.11. Public Health Proclamation

The objectives of the Public Health Proclamation (Proc. No. 200/2000) relevant to environmental health and applicable during the construction and operation phases of development projects include prohibiting discharge of untreated liquid waste generated from septic tanks, seepage pits and industries into water bodies, or water convergences; prohibiting the disposal of solid or liquid or any other waste in a manner which contaminates the environment or affect the health of the society also pertinent to this project.

2.3.12. Solid Waste Management Proclamation

This Proclamation (Proc. No. 513/2007) was issued in March 2007, and its objective is to enhance capacity at all levels to prevent possible adverse impacts while creating economically and socially beneficial assets out of solid waste. Under this proclamation, a person or institution that is generating waste is held responsible for proper disposal of wastes he produced through reuse or recycling or disposal at the officially approved sites as appropriate. It is the main objective of the proclamation to highly encourage

public and investors' participation and involvement in the collection and segregation, storage and recycling and disposal of residual solid wastes.

This proclamation clearly indicates the general obligation of urban administration in solid waste management issues and how it can ensure public participation and involvement of lowest level administration in managing solid wastes. The proclamation also indicates how the inter-regional movement of solid waste should be managed, the management of glass containers and tin cans, management of plastic bags and used tires, food related and household solid wastes, and management of construction debris and demolition of solid waste and excavated soils.

Moreover, emphasis was also given to how solid waste is transported; their disposal sites are constructed, and auditing of the disposal sites in-operation is made. Civil liability and penalty issues as well as responsibilities to issue regulations and directives that will facilitate the implementation of this proclamation are detailed at great lengths. More relevant to the solid waste management issue for the project at hand is management of construction debris or waste, management of used tires, plastics, tin cans and household waste that will be generated from the operation of camps and more importantly that of hazardous waste from garage operations.

2.3.13. Proclamation on Wildlife Development, Conservation and Utilization

This Proclamation (Proc. No. 541/2007) was issued in August 2007 with the following 3 major objectives. These are to conserve, manage, develop and properly utilize the wildlife resources of Ethiopia; to create conditions necessary for discharging government obligations assumed under treaties regarding the conservation, development, and utilization of wildlife; to promote wildlife-based tourism and to encourage private investment.

Wildlife conservation areas to be designated and administered by the Federal Government and by regions as well as that will be administered by Private Investors and by Local Communities are clearly indicated here. Hunting Permit and Collection of Wildlife or Wildlife Products for Scientific Purposes is also receiving enough attention. Wildlife related economic activities such as wildlife resources-based tourism and trading in wildlife and their products is also the attention of this proclamation.

The segregation of powers and duties of the Ministry (Ministry of Agriculture and Rural Development), Regions, and wildlife anti-poaching officers are made clear here. There is also a provision for penalty considerations and the power to issue regulations and directives.

2.3.14. Laborer Proclamation in Ethiopia

As per the Constitution of the FDRE, Sub-Article 1 and 3 of Article 55, the Ethiopian Government issued the laborer Proclamation (Proc. No. 1156/2019) on September 5, 2019, with the following umbrella objectives. The main aim of the proclamation includes, among others, ensuring that worker-employer relations are governed by the basic principles of rights and obligations with a view to enabling workers and employers to maintain industrial peace and work in the spirit of harmony and cooperation towards the all-round development of the country. To guarantee the right of workers and employers to form their respective associations and to engage, through their lawfully elected representative, in collective bargaining as well as to lay down the

procedure for the expeditious settlement of laborer disputes that may arise between workers and employers.

To strengthen and define by law the powers and duties of the organs charged with the responsibility of inspecting, in accordance with the law, laborer administration, particularly Laborer conditions, occupational safety, health and work environment. To revise the existing laborer law providing for the basic principles which govern worker employer relations and for laborer condition taking in to the political, economic and social policies of the government and in conformity with the international conventions and other legal commitments to which Ethiopia is a party with a view to translating in to practice the underlining objectives of the laborer proclamation.

The Labor Proclamation 1156/2019 which was revised in 2019 provides the basic principles which govern labor conditions considering the political, economic and social policies of the Government, and in conformity with the international conventions and treaties to which Ethiopia is a party. The proclamation under its Part Seven, Chapter One, and Article 92 of this proclamation deals with Occupational Safety, Health and Working Environment, Prevention Measures and Obligations of the Employers. Accordingly, the Proclamation obliges the employer to take the necessary measure for adequate safeguarding of the workers in terms of their health and safety. Moreover, the Occupation Health and Safety Directive (MOLSA, 2003) provides limits for occupational exposure to working conditions that have adverse impacts on health and safety.

Therefore, the workers' employers' relationship under the proposed project will be generally governed by the principles and details stated in this proclamation. As a result, the workers-employers agreement made against this law will not be accepted in-front of any of the Ethiopian Courts for workers-employers relationships covered under this proclamation.

2.3.15. Investment Proclamation No 1180/2020)

The investment objective of the Federal Democratic Republic of Ethiopia is to enhance the living standards of its people by fostering rapid, inclusive, and sustainable economic and social development. The key elements of this objective include:

a. Enhancing the competitiveness of the national economy by promoting investments in productive and enabling sectors.
b. Creating more and better employment opportunities for Ethiopians, while advancing the transfer of knowledge, skills, and technology necessary for national development.
c. Increasing foreign exchange earnings by expanding the volume, variety, and quality of the country's export products and services.
d. Saving foreign exchange through the local production of import substitutes.
e. Strengthening the role of the private sector in driving the country's economic growth.
f. Exploiting and developing the nation's natural, cultural, and other resources.
g. Creating an integrated economy by fostering inter-sectoral linkages and strengthening foreign and domestic investment connections.
h. Encouraging socially and environmentally responsible investments.

2.3.16. Occupational Safety and Health Proclamation No. 1156/2011

Under this legal provision, duty placed on the employer is to take the necessary measures to safeguard adequately the health and safety of the workers with the following obligations and liabilities.

Table 1: Applicable laws for OHS

Worker Notification and Precautionary Measures: 1. Notify workers about the hazards related to their work and precautions to avoid accidents and health injuries. 2. Assign a safety officer and issue safety directives. 3. Establish an occupational safety and health committee, as determined by the Minister.	**Liability for Employment Injuries**: 1. Employers are liable for employment injuries and occupational diseases, regardless of fault. This includes paying compensation and medical expenses. 2. Employers must pay compensation if the injury results from their fault.	**Labor Proclamation No. 1156/2011**, Articles 92 to 112
4. Provide workers with protective equipment, clothing, and materials and instruct them on their use.		
Health and Safety Standards: 1. Register accidents and occupational diseases and report them to the labor inspection. 2. Arrange medical examinations for new employees and those involved in hazardous work, at the employer's expense. 3. Ensure the workplace does not pose health or safety risks. 4. Take precautions to prevent physical, chemical, biological, agronomical, and psychological hazards.	Liability for Employment Injuries: 1. Employers are liable for employment injuries and occupational diseases, irrespective of fault. 2. Employers must pay compensation for injuries caused by their fault.	Labor Proclamation No. 1156/2011,

2.4. Administrative and Institutional Frameworks

2.4.1. Federal and Regional Administration

The Federal Democratic Republic of Ethiopia comprises the Federal Government and the state members. There are Nine National Regional States and Two City Administrative Councils, who are the members of the Federal Democratic Republic of Ethiopia. The form of government of Ethiopia is parliamentarian. There are two kinds of representation in the federal government. These are the House of Peoples' Representatives and the House of the Federation. Both the Federal Government and the Regional States have legislative, executive and judicial powers. A policy of decentralization of authority to regional administration has been pursued since 1991. The powers and functions of the Federal Government are defined in the constitution under article 51.

The Regional Governments and the City Administration have also legislative, executive and judicial power over their administrative areas, except in matters of defense, foreign relations, citizenship, currency, and the like, which fall under the jurisdictions of the Federal Government. The powers and functions given to the National Regional States

by the constitution under article 52 include enacting and executing the state constitution and other laws to formulate and execute economic, social and development policies, strategies and plans of their respective regions and to administer land and other natural resources. The administrative structures in regional governments are Zone, Woreda and Kebele while the hierarchy at City Administration is subdivided in to Sub City and Woreda levels as appropriate.

2.4.2. Environmental Council

Environmental council was established by the Provision of Environmental Protection Organs Establishment Proclamation No. 295/2002. The environmental council consists of representative drawn from Prime Minster Office, Federal and Regional States, Ethiopian Chamber of Commerce, local environmental NGOs (non-government organizations), the Confederation of Ethiopian Trade Unions, and the director general of EPA. The Council is responsible to review proposed environmental policies, and laws, and issue recommendations to the government; evaluate and provide appropriate advice on the implementation of the environmental policy of Ethiopian; and review and approve directives, guidelines and environmental standards prepared by EPA.

2.4.3. Federal EPA

Establishment of Environmental Protection Organs in Ethiopia is stipulated by the Proclamation No. 295/2002 and the new EPA is recently established under proclamation No. 916/2015. The EPA is the competent environmental agency at the Federal level in Ethiopia with one of its objectives, stipulated in Article 5 of Proc. No. 295/2002, indicating that it is established "to ensure that all matters pertaining to the country's social and economic activities are carried out in a manner that will protect the welfare of human beings as well as sustainably protects, develops and utilizes the resources base on which they depend for survival."

The federal EPA is the key national level environmental agency, with a mandate to address environmental issues. Environmental legislation gives the EPA powers to fulfil its role, support all federal agencies in establishing environmental units, and develop skills in strategic environmental analysis of policies and public instruments. The EPA is involved in the development of environmental policy and legislation, setting environmental quality standards for air, water and soils, monitoring pollution, establishing EIA procedures and an environmental information system, and undertaking capacity development in relevant agencies to ensure the integration of environmental management in policy development and decision making. The responsibilities of EPA with respect to EIA process are establishment of a system for environmental assessment of public and private sector projects, as well as social and economic development policies, strategies, laws, and programs of federal level functions; review, decision-making and follow-up implementation of environmental impact study reports for projects, as well as social and economic development programs or plans where they are subject to federal licensing, execution or supervision; also proposed activities subject to execution by a federal agency, likely to entail inter- or trans-regional and international impacts; notification of its decision to the concerned licensing agency at or before the time specified in the appropriate law or directives; ensure that the proponent complies with requirements of the EIA process; auditing and regulation of implementation of the conditions attached to the decision; provision of advice and technical support to the regional environmental agencies, sectorial institutions and proponents; making its decisions and the EIA report available to the public; resolution

of complaints and grievances in good faith and at the appropriate time; development of incentives or disincentive structures required for compliance with regional environmental agency requirements.

2.4.4. Regional Environmental Agencies

The Proclamation issued for the Establishment of Environmental Protection Organs (Proc. No. 295/2002) also states that each Regional State should establish an independent regional environmental agency or designates an existing agency that shall be responsible for environmental monitoring, protection and regulation in their respective regional states.

2.4.5. Sectorial Environmental Units

Proclamation No. 295/2002 requires establishment of in-house Environmental Protection Unit to ensure harmony with respect to implementation of the environmental proclamations and other environmental protection requirements. The duties and responsibilities of these sectorial Environmental Units are to co-ordinate and follow up of the integration of environmental requirements in project implementation in a proactive manner so as to ensure environmental sustainability of sectorial development efforts. Based on these provisions, different ministries such as Ministry of Water, Irrigation and Electricity, Ministry of Mines, Ministry of Agriculture, Ethiopian Roads Authority, etc. has established their own sectorial environmental units.

2.4.5.1. Authority for Research and Conservation of Cultural Heritage

Research and conservation of Ethiopian cultural heritage are regulated by Proclamation No.209/2000 of Ethiopia. This defines cultural heritage broadly as "anything tangible or intangible which is the product of creativity and laborer of man in the pre-history and history times, that describes and witnesses to the evolution of nature and which has a major value in its scientific, historical, cultural, artistic and handcraft content". Protection and conservation of cultural heritage from man-made and natural hazards is one of the duties of the Authority for Research and Conservation of Cultural Heritage (ARCCH).

Prior approval of the Authority for Research and Conservation of Cultural Heritage is required to remove an immovable cultural heritage from its original site, (Art. 21/1). Whenever a registered movable cultural heritage is encountered during the execution of the project it is possible to remove such property by notifying the Authority in advance (Art. 21/2). However, it is also stated that the removal of any cultural ruins is to be carried out under strict supervision of the responsible authority, ARCCH.

Any person who destroys or damages cultural heritage intentionally shall be punished with imprisonment not less than 10 years and not exceeding 20 years (Art. 45/2/). Article 42 of the same proclamation states under 'Reserved Area' that the Authority has the power of issuing building permission for any work to be carried out in an area declared reserved by the Council of Ministers.

2.4.5.2. Ethiopian Wildlife Development and Conservation Authority

The major responsibility for wildlife conservation in Ethiopia is vested in Ethiopian Wildlife Development and Conservation Authority (EWCA). This is a newly established government institution under Ministry of Culture and Tourism. In its responsibility for the husbandry of the wildlife resource of the country, EWCA carries major responsibility

within the present system of Wildlife Conservation partly with the Regional Governments. The main tasks include. To ensure the continuity of all wildlife species, particularly those not only in Wildlife Conservation Areas, but also within the entire terrestrial, aquatic and aerial ecosystem of the nation, with special emphasis on the endemic or threatened wild fauna and their habitat.

2.5. Environmental Assessment Guidelines

With a view to implement the environmental laws, environmental guidelines have been issued by Ethiopian EPA. Among these, the following three (Technical ESIA Guideline, Procedural ESIA Guideline and Guideline for Reviewing ESIA Reports) are very relevant to development projects at-large. These guidelines are intended to guide developers, competent agencies, reviewers and other stakeholders in carrying out and managing ESIA endeavors.

2.5.1. The Procedural EIA Guideline

As a step forward in developing the environmental policies and legislation, the EPA issued a procedural guideline which defines specific examinations to which a proposed project needs to be subjected in the process of environmental impact assessment. To this effect, at the project identification phase, based on EPA's guidelines, projects are categorized in one of the following three schedules. These are: -

- Schedule 1: Projects which may have adverse and significant environmental impacts, and therefore they shall require full ESIA.
- Schedule 2: Projects whose type, scale or other relevant characteristics have potential to cause some significant environmental impacts but not likely to warrant full environmental impact study; and
- Schedule 3: It includes projects which will have no impact and hence don't require environmental impact assessment at all.

According to the guideline, all projects planned to be implemented at environmentally sensitive areas are treated as equivalent to Schedule 1 activities irrespective of the nature and scale of the project. On this basis, for instance, water supply projects are considered as Schedule 1 or 2 Project based on the scope of the project and level of impac5s as it involves largely new construction, considerable earthwork operations, some vegetation removal, land acquisition, etc.

The guidelines provide a comprehensive statement of the type of adverse impact that may occur and set out clearly the aspects which need to be addressed in an initial environmental examination and in an environmental and social impact assessment.

ESIA guideline was issued in the year 2003 and provides details about the required procedures for conducting an ESIA, the permit requirements, the stages and procedures involved in ESIA processes, and the roles and responsibilities of parties involved in the ESIA process. It also includes the categories of projects (schedule of activities) concerning the scale of ESIA required (projects that may need Full, Partial and No ESIA at all), and list of project types under each category.

2.5.2. The Technical EIA guideline

It is issued in the year 2000 by EPA and specifies tools, particularly the standards and guidelines that may be considered when undertaking the EIA processes. Moreover, it

provides details and key issues for environmental assessment in specific development sectors.

2.5.3. Guideline for Reviewing EIA Reports

This valuable document issued EPA in the year 2003 to guide and make the review process of the EIA Reports easier. It is a generic guideline prepared to facilitate the EIA report reviewing and decision-making processes, and it includes review approaches, and outlines a minimum report structure and information requirements. It is intended to help the reviewers to assess the content, comprehensiveness, adequacy and accuracy of information in the report, as well as its organizational and presentation qualities. The review guideline is principally meant to be used by EPA and regional environmental agencies but also by sectorial Environmental Units, and the proponents. Thus, it is believed that the guideline will help to make decisions in good time and faith, whether and under what conditions the project shall proceed.

2.5.4. Guidelines on Ambient Environment Standards

A Guideline on ambient environment standards is prepared by the then Ministry of Environment, Forest and Climate Change (now EPA) with the assistance of the United Nations Development Organization (UNDO) under the Ecologically Sustainable Industrial Development (ESID) Project in August 2003. The Government of Ethiopia has mandated the EPA to set such standards, and the document represents the Ministry's guideline standards with respect to the ambient environment. Ambient environmental quality standards are set with a goal of safeguarding public health and protecting the environment. The guideline standards are being introduced to be used all throughout the country subjected to amendment, as more information on the state or pollution is made available. The regional states can establish more stringent standards taking in to consideration particular ecological conditions in their localities since EPA's standards are used as the minimum. The guideline standards are primarily aimed at protection of ambient environmental quality within all components of the Ethiopian Environment. The Guideline standards contain ambient quality standards for air quality guideline standards. Thus, water quality guideline standards, Soil, Ground water quality guideline standards and Noise level guideline standards are the main ones.

2.6. AfDB Environmental and Social Assessment Procedures

The Web Route Water Supply System project, located in Dubluk Woreda, Borana Zone, Southern Ethiopia, aims to provide reliable and sustainable access to clean water for the local communities, enhancing public health, economic development, and community well-being. As the project may have significant environmental and social impacts, its Environmental and Social Impact Assessment (ESIA) has been aligned with the African Development Bank (AfDB) Environmental and Social Assessment Procedures (ESAP). This alignment ensures that the project adheres to international environmental and social standards, fosters sustainability, and promotes community welfare.

2.6.1. Project Categorization and Screening

The AfDB's Environmental and Social Assessment Procedure (ESAP) mandates that all projects shall be classified based on their potential environmental and social risks. The Web Route Water Supply System project has been classified as Category 2 (moderate risk), which requires a full Environmental and Social Impact Assessment (ESIA). This

classification necessitates a thorough evaluation of the project's potential environmental and social impacts, assessing their severity and identifying mitigation measures.

In line with the AfDB's categorization guidelines, the ESIA for this project provides a comprehensive analysis of its impacts and the corresponding mitigation strategies. Although the project falls under Category 2, it does not directly affect individuals and does not necessitate the preparation of a Resettlement Action Plan (RAP).

2.6.2. Stakeholder Consultation and Public Participation

AfDB's ESAP emphasizes the importance of stakeholder engagement throughout the project lifecycle. The Web Route Water Supply System project aligns with this principle by conducting thorough community consultations, especially in Dubluk Woreda, where local communities, including pastoralists and agro-pastoralists, will benefit directly from the water supply system. These consultations ensure that the community's concerns and suggestions are incorporated into the project's planning and implementation. The engagement process includes public meetings, focus group discussions, and grievance redress mechanisms to allow the local population to voice their concerns and participate actively in Environmental and Social Management Plan (ESMP)

The AfDB ESAP mandates the development of an Environmental and Social Management Plan (ESMP) to mitigate adverse environmental and social impacts. The Web Route Water Supply System ESIA includes a detailed ESMP that outlines specific measures to reduce negative impacts such as habitat disruption, water source depletion, soil erosion, waste generation, and health and safety risks. The ESMP also includes measures for monitoring, evaluation, and reporting, ensuring compliance with environmental and social standards throughout the project's implementation. The plan addresses key mitigation areas such as biodiversity protection, water resource management, and community health and safety.

2.6.3. Environmental and Social Monitoring

AfDB's ESAP requires regular monitoring of environmental and social indicators to track the effectiveness of mitigation measures. The Web Route Water Supply System ESIA incorporates a monitoring framework with clear indicators such as air and water quality, waste management practices, worker health and safety, and community engagement levels. Monitoring activities will be conducted throughout the construction and operational phases, with regular reporting to the AfDB and Water and Energy Bureau BRWDIL program. Monitoring results will be documented, and corrective actions will be implemented if any adverse impacts exceed acceptable thresholds.

2.6.4. Corrective Actions and Risk Management

In line with AfDB's requirement for continuous risk management, the Web Route Water Supply System project includes provisions for corrective actions if monitoring reveals that mitigation measures are insufficient or ineffective. The ESIA proposes practical solutions for addressing unforeseen issues, such as adjusting water extraction rates to prevent over-exploitation, reinforcing erosion control practices, and enhancing community health measures if necessary. Risk management is a key element of the ESIA, ensuring that any potential impacts on the environment or local communities are proactively identified and managed.

2.6.5. Compliance with Environmental and Social Safeguards

The Web Route Water Supply System project has been designed to meet AfDB's environmental and social safeguards, ensuring that it does not cause irreversible harm to the environment or social fabric of the communities. The project includes sustainability principles such as efficient water use, biodiversity conservation, waste minimization, and equitable access to water resources. All project activities are aligned with AfDB's goal of promoting sustainable development that balances economic growth with social and environmental responsibility.

The Web Route Water Supply System project in Dubluk Woreda is fully aligned with the African Development Bank's Environmental and Social Assessment Procedures (ESAP), ensuring the project adheres to international best practices in environmental sustainability, social inclusivity, and risk management. Through community engagement, mitigation measures, and environmental monitoring, the project aims to deliver significant benefits while minimizing adverse impacts. By following AfDB's safeguard policies, the project is poised to make a positive contribution to the communities in Dubluk Woreda, improving access to clean water, supporting local livelihoods, and fostering long-term sustainability.

2.6.6. Africa Development Bank Integrated Safeguard System /ISS/

The African Development Bank (AfDB) has updated its Integrated Safeguard System (ISS) in 2023 by expanding from five to ten Environmental and Social Operational Safeguards (E&S OSs). This enhancement aims to strengthen the Bank's approach to managing environmental and social risks and impacts associated with its financed operations, ensuring greater protection for communities and the environment while promoting sustainable development.

The ten Environmental and Social (E&S) Operational Standards (OSs) outline the requirements for Borrowers in identifying and assessing the E&S risks and impacts associated with operations supported by the Bank. The Bank believes that applying these safeguards—by focusing on the identification and management of E&S risks—will help Borrowers protect communities and the environment from unintended harm, while also contributing to the sustainable reduction of poverty and the enhancement of prosperity for both the environment and local communities.

The E&S OSs will assist Borrowers in:

a. achieving good practices in E&S sustainability;

b. meeting their national and international E&S obligations;

c. promoting non-discrimination, transparency, participation, accountability, and good governance; and

d. improving the sustainable development outcomes of projects, activities, and other initiatives through continuous stakeholder engagement.

Here are the ten environmental and social operational safeguard systems.

2.6.6.1. ESOS1-Assessment and Management of Environmental and Social Risk and Impact

The overarching objective of this Operational Safeguard (OS), together with the complementary OSs, is to integrate environmental and social (E&S) considerations

particularly those related to climate change vulnerability into the Bank's operations. This integration aims to contribute to sustainable development across the continent. The Environmental and Social Assessment (ESA) carried out under this OS helps determine the scope and extent to which other OSs are addressed. It outlines the Borrower's responsibilities for assessing, managing, and monitoring E&S risks and impacts throughout each stage of an operation supported by the Bank Group.

The Bank reviews and discloses all documentation related to an operation's ESA in accordance with this OS, OS10, and the Bank's Policy on Disclosure and Access to Information, before presenting the operation to the Bank's Board of Directors.

The objectives of OS1 are as follows:

- **Identify and assess E&S risks and impacts**, including those related to gender inequalities, climate change, and vulnerability, in the Bank's lending, investment, and grant-supported operations, in line with the other OSs.
- **Provide opportunities for stakeholder engagement and consultation** in assessing and managing E&S risks and impacts.
- **Adopt a mitigation hierarchy approach**, which includes:
    - Anticipating and avoiding risks and impacts.
    - Minimizing or reducing risks and impacts to acceptable levels where avoidance is not possible.
    - Mitigating risks and impacts once minimized or reduced.
    - Compensating for or offsetting significant residual impacts, where technically and financially feasible.
- **Adopt differentiated measures** to ensure that adverse impacts do not disproportionately affect vulnerable groups, preventing them from being disadvantaged in sharing the development benefits and opportunities resulting from the project.
- **Utilize national E&S institutions, systems, laws, regulations, and procedures** in the assessment, development, and implementation of projects, where appropriate.
- **Contribute to strengthening the regional member countries' (RMC) systems** for E&S risk management by assessing and enhancing their capacity to meet the Bank Group's requirements outlined in the ISS.

2.6.6.2. ESOS2 - Labour and Working Condition

This OS2 emphasizes the crucial role of employment creation and income generation in advancing poverty reduction and fostering inclusive economic growth. Borrowers can promote strong worker-management relationships and enhance the development benefits of a project by ensuring fair treatment of workers and providing safe and healthy working conditions. Respecting workers' rights is fundamental to building a strong and productive workforce. This Operational Safeguard is informed by the International Labour Organization's (ILO) Declaration on Fundamental Principles and Rights at Work and the United Nations Guiding Principles on Business and Human Rights.

The objectives of OS2 are as follows:

- To protect workers' rights.
- To promote safety and health in the workplace.

- To ensure fair treatment, non-discrimination, and equal opportunity for all project workers.
- To safeguard vulnerable workers, including women, persons with disabilities, children (of working age, as defined in this OS), migrant workers, contracted workers, community workers, and primary supply workers, where applicable.
- To prevent all forms of forced and child labour.
- To support the principles of freedom of association and collective bargaining for project workers, aligning Bank requirements with ILO's Fundamental Principles and Rights at Work, the United Nations Convention on the Rights of the Child, and the Convention on the Elimination of All Forms of Discrimination Against Women, where national laws do not provide equivalent protection.
- To provide project workers with accessible channels for raising workplace concerns.
- To ensure that the Bank, along with national competent authorities where appropriate, is promptly informed of any material adverse impacts or events related to labour protection, as well as health and safety in the workplace.

2.6.6.3. ESOS3 – Resources Efficiency and Pollution Prevention and Management

This Operational Safeguard (OS) acknowledges that economic activities often lead to air, water, and land pollution, and consume finite resources that may pose threats to human health, ecosystem services, and the environment at local, regional, and global levels. The rising concentration of greenhouse gases (GHGs) in the atmosphere presents significant risks to the well-being of both current and future generations. Additionally, more efficient resource use, pollution prevention, and technologies for GHG emission avoidance and mitigation have become increasingly accessible and feasible.

OS3 establishes the requirements for addressing resource efficiency, pollution prevention, and management throughout the project life cycle, in alignment with Good International Industry Practice (GIIP).

Throughout the various stages of the project such as planning and design, construction, commissioning, operations, and decommissioning the Borrower is required to assess and evaluate resource efficiency and pollution-prevention measures, implementing those that are technically and financially feasible, as well as cost-effective.

As part of project preparation, within the Environmental and Social Assessment (ESA), the Borrower must evaluate the potential impacts of pollutant discharges and their resulting concentrations in the environment. This evaluation must take into account various potential receptors and assess the risks and impacts related to the following factors:

- Environmental and ecological carrying capacity
- Ecosystem services
- Land use (current and future), soils, and agriculture
- Surrounding communities and poverty conditions
- Local, regional, and transboundary potential impacts
- Proximity to environmentally sensitive areas and populations
- Proximity to surface and groundwater sources
- Current and future water body use
- Potential cumulative impacts.

2.6.6.4. ESOS4- Community Health, Safety and Security

This Operational Safeguard (OS) acknowledges that projects, activities, equipment, and infrastructure can increase the risks and impacts faced by communities. Additionally, communities already vulnerable to the effects of climate change may experience the acceleration or intensification of these impacts due to a project or its activities.

OS4 focuses on addressing the health, safety, and security risks to project-affected communities, outlining the Borrower's responsibility to avoid or minimize such risks, with particular attention to vulnerable individuals and groups. The objectives of OS4 are as follows:

- To anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project or operation lifecycle, considering both routine and non-routine circumstances.
- To promote public health and safety within the project's area of influence, including supporting programs aimed at preventing the spread of major communicable diseases.
- To ensure quality and safety in the design and construction of infrastructure, including dams, with particular consideration of climate change impacts.
- To minimize or avoid community exposure to project-related traffic and road safety risks, diseases, and hazardous materials.
- To establish effective measures for managing emergency events.
- To ensure that the provision of public or private security for safeguarding personnel and property is carried out in a way that minimizes risks to project-affected communities, in line with international human rights standards and principles.
- To prevent sexual exploitation, abuse, and sexual harassment (SEAH) of community members by project workers.

ESOS5- Land Acquisition, Restriction on Access to Land and Land Use and Involuntary Resettlement:

Environmental and Social Operational Safeguard (OS) 5 recognizes that project-related land acquisition, land use restrictions, and the loss of property/assets can have significant adverse impacts on communities and individuals. Land acquisition and restrictions on land use may lead to physical displacement (e.g., relocation, loss of residential land or shelter) or economic displacement (e.g., loss of assets, land, or access to resources, which results in the loss of income or livelihood). Both forms of displacement are referred to as "involuntary resettlement," which includes the processes required to mitigate and compensate for these impacts. Involuntary resettlement occurs when affected individuals or communities do not have the right or genuine opportunity to refuse land acquisition or restrictions on land use that result in the loss of assets or displacement, and when such decisions are made under coercion or intimidation.

If left unmitigated, physical and economic displacement can lead to severe economic, social, and environmental risks, such as the dismantling of production systems, impoverishment, weakened community institutions, exacerbation of gender and social inequalities, and the loss of cultural identity or traditional authority. Therefore, involuntary resettlement should be avoided whenever possible. When unavoidable, efforts must be made to minimize its effects, and appropriate measures must be implemented to mitigate

the adverse impacts on displaced individuals and host communities. The Bank will only support physical investments where the land is free from encumbrances, occupation, or conflict, or where adequate prior compensation has been negotiated and secured for the benefit of the project.

The objectives of OS5 are as follows:

- To avoid involuntary resettlement where feasible, or minimize its impacts when deemed unavoidable, after all alternative project designs have been explored.
- To ensure that resettlement plans and activities are informed by social assessments, including gender considerations, and to avoid forced evictions.
- To mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use by: (i) providing timely compensation for the loss of assets at full replacement cost, and (ii) offering sufficient resettlement assistance to support displaced persons in restoring or improving their livelihoods and living standards to pre-displacement levels, or to levels higher than those prevailing before the project started.
- To improve the living conditions of poor or vulnerable individuals who are physically displaced by the project, by providing adequate housing, access to services and facilities, security of tenure, and safety.
- To establish a mechanism for monitoring the performance and effectiveness of involuntary resettlement activities, and for addressing problems as they arise.
- To treat resettlement activities as sustainable development programs, ensuring sufficient investment resources are allocated so displaced persons can directly benefit from the project, where appropriate.
- To ensure that resettlement activities are planned and implemented with proper disclosure of information, meaningful consultation, and the informed participation of affected individuals and communities.

2.6.6.6. ESOS6 –Habitat and Biodiversity Conservation and Sustainable Management of Living Natural Resources

This Operational Safeguard (OS) reflects the objectives of the Convention on Biological Diversity, aiming to conserve biological diversity and promote the sustainable management and use of natural resources. It aligns with several key international agreements, including the Ramsar Convention on Wetlands, the Convention on the Conservation of Migratory Species of Wild Animals, the Convention on International Trade in Endangered Species of Wild Flora and Fauna, the World Heritage Convention, the United Nations Convention to Combat Desertification, and the Millennium Ecosystem Assessment. The recommendations also correspond with the International Plant Protection Convention, which addresses the movement of invasive alien species and pests, as well as pest risk analysis for quarantine pests, including genetically modified organisms.

It recognizes the importance of considering the livelihoods of project-affected communities, including vulnerable groups, whose access to or use of biodiversity or living natural resources may be impacted by a project. The potential positive role of these communities in biodiversity conservation and the sustainable management of natural resources is also acknowledged.

The objectives of OS6 are as follows:

- To protect and conserve biodiversity and various types of habitats.
- To apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could affect biodiversity, with the goal of conserving biological diversity and maintaining ecosystem integrity.
- To reinstate or restore biodiversity, guided by the mitigation hierarchy, and to implement biodiversity offsets where necessary, aiming to achieve a "no net loss, but net gain" outcome for biodiversity.
- To promote the sustainable management of living natural resources.
- To support the livelihoods of local communities, including vulnerable groups, and encourage inclusive economic development through practices that integrate conservation needs with development priorities.
- To sustain the availability and productivity of ecosystem services, ensuring that benefits for affected communities are maintained and project performance is sustained.
- To effectively integrate natural resources into sustainable economic development and protect vital local and global environmental services and the inherent values of natural resources.

2.6.6.7. ESOS7- Vulnerable Group

This Operational Safeguard (OS) recognizes that certain cultural groups, due to their unique lifestyles, cultural practices, and strong reliance on the natural environment, often have identities and aspirations distinct from mainstream groups within national societies. These communities are frequently disadvantaged by traditional development models and are among the most economically marginalized and vulnerable segments of the population. Their economic, social, and legal status often limits their ability to assert their rights and interests in land, territories, and natural and cultural resources, restricting their participation in and benefits from development projects. In many cases, they may not receive equitable access to project benefits, or those benefits may not be delivered in ways that are culturally appropriate. Furthermore, they may not always be adequately consulted during the design or implementation of projects that significantly impact their lives and communities.

This OS acknowledges that the roles of men and women in these cultural groups are often distinct from those in mainstream societies, and that women and children are frequently marginalized within their own communities and as a result of external development initiatives. These groups may have specific needs that must be addressed.

The objectives of OS7 are as follows:

- To ensure that vulnerable groups and individuals are identified early in Bank Group operations, with engagement that is meaningful, taking into account the specific needs of individuals and communities, and provided in an appropriate form, manner, and language.
- To affirm, respect, and protect the rights and interests of vulnerable individuals and groups throughout the project or investment lifecycle.
- To recognize, respect, and preserve the culture, knowledge, and practices of highly vulnerable cultural groups and minorities, including indigenous peoples, and to provide opportunities for these groups to adapt to any changes brought about by project activities in a way and within a timeframe that is acceptable to them.

- To adopt a gender-responsive approach to managing environmental and social impacts, considering the rights and interests of women, girls, men, and boys, with particular attention to the unique burdens that women and girls may face.
- To identify and avoid adverse impacts of Bank operations on the lives and livelihoods of vulnerable individuals and groups, including women, girls, and Highly Vulnerable and Marginalized (HVM) groups, including indigenous peoples. Where avoidance is not feasible, efforts should be made to reduce, minimize, mitigate, compensate, or remedy these impacts effectively.
- To obtain the Free, Prior, and Informed Consent (FPIC) of affected HVM groups in the three circumstances described in paragraph 36 of this OS.
- To promote development benefits and opportunities for vulnerable groups, including women, girls, minorities, and HVM groups, in a manner that is accessible, culturally appropriate, and inclusive.
- To enhance project design and foster local support by establishing and maintaining an ongoing relationship with vulnerable groups throughout the project lifecycle, based on meaningful consultation.

2.6.6.8. ESOS8- Cultural Heritage

The Bank recognizes that cultural heritage is a fundamental and essential aspect of self-identity, providing continuity in both tangible and intangible forms that connect the past, present, and future. Cultural heritage represents the reflection and expression of evolving values, beliefs, knowledge, and traditions. It is defined as both tangible and intangible resources inherited from the past that people identify as crucial to their cultural identity, irrespective of ownership. Cultural heritage is present in every culture across the globe, forming an integral part of individuals' cultural identity, practices, and sense of self. It holds significant value not only as a source of scientific and historical knowledge but also as an economic and social asset for development. Moreover, cultural heritage is deeply linked to the surrounding environmental and natural world.

Operational Standard (OS) 8 outlines measures to protect cultural heritage throughout the entire project lifecycle. This OS addresses the risks and impacts that project activities can have on cultural heritage, while OS7 includes additional provisions specifically for vulnerable groups and Highly Vulnerable and Marginalized (HVM) communities, including indigenous peoples. OS6 recognizes the social and cultural significance of biodiversity. Provisions for stakeholder engagement and information disclosure, essential for highlighting concerns related to cultural heritage, are set forth in OS10.

The objectives of OS8 are as follows:

- To protect cultural heritage from the adverse impacts of project activities and support its preservation.
- To address cultural heritage as a key component of sustainable development.
- To promote meaningful consultation with stakeholders regarding cultural heritage, identifying and addressing risks and impacts associated with it.
- To encourage the equitable sharing of benefits derived from the use of cultural heritage with affected stakeholders.

2.6.6.9. ESOS9- Financial Intermediaries

Environmental and Social Operational Safeguard 9 (OS9) acknowledges that robust domestic capital and financial markets, along with access to finance, are crucial for fostering economic development, growth, and poverty reduction. The Bank is committed to supporting the sustainable development of the financial sector and enhancing the role of domestic capital and financial markets. This OS specifically addresses the environmental and social (E&S) requirements related to intermediated financing through financial and non-financial institutions.

Financial institutions (FIs) are required to establish and maintain an Environmental and Social Management System (ESMS) to ensure the effective assessment, management, and monitoring of E&S risks and impacts associated with subprojects. Additionally, FIs must responsibly manage the overall portfolio risk to ensure sustainability.

The objectives of OS9 are as follows:

- To outline how FIs will assess and manage the E&S risks and impacts linked to the subprojects they finance.
- To promote strong E&S management practices in the subprojects financed by the FI.
- To encourage good environmental and human resources management practices within the FI itself.
- To support the adoption of best practices in corporate governance, business management, and corporate responsibility by enterprises supported by the Bank, in accordance with the requirements of OS1 to OS10, as relevant.
- To encourage the integration of E&S governance issues within capital market institutions, such as development finance entities and stock exchanges.

2.6.6.10. ESOS10- Stakeholder Engagement and Information Disclosure

Stakeholder engagement is a critical and inclusive process that spans the entire project lifecycle. When properly designed and implemented, it fosters the development of strong, constructive, and responsive relationships, which are essential for the successful management of a project's environmental and social (E&S) risks. Effective stakeholder engagement is most impactful when initiated early in the project development process and becomes an integral part of key decisions, as well as the assessment, management, and monitoring of E&S risks and impacts.

The objectives of OS10 are as follows:

- To establish a systematic approach to stakeholder engagement that assists Borrowers in identifying stakeholders and building and maintaining constructive relationships, particularly with project-affected parties.
- To assess the level of stakeholder interest and support for the project and ensure that stakeholders' views are integrated into project design and E&S performance.
- To promote safe, effective, and inclusive engagement with project-affected parties, ensuring the perspectives of women and vulnerable groups are considered equitably and without fear of reprisal, throughout the project lifecycle, especially on issues that may affect them.
- To enhance project benefits and reduce potential harm to local communities.

- To ensure timely and appropriate disclosure of project information related to E&S risks and impacts, in formats that are understandable, accessible, and suitable for the stakeholders.
- To provide accessible and inclusive channels for project-affected parties to raise input, concerns, questions, proposals, and grievances, and ensure Borrowers have mechanisms in place to address and manage these concerns effectively.
- To promote development benefits and opportunities for project-affected communities, with particular attention to the needs of women and vulnerable groups, ensuring that these benefits are accessible, equitable, culturally appropriate, and inclusive.

3. DESCRIPTION OF THE PROJECT AND ITS STUDY AREA

3.1. Location

Dubluk Woreda is located between the latitudes of 4.00°N and 4.38°N, and longitudes of 37.30°E and 38.00°E. Geographically, it is bordered by several other administrative areas: to the north, it is adjacent to Yabello Woreda; to the south, it borders Dire Woreda; to the east, it is bordered by Dhaas Woreda; and to the west, it shares boundaries with Dillo Woreda, while the northeastern boundary adjoins Wachile Woreda. This strategic location places Dubluk Woreda at the heart of a region with diverse ecological and cultural characteristics.

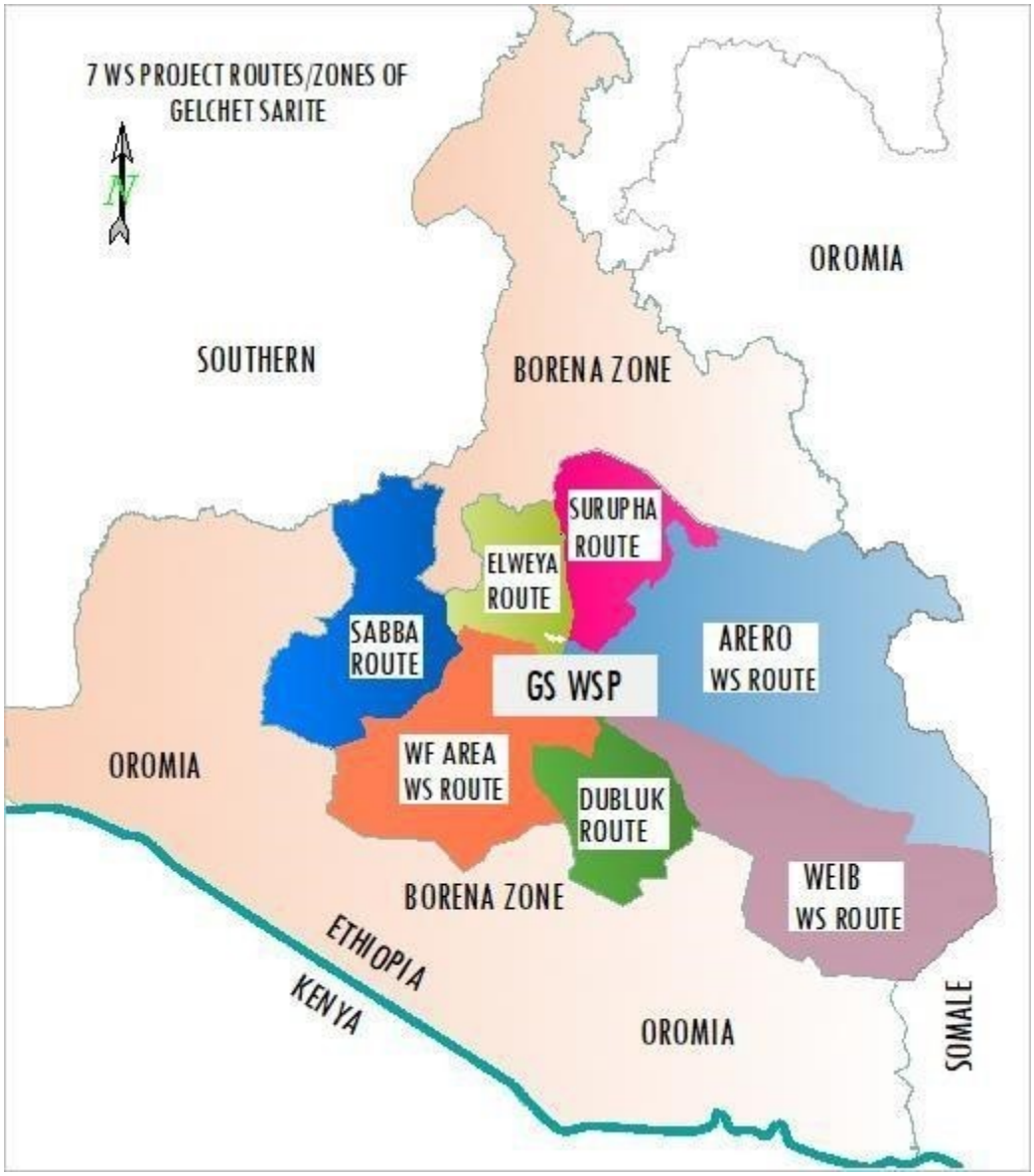

Figure 1: Location Maps of Weib Water Supply Route in Dubluk Woreda

3.2. Area

The total area of Dubluk Woreda spans 4,132.52 square kilometers. This expansive area encompasses a diverse range of landscapes, including lowlands, highlands, grazing lands, and settlement areas, contributing to its rich agricultural and natural resources. The Woreda's size makes it one of the significant districts in the region, with a variety of ecosystems that support both pastoralist lifestyles and emerging agricultural practices.

Its large area also reflects the complexity of managing land resources and addressing challenges such as water scarcity and food security.

3.3. Project Components

Inboard terms, the project consists of two main components. The first component, titled "Low Carbon and Climate Resilient Water Infrastructure Development and Improving Sanitation," includes two key subcomponents: investments in low-carbon, climate resilient water supply systems, and investments in a circular economy, waste reduction, recycling, and sanitation and hygiene services. The second component focuses on

watershed management, specifically on source area management and rehabilitation. This environmental and social impact assessment has been conducted to identify potential impacts associated with these activities and to develop appropriate mitigation measures for any adverse effects that may arise during the implementation of the project in the area. Specifically, the major project components are construction of reservoirs, cattle troughs, water points (bonos) and transmission and as well as distribution pipelines.

4. DESCRIPTION OF THE BASELINE ENVIRONMENT

4.1. Physical Environments

4.1.1. Topography

The project area's terrain is typified by an extensive, mostly level lowland with occasional hills and a range of ground elevations between 1101 and 1,969meters above sea level at the end of the project and at the beginning of the project areas, respectively. Approximately 60% of the project area has a slope class of less than 5% rise, based on the slope map analysis from Digital Elevation Model (DEM) completed during the project's feasibility assessment. In general, Dubluk Woreda is not characterized by significant physiographic diversity. The majority of the land in the district is classified as lowland (Gammojjii), with a semi-arid climate. However, the western parts of the district, particularly Dhokole and Gobsoo, feature high plateaus.

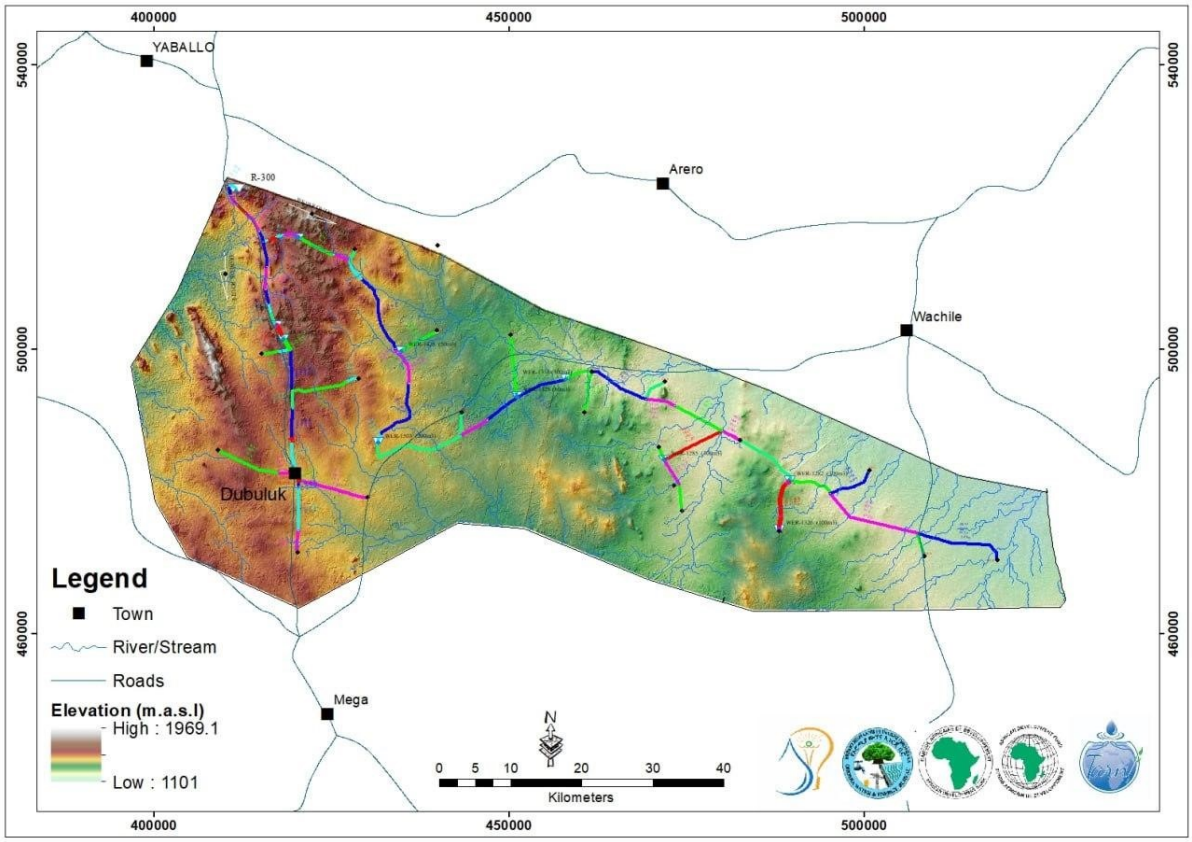

Figure 2: Topographic Map of the Project Area

4.1.2. Climate

The majority of the woreda consists of warm, semi-arid lowland areas, referred to as locally called *Gammojjii*. On the other hand, about 99% of the district is considered

arid, while the remaining 1% is classified as a semi-arid region. There are four distinct seasons in total: the long rainy season (March to May), the cold dry season (June to August), the brief rainy season (September to November), and the dry Bona season (December to February). The range of annual means of average rainfall is 450-650 mm. The project area experiences erratic and variable rainfall in terms of both intensity and duration as well as

area coverage. The average yearly temperature was between 17.5-27.50C, which is within the physiological range needed for the majority of agricultural output.

4.1.3. Air quality

Regarding the air quality, there are no major industrial pollution sources in the project's impact zone, and the road traffic and transportation density is low compared to the more populated and urban areas. For this reason, it was not considered necessary to measure the background air quality in the project area, and it is highly unlikely that the air quality is degraded under present conditions.

In general, the ambient air quality is considered as non-degraded and there are no major sources of greenhouse gas (GHG) emissions in the impact zone of the Weib Route Water Supply Project. Hence, the Ethiopian national ambient air quality guidelines are considered as a baseline and will be used as a frame of reference. Table 3 show these guideline values.

Table 3: Ethiopian ambient air quality standard

Pollutant	Averaging Period	Limit/Guideline Value (µg m-3)	Remark
NO_2	1 year	40	
	24 hour	200	
SO_2	1 year	50	
	24 hours	125	
	10 minutes	500	
CO	15 minutes	100,000	
	15 minutes	60,000	
	1 hour	30,000	
	8 hours	10,000	
PM_{10}	1 year	50	
	24 hours	150	
$PM_{2.5}$	1 year	15	
	24 hours	65	

4.1.4. Noise level

No data exist on the present noise situation. However, apart from traffic noise along the Moyale roads and urban noise in the main population centers, the background noise levels are considered insignificant. For the existing ambient noise level, the Ethiopian standard noise level guidelines mentioned in Table 4 were used as background level. This standard provides guidance for noise emissions covering three categories: industrial, commercial and residential. These guidelines are presented below. The noise standards applicable for the proposed Project include Area Code C – Residential Area.

Table 4: Ethiopian Standards for Noise Levels

Area Code	Category	Limits in dBA Leq, 15min	
		Daytime 1	Nighttime 2
A	Industrial Area	75	70

B	Commercial Area	65	55
C	Residential Area	55	45

1: Daytime 6:00am to 9:00pm
2: Nighttime 9:00pm to 6:00am

4.1.5. Geology and Soils

According to the project's feasibility study document, the local geology of the project area is made up of four main geological formations: the Quaternary deposit (alluvial deposit, alluvial-in situ weathering rock), the Tertiary and Quaternary volcanic basalt and tuff, the Sedimentary deposit (sand stone, lime stone), and the Precambrian basement complex/crystalline rocks (granite, gneisses, and magmatite). Precambrian basement complex and quaternary deposits are dominant at Hiddi Lola and Moyale, and they are dominant westward to Mega and Yabello. Quaternary deposits are dominant eastward to Mega up to Wachile. Tertiary and quaternary volcanic deposits, the Precambrian basement complex and the quaternary deposit are primarily found in succession with one another.

The structural features in the area (Figure 3) are related to the Precambrian orogenic deformation, and Phanerozoic extensional tectonics. Structural features noted in the area include metamorphic foliation, lineation and folding, primary igneous layering, faults and lineaments. These features influence the pattern of landscape in the area. Besides, the structures control surface and subsurface water systems in the area as outlined below. Most of the structures of the area trends in NW, N-S and E-W directions. Two different rift systems occur in the study area. The one is N-S trending and known as Ririba RiftⅡ and characterized by low scarp normal faults with less than 60m vertical throw. The other is NW-SE trending and known as ―Mega RiftⅡ, characterized by high scarp (up to 1,000 meters) normal faults.

Three main trends, N-S, E-W and NE-SW of joints are observed in crystalline basement rocks. All of them are sub vertical with spacing 0.7-1.5m, or 4-5m apart. In addition, columnar joints with both vertical and inclined orientation are common in massive basalt formations.

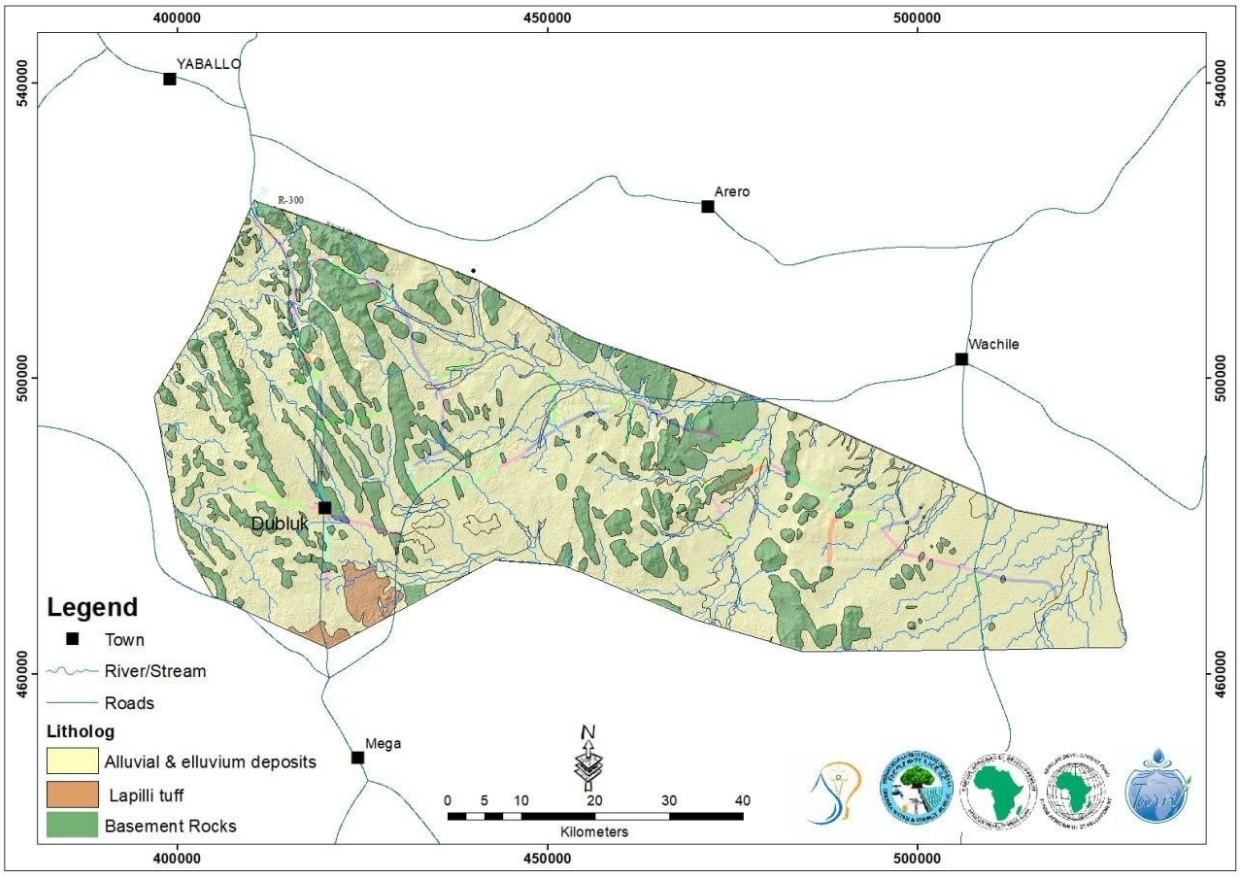

Figure 3: Geologic Map of Dubluk woreda

Concerning the soils of the project area, ten major soil types are found in the project area, namely Cambisols, Vertisols, Luvisols, Fluvisols, Leptosols, Calcisols, Andosols, and Nitisols. Camisols, Luvisols, Vertisols, and Nitosols are the dominant soil classes found in the project area, as shown in Figure 4 below. In general, the soil in Dubluk District is primarily well-drained red sandy loam, which is favorable for agricultural activities. However, the woreda also contains areas with clay soil and other less fertile soil types, which are less suitable for crop production. These variations in soil quality pose challenges for farming in certain areas of the woreda. In addition, soil erosion and gully formation are commonly observed in the project area (see picture 1 below).

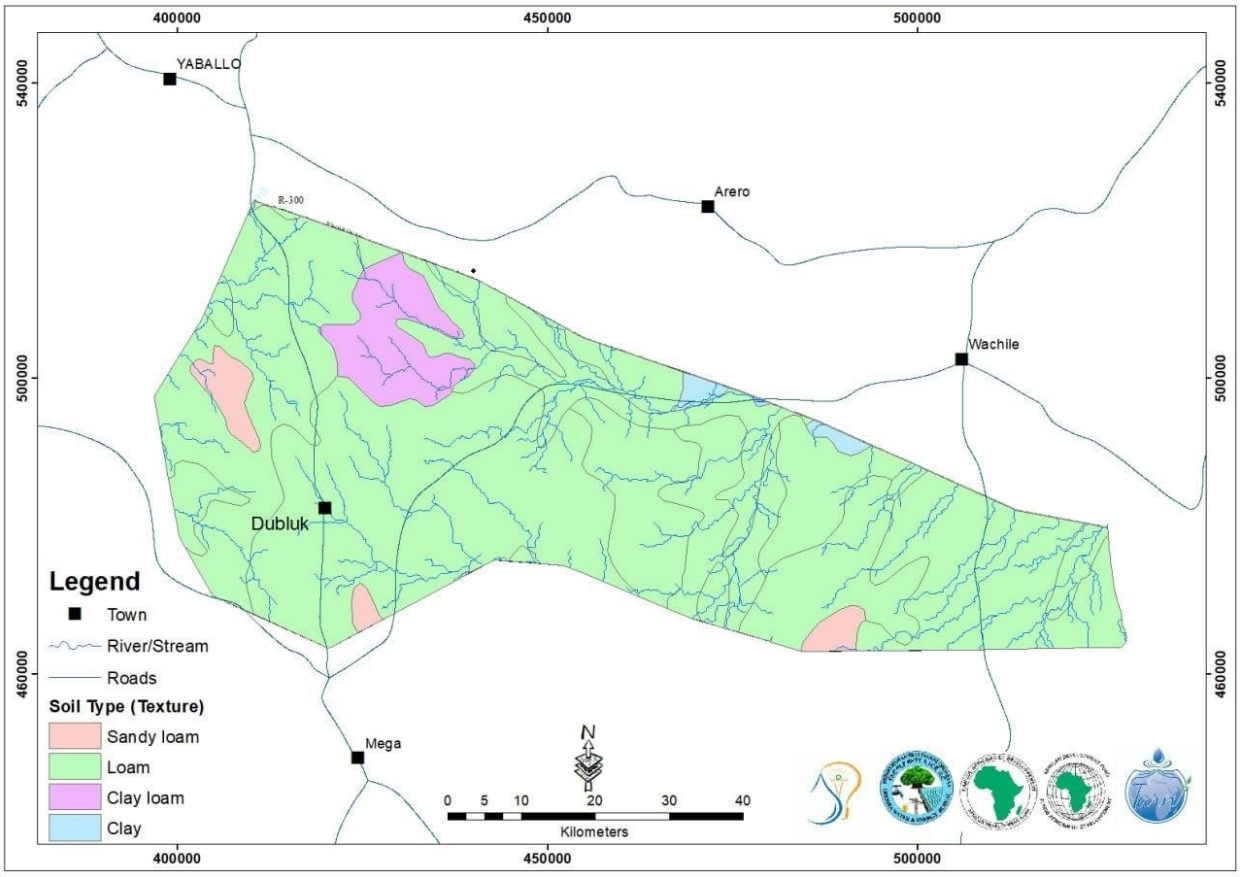

Figure 4: Soil map of Dubluk woreda

As shown in picture 1, soil ersosion and gully forfmation was evidently obseved durifng the field visit.

Picture 1: Sample view of soil erosion and gully formed in the project area

4.1.6. Water Resources

The project area is located in the Genale Dawa River Basin. However, there are no major rivers or streams that flow across or originate within Dubluk woreda. Nevertheless, there are various water sources, including traditional ponds, wells, and hand pumps, which are used by both the local community and livestock so far in the woreda. The seasonal stream flows in the rainy season are, in general, turbid and carry a relatively high load of suspended material due to the sheet and gulley erosion created by the torrential rains and surface runoff. The local community uses traditional water sources called shallow wells (Eelaa) and ponds, which are used as the major sources of water

for both humans and livestock during bad times.

4.1.7. Land Use Land Cover

The land use pattern in Dubluk woreda is distributed across various categories. The largest area, covering 55.29% of the total land, is grazing land, amounting to 228,465.75 hectares. Settlement areas, including Quftumaa, occupy 26.74% of the land, totaling 110,500 hectares. Arable land and land under crops make up a smaller portion, with 3.15% and 2.23% respectively. Other land types include highlands/mountains (12.29%), forest land (0.07%), bush encroachment (0.05%), degraded and barren land (0.18%). The total area of the district is 413,252 hectares of which the details is specified in Table 5 below.

Table 5: Land use land cover (In Hectare)

No	Land use pattern	Total area		
		Km²	**Hectare**	**%**
1	Arable land	130	13000	3.15
2	High land/Mountain	508	50800	12.29
3	Forest land	2.8	280	0.07
4	Bush encroachment	2.2	220	0.05
5	Land under crop	92.36	9236.25	2.23
6	Degradation area and barren land	7.5	75	0.18
7	Grazing land	2284.66	228465.75	55.29
8	Settlement(Quftumaa)	1105	110500	26.74
	Total Area	**4132.52**	**413,252**	**100%**
Source: Dubluk woreda Agricultural and Natural resource office, 2024				

On the other hand, the specific project area of the Weib Route was classified into three major land cover types based on spectral properties of the satellite imagery. This classification was supplemented or validated by onsite identification of the land cover types including vegetation types, density and floristic composition. As a result, as shown in Figure 5 below, the project route area is dominated by open shrub land, open woodland and dense woodland.

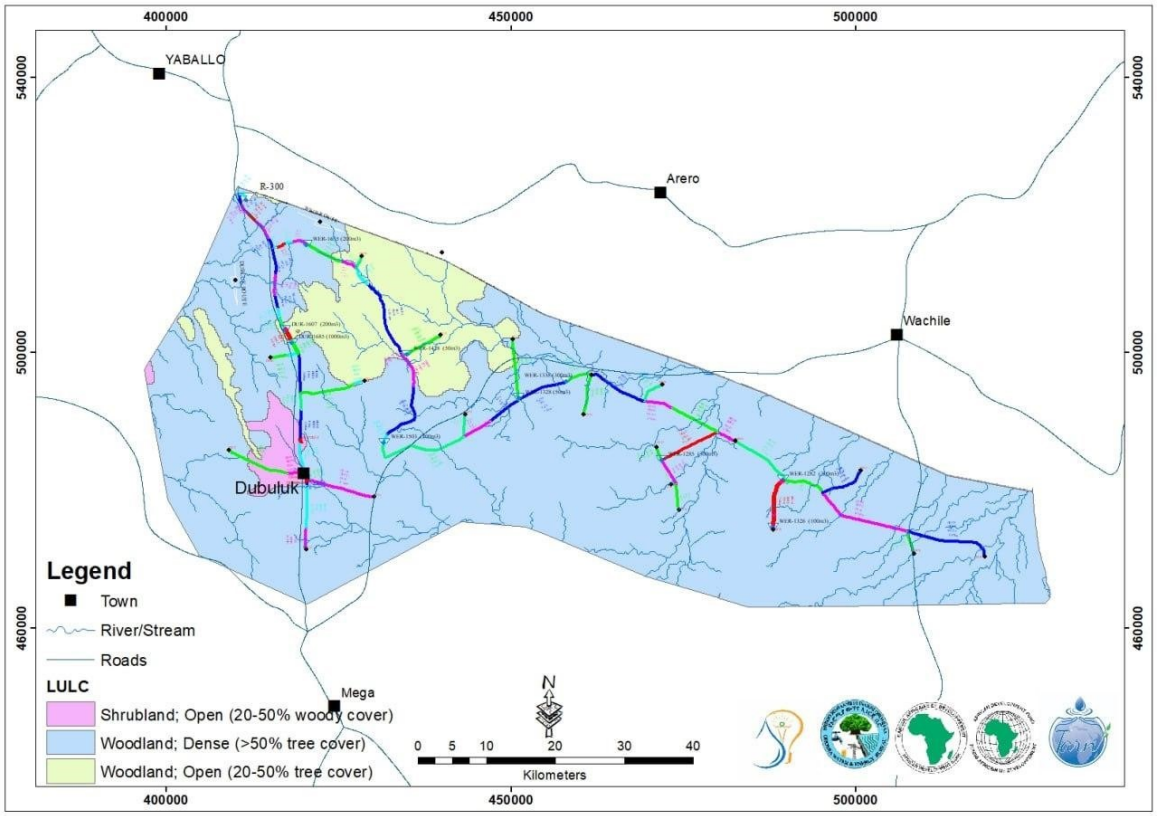

Figure 5: Land Cover Map of the Project Area

4.2. Biological Environments

4.2.1. Vegetation

The majority of the vegetation in the project corridor and the area directly under the project influence has been highly modified by anthropogenic activities including raising livestock, cultivating crops, gathering wood for fuel and construction and producing charcoal. Given that it reflects the climatic, physiographic, edaphic, and biotic characteristics of the land it grows on, vegetation serves as an integrator of environmental elements.

The dominant vegetation type of the Weib Route Water Supply and pipeline route project corridor is characterized by open and dense shrubs and woodland mainly covered with Acacia dominated bush- and shrub-land. Patches of dense acacia woodlands are also seen here and there in the project area. However, the natural vegetation in the project area is mainly characterized by short bushes and shrubs most of which are up to 3m tall. It is dominated by Acacia bushes and shrubs predominantly A. senegal. Other bushes and shrubs include Acacia tortilis, Rhus natalensis, Dichrostachys cinerea, Commiphora sp., Capparis sp., Acacia seyal sp. etc. Picture 2 below depicts an example of these vegetation types.

Picture 2: Partial View of common Vegetation type in the project Corridor

Historically, the rangelands of the project areas were characterized by tropical savannah vegetation, but over time, they have been increasingly dominated by invasive acacia tree species. This shift, coupled with recurrent droughts, has led to significant changes and degradation of the rangeland, making it less capable of supporting the livestock population as it once did. The landscape now features a mix of alien tree species, varying proportions of open grasslands, and scattered perennial woody plants. The district is home to two natural forests, Dhokole and Gobsoo, which are protected by local cooperatives. The Dhokole forest covers 50 hectares, while the Gobsoo forest spans 159.26 hectares. These are the only natural forests in the district, as there are no man-made forests. The project area lies in a remote kebele, and as a result, there are no anticipated impacts on these forests from the project's implementation in this woreda. Some of the major tree species are presented in Table 6 below.

Biodiversity Value of the Habitats of the Project Area: Even though most of the habitats along the Weib Route Water Supply project corridor and reservoir sites have been highly disturbed and degraded, there are two major habitats in the area, namely open bush and woodland areas (dominant) and patches of insect habitats such as termite-mound. Hence, the open woodland and bush land environment (habitat for mammals) as well as termite mound sites (insects) remain as wildlife habitats even though surrounded by highly transformed terrestrial areas or heavily grazed land (see picture 3 below).

Picture 3: Sample habitats and ecosystem of the project area

Ecosystem Services: The open woodland shrub land habitats in the Project area and its surroundings provide a number of important socio-economic and ecological services. These include food, fuel-wood, live fence around homesteads and farm plots, grazing resources for livestock, traditional medicines and food, sediment trap, nature conservation through supporting habitats (through provision of suitable breeding, reproduction, nursery, refugee and corridors for birds & other faunal species). Among

the essential ecosystem services is the provision of grazing resources for livestock by the open grasslands and shrub land areas.

Assessment of Critical Habitat: Among the plant species identified from the project area, it was confirmed that several tree species and herbaceous plant are endemic to Ethiopia. However, these plants are widely distributed in many parts of the country and are not categorized as species with restricted range of distribution. Therefore, there is no critical habit that will be affected by the Project

Diversity, Endemism and IUCN Red-List Status of Plant Species: Twenty tree and shrub species have been identified from the project corridor and their detail list is shown in Table 5 below. Of these, three species are endemic to Ethiopia (species of Acacia. *abyssinica*, Balanites Aegyptica and Euphorbia *abyssinica)*. Among the tree species identified, 5 species (Acacia *brevispica*, Acacia *cerofota*, Acacia *seyal*, Acacia *Senegal* and Balanites Aegyptica) were found be threatened and one species (Lannea *schimperi*) was endangered in the IUCN list. The rest of the identified plants are list as hereunder. However, the number of plant species occurring in the area is expected to be more than this figure with detailed scientific assessment.

Moreover, none of these plant species will be affected by the Weib Route water supply project as no such plant is found on the proposed route and reservoir areas.

Table 6: Major tree species in the project area

S/N	Local Name	Common Name	Scientific Name	IUCN Category
1	Agamssa	Small num	Carissa edulis	Least Concern
2	Agamssa	Bush plum	Carissa spinarum	Least Concern
3	Jirmee	Sicklebush	Dichrostachys cineria	Least Concern
4	Dobeessa	Natal karee	Rhus natalensis	Threatened
5	Amarreessa	prickly acacia	Acacia brevispica	Threatened
6	Waagaahi	Acacia	Acacia cerofota	Threatened
7	Waaccuu	white-galled acacia	Acacia seyal	Threatened
8	Arangamaa	Gum acacia	Acacia Senegal	Least Concern
9	Xaddacha	Umbrella thorn acacia	Acacia tortolis	Least Concern
10	Baddannoo	Desert date	Balanites Aegyptica	Threatened
11	Hammeessa	African myrrh	Commiphora Africana	Least Concern
12	Ruqeessa	Bicoloured bushwillow	Combretum collinum	Least Concern
13	Roqaa	Tamarind	Tamarindus indica	Least Concern
14	Arooressa	white raisin	Grewia bicolour	Least Concern
15	Waleenssuu	Abyssinian coral tree	Erithrina abyssinica	Least Concern
16	Burquqqee	Red Thorn	Acacia lahai	Least Concern
17	Handeerekku	Andaraka	Lannea schimperi	Endangered
18	Laaftoo	False paperbark thorn	Acacia sieberiana	Least Concern
19	Ejeersa	African wild olive	Olea Africana	Least Concern

20		Abyssinian spurge	Euphorbia abyssinica	Least concern

4.2.2. Wildlife

According to the site reconnaissance and reviewed literatures, also as confirmed by Woreda administrations along the project corridor, the Web route Water Supply project is not directly contiguous with the Borana National Park found in Boredna Zone. Thus, direct adverse impacts associated with the construction of the project will not be an issue. However, even though most sections of the project corridor are under high environmental degradation, various wildlife species were identified by direct opportunistic observation or indirectly through signs and sounds as well as traces indicating presence such as footprints in both protected and unprotected areas. Apart from Burchell's Zebra and Grants gazelle, some of the commonly encountered species by villagers include Ginther dik-dik, Greater Kudu, Lesser Kudu, warthog, Besia Oryx,bushpig, Anubis baboons, Mongoose, Golden jacked and pallid ground squirrel. According to the village elders there are also carnivores such as leopard, cheetah, wild dog, eared fox and spotted hyenas.

4.2.3. Birds

As to the project area, various bird species are recorded, and they are the most diverse fauna group in the project area. According to the data obtained from Borana National Park office, there are about 276 bird species in the area. The species were found in grasslands, wetlands and swamp areas. Regarding species of special concern, the project area hosts two endemic birds namely, the Ethiopian Bush Crew and White-Tailed Swallow.

Similar to the birds in different environments, the birds of the project area have ecological and economic importance. Apart from this, birds are also key components of the ecosystem and also considered as environmental indicators.

4.2.4. National Park and Protected Areas

Borana National Park is one of the protected areas found in the project zone hosting various wildlife species. It covers an area estimated to be 2496 square kilometers. The major wildlife types found in the park include Burchell's Zebra (Equus quagga boehmi), Grevy's Zebra (Equus grevyi), Gazelle, Lesser Kudu, Greater Kudu, Gerenuk, Giraffe, Baboon and Ostrich. There are also more than 270 bird species, among which two of the birds are endemic to Ethiopia (Ethiopian Bush Crew and White-Tailed Swallow). The major wild animals found in the project area (Borena National Park) are shown in Table 7 below.

Moreover, none of these wild animals will be affected by the Weib Route water supply project as the proposed water transmission line route and reservoir sites are neither contagious nor in close proximity to the park.

Table 7: Major types of Wildlife in the project area (in the park)

S/N	Local Name	Common Name	Scientific Name	IUCN Category
1	Waraabessa	Spotted Hyena	*Crocuta crocuta*	Least Concern
2	Harre Diidaa	Burchell's/Plain Zebra	*Equus quagga boehmi*	Near Threatened
3	Harre Diidaa	Grevy's Zebra	*Equus grevyi*	Endangered
4	-	Gazelle	*Gazella cuvier's*	Endangered

5	Arouayé	Common Jackal	*Canis aureus*	Least Concern
6	Kuruphe	Lesser Kudu	*Tragelaphus imberbis*	Near Threatened
7	Bosonu	Greater Kudu	*Tragelaphus strepsiceros*	Least Concern
8	Karkaro	Warthog	*Phacochoerus africanus*	Least Concern
9	Dhaddee	Crested Porcupine	*Hystrix cristata*	Least Concern
10	Gadamsa	East African oryx	*Oryx besia*	Threatened
11	Booyyee	Bush-pig	*Potamochoerus iarvatas*	Least Concern
12	Jaldeessa	Anubis baboons	*Papio anubis*	Least Concern
S/N	**Local Name**	**Common Name**	**Scientific Name**	**IUCN Category**
13	Wacwacoo	Mongoose	*Herpestes ichneumon*	Threatened
14	Sardiida	Golden jackal	*Canis aureus*	Least Concern
15	-	Pallid ground squirrel	*Spermophilus pallidicauda*	Least Concern
16	Hillensa	Abyssinian Hare	*Lepus habessinicus*	Least Concern
17	Qammale	Grivet Monkey	*Chlorocebus pygerythrus*	Least Concern
18		Common Duiker	*Sylvicapra grimmia*	Least Concern

4.3. Socio Economic Conditions

4.3.1. Population

The total population of Dubuluk Woreda is 85, 414, with 53% male and 47% female. Approximately 85% of the population resides in rural areas, while the remaining 15% live in urban areas. Table 8 below shows the total population of Dubluk Woreda disaggregated by kebeles, households and sex.

Table 8: Dubuluk Woreda Total Population

S.N	Kebele	Households			Total population		
		M	F	Total	M	F	total
1	Magaala Dubluqi	1053	918	1971	7278	6710	13988
2	Laafto	496	312	808	4502	3716	8218
3	Jigeessa	527	300	827	2603	2453	5056
4	Gaalee	565	436	1001	3318	2888	6206
5	Dhoqqolle	559	529	1088	3527	3255	6782
6	Arbaalla	433	284	717	2285	2094	4379
7	Gooroo Daada	169	116	285	968	813	1781
8	Qarsaa Dambi	513	300	813	2928	2550	5478
9	Bokossaa	571	428	999	3782	3000	6782
10	Fuloo Biqqaa	333	226	559	1800	1350	3150
11	Hiigoo	616	596	1212	5565	3119	8684
12	Aanoole	856	498	1354	2811	4818	7629
13	Goobsoo	743	434	1177	3900	3381	7281

	Total			**12811**	**45267**	**33437**	**85,414**

Source: Woreda Admin (2024)

4.3.2. Agricultural Activities

Dubluk woreda has traditionally been dominated by a pastoralist lifestyle, but agricultural practices have been gradually gaining traction in recent years. The district is situated in a lowland area characterized by high temperatures and limited rainfall, making agriculture challenging and contributing to food insecurity. Water scarcity is a significant obstacle to boosting agricultural production in the region. However, certain areas, such as Fulo Bika, Bokosa, Karsa Dambi, and Dhokole, have become known for their agricultural activities. In these areas, farming practices are thriving, with crops such as maize, haricot beans, beans, and teff being commonly grown. The cropping seasons in Dubuluk are tied to the two rainy periods: the long rainy season (winter) and the short rainy season (spring). During the short rains, haricot beans and beans are harvested, while maize, teff, and haricot beans are cultivated during the long rains.

Due to the area's low rainfall and the community's pastoralist lifestyle, agricultural practices are a recent development history. Hence, these activities are primarily limited to areas around ponds, wells, and other water sources, covering no more than 17.5 hectares of land (Table 9).

Table 9: Agricultural practices of the Woreda

No	Kebele	Number of Water	Site of water sources	Area, Ha
1	Dubuluk	**resource use**1 **d**	Dololo Dhanqo pond	3
2	Anole	2	Golichas pond and Bules Pond	4
3	Higo	1	Dhuke Motorized pump	4
4	Arbala	1	Arbala Motorized pump	1
5	Lafto	1	Oromia pond	3
6	Jigesa	1	Mandida Well	0.35
	Total	6		17.35

Source: Project woreda Education Offices

4.3.1. Livestock

4.3.1.1. Livestock Population

Table 10 below presents data on the livestock population in Dubluk woreda for the years 2021 and 2024. In 2021, the district had a significantly larger population of livestock compared to 2024. For example, the cattle population was 170,315, while in 2024, it dropped to 98, 929 due to the prolonged drought that happened during that period. Similarly, the sheep and goat populations were 128,215 and 240,552, respectively, in 2021, but these numbers decreased to 81, 526 and 99, 931 in 2024. The most notable decline is seen in the cattle population, followed by decreases in sheep and goats, indicating a possible reduction in overall livestock farming activity or a shift in agricultural practices. These changes may reflect shifts in farming priorities or challenges such as disease, drought (lack of water), or market factors impacting livestock rearing in the Woreda.

Table 10: Livestock Population in Dubluk Woreda

	Livestock population number

Year	Cattle	sheep	Goats	mules	horse	camel	donkey	poultry
2021	170,315	128,215	240,552	156	78	22,149	5,215	89,115
2024	98,929	81,526	99,931	94	46	7,831	6,241	76,225

Source: woreda socio economic profile of 2021 and 2024

4.3.1.2. Major Livestock Diseases

The major livestock diseases in the project areas are as follows. Cattle are susceptible to a range of diseases, including Contagious Bovine Pleuropneumonia (CBPP), Bovine Pasteurellosis, Lumpy Skin Disease (LSD), Anthrax, Malignant Catarrhal Fever (MCH), and Bovine Ephemeral Fever (BEF), with Foot and Mouth Disease (FMD) also posing a significant threat to their health. Sheep often face issues such as Parasitosis (parasite infestations), Ovine Pasteurellosis, Sheep Pox, and Mange Mite Infestation, which causes skin irritation. Goats are prone to Foot Rot (Barga'o), Mange Mite Infestation, Parasite Infestations, as well as conditions like Cneriosis (Sirgo), Candidiasis (Qandho), and Contagious Caprine Pleuropneumonia (CCPP). Camels can be affected by Camel Pox, Sura, Metabolic Disease (Milaamura), Camel Pasteurellosis (Furii), and Myiasis, an infestation of fly larvae. Lastly, Equine animals (horses) are vulnerable to African Horse Sickness (AHS), Glanders (Gororsaa), and Equine Infectious Anemia (Equiperdem), which can significantly impact their health and performance.

4.3.1.1. Availability of Veterinary Services

Veterinary services available in the area include preventive care through community awareness creation to educate the public about livestock health and disease prevention. Additionally, minor surgeries are provided for treating various injuries or health conditions in animals. Treatment for illnesses and vaccination programs are also offered to help control and prevent the spread of disease. These services play a crucial role in maintaining the health of livestock and improving the overall productivity of the community's animals. There are 56 vet professionals in Dubluk Woreda. Table 11 below shows the vet professional personnel in the woreda.

Table 11: Number of veterinary personnel

DVM	BSc	Diploma	Live-animal health	assistance/ Certificate	Total
2	7	30	14	3	56

4.3.2. Education Services

Access to education service and facilities are among the key for socioeconomic indicators of a given society.

As shown in Table 12, below, in the project area (Dubluk Woreda), there are two private kindergarten schools with a total enrollment of 326 students. The enrollment figures show a near equal gender distribution, with 164 male students and 162 female students across three grade levels: KG-I, KG-II, and KG-III. In addition, the woreda has a significant number of primary schools spread across different levels. There are 16 schools in the first cycle (Grades 1-4), 20 schools in the second cycle (Grades 5-8), and 2 government-run senior secondary schools for grades 9-12. This structure supports a broad range of educational stages, from early childhood education to senior secondary schooling, providing students with access to a continuum of educational services.

Student Enrollment, Dropout, and Detention Rates: The enrollment data for the primary,

secondary, and senior secondary levels show notable figures for the number of students enrolled, those who dropped out, and those detained in school. For the first cycle (Grades 1-4), there are 2017 male, and 2115 female students enrolled, with a total of 4132 students. However, 200 students dropped out, and 144 students were detained. In the second cycle (Grades 5-8), 1220 male and 1121 female students are enrolled, with 34 students dropping out and 55 detained. For Grades 9-12, there are 671 male, and 602 female students enrolled, with 64 students dropping out and 38 detained. These figures suggest a higher dropout and detention rate in the first cycle, which may require targeted interventions to improve retention.

In addition to the formal schooling system, the district offers literacy programs through various centers. There are 42 literacy centers with 1024 total participants, of which 673 are male and 351 are female. The program is structured across three levels, with Level 1 having the highest enrollment of 424 participants (including both male and female students). These literacy programs provide essential education for adults and out-ofschool youth, promoting lifelong learning and skills development.

Teachers and Teacher Distribution by Level: The teaching workforce is distributed across different school levels. In the first cycle (Grades 1-4), there are 152 total teachers, including 86 male and 66 female teachers. For the second cycle (Grades 5-8), there are 95 teachers, with 80 male and 15 female teachers. The senior secondary schools (Grades 9-12) have a total of 67 teachers, with a significant proportion of 58 males and only 9 female teachers.

Table 12: Number of students and teachers in the woreda

S.N	School Category	Number of Students			Number of Teachers		
		Male	Female	Total	Male	Female	Total
1	Kindergarten	164	162	326			
2	Primary Schools (1st Cycle: 1-4)	2017	2115	4132	86	66	152
	Dropouts (Grade 1-4)	110	90	200			
	Detained (Grade 1-4)	78	66	144			
3	Primary Schools (2nd Cycle: 5-8)	1220	1121	2341	80	15	95
	Dropouts (Grade 5-8)	25	9	34			
	Detained (Grade 5-8)	22	33	55			
4	Secondary Schools 9-12)	671	602	1273	58	9	67
	Dropouts (Grade 9-12)	40	24	64			
	Detained (Grade 9-12)	26	12	38			
5	Literacy Classes	673	351	1024			

Source: Project woreda Education Offices (2024)

4.3.3. Health Services

4.3.3.1. Health facilities

According to the data obtained from direct influence woredas respective health offices, Dubluk Woreda has relatively better health facilities in number and professional enrollment than other nearby woredas. According to the data obtained from project influence woredas, there are 9 health posts and 2 health centers in Dubluk woreda.

Health Coverage of the project influence Woredas: the general health services coverage of the Dubluk Woreda is 56%, which is calculated based on considering one health center is expected to provide services for 25,000 persons and one health post is

e

xpected to provide service for 5,000 people.

4.3.3.2. Health professionals

According to Dubluk woreda health department, there are a total of 47 people currently employed in health service facilities. As depicted bellow in Table 12, there are 2 health officers, 4 BSC nurses, 6 clinical nurses, 3 midwife, 2 lab tech, 2 pharmacists, 16 HEWs and 13 other supportive staff (Table 13). Moreover, the existing health facilities have limitations with respect to laboratory service, the situation makes difficult to differentiate between the various species of plasmodium (the vector of malaria).

Table 13: health professionals in project woredas

S.No	Type of Professionals	Number of Professionals		
		Male	Female	Total
1	Medical Doctor	0	0	0
2	Health Officer	2	0	2
3	BSc	3	1	4
4	Clinical nurse	6	0	6
6	Midwife	1	2	3
7	Lab tech	2	0	2
8	pharmacists	2	0	2
9	HEWS	5	11	16
10	Other Staff	10	3	13
	Grand Total	**31**	**16**	**47**

Source: Project woreda Health Offices (2024)

4.3.3.3. Ten Common Diseases

According to the woreda health office, the top ten most frequently diagnosed health disorders in Dubluk Woreda include malaria, diarrhea, acute upper respiratory disease, parasitic diseases, other respiratory diseases, Gastro entireties, Infection of skin, Otities and Mastication, amoeba, and unspecified pneumonia. In all cases, malaria was the leading disorder causing disease, significantly affecting the woreda population. On the other hand, it was reported that diarriea out brake seasonally and became the cause for death and illness.

4.3.4. Water Supply and Sanitation

In the rural areas of Dubluk Woreda, the primary sources of drinking water include hand pumps, ponds, wells, and spring water. The main sources of potable water in Dubluk Woreda are deep wells and ponds. As shown in Table 14 below, there are a total of 12 ponds, with 10 short well ponds (8 functional and 2 non-functional), 6 deep wells (all functional), 12 hand pumps (10 functional and 2 non-functional), and 2 spring water sources (1 functional and 1 non-functional). Although these sources provide water for the community, the water from these sources is often not clean, and not all communities have reliable access to safe drinking water. As a result, the majority of people in the district are deprived of access to pure water. Only about 44.3% of the total population has access to potable water from these sources.

Table 14: sources of water in the woreda

S.N	Water Source	Total Number	Functional	Non-Functional
1	Deep Wells	6	6	0
2	Ponds	10	8	2
3	Hand Pumps	12	10	2
4	Spring	2	1	1

On the other hand, there is no data on both the sanitation facilities and coverage in the woreda.

4.3.5. Road Services

Dubluk Woreda can be accessed by the Addis-Moyale highway and the road infrastructure in Dubuluk Woreda can be divided into all-weather roads and dry weather roads, with varying lengths of asphalt and gravel roads across different kebeles. In terms of all-weather roads, asphalt roads are predominantly found in the district, with significant stretches such as 24 km from Dubuluk-Q/dambi, 20 km from Dubuluk-Jigesa, and other smaller sections in areas like Dubuluk-Galee and Dubuluk-Dha/Dhowa. Additionally, gravel roads form an important part of the network, with notable stretches like 28 km from Lafto-Gobso, 22 km from Dubuluk-Jigesa, and 25 km from DubulukG/Dada, among others.

4.3.6. Sources of Energy

The Dubluk Woreda, like the rest of the rural woredas of the country, makes use of both traditional and modern energy forms. However, the uses of modern forms of energy such as Kerosene, LPG and electricity are negligible in Dubluk Woreda. Energy sources in the woreda are dominated by traditional forms that are derived from biomass-firewood, branch, leaves, twigs, roots, dung, charcoal and agri-residue. The woreda capital (Dubluk town) is supplied with grid electric supply for 24 hours. Whereas all projects impacted on rural kebeles are not supplied with electric power. Most people use solar torch as a source of lighting and mobile charging.

4.3.7. Settlements Pattern

The settlement pattern in Dubluk Woreda is characterized by scattered villages, locally known as "Ollaa." These villages are typically spread across the landscape, with a mix of mobile and small sedentary clusters situated at varying intervals (see picture 4 below). The mobile settlements are often associated with the pastoralist lifestyle, where communities move in search of grazing land and water sources, while the sedentary clusters are more permanent settlements for farming or other livelihoods. Most of the settlements are concentrated along major roads, reflecting accessibility to transportation and trade routes, which play a key role in the local economy and connectivity between the rural areas and urban centers.

Picture 4: Typical housing condition and settlement pattern in the project area

5. STAKEHOLDER ENGAGEMENT AND PARTICIPATION

5.1. Community Consultation

Community consultation and consent for the Web Route Water Supply System project were conducted in various kebeles of Dubluk Woreda, specifically Kersa Dambi, Fulo Bikka, and Higo. These kebeles, consisting of several villages or "ollas," actively participated in discussions regarding the environmental and social aspects of the project. The primary goal of these consultations was to identify potential environmental and social impacts, propose appropriate mitigation measures, and ensure community ownership of the project by obtaining their consent and addressing any concerns. Although the discussions were conducted in Affan Oromo, the summary of the same is presented as follow and the full minutes meeting are attached with this document as annex 1.

Consultations were held on 12/012/2024 at Katte Village at Olla Gollicha Guyyo, in Kersa Dambi kebele, where significant water scarcity issues were observed and 17 participates attended of which 13 of them were females (picture 5). The community was engaged in preparing ponds for the upcoming rainy season, which highlighted the severity of the water shortage in the area. During the discussions, community members shared that they had to walk between 4 to 6 hours to fetch water for domestic use.

Picture 5: View of community consultation at Kersa Dambi Kebele The

key points raised and discussed are summarized as follows:

- The community was very pleased to have the opportunity to discuss water.
- Emphasized that there is severe water shortage and community members are forced to fetch water from distant areas.
- This lack of water has led to the spread of waterborne diseases, particularly affecting children, pregnant women, and youth.
- The water scarcity has also contributed to high school dropout rates, as students must travel long distances to fetch water, often forcing them to stop their education.
- Assure that there is no major environmental and social issues to negatively affect the project.
- The community expressed their willingness to support the project, including contributing to the construction of pipelines, reservoirs, and addressing any related issues to ensure the project is completed on time and effectively.

Similarly, consultations were held on 12/12/2024 at Dambala Kersa village of Fulo Bikka, where the community highlighted severe water shortages that have resulted in health and social issues, including school dropouts and 12 participant atten3d the meeting out of which 9 of them were males. The community strongly supported the project, emphasizing that access to clean water was their most urgent concern. Many of the residents are currently forced to fetch water from distant sources, far from their homes. One participant even expressed a willingness to voluntarily relocate his home if the water supply line could reach his area, underscoring the critical importance of water access in the region.

Picture 6: View of community consultation sample photos at Fulo Bikka kebele

During the consultation, the community raised several important issues, and the discussion results are summarized as follows:

- First and foremost, they were grateful for the opportunity to discuss the pressing water issue, as access to water is their most urgent concern at this time.
- One participant asked if this water would be the same one that reaches Simu area and stops there. This question was based on previous information they had, and the team clarified that this water is an extension of the expected supply and assured him that the water will reach their village.
- The community expressed that they are facing severe water shortages, often having to walk long distances to fetch water. This situation has led to school dropouts, waterborne diseases, and some residents migrating to other areas in search of water.
- Some participants mentioned that they sometimes go one to two days without access to water, highlighting the extreme water scarcity they face.
- One participant emphasized the severity of the shortage, stating, "If the water line reaches my home, I will immediately dismantle my house to make way for the line in order to have water in this area." He added, "We understand the importance of water here more than anyone".
- The participants confirmed that there are no burial sites, cultural trees, farmland, forests, or other sensitive issues along the water line that could negatively impact the community or the environment. Their primary concern remains the urgent need for water.
- The community also inquired whether the pipeline would affect old water sources, such as ponds or traditional wells. This concern stemmed from a lack of knowledge about the water system. The team clarified that the pipeline would not interfere with these existing water sources, which would continue to supply water.

In Higo kebele, consultations were held on 14/12/2024, at Dambala Immu and Dambala Dima villages, where the community also expressed their support for the project. Currently, residents of these villages fetch water from a traditional well called "Ela Higo," located at an average distance from the village. 16 participants attended the meeting out of which 13 were females. The water shortage challenges faced here are similar to those experienced in other nearby kebeles and villages.

Picture 7: Community consultation at Dambala Imu village of Higo kebele

- The community at Higo Kebele also raised points and discussion results are the same as what were summarized in the previous two kebeles.

In each consultation meeting, the ESIA team had asked whether there were any issues, such as cemeteries, burial sites, culturally significant trees (locally known as 'muka kormaa korphessa'), forests, farmland, or other concerns along the pipeline, reservoir area, and distribution lines. Then, participants' replies are summarized as follows:

- The community confirmed that there are no such issues along the planned route that would hinder the construction of the project.
- If farmland or individual homes are affected, they expressed their willingness to relocate in order to support the project and bring water to their area. One participant stated, "We have experienced a serious water shortage, and we want to be free from this scarcity once and for all."
- Their most urgent concern is ensuring that the water supply is provided as quickly as possible, without delays.

Hence, the study team addressed environmental, social and cultural concerns, such as the presence of ritual trees, sacred areas, forests, endemic wildlife, and private properties along the project route, as well as other important factors that could be affected. However, the community emphasized that their primary concern was the severe water scarcity they face, and they did not foresee any significant impacts on private properties, such as farmlands or homes. Overall, the community expressed strong support for the project, viewing it as a crucial solution to their water challenges.

Based on the community consultations and field observations, the study team found that water shortage is a major issue in the area, with the community's top priority being access to clean water for both domestic use and livestock. The study did not anticipate any significant negative impacts on private properties or other sensitive concerns, and the community did not raise any additional issues or objections regarding the project. The collective need for a reliable and clean water supply far outweighed any concerns about potential disruptions. This active community engagement ensured that the project would be designed to meet local needs while respecting environmental preservation and cultural values, fostering a strong sense of ownership and support among the residents.

5.2. Stakeholder Consultation at Office Level

Stakeholder discussions were also held on 11/12/2024 with the zonal and woreda-level

water sectors to address the importance of the Web Route Water Supply System, along with the associated environmental and social issues. The water sector emphasized the critical need for clean water and related infrastructure in the area. Due to the severe lack of water for both human consumption and livestock, the community has faced numerous social and economic challenges. The project is expected to bring substantial socioeconomic benefits to the region, addressing these longstanding issues.

Providing clean water for both people and livestock will have a significant positive impact on the social and economic conditions of the area. It is anticipated that the project will help reduce health problems and school dropouts, which are currently exacerbated by water scarcity. Access to a reliable water supply will not only improve public health and education but will also enhance overall quality of life for the community. By addressing the pressing water shortage, this project will provide muchneeded relief and support the local population in overcoming one of their most significant challenges.

Picture 8: Partial view of stakeholder discussion at Dubluk water and energy office

6. PROJECT ALTERNATIVE ANALYSIS

6.1. Project Alternatives

For the Environmental and Social Impact Assessment (ESIA) of the Web Root Water Supply System, several project alternatives can be considered to minimize potential negative environmental and social impacts. These alternatives can include:

a. **Alternative Water Sources**: Exploring different water sources such as groundwater, rivers, or rainwater harvesting systems as alternatives to surface water. This could help reduce impacts on existing water bodies or ecosystems and ensure water sustainability.

b. **Pipeline Routing Alternatives**: Assessing different pipeline routes to avoid environmentally sensitive areas such as wetlands, forests, or agricultural lands, and to minimize land acquisition or displacement of local communities. Selecting the least disruptive route could mitigate soil erosion and habitat disturbance.

c. **Technology and Infrastructure Alternatives**: Comparing different technologies for water distribution, such as gravity-fed systems versus pump-assisted systems, to

reduce energy consumption, lower carbon emissions, and minimize the long-term operational costs.

d. **Shared vs. Individual Water Points**: Evaluating the use of shared water taps (common water points) versus individual household connections. Shared water points may reduce the overall cost and impact but may also raise concerns about accessibility, especially for marginalized groups.

e. **Sanitation and Waste Management Alternatives**: Considering different options for sanitation, such as decentralized treatment systems (e.g., composting toilets) versus centralized systems, to reduce waste generation and environmental contamination, especially in water-scarce regions.

f. **Alternative Reservoir Designs**: Evaluating different types of reservoirs (e.g., aboveground versus underground) to reduce land footprint, ensure better integration with the environment, and address potential issues like water loss due to evaporation.

g. **Timing and Phased Implementation**: Assessing different timelines for project implementation to avoid peak migration periods for pastoralists or critical agricultural cycles, reducing disruptions to livelihoods and land use.

By analyzing these alternatives, the ESIA can identify the most sustainable and socially acceptable options for the Web Root Water Supply System, ensuring minimal environmental degradation and social disruption while maximizing benefits to the community.

6.2. Alternative Analysis

6.2.1. Environmental Analysis:

- **Water Scarcity**: Without the project, the ongoing water scarcity in the region would likely persist or worsen, especially in areas where water supply systems are inadequate. This could lead to over-extraction of local water sources, reduced availability for both agricultural and domestic use, and further stress on ecosystems that rely on these water resources.
- **Ecosystem Impact**: The natural environment may not face the direct physical impacts from infrastructure development (such as land clearing or pipeline laying). However, ongoing water shortages could lead to ecosystem degradation, including the drying up of local water sources, soil erosion, and loss of biodiversity, particularly in aquatic and wetland habitats.
- **Public Health**: Without proper water supply and sanitation infrastructure, public health conditions are likely to remain poor, with continued risks of waterborne diseases due to inadequate access to clean water and sanitation facilities.

6.2.2. Social Analysis:

- **Livelihoods**: The absence of the project could leave the local population, particularly pastoralists and farmers, dependent on unreliable water sources. This can limit agricultural productivity, affect livestock health, and hinder economic growth in the area. Vulnerable communities, especially women and children, may have to spend more time collecting water, limiting their opportunities for education or employment.
- **Social Inequality**: In the "No Project" scenario, the existing inequality in access to

water and sanitation services would likely persist, with rural areas, particularly those far from existing infrastructure, continuing to face the greatest challenges. This can exacerbate social disparities and contribute to community unrest.

- **Cultural and Community Impact**: Without the project, the challenges faced by communities in terms of water access, sanitation, and hygiene may continue to disrupt social cohesion and public trust. This could lead to further migration, conflicts over water resources, and a lack of community development.

6.2.3. Economic Analysis:

- **Economic Growth**: The economic development potential of the area may be limited without improved water infrastructure. Lack of reliable water supply systems can restrict agricultural productivity, tourism, and other economic activities that rely on sustainable water resources. In turn, this can lead to reduced income opportunities for local communities and slower regional development.
- **Cost of Inaction**: While the "No Project" scenario avoids the upfront costs of construction and infrastructure, the long-term costs of water shortages, poor sanitation, and environmental degradation could be much higher, both in terms of health expenditures and lost productivity.

6.3. Comparison of the Project to no Project Alternatives

- Even through the "No Project" scenario is an important alternative in the Environmental and Social Impact Assessment (ESIA) process as it provides a baseline for comparing the potential benefits and impacts of the proposed Web Root Water Supply System project, selecting it will have no new water infrastructure or associated facilities to be developed, and the current conditions of the region remain unchanged. Hence, the benefits of improved water access, sanitation, and climate resilience (as proposed in the project) will be lost and creates potential negative consequences of maintaining the status quo.

In conclusion, while the "No Project" scenario avoids construction-related impacts, it presents significant environmental, social, and economic challenges that may have long-term consequences for the community and the region. This makes the project's implementation a more sustainable and beneficial option for improving water access, sanitation, and livelihoods.

7. IMPACT IDENTIFICATION, PREDICTION AND ANALYSIS METHODS

7.1. General

Like all other infrastructure development projects, the development of the proposed Weib Route Water Supply Project involves both benefits and costs to physical, biological and socioeconomic environment that need to be accounted for, mitigated and compensated, when and wherever feasible. This chapter deals with the impact identification, prediction and Analysis techniques employed in this ESIA study process. Hence, it provides site specific impact identification methods that likely to arise due to the construction of the proposed Weib Route Water Supply Project and its subsequent operation period. Furthermore, it provides the method of evaluation of impacts that help to identify significance of impacts and suggests appropriate mitigation measures for the adverse impacts and enhancement measures for the positive impacts.

7.2. Impact Identification

The identification of impacts in this ESIA study report generally used the following methods:

- Compilation of a comprehensive list of key environmental impacts such as changes in air and water quality, noise levels, bio-diversity, landscape, social and economic systems, cultural heritage, settlement patterns, and employment levels.
- Identification of all the sources of impacts such as dust, waste disposal, vehicles and/or emissions, water pollution, etc.
- Identifying and quantifying various environmental and socio-economic impacts through the use of interaction check lists and matrixes.

7.3. Impact Prediction

Prediction of impacts and technically characterizes the causes and effects of impacts, and their secondary and synergistic consequences for the environment and the local community. It examines each impact within a single environmental parameter into its subsequent effects in many disciplines (e.g., deterioration of water quality, destruction or disruption of economic activities and resulting in socio-cultural changes). It draws on physical, biological, socio- economic and anthropological data and techniques. In quantifying impacts, it employs socio- cultural models, economic models and expert judgments.

It is worth noting that all prediction techniques of environmental impacts, by their nature, involve some degree of uncertainty. Impacts due to infrastructure development such as gas field development projects can be identified at the following four stages: Mobilization (Pre-construction), during construction, post-construction (operation and maintenance phase) and Decommissioning.

7.4. Impact Analysis

After the impact is identified and predicted, the subsequent steep is impact analysis which incorporated processes based quantitative measure and professional judgment. Therefore, the final outcomes of impact analysis are the significance rate of the expected impact.

a) Extent of impact

The extent of impact is predicted based on international extent (Very High=5), national extent (High=4), regional extent (Medium=3), local extent (Low=2) and on-site extent (Very Low=1) dimensions.

The extent of the impacts on physical, biological and socio-economic environment are illustrated very well with quantitative rating methods. Therefore, the extent of the impact manifestation is local level.

b) Intensity of the Impacts

The intensity analyses of the identified impacts were carried out mainly based on the sensitivity of receiving environment. According to the international standards for measuring intensity, it is classified as the following. If the natural, cultural or social processes will be altered permanently, it is called *very high=4*; the natural, cultural or social processes will be altered temporarily, it is called *high=3*; where the affected environment is altered but the natural, cultural or social functions and processes continue albeit in modified, it is called *medium=2*; where the impact affects the environment in such a way that natural, cultural or social functions and processes are

not affected, it is called *low=1*. The impact intensity is mainly related to receiving environmental response. There is no sensitive receiving environment in the vicinity due to most of the negative impacts are low intensity. The intensity of probable impact be occurring related to the project is predicted in Table 26.

c) Duration of the impact

The length of expected impact occurrence has been measured based on permanent=4, long-term=3, medium- term=2, and short-term=1 life time/period.

d) Impact Aggregation

Therefore, the combined score of the three criteria corresponding to a consequence rating as follows: Consequence of the impact = Intensity (I) + Extent (E) + Duration (D). If the impact aggregation is 3-4, it is very low, if 5 low, if 6 mediums, if 7 high, and if 8-9 very high.

e) Probability or the Likelihood of the Impact Occurrence

The probability of occurrence shows the degree of certainty of the impact actually occurring as unsure, possible, probable, or define. Therefore, the international standards/ satiated criteria for probability measuring as follows: The impact will occur regardless of any prevention measures (definite = more that 90% sure), Most likely that the impact will occur (probable = over 70% sure), distinct probability that the impact will occur (possible = 40-70%), less than 40% occurrence (improbable).

f) Significance of the Impacts

The overall significance of the impact was determined by considering consequences and probability using the rating described below:

g) Consequence of impact X Probability of the impact = Impact significance

The impact significance rate should be considered by decision making body during decision making processes of the proposed project. Therefore, the interpretations of impact significance analysis results in the table are as follows:

- if the impact significance rate is **insignificant** – the potential impact is negligible and will not have an influence on decision regarding the proposed project.
- if the impact significance rate is **very low** – the potential impact is very small and shouldn't have any meaningful influence on the decision regarding the proposed project.
- if the impact significance rate is **low** – the potential impact may not have any meaningful influence on the decision regarding the proposed activity.
- if the impact significance rate is **medium** – the potential impact should influence on decision regarding the proposed activities.
- if the impact significance rate is **high** – the potential impact will affect the decision regarding the proposed activity; and
- if the impact significance rate is **very high** – the proposed activity should be only approved under special circumstances.

Table 15: Summary of impact analysis to determine significance of the expected impacts

S/N	Main Identified Impact	Nature	Extent	Intensity	Duration	Combined Score		Probability	Significance
						E+I+D	Consequence		
1. Impact on Physical Environment									
1	Soil Erosion and contamination	Negative	2	3	2	7	High	Probable	High
2	Land Alteration and aesthetic impact	Negative	2	2	1	5	Low	Possible	Low
3	Impacts on Water Resources and Drainage Line	Negative	2	3	2	7	High	Possible	Medium
4	Water Source Depletion and Pollution	Negative	3	2	1	7	High	Possible	High
5	Impacts on Air Quality	Negative	2	2	1	5	Low	Possible	Medium
6	Impact due to Waste Generation and Pollution	Negative	2	3	2	7	High	Possible	Medium
7	Competition for Water Resources	Negative	3	2	2	7	High	Possible	High
8	Noise and vibration impact	Negative	2	2	1	5	Low	Possible	Low
2. Impact on Biological Environment									
1	Impact on Flora	Negative	3	3	2	8	High	Definite	High
2	Impact on Wildlife	Negative	2	2	3	7	High	Possible	Medium
3. Impacts on Socio-economic Environment									
1	Employment opportunities	Positive	2	2	3	7	High	Probable	High

2	Improved Public Health and Hygiene	Positive	2	4	3	9	high	Possible	High
3	Increased School Attendance and Reduced Dropout Rate	Positive	2	2	2	6	High	Probable	Medium
4	Economic Benefit	Positive	2	2	1	5	Low	Probable	Medium
5	Reduction in Gender Inequality	Positive	2	3	2	7	High	Definite	High
6	Poverty Reduction	Positive	2	2	1	5	Low	Definite	Medium

S/N	Main Identified Impact	Nature	Extent	Intensity	Duration	Combined Score		Probability	Significance
						E+I+D	Consequence		
7	Improvement of Livestock Health and Productivity	Positive	2	2	1	5	Low	Probable	Low
8	Impact on farm and grazing Lands	Negative	2	2	2	6	Medium	Possible	Medium
9	Obstruction Caused by Pipeline Trenching	Negative	2	2	1	5	Medium	Possible	Low
10	Obstruction caused by Cut-and Fill- Slopes	Negative	1	2	1	4	Very low	Possible	Very low
11	GBV, Exposure to HIV/AIDS, other STDs and COVID - 19	Negative	2	3	2	7	High	Possible	Medium
12	Impacts on Historical, Archaeological, Cultural & Religious Value	Negative	2	1	1	4	Very low	Possible	Very low
13	Impacts due to influx of labor	Negative	2	2	1	5	Low	Possible	Low

The impact significance rate shown in Table 26 could be considered by decision making during the environmental and social management processes of the proposed project. Therefore, the interpretations of impact significance analysis result in the table are as follows: *If the impact significance rate is* ***insignificant****- The potential impact is* ***negligible*** *and* ***will not have an influence on decision*** *regarding the proposed project, if the impact significance rate is* ***very low****: The potential impact is* ***very small*** *and* ***should not have any meaningfully influence on the decision*** *regarding the proposed activity, If the impact significance rate is* ***low****: The potential impact* ***may not have any meaningful influence on the decision*** *regarding the proposed activity, if* the *impact significance rate is* ***medium****: The potential impact* ***should influence on the decision*** *regarding the proposed activity, if the impact significance rate is* ***high****: The potential impact* ***will affect the decision*** *regarding the proposed activity and if the impact significance rate is* ***very high****: The proposed* ***activity should be only approved under special circumstances.***

8. POTENTIAL IMPACTS AND MITIGATION MEASURES

The Web Route Water Supply System in Dubluk Woreda has the potential to bring several positive and negative environmental and social impacts to project area.

8.1. Beneficial Impacts

8.1.1. Improved Public Health and Hygiene

Clean water is essential for preventing waterborne diseases, which are a significant issue in areas with poor sanitation and contaminated water sources. By ensuring access to safe drinking water, the project will help reduce the incidence of diseases like cholera, dysentery, and typhoid. As a result, the overall health of the community will improve, reducing the burden on local healthcare facilities and improving the quality of life for residents.

8.1.2. Increased School Attendance and Reduced Dropout Rate

Access to clean water will also have a direct impact on education. In many rural areas, children, particularly girls, often miss school because they spend hours collecting water for their families. With a reliable water supply closer to home, children will have more time to attend school regularly, which can lead to better educational outcomes. This will contribute to a reduction in school dropout rates, especially among girls, promoting gender equality in education.

8.1.3. Economic Benefit

The Web Route Water Supply System Project in Dubluk Woreda holds significant economic potential for the local community. By providing clean and reliable water, the project will reduce the prevalence of waterborne diseases, improving public health and reducing healthcare costs. Healthier communities are more productive, and with improved access to water, time spent on water collection will be reduced, allowing people to focus on income-generating activities such as farming, small businesses, and education. This increased productivity, combined with better agricultural output through more effective irrigation, can boost the local economy, improving livelihoods and creating new opportunities for business and employment. Additionally, the project will empower women and children, who traditionally bear the burden of water collection, by freeing up time for education and other economic activities.

Furthermore, the water supply system will enhance community resilience to climate change, especially in areas prone to drought like Dubluk woreda. It will provide a more reliable water source, mitigating the negative impacts of water scarcity, and fostering long-term sustainable development. The project also aligns with several Sustainable Development Goals (SDGs), including access to clean water, poverty reduction, and improved health. By improving local infrastructure, it could attract investment, further stimulating economic growth and development. Overall, the project will not only improve daily life for the people of Dubluk Woreda but also contribute to the broader national development agenda, supporting the long-term stability and prosperity of the region.

8.1.4. Reduction in Gender Inequality

Water collection is traditionally a task that falls on women and children in many communities. By reducing the time and effort required to collect water, the project will free up time for women and children, enabling them to engage in more productive activities, such as education, income-generating activities, or household responsibilities. This can contribute to a shift towards greater gender equality, empowering women and improving their social and economic status in the community.

8.1.5. Social Empowerment and Community Cohesion

The Web Route Water Supply System project will empower local communities by involving them in decision-making processes and project implementation. By ensuring that the community has a say in the design and execution of the project, residents will feel a sense of ownership and responsibility, which will increase the likelihood of the project's longterm success. Additionally, the project will foster social cohesion as it addresses a common issue that affects everyone, promoting collaboration and solidarity within the community.

8.1.6. Improvement of Livestock Health and Productivity

For pastoralist communities, reliable access to water for their livestock is crucial. The project will ensure that animals have access to clean water, leading to better animal health, higher productivity, and a reduction in losses caused by droughts or water shortages. Healthier livestock will improve food security and provide a more stable income for pastoralists, contributing to overall economic resilience.

8.1.7. Reduction of Negative Consequences of Mobility

In rural areas like Dubluk Woreda, access to water is often a major driver of mobility, as people (especially women and children) have to travel long distances to fetch water. This leads to several negative consequences:

- **Time and Energy Wasted**: Long hours spent walking to collect water reduce the time available for other important activities, such as education, work, or household responsibilities. By providing a reliable water supply closer to home, the project can significantly reduce the need for such long-distance travel.
- **Physical Strain**: The act of carrying heavy water containers over long distances can lead to physical exhaustion and health issues, especially for women and children. Reducing the distance to water sources will lessen this strain, improving the overall well-being of the community.
- **Social Impact**: The time saved by reducing the need for long-distance water collection can allow for more participation in community activities, education, and social engagements. It can also allow for more family cohesion and stability, as community members spend more time at home rather than constantly being away from fetching water.

8.1.8. Improvement in Job Opportunities

Access to clean water can have also direct impact on economic activities, which in turn can create new job opportunities:

- **Job Creation in Water Infrastructure**: The construction, operation, and maintenance of the water supply system itself can generate employment opportunities. This includes jobs in the installation of pipelines, construction of reservoirs, the operation of water treatment plants, and ongoing maintenance of the system.
- **Agricultural and Livestock Production**: Reliable access to water will improve agricultural productivity and livestock health, which are the primary sources of income in the area. With better water access, farmers may diversify crops, improve irrigation practices, and raise healthier livestock, leading to greater agricultural yields and income. This could, in turn, create new job opportunities in farming, marketing, and value-added agricultural businesses.
- **Small Business Development**: Access to clean water can spur local economic growth, providing opportunities for small businesses to flourish. For example, local entrepreneurs could start businesses around water-related services, including water treatment, storage solutions, and irrigation equipment. Additionally, the improved economic stability resulting from increased agricultural productivity may encourage the development of local markets and trading businesses.
- **Health and Education Sectors**: With the improved public health resulting from clean water, the healthcare and education sectors may experience growth, creating new employment opportunities in these fields. For instance, more teachers and healthcare workers may be needed to accommodate the growing and healthier population.

In conclusion, the Web Route Water Supply System has the potential to address both environmental and social challenges in Dubluk Woreda. By providing a sustainable and reliable water source, the project will improve public health, support economic development, enhance educational outcomes, and foster environmental sustainability. Furthermore, it will empower local communities, promote social cohesion, and support gender equality, making it a transformative initiative for the region.

8.2. Potential Negative Impacts

The Web Route Water Supply System project in Dubluk Woreda, which includes activities such as transmission pipeline laying, construction of reservoirs, cattle troughs, distribution lines, water points, and public/institution sanitation facilities, could lead to several potential negative environmental and social impacts**.** These impacts should be closely monitored and mitigated to ensure the project's success and sustainability.

8.2.1. Impact on Physical Environment

Possible impacts on physical environment include impacts on soil such as soil erosion, soil pollution or contamination, impacts on water resources including increased sedimentation and water pollution, impacts on landscape quality, impacts on slope stability (like land-sliding), air pollution (esp. dust emission), and noise pollution.

Furthermore, Table 15 above indicates the significance, nature (likelihood), extent, duration and magnitude of the impacts of physical impacts.

8.2.1.1. Soil Erosion and Contamination

Soil and land are important component of the natural environment and are primary important for many biological and human activities, including agriculture. Its protection in relation to infrastructure development deserves considerable attention. Loss of topsoil and impairment of natural soils caused by earthworks, operation of heavy machinery, quarries and establishment of construction facilities is the main soil erosion and pollution issues of concern for the proposed water supply project. Earthworks during the construction of reservoirs, installation of pipelines in routes, access roads and land clearing for establishment of the contractor's site facilities will remove the top soil and expose it to runoff water erosion. In addition, changes and visual impact may occur during site preparation, construction activities, and operation activities.

The soil may also be affected or degraded by the occurrence of spills and leaks events during heavy trucks and machinery hauling. Generally, soil and land degradation impacts could result from the following project activities and environmental aspects: o Construction of access roads

- Excavation and earth moving works for reservoirs, water points, cattle troughs and pipeline routes.
- Waste disposal during construction and operation activities. o Accidental spills and leaks. o Accidental or inappropriate waste disposal.

Additional loss or impairment of soil will be caused by construction of temporary roads such as access to material sites, exploitation of quarries and borrow pits, and moving heavy equipment. Heavy machinery used in the construction and operation will likely cause soil compaction and pollution. This will harm the soil's potential for future agricultural use or vegetation. The physical characteristics of the area such as some sloppy topographic areas may make the project area venerable for erosion and flooding. The sealing of the soil surface by compaction leads to the destruction of the soil physical properties and its various functions.

Besides the loss or impairment of soil due to the above discussed activities, soil 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 waste 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 soil can result from waste water, sewage and cleaning of equipment, storage and handling of hazardous substances. Implementation of the project will also cause changes to the local natural landscape, which will be mainly related to extraction of construction materials from quarries and borrow pits and cutting and filling in sloping lands that will ultimately end up in marred landscape. The magnitude of the impact is expected to be **high negative**.

Mitigation Measures

The following proposed mitigation measures are appropriate and practicable if implemented to minimize soil contamination and erosion due to road construction and excavation of construction materials.

- Use erosion control techniques such as silt fences, mulching, and stabilizing disturbed areas with grass or other vegetation to prevent soil loss.
- Ensure proper planning of trenching and reservoir construction to minimize land disturbance and implement best practices for slope stabilization to reduce erosion.
- Implement sedimentation basins or other sediment traps near construction sites to capture runoff and prevent sediment from entering nearby rivers or water bodies.
- Periodic and proper maintenance of facilities related such as pumps, generators and vehicles so as to avoid any leaks and spills
- Provide adequate cross-sectional area to drainage structures to allow sufficient passage for the discharge and shall put energy dissipaters, were important, for safe disposal of the discharge.
- Limit earth moving activities to the scheduled and mandatory list only
- Implement Bio-engineering conservation techniques to protect and stabilize unstable slopes, and also shall use appropriate local variety grass species, which have multiple purposes, like vetiver grass, together with a physical engineering measure as soon as possible after completion of the works.
- Pave side drains, depending on site conditions, for instance, nature of the soil, gradient/slope of the area, and other factors and construct all energy-dissipating structures at the drainage outlets and discharging points.
- Provide cross drainage structures as close as possible to minimize concentrated flow from side ditches and to let the flood lead to the nearest stream easily without scouring the side walls.
- Minimizing extension of work activities beyond the imperative area for the construction of the road within the RoW and exploitation of material sources such borrow pits.
- Preventing soil pollution by hazardous substances by collecting and putting it in a sealed container at camp sites and workshop areas.

8.2.1.2. Landscape Alteration and Aesthetic Impacts

While the primary goal of the project is to improve water access, the physical infrastructure such as reservoirs, pipelines and water points could alter the natural landscape. In rural or natural areas, this can affect the visual appeal of the environment. While this is often a less tangible impact, it can still be of significant concern for communities who have cultural or aesthetic attachments to the land.

Mitigation Measures:

- Minimize Visual Impact: Where possible, choose locations for reservoirs, pipelines, and other infrastructure that blend with the natural landscape, minimizing visual disruption.
- Landscape Restoration**:** After construction, restore the landscape to its original state, using native plant species and ensuring that the project's infrastructure is less intrusive on the surrounding natural beauty.
- Community Consultation: Consult with local communities about aesthetic values and concerns and seek solutions that address these preferences where possible.

8.2.1.3. Impacts on Air Quality

Air pollution will occur during the construction phase arising from dust and exhaust emissions. The major sources of air pollution are fuel combustion in construction equipment, dust generated from trenching and excavation works and vehicular movements. Dust pollution will result from construction and operation of access roads, excavations and trenching of pipelines and quarry sites, as well as vehicular movement on unpaved roads. Dust nuisance within the construction sites could affect the health of the workers and local dwellers. Therefore, workers should be advised to strictly follow precautionary measures like equipping workers with appropriate protective safety tools.

The magnitude of the impact is estimated to be **low negative** as it will be short term mainly in the construction phase and its extent will be local.

Mitigation measures

Emissions of dust particulate matter shall be reduced to acceptable levels by adopting the recommended measures. An environmental clause will be included in the works contract that requires the contractor to implement the following mitigation measures to minimize the possible air pollution:

- The Contractor shall reduce dust from construction sites, access roads by watering at least three times a day when the same are located in sensitive areas, road side crops and villages.
- Use of modern and well-maintained equipment (with mufflers where appropriate or bag filters), regular maintenance of diesel-powered machinery and vehicles to reduce excessive exhaust emissions.
- Avoiding burning materials such as tiers, plastic, rubber products or other solid waste materials that creates heavy smoke, hazardous smoke or nuisance odor and disposing of any volatile chemicals to near schools, religious places, and drinking water supply sources.
- Implementing well-designed traffic management plan that considers traffic safety and working hours for materials transport thereby minimizing transport-related disturbances to local residents and road users and reduce traffic accidents.
- Avoiding disposing of any volatile chemicals to the air.
- Skilled and properly trained drivers to be employed for plying of vehicles used in construction related activities.

- Restrict traffic speeds to minimize dust and apply approved dust suppressants including regular spraying of water.
- Warning signs and speed breakers to be installed.
- Use dust collectors or water spray systems as appropriate to prevent high dust emissions from batching plant operations.
- Subject diesel operating engines of construction equipment to regular checking and cleaning of the injectors to minimize emissions.
- Wearing material for access roads should be selected so that dust levels would be minimized.
- Existing access roads to be widened and used wherever possible for transportation of both personnel and materials. Provision of face mask to labor population, and Periodic maintenance of access roads.

8.2.1.4. Noise and Vibration Impact

It is predicted that Noise and vibration impacts might result from construction activities in genera. Particularly, the most noticeable sources of noise will be from heavy equipment and trucks. Other operations generating significant noise include concrete mixing plant equipment, excavation and stone crushing sites.

During construction, vibration will increase temporarily because of the operations of machineries and equipment like vibrators, and excavators. Some rural villagers may be affected by noise and vibration during construction; however, the impact is temporary and short term. Moreover, the noise and vibration impact adversely affect the workforces especially on the operators working with heavy machines such as excavator and vibrators. The magnitude of the impact is estimated to be **low negative** as it will be short term mainly in the construction phase and its extent will be local.

Mitigation measures:

It should be noted that a clause shall be included in the Works Contract that requires the Contractor to implement the following mitigation measures to minimize possible noise and vibration impacts:

- The Contractor shall not operate noisy operations like vibrators and excavators near the noise Sensitive areas such as settlement areas, health institutions, and schools.
- Construction activities that generate disturbing noise levels are to take place during conventional working hours wherever possible.
- The Contractor shall screen equipment producing high levels of noise when working near the settlement areas, clinics and religious areas.
- All machinery and equipment should conform to the applicable noise standards, and plants should be provided with effective noise mufflers; and
- Construction workers should adhere to health and safety standards pertaining to noise, such as wearing ear protection when operating plants or heavy machinery.
- The Contractor shall provide safety equipment pertaining to noise, such as ear protection mufflers whenever necessary for the workers.

8.2.1.5. Impacts on Water Resources and Drainage Line

The Weib Route Water Supply Project construction area is located in the Genale Dawa River Basin system that drains the south eastern part of Ethiopian lowland. There is no river and stream to be directly crossed or affected by any of the project components. Only minor drainage lines and some gullies are observed along the transmission pipeline routes. Construction activities, particularly those that involve land disturbance such as pipeline trenching, reservoir digging, and the installation of water points, can lead to soil erosion. The removal of vegetation and digging of trenches increases the risk of topsoil being washed away during heavy rains, leading to increased sedimentation in downstream rivers and water bodies. Sedimentation not only harms aquatic ecosystems but also reduces the effectiveness of the water storage and distribution systems. Furthermore, soil erosion can decrease the fertility of agricultural land, affecting local farming communities and their food security. Hence, the construction of the project may increase sediment yield in the basin by disturbing the drainage lines during trench excavation and access road construction.

On the other hand, groundwater is a major and valued resource in the project area and needs to be preserved and monitored during the construction and operation of the proposed project. Groundwater quality may be affected during construction activities and eventually during operational activities to. Impacts on groundwater and surface water could result from the following project activities and environmental aspects:

- Waste disposal during construction activities. o Waste disposal during operation activities.
- Accidental events such as spills and leaks which may include seepage from improperly protected storage location, surface discharge of liquid wastes, fuel spillage, and spills and leaks from container vehicles. This can result in contaminated substances reaching groundwater resources.
- Accidental or inappropriate waste disposal. Accidental events that may contribute to groundwater contamination is mainly attributed to seepage of contaminants from accumulation of solid waste.

The magnitude of the impact is estimated to be **medium negative** as it will be short term mainly in the construction phase and its extent will be local.

Mitigation measure:

While the contractor will require and find water sources for the construction and operation phases, the major priority shall be to protect existing freshwater users and to ensure that this increased demand is sustainable and will not negatively impact on the supplies in the short or long term for local communities and terrestrial ecology.

- Construction of the project shall be carried out during the dry season.
- In place preventive maintenance plan to avoid accidental events such as spills and leaks and ruptures of the pipe and/or screen.

- All activities should prevent the release of any contaminant that might enter the surface water bodies.
- Adequate emergency spill response should be in place.
- Good housekeeping should be practiced during construction to avoid spreading litter and waste from human/construction activities.
- Avoid disposal of construction spoil from earthworks and bridge construction sites at or near the rivers, natural waterways and streams.
- Avoid disposal of hazardous substances such as oil, fuel, detergents and cement at and near water point to avoid water pollution risks due to spillages.
- Avoid disposal of solid and liquid waste generated by construction works near water sources and water points; and
- Avoidance of leakages from vehicles and construction equipment by regular and effective maintenance

8.2.1.6. Water Source Depletion and Pollution

As the project relies on groundwater, it could contribute to over-extraction, leading to the depletion of water reserves during operation phase. Overuse of groundwater in particular can lead to long-term ecological damage, such as land subsidence or a reduction in water quality.

Additionally, construction processes can introduce pollutants into the water sources if wastewater or chemicals are not managed correctly. This could potentially impact water quality for both human consumption and agricultural or livestock use, undermining the health benefits that the project aims to bring.

Mitigation Measures:

- Ensure the water sources used for the project (groundwater) are sustainably managed and not over-exploited; regular monitoring of water levels and quality should be undertaken during operation.
- Implement water conservation practices within the community and operational systems to minimize demand and overuse of the water supply.
- Establish proper waste management practices during construction to prevent pollutants, including chemicals or wastewater, from entering water bodies. Use environmentally friendly materials and ensure proper disposal of construction waste.

8.2.1.7. Impact due to Waste Generation and Pollution

The construction phase could generate a significant amount of solid waste, including construction debris, plastics, and hazardous materials like oils, solvents, and paints. If not properly managed, this waste could contaminate soil and water sources, leading to pollution. Once operational, the water supply system could also contribute to waste issues, particularly if sanitation facilities are not well maintained, or if there is improper disposal of wastewater from the system.

Mitigation Measures:

- Proper Waste Disposal**:** Develop a waste management plan that includes the proper disposal of construction debris, hazardous materials, and general waste. Ensure that waste does not contaminate the local environment or water sources.
- Recycling and Reuse**:** Encourage the reuse and recycling of construction materials whenever possible to reduce waste and minimize environmental impact.
- Monitoring and Reporting: Set up regular monitoring of water quality and environmental conditions around the project to detect any pollution early and take corrective action.

8.2.1.8. Competition for Water Resources

Although the water requirement and demand for construction work may not be too much; the implementation of the Weib Route Water Supply project may conflict with existing water uses due to competition for water during the construction period. Abstraction of water from the major rivers, such as Genale River (50 km for construction site), for the construction will not be expected to bring appreciable reduction in water availability for downstream users. However, as most sources such ponds and water wells are overstressed, any scale of withdrawals by contractors could reduce water availability to existing downstream users. Hence, any withdrawals from ponds and spring sources or low flowing steams may reduce water availability for domestic uses and animal consumption. Therefore, the contractor may need to develop its own water supply sources its reservoir, access roads construction and the campsites requirements unless it uses water from the major river away from the area. This impact is **highly negative** as the area is water scarce area.

Mitigation measures

The impact due to water resources competition can be minimized satisfactorily by requiring the contractor to make every effort not to affect the rights of others. Therefore, it is recommended that the following measure should be adopted:

- The contractor shall avoid conflicts with existing water uses by not affecting the quality or quantity of the water sources used for human and/or animal water supplies. The contractor may need to develop its own water supply sources for road construction and the campsite's requirements in order to avoid conflicts with existing uses.
- The contractor is responsible for making arrangements for water supply for construction and other purposes in consultation with existing users and without affecting the quality or availability of water resources.
- In the event of there being any valid dispute regarding the effect the contractor's arrangements has had on the water supply of others, the contractor shall be responsible for providing an alternative supply to those affected, which is not inferior in quantity or quality to that previously enjoyed.

8.2.2. Impact on Biological Environment

8.2.2.1. impacts on Shrub Land Vegetation

Even though the project area is not located in environmentally sensitive areas, the construction of this Weib Route Water Supply Project will have vegetation damage and loss of flora, specifically, the widely available shrub land vegetation due to the land use change for construction of Reservoirs, such as 300m^3 and 200m^3 reservoirs GTP and pipeline route construction (trenching); quarry area; construction of the camp site and access roads.

Activities related with construction of the access roads, pipeline route, reservoir, cattle troughs and others may result in damaging natural vegetation like trees, bushes and shrubs along the pipeline route corridor, which will be extended up to 177.70 km in length (Table 16). As shown in Table 16 below, all the project components which requires a total land area of 19.31 hectares, to be impacted on permanent and temporary basis, are designed on mainly shrub land, which is communal in ownership, with the exception of some stretches of the pipeline which traverses on some farmland and urban areas. However, the impact of pipe line installations will be temporary. In addition, there is no evidence that endemic, threatened and endangered plants will be affected by the project activities. Hence, the impact on vegetation can be **moderate negative** and can be reduced by adopting some mitigation measures and the unavoidable losses compensated through replanting program. Initially, the magnitude of the impact will be high negative as it causes damage to natural forest along the road corridor.

Mitigation Measures

- Design the access road following existing road alignment as much as possible and avoid its impact on vegetation.
- Maximum effort will be made to make the pipeline route alignment out of dense vegetation areas and termite mound sites.
- Any removal of trees or shrubs shall be permitted only after prior approval by the environmentalist and replaced early in the next planting season. The replacement shall be of the same species, or other approved species, and of the maximum size that is practicable to plant and sustain growth in the particular environment. Any replacement tree or shrub that dies shall be removed and replaced, as directed by the environmentalist, with such replacements being maintained for a period of one year from the date of replacement.
- Limit land clearing and cutting to the imperative areas and avoid disposal of excavation materials on down-slope to avoid excessive destruction of trees and other vegetation.
- Contractor's site facilities such as camp sites, material production and storage areas, etc. will be selected outside vegetation areas;
- The Contactor shall maximize the use of existing roads for material haulage and the use detour roads to avoid damage on vegetation as far as possible and works will be limited to the imperative area for exploitation.

- Contractors shall provide none-wood fuel sources for cooking and use of charcoal and fire wood should be strictly forbidden.
- The contractor shall create awareness among drivers and operators not to cut trees or shrubs for any purpose without prior approval of Environmental supervisor and local forestry department.
- Planting appropriate trees along the project road corridor as well as roadside and areas affected due to construction activities to compensate for the unavoidable losses. Indigenous species, which are environmentally friendly, are the best candidate for this purpose.
- Responsible officials shall be consulted on how to integrate any of its reforestation programs for the roadside that may coincide with the Contractor's replanting program to replace the trees removed during the construction activities.

Table 16: Summary of Project components and its impact

S/N	Components	Description of Components	Area required, ha	Prevailing Land use	Land Ownership	Nature of Impact
1	**Reservoirs**					
1.1	WER-1326:100m^3	Reservoir, Guard House, VIP Latrine and Compound Works	0.06	Shrub Land	Communal	permanent land use change
1.2	WER-1282: 300m^3 + BPS	Reservoir, Pump House, Generator House, Operator Dwelling, Guard House, VIP Latrine, Septic Tank	0.3	Shrub Land	Communal	permanent land use change
1.3	WER-1285: 300m^3	Reservoir, Guard House, VIP Latrine and	0.12	Shrub Land	Communal	permanent l
1.4	WER-1338: 300m^3	Reservoir, Guard House, VIP Latrine and	0.12	Shrub Land	Communal	permanent l
1.5	WER-1328: 50m^3	Reservoir, Guard House, VIP Latrine	0.04	Shrub Land	Communal	permanent
1.6	WER-1503: 200m^3	Reservoir, Guard House, VIP Latrine	0.12	Shrub Land	Communal	permanent
1.7	WER-1428: 50m^3	Reservoir, Guard House, VIP Latrine	0.04	Shrub Land	Communal	permanent
1.8	WER-1635: 200m^3	Reservoir, Guard House, VIP Latrine	0.12	Shrub Land	Communal	permanent
1.9	DUR-1685: 1000m^3	Reservoir, Guard House, VIP Latrine	0.3	Shrub Land	Communal	permanent
1.10	DUR-1607: 200m^3 + BPS	Reservoir, Pump House, Generator House, Operator Dwelling, Guard House, VIP Latrine, Septic Tank	0.3	Shrub Land	Communal	permanent land use change
2	Cattle Trough (8)	Cattle Trough with Pavement Works	0.006	Shrub Land	Communal	permanent
3	Cattle Trough (11)	Camel Trough with Pavement Works	0.006	Shrub Land	Communal	permanent
4	Water Points (120)	WP with Compound Works	0.003	Shrub Land	Communal	permanent
5	Pipe lines (177.7 km)	Pipe lines laying	17.77	Shrub land, farm, urban	Communal + Private	Temporary
		Total Land Area Required (ha)	**19.31**			

8.2.2.2. Impacts on Wildlife

The Borena National Park, which is located in Dubluk Woreda, is far from the Weib Route Water Supply project vicinity. Hence, no national park or wildlife protected area will be directly affected by the project activities. However, the multifaceted water supply projects construction can have some adverse impacts on wildlife in the project areas, including disturbance from noise, wildlife killing due to traffic incidents and illegal pouching by construction workers. Hence, during design and construction phases of the project, maximum effort will be made for protection of sensitive wildlife areas such as, not to demolition termite mounds and wildlife corridors and not to result in impediments to wildlife movements due to pipeline trenches, specifically transmission line section between the water source and 300m^3 reservoir.

Due to intensive human activities such as grazing, the habitats in the major project impact areas are seriously degraded and do not support significant wildlife resources. Most of the wild animals that used to inhabit the area will be expected to migrated/move to less disturbed areas. Therefore, the project is not expected to create significant impact on the fauna of the project area. Hence, the magnitude of the impact will be **moderately negative**.

Mitigation Measures

Potential impacts on fauna will be minimized through the following mitigation measures:

- Avoid transmission pipeline trench left open at night to minimize the wildlife movement impediments.
- Avoiding selection of material sources (quarry and borrow sites), materials processing plants site and campsites within the dense shrub lands or forests.
- Strict prohibition of illegal hunting by the workforce and killing of wild animals due to deliberate killings or reluctances of drivers like over speeding of vehicles.
- Posting appropriate signs in the important wildlife areas and applying speed limits for sections passing through those areas like wildlife corridors; and
- Taking precautions to avoid any fire accident and control any fire incident due to contractor's activities.

8.2.3. Negative Impact on Socio-Economic Environment

8.2.3.1. Impact on Grazing and some Farm Lands

Land will be required by the project on temporary and permanent basis for construction of the various project components. Along with the proposed project water supply pipeline alignment and access road, there will be a temporary but big magnitude impact mainly on grazing and shrub lands (communal) and some farm land areas. The major direct adverse impact due to permanent land expropriation will be for reservoir, water point and cattle trough construction which will all be constructed on communal shrub land area. Temporary land expropriation due to activities such as access development of material extraction sites (quarry and borrow sites), establishment of camp will be also mandatory.

The magnitude of this impact is thus expected to be **Medium negative**. The recommended mitigation measures are as follows.

Mitigation Measures

- Limiting land to the area is absolutely necessary for construction works.
- Restore areas affected due to temporary activities like trenches, access roads to productive state by removal of pavement materials, loosening of compacted soils and spreading of the topsoil preserved for this purpose; the topsoil removed from trenching, access road and other areas shall be stockpiled for re-use in the restoration of temporary affected areas.
- Maximize the use of existing roads for material haulage and avoid the need for detour and access roads to minimize land acquisition by the project.
- Properly rehabilitate access roads and detours as well as other temporarily used spaces so that those areas could be put back to their previous use.
- Avoiding releasing wastewater on to agricultural lands, restoration of areas affected due to temporary activities, and payment of adequate compensation for immitigable losses.
- Reinstate all the quarry sites and camp sites after the completion of intended uses by removing all the foreign materials and by refilling of borrowers and quarry sites with construction spoil and stockpiled topsoil; and plant locally recommended trees and grasses to compensate the lost tree.

8.2.3.2. Obstruction Caused by Pipeline Trenching

Deep trenching sections for the distribution pipeline route may cause impediments to movement of people, domestic and wild animals. Hence, trenching of the land for distribution pipe lines from the water sources to reservoirs certainly will create obstruction to movement of people and animals or access to houses and other important locations. The impact is temporary and **low negative.**

To mitigate the impacts, the design and construction of the pipeline trench should include the provision of temporary crossing structures at appropriate locations or intervals so that people and animals can easily move across the sections of high cut and/or fill or along sections with open side ditches. It should be noted also that any existing paths have to be provided with crossing structures or embankment with sufficiently gentle slope. Moreover, any trench section shall be backfilled within 24 hours. The magnitude of the impact is thus expected to be **low negative.**

8.2.3.3. Social Issues Related to Water Distribution

Even though the primary goal of the project is to improve water access, the introduction of new water sources can sometimes lead to social challenges. For instance, women and children who traditionally collect water may be disproportionately impacted by the new distribution systems if they are not included in the planning or if the new infrastructure is not easily accessible. In some cases, women may find themselves excluded from the decision-making process, despite their central role in water collection. Additionally, communities that are further away from the

distribution points might continue to face challenges in accessing clean water, further exacerbating inequalities.

Mitigation Measures:

- Inclusive Planning: Involve women and marginalized groups in the planning and decision-making process regarding the location of water points and distribution systems to ensure that their needs are addressed.
- Easy Access to Water Points: Ensure that water points are easily accessible to all, especially to women and children, who are typically responsible for fetching water.
- Awareness Campaigns: Educate the community about the benefits of the new water system, emphasizing the importance of fair distribution and equal access for all.

By applying these mitigation measures, the Web Route Water Supply System can minimize its potential negative environmental and social impacts while maximizing its positive outcomes for the local communities in Dubluk Woreda of those project kebeles. Regular monitoring and community engagement will be key to the project's long-term success and sustainability.

8.2.3.4. GBV, Exposure to HIV/AIDS, other STDs

Exposure to HIV/AIDS, other STDs: The construction of Weib Route Water Supply project may exacerbate the risks of HIV/AIDS and other Sexually Transmitted Diseases (STDs) due to, mainly, due to additional influx of labor and people to the project site as daily laborers. This situation even will affect the health of surrounding people as STD will proliferate among communities and laborers. Although the impact is long term, the level of HIV/AIDS awareness in the district is moderately high and thus, the magnitude of the impact is expected to be medium negative.

Gender Based Violence (GBV): GBV is a problem that cross cuts all sectors, organizations and projects. Ensuring the widest possible support for a given intervention will foster a sense of ownership and increase its acceptance and support by the concerned actors both those who will be affected by it and those who may be called on to support it. This means including key government agencies, affected populations and local communities, women's groups and civil society and non-governmental organizations.

To be intolerant of, and enforce disciplinary measures for GBV, inhumane treatment, sexual activity with children, and sexual harassment; incorporate a gender perspective and provide an enabling environment where women and men have equal opportunity to participate in, and benefit from, planning and development of the Works.

Mitigation measures

- There should be mitigation measures to avoid the potential risk of STD proliferation. Some of mitigation measures are as follows:
- Inform construction workers and local population awareness through rising and education campaigns about HIV/AIDS, and STDs.

- Project authorities to work with the already established clinics that provide ARV and other HIV/AIDS services to scale up awareness and service delivery.
- Voluntary Counseling and testing services for the workers and community members should constantly be made available.
- Continuous sensitization of the workers and community members about HIV/AIDS and other STDs through awareness program.
- Condoms should be available at all health centers and should be accessed free of cost to the community.
- Conduct educational 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.
- Awareness creation activities about GBV, and
- Inform the youth and the community on controlling mechanism of the pandemic & GBV.

8.2.3.5. Impacts on Archaeological, Cultural & Religious Value

Enquiries to residents and respected government offices in the project area have indicated that there are no known sites of historical, cultural, and religious significance in the vicinity of the area to be affected by the proposed gas field development project.

However, during construction period, there may be accidental chance of findings that were not identified during the field assessment may become apparent during excavation and other principal and ancillary project works. Therefore, it is important that the Contractor should suspend the work and report to the nearby culture and tourism office. The magnitude of the impact is thus expected to be ***medium negative*** as the area is endowed with cultural and religious sites and it requires careful attention.

Mitigation measures

The suggested mitigation measures to overcome unforeseen adverse impacts are as follows. If archaeological, cultural and religious sites are encountered during the excavation, it has to be immediately reported to the Woreda or Zone culture and tourism bureau, and at the same time report to the regional and federal conservation and preservation of cultural heritages authority and seek approval on how to continue the construction works.

8.2.3.6. Impacts due to influx of labor

The influx of workers due to the availability of job opportunities created may lead to a number of adverse social and environmental impacts on local communities.
Environmental and social risks associated with labor influx are usually amplified by locallevel low capacity to manage and absorb the incoming labor force, and specifically when civil works are carried out in, or near, vulnerable communities and in other high-risk situations. Some of adverse impacts due to labor influx are increased risk of illicit behaviors and crime (including prostitution, theft and substance abuse), increased burden on public service Provision, Increased risk of communicable diseases

(including STDs and HIV/AIDS), and Gender-based violence, including sexual harassment, child abuse and exploitation. The magnitude of the impact is thus expected to be ***low negative***

Mitigation measures

- Establishment and operation of an effective Grievance Redress Mechanism (GRM) accessible to community members involvement of respective Woreda administration through Woreda Grievance Redress Committee to facilitate early identification of problems/complains and targeted mitigating interventions.
- Provision of information to communities on how to use the GRM to report issues.
- Workers' camp to include wastewater disposal and septic systems.
- Identification of authorized water supply sources and prohibition of use from other community sources.
- Separate service providers for community and workers' camp/construction site.
- Police monitoring to prevent drugs trafficking.
- Sensitization campaigns both for workers and local communities
- Provision of information regarding Worker Code of Conduct in local language(s);
- Provision of cultural sensitization training for workers regarding engagement with local community.
- Consultations with and involvement of local communities in project planning and implementation.
- Awareness-raising among local community and workers.

8.2.4. Impact on Occupational Safety and Health

There will be occupational safety and health issues for the construction workforce caused by accidents (operating machinery, falling in ditches, etc.) and poor hygiene in construction camps. During the construction works, accidental discharge or spillage caused by inflammable, toxic, explosive and chemical substances could create health risks on the work force. Occupational health and safety issues associated with the road construction and operation of roads primarily include the following:

Physical Hazards

Construction and maintenance personnel, as well as landscaping workers maintaining vegetation in the rights-of-way, can be exposed to a variety of physical hazards, principally from operating machinery and moving vehicles but also working at high elevation such as reservoirs and others. Other physical hazards (e.g., exposure to weather elements, noise, falls from machinery or structures, and risk of falling objects) are the peculiar ones.

Chemical Hazards

Chemical hazards in construction, operations and maintenance activities may be principally associated with exposures to dust during construction and trenching g activities; exhaust emissions from equipment and motor vehicles during all construction and maintenance activities; potentially hazardous dust during earthworks, construction

material excavation, dust from crusher site and cement fume during and diesel fuel used as a release and cleaning agent for equipment.

Noise

Construction and maintenance personnel may be potentially exposed to extremely high levels of noise from heavy equipment operations and from working in proximity to vehicular traffic. As most of these noise sources cannot be prevented, control measures should include the use of personal hearing protection by exposed personnel and implementation of work rotation programs to reduce cumulative exposure.

Communicable Diseases

Communicable diseases pose a significant public health threat to construction workforce. Communicable diseases of most concern during the construction phase due to labor mobility are sexually-transmitted diseases (STDs), such as HIV/AIDS. As far as construction work forces are within sexually active age and far from their family within the construction camps, they are adversely impacted by communicable disease such as STD and/or HIV/AIDS during construction and maintenance phases.

Mitigation measures

The following mitigation and precaution measures are suggested to overcome the adverse impacts on the workforce.

- The contractor should provide standard PPEs for it work force
- The contractor by all means takes maximum care in applying the internationally accepted standards and recognized occupational health and safety guidelines.
- Consider appropriate care for storage of chemicals and explosives and provision of training to workers on how to handle it to avoid inhalation of chemicals and easily be exposed to it.
- The contractor is also required to provide workers with protective clothing and equipment and create awareness of safety issues.
- At the same time the contractor is also responsible for creating awareness among the local community on the hazardous nature of chemicals and explosives used during the construction works.
- Contractors should provide clinics at construction camps and first aid kits at workshops, active construction sites and also inside vehicles.

Additionally, the recommended management practices to prevent and control physical hazards in the workforce include but are not limited to the following.

Moving Equipment and Traffic Safety

Development of a traffic safety management plan for the construction and repairs that includes"

Measures to:

- Ensure work zone safety for construction workers and the travelling public.
- Establishment of work zones to separate workers on foot from traffic and equipment by:

- Routing of traffic to alternative roads when possible.
- Closure of lanes and diversion of traffic to the remaining lanes as the road is wide enough (e.g., rerouting of all traffic to one side of a multi-lane highway).
- Where worker exposure to traffic cannot be completely eliminated, use of protective barriers to shield workers from traffic vehicles, or installation of channeling devices (e.g. Traffic cones and barrels) to delineate the work zone.
- Regulation of traffic flow by warning lights, avoiding the use of flaggers if possible.
- Design of the works pace to eliminate or decrease blind spots.
- Reduction of maximum vehicle speeds in work zones.
- Training of workers in safety issues related to their activities, such as the hazards of working on foot around equipment and vehicles; and
- Safe practices for work at night and in other low-visibility conditions, including use of high visibility safety clothing and proper illumination for the workspace (while controlling glare so as not to blind workers and passing motorists).

Elevated and Overhead Work Safety

The area around which elevated work is taking place should be barricaded to prevent unauthorized access. Working under personnel on elevated structures should be avoided; hoisting and lifting equipment should be rated and properly maintained, and operators trained in their use. Elevating platforms should be maintained and operated according to established safety procedures including use of fall protection measures; equipment movement protocols (e.g., movement only when the lift is in a retracted position); repair by qualified individuals; and installation of locks to avoid unauthorized use by un trained individuals; ladders should be used according to pre-established safety procedures for proper placement, climbing, standing, as well as the use of extensions.

Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures.

- inspection, maintenance, and replacement of fall protection equipment; and rescue of fall arrested workers, among others.
- Establishment of criteria for use of100 percent fall protection (typically when working over two meters above the working surface, but sometimes extended to seven meters, depending on the activity).
- The fall protection system should be appropriate for the structure and necessary movements, including ascent, descent, and moving from point to point; Installation of fixtures on bridge components to facilitate the use of fall protection systems.
- Safety belts should be not less than 16 millimeters (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident.
- When operating power tools at height, workers should use a second (backup) safety belt.

The recommendations to overcome or minimize adverse impacts from chemical hazards specific to road projects include:

- Use of millers and pavers with exhaust ventilation systems and proper maintenance of such systems to maintain worker exposure to crystalline silica (millers and grinders) and asphalt fumes (pavers) below applicable occupational exposure levels.
- Use of the correct asphalt product for each specific application and ensuring application at the correct temperature to reduce the fuming of bitumen during normal handling.
- Maintenance of work vehicles and machinery to minimize air emissions.
- Reduction of engine idling time in construction sites.
- Use of extenders or other means to direct diesel exhaust away from the operator.
- Ventilation of indoor areas where vehicles or engines are operated, or use of exhaust extractor hose attachments to divert exhaust outside.
- Provision of adequate ventilation in tunnels or other areas with limited natural air circulation.
- Installation of tollbooth ventilation and air filtration systems; Use of protective clothing when working with cutbacks (a mixture of asphalt and solvents for the repair of pavement), diesel fuel, or other solvents.
- Use of dustless sanding and blasting equipment and special containment measures for paint removal activities.
- Avoiding the use of lead-containing paint and using appropriate respiratory protection when removing paints (including those containing lead in older installations) or when cutting galvanized steel.

Vector-Borne Diseases

To manage vector borne diseases the contractor, in close collaboration with community health authorities, can implement an integrated control strategy for mosquitoes and other arthropod-borne diseases that might involve:

- Prevention of larval and adult propagation through sanitary improvements and elimination of breeding habitats close to human settlements.
- Elimination of unusable impounded water.
- Increase in water velocity in natural and artificial channels considering the application of residual insecticide to dormitory walls.
- Implementation of integrated vector control programs promoting use of repellents, clothing, netting, and other barriers to prevent insect bites.
- Use of chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs.
- Monitoring and treatment of circulating and migrating populations to prevent disease reservoir spread collaboration and exchange of in-kind services with other control programs in the project area to maximize beneficial effects.
- Educating project personnel and area residents on risks, prevention, and available treatment.

- Monitoring communities during high-risk seasons to detect and treat cases

9. ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS

The Environmental and Social Management Plan (ESMP) for the Web Route Water Supply System aims to plan and mitigate the negative environmental and social impacts of the project while enhancing its positive outcomes. The effective implementation of the mitigation measures outlined in this ESMP is essential to achieve optimal environmental and social performance, ensuring the sustainability of the water supply, promoting environmental health, and enhancing the well-being of the local community. As a result, this ESMP must be fully integrated into the overall project management framework, encompassing all phases of the water supply and sanitation project, including preconstruction, construction, maintenance, and ongoing operations. By integrating environmental and social objectives into each phase, as well as bid documents, this approach ensures that the project's activities align with sustainable water management principles, as well as the Bank's broader environmental goals. This alignment focuses on improving access to clean water, enhancing sanitation, fostering environmental stewardship, and promoting social responsibility through efficient resource use and conservation.

9.1. The ESMP Guiding Principle

The Environmental and Social Management Plan (ESMP) for the Web Route Water Supply System should be based on several key guiding principles to ensure that the project is implemented in an environmentally and socially responsible manner. These principles provide a framework for decision-making, ensuring that potential negative impacts are minimized while maximizing the benefits of the project. Here are the important guiding principles for the ESMP:

a. Sustainability: The project should aim for long-term environmental, social, and economic sustainability by ensuring that natural resources are used efficiently, reducing environmental degradation, and promoting the well-being of local communities both during and after project implementation.
b. Precautionary Principle: Where there is uncertainty about the potential environmental or social impact of an activity, the project should be on the side of caution. This involves proactively addressing potential risks, minimizing harm, and conducting appropriate studies to avoid irreversible damage.
c. Integration of Environmental and Social Considerations: Environmental and social considerations should be integrated into every stage of the project, from planning and design through to construction, operation, and maintenance. This includes ensuring that environmental and social goals align with the broader project objectives.
d. Stakeholder Engagement and Participation: Continuous engagement with local communities, stakeholders, and affected groups should be prioritized throughout the

project. Public participation helps identify issues early, builds local support, and ensures that the project meets the needs and concerns of the community.

e. Mitigation of Adverse Impacts: The project should adopt proactive measures to avoid, minimize, or offset any negative environmental and social impacts. This includes implementing effective mitigation strategies for issues such as water pollution, habitat disruption, and social conflict.
f. Transparency and Accountability: The project should operate transparently, with regular monitoring, reporting, and public disclosure of environmental and social performance. Accountability mechanisms should be in place to ensure that mitigation measures are being implemented effectively.
g. Cultural Sensitivity and Respect: The project should respect the cultural and social practices of local communities, especially in relation to land use, sacred sites, and other culturally significant areas. This includes avoiding or minimizing impacts on culturally sensitive areas and engaging in culturally appropriate consultation.
h. Equity and Social Inclusion: The project should ensure that all groups, particularly marginalized and vulnerable populations, have equitable access to the benefits of the water supply system. Efforts should be made to address inequalities, including gender-based disparities in access to water.
i. Worker Health and Safety: Protecting the health and safety of workers is essential. Safe working conditions, adherence to labor laws, and providing necessary health and safety training should be prioritized during the construction and operational phases.
j. Environmental Stewardship: The project should adhere to principles of environmental stewardship by minimizing resource consumption, reducing emissions, promoting conservation practices, and enhancing local biodiversity conservation efforts wherever possible.

9.2. Environmental and Social Management Plan

The ESMP provides a general outlay of the environmental and social aspects, potential impacts, mitigation measures, performance indicators, monitoring means and frequency, responsibility for monitoring and associated cost estimates. ESMP is used to ensure that environmental and social impacts identified are mitigated during the project implementation and operation phase. Unless mitigation and benefit enhancement measures identified in this ESIA are fully implemented, the prime function of the ESIA, which is to provide a basis for shaping the project so that the overall environmental performance of the proposed project is enhanced, cannot be achieved. In order to be effective, environmental management must be fully integrated with the overall project management effort at all levels. Therefore, it is aimed at providing a high level of quality control, leading to a project which has been properly designed and constructed and functions efficiently throughout its life.

This section presents an Environmental and Social Management Plan (ESMP) that links the impacts identified and mitigation measures proposed in the ESIA Report and the responsibilities for implementation and monitoring. Prior to the commencement of the

construction works and during construction, the Contractor, the Supervisory Consultant, and other responsible bodies should be aware of the environmental and social mitigation and management requirements and organized to perform the responsibilities vested upon them. During construction, the Construction Contractor would execute most of the mitigation measures recommended to control the possible impacts related to construction activities. The Supervisory Consultant would monitor impacts and the proper implementation of the mitigation plan. In particular, the Supervisory Consultant would control the activities at the construction sites such as operation of equipment and vehicular traffic, operation of quarry and borrow sites, operation of materials processing sites like stone crushing & concrete batching plants, handling of hazardous substances like oils and fuel, disposal of spoil materials, etc. In addition, the Consultant has to approve the Contractor's Site Restoration Plan for the construction sites, construction material sources (quarries and borrow pits), processing and storage sites, and campsite, and make sure its proper implementation. When construction is completed, it is expected that those sites would be reinstated to their original state as closely as possible or to the state where the sites can be used for some productive uses like growing trees, crops, livestock pasture, etc.

The contractor would implement most of the mitigation measures for the impacts associated with land acquisition and loss or damage of private or public properties. These activities would be implemented immediately after the Contractor conducted the site survey and determined the exact location of the project components and actual size of land required for laying them.

During the project operation phase, the woreda administration would be responsible for implementing most of the mitigation and monitoring measures recommended in this ESIA study. Details of the proposed ESMP are presented in Table below. In order to ensure that the Contractor complies with the recommended environmental protection requirements, the provisions of the EMP and Environmental Guidelines for the Contractor should be part of the contract terms or agreements for the Contractor. Overall, the implementation of ESMP requires the identification of suitable administrative arrangements and responsible parties to undertake the ESMP and a mitigation plan setting out what mitigation is required. The responsibility for the incorporation of mitigation measures for the project implementation lies with the Supervising Engineer, who must ensure that the contractor implements all specified mitigation measures. To carry out environmental and social management activities during construction, the contractor should draw up an environmental and social management plan of his/her own, which is the contractor's environmental and social management plan (CESMP), as presented below aligned with this ESIA and project ESMP (this section) to show how s/he will address the mitigation measures during the construction period. The Supervising Engineer is responsible for assessing the contractor's environmental and social management plan (CESMP).

The ESMP has been developed with project knowledge and information available to date. As project commencement and scheduling plans are developed and changed, components of the ESMP might require amendments. This is therefore a working

document, which can be updated whenever new information is received, or site conditions change. The main purpose of the Environmental and Social Management Plan (ESMP) is to develop a procedure that details measures to be taken during the implementation and operation of a project that reduces, eliminating or offset adverse environmental and social impacts and actions needed to implement these measures.

The objectives of the ESMP are to:

- bring the project into compliance with applicable national environmental and social legal requirements social policies and procedures; and
- outline mitigation/enhancing, monitoring, consultative, and institutional measures required to prevent, minimize, mitigate or compensate for adverse environmental and social impacts, or to enhance the project's beneficial impacts.

The objectives, activities, mitigation measures, and allocation of costs and responsibilities for prevention, minimization, and monitoring of significant negative impacts and maximization of positive impacts associated with the project equipment installation and operational phases are outlined in the proposed ESMP. This outlines corresponding management strategies proposed in the preceding chapter that will be employed to mitigate potential negative environmental impacts and assign responsibility for the implementation of mitigation measures. Table 5 sets out, in summary form, the management measures to be taken concerning controlling the potential impacts that could occur during the construction phases of the Project & also indicates who is responsible for taking management actions. Executive responsibility for project management commonly involves several organizations, each with specific responsibilities for particular aspects, and this project is no exception. Therefore, major responsibility for environmental management will be split between several organizations, depending on their respective activities which are being executed at various stages (National, Regional, Zonal/Woreda Environmental organs).

However, the Oromia Water and Energy Bureau as an implementing agency of the proposed project has the overall responsibility for the implementation of this Environmental and Social Management Plan. Apart from this, most of the project's environmental and social management activities will be carried out during the construction phase, and most proposed project impacts are expected to arise during this phase. The project proponent management will very largely be concerned with managing impacts that may result from the actions of the Contractor, through enforcement of the construction contract clauses related to the protection of the environment, social, health, and safety risk management as a whole, and of the components within it. In this respect, it is important to recognize that successful mitigation of construction impacts can only be achieved if the environmental and social management measures, as set out in the construction contract, are properly enforced.

The Contractor will utilize the already identified information under the environmental and social management and mitigation plan and use it to develop its own ESMP called the Contractor Environmental and Social Management Plan (CESMP). Below an

indicative guideline is stated for the preparation of CESMP and Management Strategy Implementation Plans (MSIP) or site-specific management plans aligned with this ESIA and the ESMP embodied under this ESIA. These instruments will be prepared by the Contractor to be used as a tool to manage anticipated project environmental, social, health, and safety (ESHS) risks and impacts that arise during the construction period and for the proponent to review and supervise the efficiency of the contractor on the management of ESHS risks.

9.3. CESMP and Management Strategy Implementation Plans Preparation

In Addition to the above mitigation measures stated under section 7 to manage the different anticipated project impacts, the Contractor shall prepare the Contractor Environment and Social Management Plan (C-ESMP) and other key Management Strategy and Implementation Plans (MSIPs) to ensure that all impacts are mitigated and managed at higher level of concern.

The Key Management Strategy and Implementation Plans (MSIPs) to be prepared and operationalized during project implementation include but are not limited to the following:

- Code of Conduct,
- Public and Occupational Health and Safety Management Plan (POHSMP),
- Gender Based Violence, Sexual exploitation and abuse, Sexual Harassment and Violence against Children (GBV, SEA/SH/ VAC) and Labor Influx prevention and response action plan, (PRAP),
- Traffic management plan,
- Water resources protection & Storm water management plans,
- Emergency Preparedness and Response Plan, • Incident Notification procedure, and
- Wastes, Management plan, etc.

9.4. Institutional Arrangements

The organizational management of the scheme is one of the prerequisites for smooth operation and sustainable functioning of the water supply system. Besides this, it is also important to manage environmental and social impact of the project. To this end, the key partners for ESMP implementation have been assumed as follows:

- Government/Regulatory Authority-MoWE (Ministry of Water and Energy), Oromia Bureau of Water, Mineral and Energy and Oromia Environmental Protection Authority (OEPA) together with Zonal and District line sectors,
- Project Implementation Unit,
- Bulk Water Supplier (Galchet Sarite Water supply and Sanitation Enterprise),
- Contractors,
- Consultants, and
- Financiers / Lender.

9.4.1. Regulatory Authority

For purposes of this project, the regulating body will include all those government institutions responsible for enforcing compliance with national standards in the different areas of specialization. These will include but not be limited to the following:

- Environmental Protection Authority
- Ministry of Water and Energy
- Pastoral Commission
- Ministry of Agriculture and Natural Resources
- Oromia Regional Environmental Protection Authority

9.4.1.1. Environmental Protection Authority

EPA is also the key institution at the federal level responsible for all environmental protection & management activities. Hence, the key responsibilities in implementing the ESMP include in collaboration with federal and regional environmental institutions: -

- Establish a system, monitor, audit, coordinate, and ensure that ESMP and related activities of the project are implemented in accordance with national policies, regulations, standards, and guidelines; and
- Follow up and ensure that all environmental study and related activities at different phases of the project including environmental inspection and auditing are properly undertaken by competent consultants/firms having competence certificates from the commission or other relevant federal or regional environmental organizations in the country.
- Issue Environmental Clearance
- Enforcing implementation of the environmental policies and legislation and the ESIA process
- Monitor, audit, coordinate and ensure that recommendations of ESIA/ESMP are implemented, and
- Monitoring and auditing for compliance with National/Regional Environmental Regulations.

9.4.1.2. Oromia Environmental Protection Authority (OEPA)

The OEPA is delegated by EPA to provide an environmental clearance certificate by reviewing ESIA reports on different development projects within the region. Therefore, the OEPA is responsible for reviewing, clearing and providing certificate for this Project ESIA as well as during project implementation to follow-up and ensure that ESMP is implemented as per the approved project ESIA study document.

- Issue Environmental Clearance
- Enforcing implementation of the environmental policies and legislation and the ESIA process
- Monitor, audit, coordinate and ensure that recommendations of ESIA/ESMP are implemented

- Monitoring & auditing for compliance with National/ Regional Environmental Regulations.
- Pastoral Commission, and
- Ministry of Agriculture and Natural Resources.

9.4.1.3. Project Implementation Unit

The PIU is meant to be an operation unit supplementing and enhancing the existing skill mix of the project implementing agencies (Bulk Water Supplier, UWSAs and COWSOs). During the construction phase, the PIU will have the primary overall responsibility for the implementation of the ESMP and for ensuring compliance with National legislation and international lenders' guidelines for environmental and social performance.

The capacity to manage and monitor environmental and social issues needs to be developed through recruitment of three competent staff, namely, Socio-economist, Environmentalist and Health and Safety officer. For the purpose of ESMP implementation, the PIU will be expected to establish an Environmental and Social Management Unit and designate three appropriately experienced and qualified people in charge of environmental, social Health and Safety risk and impacts management. The Environmental and Social Management Unit will implement the Owner's ESMP, including all operation-related management plans and community relations activities.

9.4.1.4. Contractor

The contractors will be responsible for avoiding or minimizing environmental impacts caused by construction activities. It is expected that the construction works will be divided into several contracts, e.g., intake and water treatment plant, water reservoirs, main pipelines (probably sub-divided into different sections) and pumping stations, etc. The contractor should be required to have an Environmental, Social Health and Safety (ESHS) Unit, which will be responsible for managing and monitoring the environmental and social mitigation measures in accordance with the contractual obligations.

9.4.1.5. Consultant

The PIU and/or the Bulk Water Supplier is likely to delegate certain tasks to external consultants. Consultants will be needed for some of the specialized monitoring and evaluation activities.

Table 18: Summary of environmental and social management plan (ESMP)

Predicted Impacts	**Mitigation/Enhancement Measures**	**Responsible Body**
Soil Erosion and Contamination - Construction of access roads and trenches - Excavation and earth moving works for Reservoirs, camp sites and water points. - Accidental spills and leaks. - Accidental or inappropriate waste disposal	• Periodic and proper maintenance of facilities to avoid any leaks and spills • Exposed slopes on cuts and embankments should be stabilized with grassing measures. • Quarry sites and borrow pits should be reinstated timely (not at the end of the Project contrary to the usual practice) to an acceptable and safe slope (close to the original landscape as much as possible) • Adopt popper waste management standards	Contractor, Supervisor
Landscape Alteration and Aesthetic Impacts due to: - Construction of Reservoir, water points, cattle trough	• Select sites for reservoirs, pipelines and other infrastructure that blend with the natural landscape, minimizing visual disruption. • After construction, restore the landscape to its original state, using native plant species and ensuring that the project's infrastructure is less intrusive on the surrounding natural beauty. • Consult with local communities about aesthetic values and concerns and seek solutions that address these preferences where possible.	Contractor, Supervisor, Woreda
Impacts on Air Quality	• Minimize dust by periodic spray of water, maintain equipment • Avoid high emission machines and vehicles	Contractor, Supervisor,
Impact on Shrub land vegetation due to clearing for the pipeline route, access roads, reservoirs, quarries, borrow areas, etc.	• Avoid unnecessary deforestation beyond the RoW of the permanent and temporary/service roads and the areas required for quarry sites and borrow pits. • If cutting of an indigenous tree is inevitable, the contractor should plant 10 (survived) seedlings for each tree cut.	Contractor, Supervisor, local Agriculture Office

Impacts on Wildlife	• Awareness creation to avoid killing wild animals by workforce • Avoid improper disposal of waste • Introduction of traffic signage and speed limit	Contractor, Supervisor,
Impact on water resources and derange line due to	• The contractor should limit most of the earthwork to the dry season	Contractor, Supervisor,

Predicted Impacts	**Mitigation/Enhancement Measures**	**Responsible Body**
Trenching, reservoir construction improper waste management.	• Used oil and lubricants from garages should be collected in sealed containers (through the proposed process and disposed for recycling or reuse. • Fuel, lubricants and oils should be stored in containers that do not leak	Regional EPA
Water Source Depletion and Pollution Impact due to Waste due to excess abstraction and improper use (wastage)	• Monitoring of ground water during operation phase • Awareness creation on conservation water	Water and Energy Bureau, Water supply enterprise
Influx of workers and conflict between local and migrant workers	• The contractor should be advised towards local labor preference for appropriate jobs (mostly the unskilled labor) and settle, as immediately as possible, any dispute in an amicable way possible	Contractor, Supervisor, Local Administration
GVB, spread of HIV/AIDS in and around construction sites due to presence of large number of concentrated workers in one area (labor camps)	• A firm (such as a local NGO) should be given a sub-contract for activities (ranging from awareness creation to conducting voluntary counseling and testing-VCT) to prevent and control of the spread of HIV/AIDS at workplaces • Awareness Creation on GBV	Contractor, Subcontractor, Supervisor, Local Administration, Local Health Office
Spread of diseases related to poor condition of sanitation in construction site(s)	• Camps and workplaces should be kept clean • Workers should be given awareness (knowledge) of basic sanitation • Water should be made potable (at least through boiling if there are no other means of treatment) • Wastes of all types should be disposed properly	Contractor, Supervisor, Local Health Office

Social Issues Related to Water Distribution	• Involve women and marginalized groups in the planning of water points. Ensure easy access to water points for children and women.	Water enterprise, WaSH COM
Problems associated with noise, vibration and air pollution especially from heavy duty construction machinery	• Heavy duty machinery should be operated near settlements during day times only • Effect of vibration on structures of special importance should be well considered • Structures should be compensated for impacts from vibrations • Vehicles of the contractor should be serviced timely	Contractor, Supervisor
Obstruction Caused by Pipeline Trenching	• Construct crossing structured • Backfill trenches in 24 hours	Contractor, Supervisor
Predicted Impacts	**Mitigation/Enhancement Measures**	**Responsible Body**
Impact on Grazing and some Farm Lands	• Limit Row not only absolute requirement • Rehabilitate any temporary land use such as for quarry, access road, pipeline route etc.	Contractor, Supervisor
Improper waste (solid as well as liquid) management will cause health problems	• Latrines and septic tanks should be sealed not to leak into the soil • Solid wastes should be disposed properly (to landfill, incineration, etc.) generally following waste disposal hierarchy • Reuse of materials like plastic bags should be practiced as it contributes to waste reduction • Clinical waste should be burned in exclusive chambers	Contractor, Supervisor, Local Health Office
Health and Safety Risks During Construction	• Establish health and safety protocols for workers. • Provide safety gears, emergency services, and regular safety training.	Contractor, Supervisor

10. ENVIRONMENTAL AND SOCIAL MONITORING PLAN

10.1. General

The environmental and social monitoring program is a vital tool and process in relation to environmental and social management as it provides the basis for rational management decisions regarding impact control. In this water supply and sanitation project, the environmental and social monitoring plan will help to ensure that the proposed mitigation measures for identified impacts and risks are being implemented effectively to fix issues they have been designed for. The monitoring program for the proposed project will be undertaken to meet the following objectives to:

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

There are two basic forms of monitoring:

- ***Compliance monitoring,*** which checks whether prescribed actions have been carried out, usually by means of inspection or inquiries.
- ***Effects monitoring,*** which records the consequences of activities on one or more environmental components and usually involves physical measurement of selected parameters or the execution of surveys to establish the nature and extent of induced changes.

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

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

- Review of the Contractor's plans, method statements, temporary works designs, and arrangements relating to obtaining necessary approvals from Construction Supervisor Engineer, so as to ensure that environmental and social protection measures specified in the contract documents are adopted and that the Contractor's proposals provide an acceptable level of impact control, and
- Systematic observation on a day-to-day basis of all site activities and the Contractor's offsite facilities including quarry and borrow areas, as a check that the contract requirements relating to environmental and social matters are being complied with and that no impacts foreseen and unforeseen are occurring.

This section discusses the need for programs covering both internal and periodic external monitoring. The overall objective of environmental and social monitoring is, therefore, to ensure that mitigation and enhancement measures are implemented and that they are effective. The activities and indicators that have been recommended for monitoring are presented in the Environmental and Social Monitoring Plan (ESMP), Table 6.

Environmental and Social Monitoring will be carried out to ensure that all construction activities comply and adhere to environmental provisions and standard specifications of the Environmental Protection Authority of the country so that all mitigation measures are implemented. Such monitoring can act as an early warning system to management, providing feedback mechanisms to enable damaging practices to be altered.

The monitoring activities are fully integrated with other construction supervision and monitoring activities to be carried out by the construction supervision consultant. The primary responsibility of ensuring the implementation of sound environmental and social monitoring will rests on the Supervision Engineer (SE), as part of his duties connected with general site supervision. Actual monitoring on a day-to-day basis will be carried out by the site staff from the construction supervision consultant under the direction of the SE. Most of the monitoring will comprise visual observations carried out at the same time as the engineering monitoring activities.

Site inspections will take place with an emphasis on the early identification of any environmental problems and identifying implementation of recommended remedial actions. Where remedial actions have been required on the part of the Contractor, further checks will need to be made to ensure that these are being implemented to the agreed schedule and in the required form. Each part of the site where construction is taking place needs to be regularly inspected from an environmental and social management viewpoint.

The SE will decide on the appropriate course of action to be taken in cases where unsatisfactory reports are received from his field staff regarding ESHS matters. In the case of relatively minor matters, advice to the Contractor on the need for remedial action may suffice, but in all serious cases, the SE should either recommend an appropriate course of action to the contractor or issue formal instruction to the Contractor to take remedial action, depending on the extent of his delegated powers.

Monitoring systems should be set up during construction by the Supervising Engineer (SE) and Contractor and by the Proponent during construction activities of the project so that potentially environmentally problematic areas can be detected well in advance and the appropriate remedial action taken. This could simply be a checklist of items that need to be inspected as a matter of routine, or periodically, depending on the nature of the aspect.

Checking monitoring will be carried out on an intermittent basis by the Environmental Specialist of the PIU. Monthly reports prepared by the SE should contain a brief section referring to environmental and social matters, which summarizes the results of site monitoring, remedial actions which have been initiated, and whether or not the

resultant action is having the desired result. The report will also identify any unforeseen environmental, social, health, and safety risks and impacts and will recommend suitable additional action items. Progress meetings with the contractor will also include a review of ESHS aspects.

Monitoring construction activities and mitigation measures implementations will be based on visual inspections at the construction sites. In addition, the contractors will be responsible for monitoring the outcome of their management actions on the physical, biological and human environment. The proposed performance indicators, means of verification and monitoring frequency are described in Table 6.

As stated above, one of the major approaches to carry out monitoring activities is visual observation. However, apart from visual observations, particularly it is important that monitoring should also include limited informal questioning of people and local community leaders who live near the project, since they may be aware of matters which are unsatisfactory but may not be readily apparent or recognized during normal site inspection visits. The most critical parameters to be monitored are listed below and the summary of the Environmental and Social Monitoring Plan is indicated in Table 6.

- Behavior control,
- Security control around project sites
- Occupational health and safety (OH)
- Violence related to the project (GBV, SEA, VAC, SH)
- Road safety and traffic control,
- Water Quality,
- Air Quality,
- Noise level,
- Soil conservation and reforestation, and
- Project Capacity building

10.2. Internal Monitoring Plan

The ESIA study has identified a number of areas of concern. Mitigation measures have been developed and monitoring of the effectiveness of the proposed mitigation measures is important. It will be the responsibility of proponent to conduct regular internal monitoring of the project to verify implementations of the Contractor and to audit direct implementation of environmental mitigation measures contained in the ESMP for the Project. Monitoring proposed environmental and social parameters will form part of the routine management of the proposed project from implementation to operations. Therefore, monitoring must be seen as more than merely satisfying compliance with environmental rules and regulations. Without specific reporting, response mechanism and auditing, monitoring is of little value. The interpretation of monitoring data and its implication for management should be provided to senior management.

The responsibility for mitigation monitoring during the operation phase will be solely for the proponent. The monitoring unit should produce an annual report which should be

publicly available for inspection. It is strongly recommended to the proponent to employ an ***Environmental and Social Officer or Environmentalist or Health Officer*** (or any other desired) to undertake the responsibility for ensuring project sustainability.

10.3. External Monitoring Plan

The National ESIA and Audit Regulation prerequisite is that executing a project or a development plan shall be effected after an environmental impact statement has been approved by the line Environment Protection Authority (EPA), the project owner shall take all practical measures to ensure implementation of the ESMP by: - • Undertaking self-auditing annually or as needed.

- Preparing an environmental and social audit report after each audit and submitting its report to EPA annually or as required, and
- Ensuring that the criteria used for the audit is based on the environmental impact assessment process or after an initial audit.

EPA has the overall responsibility for issuing approval team or body for the Project and ensuring that ESMP and EMP are implemented accordingly. EPA reviews environmental monitoring and environmental compliance documentation submitted by developers and they would not normally be directly involved in monitoring the Project unless some specific major environmental issue arises. The proponent through a consulting firm or registered environmental expert will therefore provide EPA with reports on environmental compliance during implementation as part of their annual progress reports and annual environmental audit reports.

Key points in environmental and social impact monitoring.

- **Indicators**: These are measurable parameters tracked to assess the effectiveness of mitigation measures. Examples include monitoring air quality, water quality, energy consumption, and labor audits.
- **Monitoring Methods**: The tools or methods used to collect data on the identified indicators. Examples include air quality monitoring stations, noise meters, wastewater testing, and labor audits for working conditions.
- **Frequency of Monitoring**: This specifies how often monitoring will occur. Highimpact areas like air and noise pollution will require more frequent monitoring, while others like CSR initiatives or labor audits may be checked less frequently.
- **Responsible Body**: The teams or individuals responsible for overseeing and conducting monitoring activities to ensure that the mitigation measures are implemented and tracked. In addition, the following considerations are important for the successful implementation of the ESMP:

1. **Data Reporting**:
   - Data collected from monitoring activities should be documented in regular reports (e.g., monthly, quarterly) and reviewed by the relevant project teams to ensure that environmental and social performance aligns with the mitigation strategies outlined in the ESMP.

- Reports should be shared with stakeholders, including local authorities and community representatives, to ensure transparency and accountability.

2. **Corrective Actions**:
   - If monitoring reveals that mitigation measures are not effective (e.g., air quality exceeds allowable limits or water contamination is detected), corrective actions should be implemented promptly.
   - This could include revising methods, enhancing mitigation efforts (e.g., dust suppression or improving waste management), or additional interventions like replanting vegetation or implementing stricter environmental controls.
3. **Stakeholder Involvement**: o For social impacts like community disruption or labor conditions, feedback from the local community and workers should be collected regularly.
   - Grievance mechanisms should be established and promoted to allow local people to voice concerns and offer input on project implementation.
   - Social audits and surveys should be conducted to gauge community satisfaction and worker welfare during construction and operational phases.

The overall Environmental and Social Monitoring Plan is presented in Table 20.

Table 19: Environmental Monitoring Plan

Predicted Impacts	**Phase**	**Monitoring Indicator**	**Monitoring Method**	**Frequency**	**Responsible Body**
Soil Erosion and Contamination	• Construction	-Erosion -Gully -Any pollution	• Observation	• Monthly	Contractor, Supervisor, Woreda Agriculture Office
Landscape Alteration and Aesthetic Impacts	• Design • Construction	-Location of structure -Presence of structure	• Observation	• Quarterly	Contractor, Supervisor, Woreda Authority
Impacts on Air Quality	• Construction	• Dust • Emission	• Observation • Lab analysis	• Quarterly	Contractor, Supervisor,
Impact on Shrub land vegetation	• Design • Construction	-Changes in vegetation cover. -Presence of wildlife species.	-Field surveys and mapping. -Wildlife presence	• Quarterly	Contractor, Supervisor, local authority
Impacts on Wildlife	• Construction	-Presence or absence of wildlife species.	• Observation	• Monthly	Contractor, Supervisor,
Impact on water resources and derange line	• Construction	• Blockage of drainage lines, • Pollution	• Construction	• Observation • Lab analysis	Contractor, Supervisor, Regional EPA, Regional Water and Energy Bureau
Water Source Depletion and Pollution	• Construction • Operation	-Groundwater. -Water quality (e.g., BOD, pH, turbidity, contamination).	• Observation • Lab Analysis	• Quarterly	Water and Energy Bureau, Water supply and sanitation enterprise, Supervisor,
Influx of workers and conflict between local and migrant workers	• Construction	• Number migrated Workers	• Access to data (number)	• Monthly	Contractor, Supervisor, Local Administration

GBV, spread of HIV/AIDS	• Construction	• GBV incidence • HIV Victims • Awareness creation given	• Observation • Access to data	• Monthly	Contractor, Supervisor, Local Administration, Local Health Office

Predicted Impacts	**Phase**	**Monitoring Indicator**	**Monitoring Method**	**Frequency**	**Responsible Body**
Social Issues Related to Water Distribution	• Operation	• Water points for women and children • User satisfaction on water points	• Observation, • Satisfaction survey	• Quarterly	Water enterprise, WaSH COM
Obstruction Caused by Pipeline Trenching	• Construction	• Crossing structure constructed • Not back filled trench	• Observation	• Monthly	Contractor, Supervisor
Impact on Grazing and some Farm Lands	• Construction	• Land acquisition • RoW Data	• Observation • Access RoW ,Data	• Monthly	Contractor, Supervisor, Woreda Agriculture Office
Improper waste management	• Construction	• Waste Generated • Waste Disposal	• Observation	• Monthly	Supervisor, Local Health Office
Health and Safety Risks During Construction	• Construction	• Accident and injury rates. • Compliance with health and safety protocols.	• Observation • Document review	• Monthly	supervisor

10.4. Reporting

The reporting system for the Web Route Water Supply System should be structured to ensure transparency and accountability throughout the project's lifecycle. Regular monitoring reports should be generated to track the effectiveness of the mitigation measures outlined in the Environmental and Social Impact Assessment (ESIA). As a result, the contractor should prepare and submit monthly and quarterly environmental and social implementation reports to the consultant; and the consultant should prepare and submit Monthly and quarterly environmental and social supervision reports to the Oromia Water and Energy Bureau, and AfDB.

These reports should include data on environmental and social monitoring indicators such as air and water quality, waste management, worker safety, and community engagement. Reports should be produced on a quarterly or annual basis, depending on the phase of the project, and shared with stakeholders, including the project management team, local authorities, and relevant regulatory bodies. In addition, the system should allow for timely identification of any deviations or non-compliance, with corrective actions taken as necessary.

The reports should be based on data collected through various monitoring methods, such as field surveys, inspections, community feedback, and environmental testing. The parties responsible, such as the environmental consultant, construction contractor, and project manager, should compile the information and ensure that all relevant stakeholders are kept informed. The reporting system should also include clear timelines for corrective actions and follow-up, ensuring continuous improvement in the project's environmental and social performance. Additionally, all reports should be stored in a centralized database for future references and to facilitate audits and evaluations.

Annual overall environmental and social management performance report is also expected from the Environmental and Social Management Unit of OWEB with other proponents' annual reports. The annual report shall be submitted to the line Environment Protection Authority (EPA) of the region and other government agencies as part of the proponent's statutory responsibilities towards the Government and also to AfDB. The report will also be disseminated to the other project stakeholders as needed.

11.ENVIRONMENTAL MANAGEMENT AND MONITORING COST

Most of the mitigation measures specified in Chapter 8 will not incur separate costs as they can be implemented by following proper construction methods, or are engineering/physical features, which are part of the construction items like drainage facilities, erosion protection and slope stabilizing measures, etc. Other mitigation measures that may have a separate cost implication can include:

- Grassing of trenching lines on steep slopes and other erosion prone areas to stabilize slopes and prevent erosion.
- Replanting of trees to replace or compensate vegetation/trees removed or to prevent erosion or stabilize slopes,
- Restoration of quarries and other areas affected due to temporary land uses,
- Awareness creation programs on traffic safety and public health issues for the

local community to minimize traffic accidents and spreading of sexually transmitted diseases (esp. HIV/AIDS)

- Environmental monitoring activities (soil erosion, water, wildlife, etc.).

The costs of the recommended environmental mitigation measures and management activities are estimated and presented in Table 21 below. It is estimated that about **10.76 million Birr or 0.86 million USD** is required to cover the costs of the environmental mitigation and management plan.

Table 1: Environmental Management and Monitoring Costs

S.N	Description of Activities	Unit	Quantity	Rate (Birr/ Unit)	Total Amount (Birr)
1	**Soil contamination prevention, erosion control and slope stabilizations measures**				
1.1	Engineering/physical measures	To be included in the ECE*			
1.2	Bio-Engineering measures				
A	Grassing to side slopes	m^2	30,000	60	1, 800,000.00
B	Planting trees to replace trees removed and/or to control erosion or stabilize slopes and management	nr	10,000	100	1,000,000.00
2	**Restoration and Rehabilitation**				
2.1	Restoration of pipeline trenches	To be included in the ECE*			
2.2	Restoration of material sourcing sites, spoil and waste disposal sites and other areas affected due to temporary land uses	Lump sum			1,500,000.00
3	Water Level Monitoring (Operation)	Recurrent Budget by Region			
4	Safety and Health provisions (PPEs, road and traffic signs, etc.)	Lump sum (during construction only)			2,000,000.00
5	HIV/AIDS prevention program implementation	Lump sum			1,000,000.00

0

S.N	Description of Activities	Unit	Quantity	Rate (Birr/ Unit)	Total Amount (Birr)
6	Awareness raising programs on public health and safety issues for local population, influx etc.	Lump sum (during construction only)			500,000.00
7	**Environmental monitoring**				
7.1	Assignment of Environmentalist on site	Man month	18	60,000	1,080, 000.00

7.2	Assignment for Environmenta Inspector	Manmonth	6	150,000.00	900,000.00
	Total				**9,780,000.00**
	Contingency (10%)				71,000.00
	Grand Total				**10,758,000.00** plus, ECE

USD 1= 125 TB

12.CONCLUSION AND RECOMMENDATION

12.1. Conclusion

The Environmental and Social Impact Assessment (ESIA) for the Web Route Water Supply System provides a thorough evaluation of the potential environmental and social impacts associated with the construction, operation, and maintenance phases of the project. This assessment has identified both the positive and negative effects that could arise from the project, while highlighting the need for a strategic approach to mitigate any adverse outcomes.

Based on the findings of this ESIA study, the construction and operation of the proposed water supply project is expected to bring several significant socio-economic benefits to the influence area. According to the data obtained from the field and review of literature, the proposed project area harbors no significant ecological and wildlife values as there is no known park or wildlife conservation sites in the project corridor to be directly affected by the project activities.

Nevertheless, the construction and operation of the reservoirs, cattle troughs, water points and pipelines will emanate some adverse impacts that can be avoided or reduced to significant levels through appropriate mitigation and compensation measures. Therefore, proper care should be taken during design, construction and operation of the project, unless proper implementation of the ESIA is ensured, these impacts will have massive opportunity costs that are passed on to society, particularly the marginalized communities who live adjacent to the project area as massive communal grazing land will be affected.

The overall conclusion is that the significant negative environmental and social impacts of this water supply project must be reduced to acceptable levels through good engineering practices and environmental and social management activities if the project is to be implemented in an environmentally sustainable and socially acceptable way.

12.2. Recommendation

As clearly indicated above, the implementation of the proposed water supply project will cause some significant negative impacts on the natural environment as well as the socio-economy of the local community within the direct impact zone. Therefore, the following are the major recommendations made:

Environmental management and monitoring activities should be an integral part of the implementation and operation of the project

- Concerned stakeholders and the local community are properly communicated and involved in the project implementation of environmental mitigation measures starting from the preparation/ pre-construction phase and throughout the constriction period. The key bodies can include EPA, each Woreda Administration Office, Agricultural Offices, Women Affairs offices,

Health and Police Offices, Kebele Administration as well as the local community including the project affected people.

- Development and implementation of a detailed, site specific Environmental and Social Management Plan (ESMP), provide a clear framework to manage and mitigate the identified risks. These measures aim to ensure that negative impacts are minimized while maximizing the benefits to the community and the environment. If adhered to, the proposed mitigation strategies will enhance the sustainability of the water supply system and contribute to the long-term wellbeing of the local population.
- Establish a rigorous Environmental Monitoring Plan (EMP) that includes specific indicators, monitoring methods, and timelines to ensure ongoing compliance with environmental regulations.
- Conduct annual environmental audits to assess the effectiveness of the mitigation measures and identify any necessary corrective actions.

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ANNEX 1: COMMUNITY CONSULTATION MINUTES OF MEETINGS

Qaboo Yaa'ii Marii Hawaasaa Qorannoo
Dhiibbaa Naannoo fi Hawaasaa Saaraa Bishaanii
Qarxaa Qamsii-Weeyib Jiraattota Ganda
Hiifoo
Guyyaa: 4/4/2017
Bakka: Ardaa Buchiinsa Gandaa
Yeroo: Sa'aatii Jalqaba: 4:54 Kliduu

Hirmaattota: 1. Obbo Kaasaahun Dibaabaa - Waliti Qabaa
2. Obbo Mohammad Hiikoo - Qodeessaa
3. Obbo Waaniyoo Gaafaloo - ATENGB
4. Obbo Gammachuu Itichaa - Miseensa
5.
6.
7. Jiraattota Ganda Hiifoo Afeerdaman irratti tarreeffaman.

<u>Ajandaa Marii:</u> Dhiibbaa Naannoo fi Hawaasaa Hojii Ijaarsa Pirojektii Bishaanii Saaraa Weeyib irratti mari'achuu

Ibsa Ajandichaa irratti Obbo Kaasahuun fi Obbo Mohamad Hiikoo Kaayyoo Marii Kanaa ibsanii Hawaasni akka yaada kennu carraa kennaniiru.

Obbo. Duulacha . Waan Dhufaniin daasaa takkoon feesisu ani ake hin jiru ewaan Qaamidha

Aadde. Qarmi Ganyaa- Bishaan dhufuuf deemu kuni halam feesisii? Kan Fuddoo nu fiyyadduu?

-1-

Aadde Dabbo- Bishaan kuni yoo dhufe nu midhi-
naa- Yoo bishaan baay'atee dhufe lolaan itti
nuti qadhufnu, bakkeewwan haroo, irreessaa
hin midhuu?
Deebii; Obbo Kaasiyoo fi Obbo Mohammad
- Bishaan akka miidhaa hin qeessifneef hooĉhaa
Bishaan dhufu loonif namaaf baay'ee barbaachi-
saadha. Dhiibbaa inni qeessisu hin jiru.
Haroo fi irreessa faa'aatti hin faajeew, bira
baheeti darbamalee.
Aadde Dhakkii Saaraa- Nuti hirmaattonni akka
keenyatti itti waliigalleerra; Hawaasni bal'aanis
osoo nutti mari'ate qaamidha.
Mariin qaaffii qabatame deebisuun
waliigalteen sa'aatii 5:45 irratti
Xumurameera.

-2-

Attendaanii/To'annoo Marii Hirmaattota Garda...
Hiipoo:

T.L	Maqaa Guutuu	Saala	Hojii	Mallattoo
1	Dhakkii Saaraa	Dhi.	Tiksee	
2	Elemaa Gaifaroo	Dhi.	Barattoo	
3	Guyyoo Liban	Dhi.	T. Buisa	
4	Dhakki Konso	Dhi.	H. Keessa	
5	Dubbaa Guyyoo	Dhi.	T. Buisa	
6	Dullacha Kesumtee	Dhi.	Tiksee	
7	Dhakkii Boruu	Du.	Tiksee	
8	Galma Guddoo	Dub.	Tiksee	
9	Saase Saanfaa	Dub.	Tiksee	
10	Darmi Ganyaa	Dub.	Tiksee	
11	Dabo Maiichaa	Dub.	Tiksee	
12	Dadhe Dudaa	Dub.	Tiksee	
13	Dubo Xiffaa	Dub.	Tiksee	
14	Darmi Dullacha	Dub.	Tiksee	
15	Elema Tadhee	Dub.	Tiksee	
16	Dalmaa Dhakkee	Dub.	Tiksee	

Qaboo Yaa'ii Marii Hawaasaa Jiraattota Ganda
Fuloo Biffaa - Ollaa Dida Forsaa
. Bakka: Buchimsa Gandaa - Dida Forsaa
. Guyyaa: 04/04/2017
Yeroo: Sa'aatii 7:13 kl. Booda
Hirmaattota:
1. Obbo Kaasahuun Dibaabaa - Waliitti Qabaa - WBIO
2. Obbo Mohammad Hufoo - BRKWDILQ - Qindeessaa Aanaa
3. Obbo Waaqiyoo Gelgaloo - ATEN Godina Booranaa
4. Obbo Gammachuu Itichaa ESS Specialist Aanaa
5.
6. Jiraattota fi Caasaa Gandaa Akkasumas Maatii Taneeffamani Mallattessani

Ajandaalee Marii: Dhiibbaa Naannoo fi Hawaasaa asaa Ijaarsa Sararaa Bishaanii Waayyib maatii marii'achuu.

Ibsa Pirojektichaa fi Kaayyoo marii maatti Obbo Kaasaahuunii fi Obbo Mohaammad ibsaniiti Caasaa yaadaa fi Gaaffii hirmaattotaaf kennaniiru.

Gaaffii fi yaada Hirmaattotaa:

Obbo Waariyoo Dooyyoo Sararri bishaanii kun fonna nama hin cabsuu? Iddoowwan fala maal gochuun ni danda'ama?

Yaada Bishaan dhaboo fabna, otoo bishaan nuuf dhufe manni keenya jala kaanee qanana deddeebii nuuf haa hojjetamu.

Obbo - Soraa Nuuraa. Sararichi addaba hee siinsitii nuuf haa ibsamu? Yoosan adda baafnee hinna

-1-

Obbo Jaldeessa Abbuna Kanuma dabalanii yaada kennani

Deebii fi ibsa Paatiilee ka'eef kennaman:

Obbo Mohammed - saami daandeema kana fabatee deema. Bakkeewwan aadaa fi meeshaa tuqamu tokkollee hin jiru jechuun hirmaattotaa yaada gabbaanii kennaniiru.

- Rakkoon saaraa bishaan iddoowwaniif deemii kanaan dhaffatu hin jiru kanaafuu haa nuuf aniitatee hoojetamu jechuun hirmaattotaa yaada kennaniiru.
- Bishaan kana jalluunf fayyadamuun dandaa'amaa jechuun faatabnuuf lakki ammaaf kan dhuunfatu tarudha jechuun Obbo Mohammed deebii kennaniiru.

Haala kanaan marichi Sa'aatii 8:10 keB tti xumurameera.

-2-

Ganda Fuloo Biftaatii – Oliiqa Duda Foraa.

Tarree Maqaa fi Mallattoo Hirmaattota Mana

T.L.	Maqaa	Saala	Hojii	Mallattoo
1.	Jaldeessa Yachee	Dhi	H/Bersa	
2.	Kontoma Godaanaa	Dhi	Buchaa Gosa	
3.	Lookoo Yachee	Dub	Daldaltuu	
4.	Dhaddacha Kuulaa	Dhi	I/G Oddafata	
5.	Soraa Nuraa	Dhi	H/Misomaa	
6.	Kharfuu Dooyoo	Dhi	I/G. M.M.	
7.	Darmii Ganyaa	Du	Jiraataa	
8.	Lookoo Gurraachaa	Du	"	
9.	Daallacha Diidaa	dhi.	"	
10.	Wagoo Garboolee	dhi	"	
11	Huggaa Arbooraa	dhi	"	
12	Godanaa Dhaddachaa	dhi	"	

Marii Hawaasaa DORBI Qaxxee Ganda Qaxxaa Dambii Dhimma Dhiibbaa Naannoo fi Hawaasaa Sarara Bishaanii Saraa Keessiib.

Guyyaa: 06/04/2017

Iddoo: Zoonii Qaxxee Ollaa Goticha Diidoo

Yeroo: Sa'aatii 4:30 kutaa jalqabe.

Hirmaattota: 1. Obbo Kaasaahun Qabsaa - koottii Qaba

2. Obbo Mohaammad Hikoo

3. Obbo Waaqjiraa Galfaa

4. Obbo Gammachuu Itichaa

5. ·

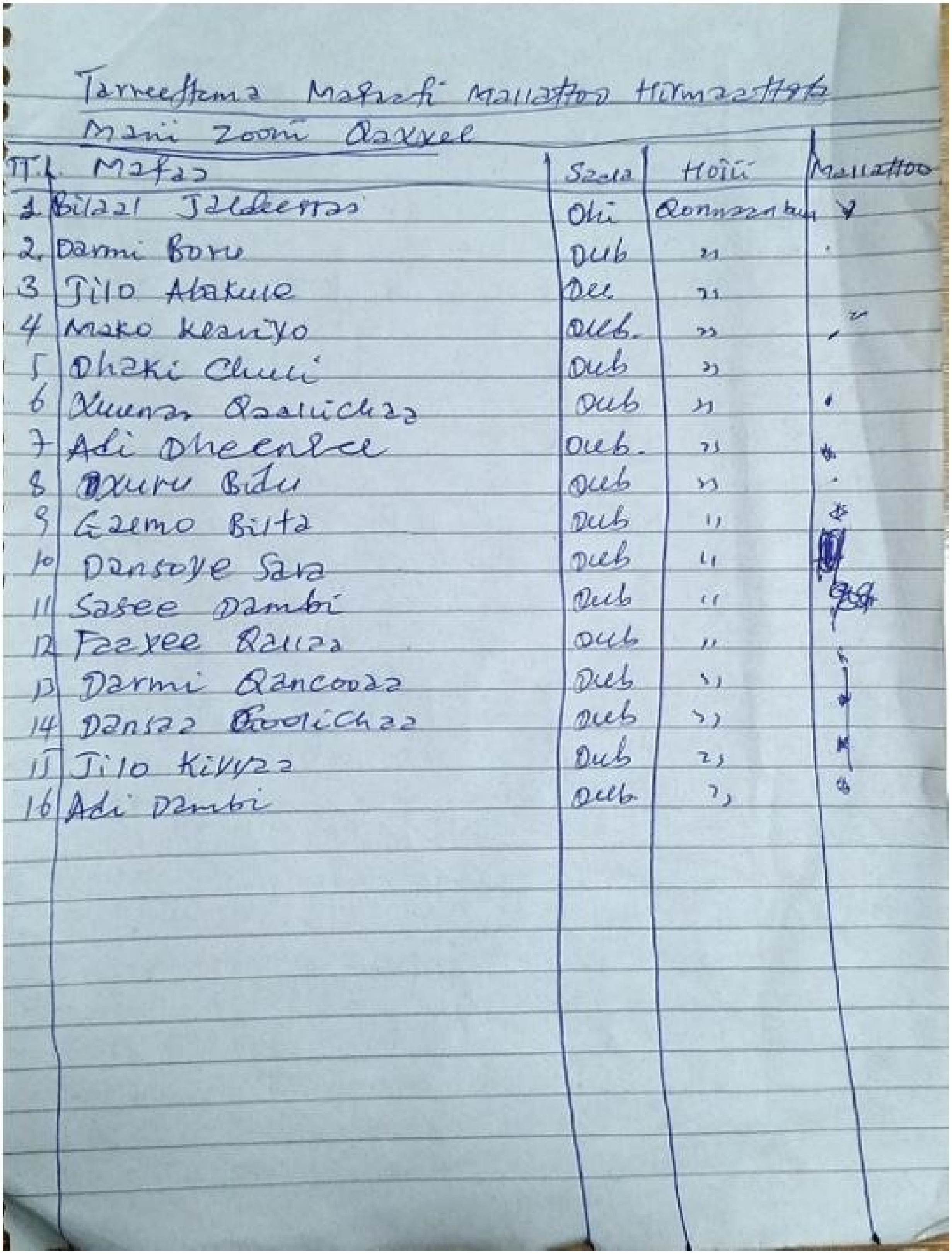
6. Jiraattota zoonii Qaxxee Afaan Oromoo irratti tarreeffamaniiti

Ajandaa: Dhiibbaa Naannoo fi Hawaasaa Pirojektii Bishaanii Sarara Keessiib irratti mari'achuu

Kaayyoo fi Barbaachisummaa marii irratti ibsa bal'aan Obbo Kaasaahuniin kennameera. Hirmaattonni Gaaffii fi yaada akka kennatan carraan kennameera.

Obbo. Bilaal Jaldeessaa: Irreessiis waan biraas sarara bishaanii kanaan hojii dhamuu hin jiru bishaan rakkoo guddoo waan qabnuuf akka nuuf hojjetamu feena.

Aadde Fatimaa: Rakkoo bishaanii guddoo qabna nu bulchanna daddaffaa nuuf tolchaa. Kunuunsa fi yeroo irratti waliigaluun marichi Sa'aatii 5:05 WD irratti dummurameera.



Tarreeffama Mafaah Mallattoo Hirmaattota
Mani Zooni Qaxxee

T.L	Mafaa	Saala	Hojii	Mallattoo
1	Bilaal Jaldeessaa	Ohi	Qonnaan bulaa	
2	Darmi Boru	Dub	,,	
3	Jilo Abakule	Dee	,,	
4	Mako Keaniyo	Dub.	,,	
5	Dhaki Chuli	Dub	,,	
6	Xuuna Qaaliichaa	Dub	,,	
7	Adi Dheenbee	Dub.	,,	
8	Qxuru Bidu	Dub	,,	
9	Gaemo Bilta	Dub	,,	
10	Dansoye Sara	Dub	,,	
11	Sasee Dambi	Dub	,,	
12	Faaxee Railaa	Dub	,,	
13	Darmi Qancooaa	Dub	,,	
14	Danlaa Boodichaa	Dub	,,	
15	Jilo Kiyyaa	Dub	,,	
16	Adi Dambi	Dub.	,,	

ANNEX 2: ESIA SCREENING DATA COLLECTION FORMAT CHECK LIST

Environmental and Social Screening Form (ESSF) for BRWDILP community sub projects

'2013

Dubluk......Woreda Water & Energy......................................Office

Borana Resilient Water Development for Improved Livelihood Program (BRWDILP) Phase II

Climate Action Window /CAW/ Project

Environmental and Social Screening and Impact Identification Format for Web Root Water Supply System Sub-Project

Date..4/4/2017 EC

Address..Mugor Kebele
Dambala Dmu Village

Environmental and Social Screening Form (ESSF) for BRWDILP community sub projects

Annex 1: Community Sub-projects Social Screening Form (SSF)

The Social Screening Form (SSF) has been designed to assist in the evaluation of sub-projects of BRWDILP Phase II in Borana zone. The form is designed to place information in the hands of implementers and reviewers so that impacts and their mitigation measures are determined.
The Form contains information that will allow reviewers to determine the characterization of the prevailing local bio-physical and social environment with the aim to assess the potential social negative impacts of the sub-project. The social screening form is a generic form and can be used for all subprojects.

A. Name of the sub-project..... Web root Water Supply System

B. Sector......... Water Office

C. Name of the Kebele/community..... Hiiqo (Zeeran Dambala Tmuu)

D. Name of the Approving Authority ....

E. Contact details of the person responsible for filling out this SSF:

Name: ....

Job title..

Telephone numbers...............................; ....

E-mail address: ....

Date: ....

Signature: ....

PART A: BRIEF DESCRIPTION OF SUB-PROJECT

Please provide information on the type and scale of the sub-project (area, required land, approximate size of total building floor area, etc.). Provide information about actions needed during the construction of facilities including support/ancillary structures and activities required to build it, e.g. need to quarry or excavate borrow materials, laying pipes/lines to connect to energy or water sources, access roads, etc. Describe how the sub-project will operate, including support/activities and resources required operating it, e.g. roads, disposal sites, water supply, energy requirement, human resources, etc.

- The identified sub project planned to be implemented in the Kebele (hiiqa) Dambala Tmuu sub kebele is pipe line laying and distribution through the village for the water supply.
- The project activities here are reservior, pipeline, water points, cattle trough and sanitation facilities.

PART B: SOCIAL SAFEGUARDS SCREENING FORM:

No	Social safeguards screening information	Yes	No
1	Will the sub project activities reduce other people's access to their economic resources, like land, pasture, water, public services or other resources that they depend on?		✓
2	Will the project result in resettlement of individuals or families or require the acquisition of land (public or private, temporarily or permanently) for its development?		✓
3	Will the project result in the temporary or permanent loss of crops, fruit trees and household infra-structure (such as granaries, outside toilets and kitchens, etc.)?		✓
4	Will the project require excavation near any historical, archaeological or cultural heritage site?		✓
5	Might the project adversely affect vulnerable people and underserved groups (e.g., elderly poor pensioners, physically challenged, women, particularly head of households or widows, etc.) living in the area?		✓
For all issues indicated by "Yes", the applicant is expected to explain how he/she intends to mitigate them.			

Annex 2. Environmental and Social Screening Form (ESSF) for Community Sub-projects

The Environmental and Social Screening and Impact Identification Form has been designed to assist in the evaluation of sub-projects of BRWDILP in Ethiopia. The form is designed to place information in the hands of implementers and reviewers so that impacts and their mitigation measures are determined.

The Form contains information that will allow reviewers to determine the characterization of the prevailing local bio-physical and social environment with the aim to assess the potential sub- project impacts on these environments.

PART A: BRIEF DESCRIPTION OF SUB - PROJECT

PART B: BRIEF DESCRIPTION OF THE ENVIRONMENTAL AND SOCIAL SITUATION AND IDENTIFICATION OF ENVIRONMENTAL AND SOCIAL IMPACTS

1. **Brief description of the proposed sub-project**

Describe the sub-project location, sitting; surroundings (include a map, even a sketch map)

- The web rural water supply system is one of the root system from the ~~major~~ Galchete-Sarite water supply system. This is mainly laying in Dubluk woreda of Borana zone. It is in Higo kebele Dambala Enu sub kebele (rera) having distribution & pipe line.

2. **Natural Environment**

(a) Describe the land formation, topography, vegetation in/adjacent to the project area

- The topography of the area is more of plain with Julia flora acacia type alien species. The community is mostly pastoralist and dwelling into the area for certain period main with the availability of water, humid weather and pasture for their livestocks. at the absence of these resources they have been moving in search of these resources across woredas and further.

Environmental and Social Screening Form (ESSF) for BRWDILP community sub projects

(b) Estimate and indicate where vegetation might need to be cleared.

- the estimated land needed for construction of this sub activities is limited. the line that pipe lay through and is so narrow and will going to serve for other purpose after construction

(c) Are there any environmentally sensitive areas or threatened species (specify below) that could be adversely affected by the sub-project? No.

(i) Intact natural forests: Yes_____ No ✓

(ii) River line forests: Yes _____ No ✓

(iii) Surface water courses, natural springs: Yes_____ No ✓

(iv) Wetlands (lakes, rivers, swamps, seasonally inundated areas): Yes____ No ✓

(v) How far is the nearest wetland (lakes, rivers, seasonally inundated areas)?__km. no river with 2km

(vi) Area of high biodiversity: Yes_____ No ✓

(vii) Habitats of endangered/threatened or rare species for which protection is required under Ethiopian national law/local law and/or international agreements: Yes_____ No ✓

(viii) Others (describe): Yes _____ No _____

3. Rivers and Lakes Ecology

(a) Is there a possibility that, due to construction and operation of the sub-project, the river and lake ecology will be adversely affected? Attention should be paid to water quality and quantity; the nature, productivity and use of aquatic habitats, and variations of these over time.
Yes_____ No ✓

(b) Is there a woreda office responsible for water management in the sub-project area? Yes ✓
__No _____ the woreda water & energy office is responsible
If so, what is its name, and what are its specific responsibilities and how would it interact with BRWDILP sub-projects? Please describe.
monitoring, - maintenance and so on
- supervision

(c) Are there small dams and other water management structures, and, if so, are they functioning properly? Yes .... No...✓...... - higo well, traditional well is existed
If yes, please describe the current state of these water management structures, the institutional responsibilities for their maintenance, and potential need for repairs.
- higo well is a functional traditional well that currently servicing the community

4. Protected areas

Does the sub-project area (or components of the sub-project) occur within/adjacent to any protected areas designated by government (national park, national reserve, world heritage site etc.)? Yes .... No...✓......

If the sub-project is outside of, but close to, any protected area, is it likely to adversely affect the ecology within the protected area areas (e.g. interference with the migration routes of mammals or birds). Yes .... No ✓

5. Geology and Soils

Based upon visual inspection or available literature, are there areas of possible geologic or soil instability (prone to: soil erosion, landslide, subsidence, earthquake etc.)? Yes ..✓.... No...........

- there is fragile soil structure site is prone to soil erosion and needs attention during this project implementation.

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Based upon visual inspection or available literature, are there areas that have risks of large scale increase in soil salinity? Yes .... No.. ✓.......

Based upon visual inspection or available literature, are there areas prone to floods, poorly drained, low-lying, or in a depression or block run-off water? Yes ..✓... No............ – slight flood/soil erosion.

6. Contamination and Pollution Hazards

Is there a possibility that the sub-project will be at risk of contamination and pollution hazards (from latrines, dumpsites, industrial discharges, etc.)? Yes .... No..✓......

7. Landscape/Aesthetics

Is there a possibility that the sub-project will adversely affect the aesthetic attractiveness of the local landscape? Yes .... No..✓.......

8. Historical, Archaeological or Cultural Heritage Sites.

Based on available sources, consultation with local authorities, local knowledge and/or observations, could the sub-project alter any historical, archaeological, cultural heritage, traditional (sacred, ritual area) site or require excavation near same? Yes .... No...✓......

9. Resettlement and/or Land Acquisition

(a) Based on the results screening will involuntary resettlement, land acquisition, relocation of property, or loss, denial or restriction of access to land and other economic resources be caused by sub-project implementation?

Yes__________ No __✓________

(b) If yes, have consultations been carried out with potentially affected persons and relevant stakeholders? Yes .... No ....

What was the outcome of these consultations? Was the decision made to (i) change the design/location of the sub-project and therefore not requiring compensation; or (ii) retain the original sub-project design/location, thus requiring compensation of potentially affected persons? Please describe. ...the Community was strongly asking the access of ~~[illegible]~~ water due lacking clean water for human & their livestock.

(c) If the decision was made to retain the original sub-project design/location, OS2 – Involuntary resettlement: land acquisition, population displacement and compensation is triggered and appropriate mitigation measures consistent with this Africa Development Bank's Integrated Safeguard System operational safeguard would have to be taken.

10. Blocking of Access and Routes or Disruption of normal Operations in the General Area Will the sub-project interfere or block access, routes, etc (for people, livestock and wildlife) or traffic routing and flows? Yes.............. No ..✓........

11. Noise and Dust Pollution during Construction and Operations.

Will the operating noise level exceed the allowable noise limits? Yes

__✓_____ No__________ – the dust and air pollution might not exceeds the limit.

Will the operation result in emission of copious amounts of dust, hazardous fumes? Yes No

__________: yes. dust due pipe line digging and the like will produced.

12. Degradation and/or Depletion of Resources during Construction and Operation

Will the operation involve the use of considerable amounts of natural resources such as sand, wood, stones (construction materials, water spillage, land, energy from biomass, etc.) or may lead to their depletion or

– limited resources.

degradation at points of source? Yes .....No ...✓.....

13. Solid and Liquid Wastes

Will the sub-project generate solid and/or liquid wastes (including human excreta/sewage, and hospital/medical waste)? Yes_____No _____ – excreta from project worker.
If "Yes", does the sub-project include a plan for their adequate collection and disposal? Yes _____No ✓_____
As regards safe medical waste management, does the sub-project have a medical waste management plan to guide it in the selection and implementation of appropriate disposal methods?
Yes_____No✓_____
If yes, who will be responsible for integrating its provisions for medical waste management into the sub-project? Please describe. .....
.....

14. Occupational Health Hazards

Will the sub-project require large number of staff and laborers; large/long-term construction camps? Yes ..... No ..✓.....
Are the sub-project activities prone to hazards, risks and could result in accidents and injuries to workers during construction or operation? Yes ..... No..✓..... limit infra may happen.

15. Public Health

(a) Is there any concern about **HIV/AIDS** in the area of the planned sub-project?
Yes.....No ...✓...
If yes, please indicate current efforts to address HIV/AIDS issues in the proposed sub-project area, or, make recommendations how such concerns should be addressed. Could the sub-project benefit from support through the ongoing HIV/AIDS Project? Are there any training needs in this regard? Please describe. ..... the Woreda health office may/will be responsible to teach and work on any health issues of the area.

(b) Is there any concern about **malaria** in the area of the planned sub-project?
Yes....✓.....No .....
If yes, please indicate current efforts to address malaria issues the proposed sub-project area, or, make recommendations how such concerns should be addressed.
Is there a Vector Management Plan or equivalent that could be implemented under the proposed sub-project? Yes✓_____No _____ – the woreda health office has been working on
If yes, please describe who will be responsible for implementing this plan under the proposed sub-project, and whether any training in this regard should be provided. this issues may distribute bed net and spray
.....
.....

(c) Is there any concern about ineffective pest management in the area of the planned sub- project?
Yes_____No✓_____
If yes, please indicate current efforts to address impacts due to unsafe pest management in the proposed sub-project area, or, make recommendations how such concerns should be addressed.
Is there a Pest Management Plan (PMP) which could be implemented under the planned sub- project?
Yes_____ No ✓_____
If yes, please describe who will be responsible for implementing this plan under the proposed sub-project, and whether any training in this regard should be provided.

16. Operation and Maintenance

Will the sub-project require regular maintenance and/or repair Yes

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_____ No _____

If yes, is there sufficient capacity at the community/Woreda levels to carry out effective operations and maintenance activities? Indicate types and extent of capacity building needs.

Yes ✓ No _____ The woreda water & Energy office is capable of this maintenance work under their capacity

17. Public Consultation

Has public consultation, participation and prior and informed consent been sought? Yes ✓ No _____ The community has discussed on the issues and give their consent and agreed.

Describe the consultation process that has taken place and list the outcomes and recommendations made by the participants.

PART C: Recommendation/Mitigation Measures

For all "Yes" responses, describe briefly the measures taken/proposed to this effect with the necessary budget, cost estimates. Environmental and social management plan (ESMP) including the monitoring plan, RAP, PMP and other safeguards instruments should be prepared to manage all the impacts under each yes responses. The ESMP put systematically the impacts, the mitigation measures, the cost/budget required, monitoring plan, responsible body and the schedule to implement the plan. Refer respective annexes when preparing ESMP, including the monitoring plan, RAP, PMP and other safeguards instruments.

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This form has been signed after Project approval: Qualified Member of the zone/woreda environmental protection authority.

Name Hanyo Signature ✓ Date _____

1.

2. _____ Signature _____ Date _____

Environmental and Social Screening Form (ESSF) for BRWBILP community sub projects

Table 2. Environmental and Social Management Plan(ESMP)

Project Phase	Project Activities	Project Impacts	Mitigation Measures	Implementation Schedule	Responsible body	Mitigation Cost (birr)
Design phase	habitat destruction					
Design phase	transmission pipeline layout	- vegetation clearance - Solid waste generation - Air pollution	- minimize clearance - proper site selection - proper waste collection - proper disposal	during construction	- contractor	50,000
Construction phase	"	- soil erosion & sedimentation	- implement soil erosion control - silt trap, mulching & revegetation	- during construction	- Contractor - Client	15,000
Construction	reservoir Construction	- clearance - waste generation - OHS	- proper waste mgt plan - minimize clearance - provide PPE & awareness	- during construction	- contractor	65,000