

**THE FEDERAL DEMOCRATIC REPUBLIC OF  
ETHIOPIA  
INDUSTRIAL PARKS DEVELOPMENT CORPORATION**



Updated Environmental and Social impact  
**ASSESSMENT**

**FOR**

**‘KILINTO’ INDUSTRIAL PARK**

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## ACRONYMS

CJC	Competitiveness and Job Creation Project
CRMP	Cultural Resources Management Plan
EA	Environmental Assessment
EIA	Environmental Impact Assessment
IPDC	Industrial Parks Development Corporation
EMP	Environmental Management Plan
EMU	Environmental Management Unit
EPA	Environmental protection Authority
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
GoE	Government of Ethiopia
GHG	Green House Gasses
GTP	Growth and Transformation program
IDA	International Development Association
IPDC	Industrial Park Development Corporation
IPDP	Industrial Park Development Project
IP	Industrial parks
IPDESD	Industrial Park Development and Environmental safeguards Directorate
KIP	Kilinto Industrial Park
MOFED	Ministry of Finance and Economic Development
MOI	Ministry of Industry
MEF	Ministry of Environment and Forestry
MUDHC	Ministry of Urban Development, Housing and Construction
OHS	Occupational health and safety
OP	Operational Policies
PPD	Public Private Dialogue
PPP	Public-Private Partnership
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SME	Small and Medium Enterprises

## EXECUTIVE SUMMARY

The Government of Ethiopia has given emphasis to ensure faster and sustained development of the industrial sector, as envisioned in the Growth and Transformation Plan (GTP). The Growth and Transformation Plan (GTP) seeks to consolidate the positive development outcomes attained in the last decade to bring about broad-based and transformative structural changes required to stir the economy on rapid growth path toward becoming a middle income country by 2025. This development goal is especially anchored on stimulating rapid growth and structural transformation of the agricultural and industrial sectors in ways that enhance wealth creation and expansion of employment opportunities in the economy.

As development tools, IPs have been used in several countries to help stimulate economic development by attracting local and foreign direct investment (FDI), enhancing competitiveness, and facilitating export-led growth. The development of the Industrial Park (IP) is also intended to contribute to job creation by attracting investments and improving enterprise competitiveness.

Accordingly, as of recent times, the Government of Ethiopia (GoE) is striving to establish Industrial Parks that are thought to facilitate and enhance the transformation. To this effect, the Government in collaboration with the International Development Association (IDA) of the World Bank is spearheading an Industrial Park Development program through the Competitiveness and Job Creation (CJC) Project which is implemented with funds contributed by GoE, the IDA and other development partners. The proposed *Kilinto* Industrial Park is one of such development programs which is planned to be developed in a total area of 279ha. The proposed *Kilinto* IP is located in the south eastern part of Addis Ababa in *Woreda* 9 and 10 of *Kaliti* Sub-city which is one of the 10 sub cities of Addis Ababa. It is located at about 20 km from the city's centre.

The pharmaceutical sector is one of the focus sectors in the GTP-II, and in 2015 GoE developed a National Strategy for Pharmaceutical Manufacturing Development (2015-2025). According to this Strategy, the GoE is targeting manufacturers in generic medicines from China and India. The EIC reports that seven FDI pharmaceutical companies have expressed interest to lease land from Kilinto IP of which four have signed MoUs with the GoE and three are in advanced negotiations to conclude the MoU. While pharmaceutical manufacturing does not create as many jobs as labour intensive industries such as textile sectors, jobs created will be higher skilled and more paying. Attracting FDI in pharmaceutical manufacturing can contribute to improved standards of the local industries through joint ventures and improved regulation.

However, while striving to fulfil the objectives, the Government clearly recognizes that the development of the intended industrial parks can have some negative bio-physical and social impacts unless they are implemented by giving due emphasis to the protection of the environment as well. Wise management of the environment requires ability to forecast, monitor measure and analyse environmental trends and assess the capability of the resource base (land-soil, water, air, energy, etc.) and the socio-economic system at different levels. Negative impacts of the development of the IP would reduce productivity and jeopardize long-term sustainability and can even cause irreversible environmental damage.

Hence, in order to ensure sustainability of the IPs, the Government has found it essential to integrate environmental and social concerns into the IPs development process. This report deals with the ESIA part of the study. The study is expected to meet the legal requirements of the Ethiopian Government relevant to this project and the requirements indicated in the Environmental and Social Management Framework (ESMF), the Project Implementation Manual (PIM), the Resettlement Policy Framework (RPF) and other relevant operational policies of the World Bank.

The main objective of the feasibility study is specifically to prepare development strategies for high-quality IPs, which contribute to the job creation and enterprise competitiveness in the targeted Kilinto IP by determining highly promising industries for each site through conducting demand analyses and by developing structure plan and indicative master plan. The creation of linkages for the development of Micro and Small and Scale Enterprises (MSSEs) is very important. In order to fulfil the objective, the feasibility study is expected to address four main components of

- Market Assessment and Demand Analysis
- Master Planning
- Environmental and Social Impact Assessment
- Economic and Financial Modelling

The main objective of preparing this ESIA is, therefore, to ensure that potential impacts of the establishment of the proposed Kilinto Industrial Park (KIP) are identified at the early stage of a feasibility study in order to develop minimizing or avoiding strategies. The implementation of the IP should be carried out without creating much adverse impacts on the biophysical and socioeconomic environment.

Assessing the possible environmental impacts of the proposed Industrial Park development will help identify the activities that are likely to give rise to significant adverse impacts with the aim of avoiding or minimizing the anticipated negative impacts by amending the design, operational processes or technologies applied; thereby ensuring the environmental sustainability of the project.

The specific objectives of the study are aimed at

- Ensuring that environmental considerations are properly addressed into the development decision making process;
- Assessing bio-physical and socio-economic adverse effects that may result from the implementation of the IP; and
- Proposing mitigation measures that would minimize/ avoid adverse effects and prepare required Environmental and Social Management and Monitoring Plan.

#### Type and Nature of Proposed Industrial Activities

The three main categories of industries namely:

- Food and Beverage,
- Pharmaceutical and Medical, and
- Miscellaneous

The miscellaneous industry consists of electric/electronics, furniture/fixtures and purely miscellaneous industries. The ratio has been given out of the total area allotted for manufacturing excluding other uses included the land use plan. KIP comprises Food and Beverages, Pharmaceutical and Medical and Miscellaneous. The total are allocated for the industries is about 1, 661,582 m<sup>2</sup>. Where, the area allocated for each industry is 762,666.138, 299,084.76, 599,831.102 m<sup>2</sup> for Food and Beverages, Pharmaceutical and Medical and Miscellaneous respectively.

The proposed industries are to be implemented with the guiding principle of (i) being eco-friendly, (ii) possessing flexibility, and (iii) maintaining quality work environment. Principles of eco-friendliness, flexibility and quality of work environment are to be maintained. It is expected that these concept of development will have a very important bearing on the management of environmental resources. As indicated in the development concept for the master plan and land use of the IP, emphasis given to parks and green areas is very important. It is ideal for people's living and working in the IP.

As such, proposed master plan study of the Kilinto IP, has already incorporated basic environmental principles as well as facilities expected to reduce and minimize, if not totally eliminate, much of the potential negative impacts on the socioeconomic and biophysical environment. The park will also accommodate and facilitate not only those export-oriented businesses but also those businesses that concurrently cater the needs of the local market.

In principle, the establishment of pharmaceutical industry in the KIP is also assumed to be those that

- Can be categorized as less polluting light manufacturing
- Which use semi processed and processed raw materials and inputs
- Are engaged mainly on the final design and manufacturing of finished goods
- Fulfil the requirements of Ethiopia's Climate-Resilient Green Economy Strategy particularly with respect to energy efficiency.
- Are equipped with their own primary sanitary and solid and liquid system and safe disposal of both solid and liquid waste.
- Fulfil health and safety measures for their employees based on the standards and practices set by pertinent regulatory and supervisory bodies, etc.

### **Findings and interpretation of Project Category**

The implementation of *Kilinto* Industrial Park will involve the dispossession of farmlands and grazing land of 272 farming households. These all in all include 1,360 families or PAPs residing within the 279ha of land incorporated by the Industrial Park from Woreda 9 and 10 of Akaki-Kaliti Sub-city of Addis Ababa. There will also be a relocation (or involuntary resettlement) of 15 households from among the project affected population (PAPs) located within the project site, thus triggering the World Bank OP 4.12 policy on involuntary resettlement. The livelihood of such a large number of people depends on farming practiced on a relatively good potential agricultural land in which the IP is located. Furthermore, the magnitude of other potentially adverse socioeconomic and biophysical impacts that the KIP will have is also expected to be on the higher side. The industrial categories expected to come in KIP such as food processing and pharmaceuticals are also put as Schedule-1 projects by EPA. Hence, the project falls under **Schedule 1** or **Category 'A' Project** as per the categorization of the EPA and World Bank respectively.

### **Positive Impacts of the Project**

The project has a very significant economic importance considering the immediate benefit of huge and numerous job opportunities that will be created to the population residing near and

around the project area as well as at country level. Besides, the long term positive impacts include but are not limited to:

**(i) Import substitution:** The country is spending relatively huge amount of money for imports of various products that are expected to be manufactured in the IP. This would allow it to save the meagre hard currency it possesses and spend it for the purchase of other crucial materials and services in the development process it is undertaking.

**(ii)** Promotion of export and generation of foreign exchange

**(iii)** Improving the quality and living standards of citizens

**(iv)** Increment in the Gross Domestic Product (GDP) through the expansion of a chain of business and income generation opportunities.

**(v) Technology and knowledge Transfer** – being the first of its kind and creating good experience, it will lay smooth ground for the establishment of eco-friendly industrial zones in the future of a country which is still at the earliest stage of industrial development.

**(vi) Employment Generation** for more than 60,000 people at different levels.

### **Potential Negative Impacts of the Project**

As per the scoping conducted, the major negative impacts of the implementation of the Kilinto IP can be put into two categories as follows:

#### **i) Impacts of Land Acquisition and Loss of Income Generation**

The major negative impact is the loss of income generation and livelihood caused by the expropriation of much of the farmland and the loss of some housing and property of people whose farmlands and other properties are located in the project area. As indicated above, about 272 farming households consisting all in all 1,360 family members (PAPs) will lose their farmlands either fully or partially and 15 PAPs whose housing and property are affected will have to be relocated. This is a substantial loss of income and livelihood especially in view of the very productive nature of the farmlands expropriated as will be detailed in the Resettlement Action Plan (RAP) prepared by the same Consultant.

#### **(ii) Environmental Pollution and Anticipated Health and Safety problems**

The other major negative impacts are those related to potential pollution of the biophysical environment and health and safety of workers as well as residents near and around the project area. This is mainly due to potential release of solid, liquid and gaseous waste manifested in pollution of water resources, air and potential contamination of land and soil resources. Noise pollution as well as potential accidents and injuries to human beings that can happen during the construction and operation phases of the IP are also problems that need to be mitigated. All these have negative impacts on the health and safety of human beings and other living

organisms in and around the project area. Some of the impacts may be even of a wider scale especially in relation to the anticipated surface water pollution.

Especially worth mentioning is the potential impact that the release of uncontrolled solid and liquid waste from the industrial activities in the IP will have on the nearby Akaki River which has almost become waste reservoir of the whole of Addis Ababa. All streams and rivers that carry huge solid and liquid waste on their way add their waters to Akaki River.

In summary it can be stated that the potential negative impacts associated with permanent land acquisition for project purposes have been found to be comparatively significant requiring more effort and determination to mitigate and minimize the impacts. It is followed by the potential proliferation of different types of waste due to anticipated poor waste management that can cause environmental and human health problems. Other shortcomings may be related to:

- Health and safety practices,
- Poor operating procedures,
- Obsolete or poorly functioning equipment,
- Weak technical management capacity,
- lack of quality assurance and quality control procedures,
- Absence of clean production practices such as recycling and reuse and finally a lack of community input.
- Social problems such as the proliferation and transmission of diseases, particularly HIV and STD and any violation of cultural norms and safety of local residents by construction crew. It has been found that most of the negative impacts can be mitigated and are ameliorable. Appropriate mitigation measures and Environmental and Social Management and Monitoring Plan have been prepared as per policy and regulations as well as best practices.

The possibility of land to land replacement, i.e. replacing land of an equal or better function for any land lost was a preferred option of compensation for the farm and grazing land lost. But this has been found to be very difficult under the conditions of the local landholding and land ownership reality particularly in an area which has been already incorporated to an urban area type of land use and designated as an industrial zone. Hence, the option of cash compensation in conjunction with other supporting measures that would restore the livelihood of the project affected populations is proposed. The consultant suggests that the cash



compensation will not sustain the Economic and growth of social welfare of the society, the implementation of the lively hood restoration must be in place.

However, many of the mitigation measures related to potential pollution and waste disposal from the manufacturing are to be treated as the cost of the industrial establishments themselves with the development of in-house design solutions or installing of appropriate equipment' and work practices to be enforced with manuals and licensing to be implemented by the branch office of the Ethiopian Industrial Parks Development Corporation (EIPDC) to be established in the IP. As such, only what is needed for short-term training and sensitization and awareness creation related to supervision and enforcement of personnel of the environment and safeguard unit to be established in the IP has been included. Hence, the estimated total cost for the recommended Environmental and Social Management Plan (ESMP) has been found to be about **296,974,878.95** (Two Hundred Ninty Six Million Nine Hundred Seventh Four Thousand and Eight Hundred Seventh Eight Birr).

In conclusion, This ESIA study has been conducted as per the contract agreement and TOR provided by the Client (IPDC) in line with relevant policies and guidelines of the Environmental Protection Authority of the Federal Government of Ethiopia and the World Bank. The ESIA study is based mainly on the feasibility and master plan of the *Kilinto* Industrial Park Development conducted by the same Consultant.

It can be concluded that, given the pressing needs of industrial development for a developing country and the need for employment generation that is required to accommodate the ever more and alarming increase in the number of working age population, the project is justifiable. If all mitigation measures and Environmental and Social Management Plan ESMP recommended by this study are appropriately implemented, it is believed that the benefits that can be achieved from the proposed industrial park development at both community and country level by far outweigh the anticipated negative impacts.

## 1 INTRODUCTION

The GoE has given emphasis to ensuring faster and sustained development of the industrial sector, as envisioned in the Growth and Transformation Plan (GTP). The Growth and Transformation Plan (GTP) seeks to consolidate the positive development outcomes attained in the last decade to bring about broad-based and transformative structural changes required to stir the economy on rapid growth path toward becoming a middle income country by 2025. This development goal is especially anchored on stimulating rapid growth and structural transformation of the agricultural and industrial sectors in ways that enhance wealth creation and expansion of employment opportunities in the economy.

As development tools, IPs have been used in several countries to help stimulate economic development by attracting local and foreign direct investment (FDI), enhancing competitiveness, and facilitating export-led growth. Through the IP development program, the GoE intends to create favourable conditions for private sector and also address binding constraints in priority industries in the potentially suitable towns and cities of the country.

Accordingly, as of recent times, the Government of Ethiopia (GoE) is striving to establish Industrial Parks that are thought to facilitate and enhance the transformation. The Government in collaboration with the International Development Association (IDA) of the World Bank is spearheading an Industrial Park Development program which is implemented with funds contributed by GoE, the IDA and other development partners. The Ministry of Industry (MOI), with the support of the World Bank's International Development Association (IDA) plans to support the Government's Industrial Parks (IP) program through the Competitiveness and Job Creation (CJC) Project. The proposed *Kilinto* Industrial Park is one of such development programs which is planned to be developed in a total area of 279ha. The development objective of the proposed Project is to contribute to job creation by attracting investments and improving enterprise competitiveness in the targeted industrial parks (IP).

However, while striving to fulfil the objectives, the Government clearly recognizes that the development of the intended industrial parks can have both positive and negative bio-physical and social impacts unless they are implemented by giving due emphasis to the protection of the environment as well. Wise management of the environment requires ability to forecast, monitor measure and analyse environmental trends and assess the capability of the resource base (land-soil, water, air, energy, etc.) and the socio-economic system at different levels.

Negative impacts of the development of the IP would reduce productivity and jeopardize long-term sustainability and can even cause irreversible environmental damage.

Hence, in order to ensure sustainability of the IPs, IPDC has found it essential to integrate environmental and social concerns into the Industrial parks development process. IPDC hired Colorado General Business PLC to update the Environmental and social impact assessment for the proposed industrial park development which was primarily conducted by another consulting company.

This report deals with the ESIA part of the study. The study is expected to meet the legal requirements of the Ethiopian Government relevant to this project and the requirements indicated in the Environmental and Social Management Framework (ESMF), the Project Implementation Manual (PIM), the Resettlement Policy Framework (RPF) and other relevant operational policies of the World Bank.

## **1.2 Rationale of the proposed project**

The government of Ethiopia has a vision of joining countries with middle income economy by 2025 whereby the industry leads the economy. The Industry Development Strategy (IDS) of Ethiopia sets out the cornerstones and paths to be followed to promote the manufacturing industry and achieve its goal of playing the leading role in the future of Ethiopia's economy. Ministry of Industry (MoI) has prepared and disclosed the Growth and Transformation Plan II (GTP 2) of the manufacturing industry.

The adverse impacts caused by industrial expansion within the zone needs to be identified and assessed urgently to preserve the sanctity, spirituality as well as the biodiversity of the region by promoting the sustainable development of the surrounding communities in a deliberate and tactful way. In order to assess the situation, comprehensive information about the existing industries; multi-dimensional impacts caused by the industries; land use planning for the promotion of livelihoods of the locals using non-carbon emissions sources of income generation; and preservation of cultural values of the selected industrial area are needed to be integrated into the conservation and development plan of the region in order to reduce the environmental degradation.

For the implementation of KIP, an environmental and social impact assessment is required according to the Ethiopian Environmental Impact Assessment Proclamation No. 299/2002.

According to World Bank Guidelines, the project has to be categorized as category 'A' project. Projects require a full fledged EIA study. The proposed KIP project is screened as requiring Detailed Environmental Assessment. While according to African development bank the project is categorized under category 2. These are projects that are likely to have detrimental and site-specific environmental and social impacts that can be minimized by the application of mitigation measures included in an ESMP. The Scope of the work shall be a comprehensive Environmental and Social Impact Assessment according to the National Environmental Legislation and the applicable World Bank and African Development bank guidelines.

### **1.3 Objectives of the Project and the ESIA**

#### **1.3.1 General Objective**

The main objective of preparing this ESIA is to ensure that potential impacts of the establishment of the proposed *Kilinto* Industrial Park (KIP) are identified at the early stage of a feasibility study in order to develop minimizing or avoiding strategies. The implementation of the IP should be carried out without creating much adverse impacts on the biophysical and socioeconomic environment.

Assessing the possible environmental impacts of the proposed Industrial Park development will also help to identify which activities are likely to give rise to significant adverse impacts. Appropriate mitigation and compensation measures have to be taken to ensure, that adverse impacts from the construction and operation of the IP are reduced to as low as reasonable and acceptable level by amending the design, operational processes or technologies applied; thereby ensuring the environmental sustainability of the project. For the preparation of this ESIA, a baseline survey was carried out during this study to identify and document affected resources, in order to establish a project related basis for the impact assessment.

This ESIA report comprises the findings of the survey, results of the public consultation process, impact assessment and mitigation measures, against the background of the national legal and institutional frameworks, and the World Bank's safeguard Policies, the report describes in detail the mitigation measures, roles and responsibilities of the parties involved in the ESIA process, and sources of funds. It also provides the time frame for the implementation, as well as monitoring and evaluation of the same.

#### **1.3.2 General Objective**

- Ensuring that environmental considerations are properly addressed into the development decision making process

- Assessing bio-physical and socio-economic adverse effects that may result from the implementation of the IP.
- Proposing mitigation measures that would minimize/ avoid adverse effects and prepare required Environmental and Social Management and Monitoring Plan.

#### **1.4 Scope of the Study**

- Collecting baseline data on different environmental parameters.
- Undertaking impact assessment and suggesting mitigation measures to minimize impacts.
- Preparing Environmental Management Plan and Environmental Monitoring Plan
- Generating primary data for the preparation of EIA/ EMP Report.
- Classification of existing land use and land cover of the study area into different zoning classes for the protection and conservation of the region and recommendation of a guideline for the development of industrial activities permitted or prohibited in the protected zone.

#### **1.5 Project Proponent**

The Ethiopian Industrial Parks Development Corporation (IPDC) was established in 2014, as a public enterprise. Inspired from the full support of government, IPDC is becoming an engine of rapid industrialization that nurture manufacturing industries, to accelerate economic transformation, promote and attract both domestic and foreign investors.

To activate both pre and post investment servicing, it avails serviced industrial land, pre-built sheds equipped with all-encompassing utilities and infrastructural facilities that fit international standards, with no compromise on workers' security and environmental safety.

Some of the mandates of IPDC include:

- Develop and administer Industrial Parks, lease developed land and lease and transfer, through sale, constructions thereon;
- Prepare detailed national Industrial Parks Master plan based on the national special Master plan, and serve as the industrial park land bank in accordance with the agreements concluded with regional governments;
- In collaboration with the concerned bodies, ensure that necessary infrastructure is accessible to Industrial Park developers;
- Outsource, through management contracts, when it is deemed necessary, the management of Industrial Parks;
- Promote extensively the benefits of Industrial Parks and thereby attract investors to the parks;

- In line with directives and policy guidelines issued by the Ministry of Finance and Economic Development, sell and pledge bonds and negotiate and sign loan agreement with local and international financial sources; and
- Engage in other related activities necessary for the attainment of its purposes.

The Government of Ethiopia (GoE) jointly with the International Development Association (IDA) of the World Bank plan to implement Industrial park Development Project (IZDP) with the financial support of the Government of Ethiopia, the IDA and other donors. The objectives of the proposed industrial park project is to promote export oriented industrial production and also encourage the production of import substitution to positively contribute to the national economy by attracting investments and improving enterprise competitiveness in the targeted industrial parks.

### **1.6 Company Responsible for Preparing the Scooping Document**

This scooping report is prepared for Kilinto industrial park development project by Colorado General Business Pvt. Ltd. Co to prepare the scooping report. Colorado General Business is a consulting and publishing firm established in Ethiopia in 2007 to offer wide spectrum of consulting and publishing services. The Company is duly certified and registered by the Federal Democratic Republic of Ethiopia's Environmental Protection Authority as firm of Environmental Experts that is entitled to undertake Environmental Impact Assessments (EIA), Environmental Management Plan, Environmental Audits (EA) and Green House Gas Inventory of development projects in the country and elsewhere. It has also been certified by the Ethiopian Management Institute, to undertake other management related consultancies. The firm was born out of desire to provide high quality and cost effective consulting, specialist training as well as research services in the fields of environmental planning and management; occupational health and safety and quality management system. The Company works to provide Ethiopians and foreign clients with high-quality services that contribute to informed decision making, in support of sustainable development. The company boasts of its highly skilled personnel and associates with many years of experience in their respective fields. Clients therefore, have the advantage of securing fully fledged services which are professionally undertaken and quality assurance ensured to meet the national and international standards. Since its formation, the company has completed environmental impact assessment (EIA) and feasibility studies in more than 400 projects with considerable success. Moreover, the company has conducted various studies in an expanding range of sectors including the manufacturing industries, infrastructure development, Livestock development, oil and gas industry, Mining Industries, Water and Sanitation, tourism, aquaculture and fisheries. The

staffs of our company maintain close ties with business organization and governmental, teaching and research institutions. Mixture of Feasibility Study/Business Plan, Environmental Impact assessment, Development Research, Project evaluation and training experience of our staff both at national and international levels makes the company one of the leading organizations in development and environment related services. We are able to offer a wide range of services to suit a diverse set of clients working on national and international development priorities. More information can be obtained from our website ([www.coloradoplc.com](http://www.coloradoplc.com))

### **1.7 Methodologies**

Conducting ESIA study naturally involves a whole range of stakeholders and needs to be carried out in a much more participatory manner. As such, discussions and consultations were conducted at different levels starting from the pertinent directorates and departments at the Ministry of Industry (MoI) down up to the level of the Project Affected Populations (PAPs) in the project communities as will be explained in detail in the chapter on consultations. **The participatory approach** served as a platform to jointly identify the potential positive and negative outcomes and enhancement and mitigation measures respectively in the implementation of IP at Kilinto. It was also very important in defining their roles and responsibilities, required resources in the process of the preparation and implementation of the Environmental and Social Management and Monitoring Plan (ESMP).

A combination of both **quantitative and qualitative approach** was used to collect data for the assessment in order to close gaps that can emanate from the exclusive use of either one or the other due to the merits and demerits of each data collection system. However, within the context of this proposed IP project, the qualitative approach, which is more flexible and allows for exploration of issues that emerge during the fieldwork, was employed more. This allowed the Consultant to tap into the diverse perspectives of multiple stakeholders. “Triangulation”, using various informants, data collection methods and settings, was used to cross-check on the validity of findings.

**An Integrated and Holistic approach was utilized for the preparation of this ESIA.** Impact identification and analysis becomes more comprehensive and complete when it assesses all steps and activities involved in a given operational process of a project and the inter-linkages between them. Therefore, instead of assessing each project component separately, the approach to the assignment was designed in such a way that it assesses the impacts and the ESMP

measures in the light of their linkages and integration. The ESIA has employed a **multi-dimensional approach** in considering the impact of the project by way of assessing the:

- Environmental (Biophysical Impacts) which include fauna and flora and biodiversity impacts
- Economic Impacts
- Social Impacts and
- Project impacts and their interactions.

#### Methodologies Employed and Detailed Scope of Work

The methodologies and detailed scope of work used in conducting the ESIA study and the preparation of the ESMP are discussed below.

- **Field Surveys:** The environment consultant made repeated field surveys basically for the observation and understanding of the baseline environment and the without project situation in both biophysical and socioeconomic terms. The consultant has used 1:50000 topographic sheets and a location map of the proposed Kilinto Industrial Park (KIP) prepared by the MoI to assess the existing biophysical (topography, slope, vegetation cover, etc and socioeconomic (settlements, major economic activities, land use, etc) within the proposed site and the surroundings. He has also used GPS readings of coordinates of the boundaries of the proposed site for the preparation of the location map, catchments and watershed map, settlement, existing land use and the like. This was very important since it clearly depicted the without project situation upon which the implementation of the IP is to be superimposed for the identification, understanding, and assessment of the likely positive and negative impacts.
- **Interviews and discussions with specialists:** Potential project components, alternatives, designs and processes have been discussed with the project engineers in the feasibility study and master plan teams with particular emphasis on the most important components and elements of IP Master Plan to be proposed and reasons for establishing the form and scope of the proposed project.
- **Literature review:** Information on existing environmental conditions was obtained from review of various published and unpublished sources including the recently accomplished Environmental and Social Management Framework (ESMF) and Resettlement Policy Framework (RPF) of the Bole Lemi and Kilinto Industrial Parks. In addition, review of studies including pre-feasibility study of the Bole Lemi Industrial Park Project, the World Bank Safeguard Policies, ESMF and the mid- term guidance was made. Review of recent



World Bank Reports on the area such as Benchmarking and Demand Forecast Reports, Global documents and ESIA reports on IPs, etc. was made.

- Available relevant literature in MoI and Akaki Kaliti Sub-city, Woreda Administrations such as Proposed Institutional Infrastructure and Manpower requirements for the recently established Industrial Park Corporation were reviewed. Similarly, institutional and organizational setups as well as objectives, mandates, plans, performances, etc, of the different offices in the sub city such as the Small Scale and Micro Enterprise, Technical and Vocational Educational Training (TVET), etc have been reviewed. Documents and research papers on the prevailing conditions of pollution on water, in particular the Akaki River catchment in which the proposed IP is located were consulted.
- **Competent authority guidelines:** The Federal and regional legislative and institutional framework, policies, procedures, guidelines etc. were reviewed. In particular, EPA and World Bank guidelines were reviewed and adhered too in as much as possible.

The methodology adopted for conducting the Environmental and Social Impacts Assessment (ESIA) studies follows the conventional methods that meet the requirements of the Federal and Regional Environmental Protection Organs' Environmental and Social Impact Assessment Guidelines. Accordingly, the study team of the consulting firm is collecting and reviewing published national and regional policies, legislatives, regulations and guidelines as well as international conventions and protocols ratified by the Federal Democratic Republic of Ethiopia (FDRE), Central Statistical Authority (CSA) Census Reports and documents. The overall approach followed is shown schematically in the following figure. Details on each of the individual stages within the ESIA process are also described.

Our company favours a phased approach to the Environmental and Social baseline study that enables the clear definition of the issues over a number of steps. In this way, critical issues can be identified and tackled; a gap in the data set identified and filled and effort focused on what is important to all the stake holders are identified. The following approach was employed during the course of environmental baseline data evaluation study.

1. Phase I-Secondary data collection and review
2. Phase II-Field/site observation and initial data collection
3. Phase III-Reporting

#### **1.7.1 Phase I–Secondary Data**

The data sources include, but not limited to:

- Records and data relevant to the project site for the proponent;

- Ministry of water resources, agriculture, and Addis Ababa City project documents;
- EPA documents and earlier studies in these or similar activities;
- National and local level statistical reports such as Population and Housing Census, Demographic and Health Survey, Education Statistical Abstracts, Welfare Monitoring, National Agriculture Survey and Fertility Survey reports etc.;
- Federal, regional, zonal and Woreda level reports from desks and offices on livestock and crop production, wild life management, tourism, irrigation, forestry, water quality, health service coverage and health security, cooperatives promotion, skills training etc.;
- Relevant regional and federal strategies, policies, regulations and guidelines.

### **1.7.2 Phase II- Field reconnaissance**

During this stage all experts have travelled to study site and get to know the existing site condition, meet with local leader and relevant office heads to build good working relations and to gather important baseline data. This is followed by collection of data from respective sectors such water, Education agriculture, industrial and etc.

#### **Primary data collection**

Primary data collection has involved a glance observation of the study area by making transect walk all along the proposed development site in the project site. During this the experts has observed the overview of socioeconomic environment (settlement pattern, livelihood basis and social services) of the Study Area. The primary data collection has involved making public /stakeholders' consultation of the study area. The public and stakeholders consultation participants are representatives of the people whose part of their land is going to be used for the envisaged project and representatives of sectoral offices of Akaki-Kilinto area. The process, agendas and output of the discussion have been thoroughly treated in socio-economic part of this document.

### **1.7.3 Baseline Investigation Methods**

An environmental and socio-economic data are assessed in greater detail to ensure that all of the proposed activities and their consequences are considered in full. Description of the environmental baseline conditions includes the establishment of both the present and future state of the environment, by taking into account only the changes resulting from natural events and other human activities. In order to identify any potential impact on and potential change to the natural and socio-economic environments, it is essential to have through understanding of the nature of the existing environments and characterize them prior to commencement of the proposed activities. This translates to essentially characterizing the existing baseline environmental and socio-economic conditions including establishing the prevailing conditions for a range of media such as:

- Natural environment media such as air, water, soil and ground water, and plant species.
- Socio-economic media such as demographics, economic activity and service provision.

A significant amount of data already exists for the region obtained through the field work, desk based data gathering and interpretation. There are also other studies conducted as part of previous ESIA for the envisaged project. The existing environmental and social conditions are being established using the above data and the results of these studies and by completing the following main tasks:

- Investigating the necessary primary data and conducting a detailed review of all secondary data sources. Significant data acquisition surveys and studies have been carried out in the envisaged project area and in the vicinity.
- Production of an updated stakeholder list detailing persons/organizations and groups with an interest in the project
- Meeting with local community representatives and local authorities to assemble new and revised socio-economic baseline information on the project area.

Both existing secondary sources and results of the new studies are being analysed and integrated into a coherent description of baseline characteristics.

- Participatory analysis which includes:
  - **Consultation with relevant federal, regional and local authorities:** As explained above under the participatory approach interviews and discussions with several federal and local authorities and stakeholders were carried out in Addis Ababa and in the project area. This includes consultation with Ministry of Industry, Akaki Sub-City Administration, Woreda 9 and 10, which are the lowest administration units.
  - **Community consultation:** Community consultation meetings were conducted for both Woreda 09 and 10 to draw together the issues and concerns of stakeholders and project affected parties. A brief introductory note containing brief description of the project, its positive and negative impacts was presented by the consultant to stimulate their participation in the discussion.

Basically, the methods employed for the review and assessment comply with both Ethiopia's and WB Guidelines and have been performed through the six steps of Scoping, Profiling, Prediction, Assessment, Reduction and Monitoring to establish the reasonable and efficient methods for predicting and accounting for effects as given in the pertinent chapters that follow.

The assessment process constituted a systematic approach to the evaluation of a project in the context of the natural, regulatory and socio-economic environments of the area in which the project is proposed to be implemented.

### **ESIA Standard Analysis Procedures**

The ESIA has passed through all the processes required for screening, scoping, detailed data gathering and review, assessment of the baseline data or existing environmental conditions, looking into project alternatives, consultations, determining of potential impacts and their analysis (Identification, Prediction, and Evaluation), recommendation of enhancing and mitigation measures for the positive and negative impacts respectively and finally the preparation of the Environment and Social Management Plan (ESMP).

### **Findings and interpretation of Project Category**

Screening and initial assessments have been made based on the outcomes of the reconnaissance and prefeasibility study, Environmental and Social Management Framework conducted earlier. The Consultant has also done the same based on the results of the feasibility and master plan studies with the consultation of experts involved in the studies as well as relevant stakeholders that include the MoI, IPDC and the World Bank. Accordingly, the type and multitude of projects to be implemented and the resulting magnitude of potentially adverse socioeconomic and biophysical impacts have been noted. More than 1,360 PAPs whose livelihood depends on a relatively good potential agricultural land in which the IP is located will be affected. Hence, the project falls under **Schedule 1** or **Category 'A' Project** as per the categorization of the EPA and World Bank respectively.

#### **1.7.4 Geological and Hydro Geological Investigation Methodology**

In order to fulfil the study objectives the methodologies employed during the study can be broadly classified as secondary and primary data collection and analysis.

**Secondary data collection:** prior to field work all data /information pertaining to the study **have** been gathered, reviewed and analysed.

#### **Soil and water quality analysis**

**Primary data collection:** field investigation have been planned, and conducted to identify, and describe the various physical, biological and socio-economic environmental parameters. During field work for soil and water quality investigations, composite soil samples were taken from over ten sites by using soil augur. Composite sample of surface and spring water was also taken and analysed for chemical and physical constituents of the water which will be incorporated in the final report.

### **1.7.5 Environmental Impact Identification and evaluation Methodology**

Identification of key impacts bring together the previous steps with the aim of ensuring that all potentially significant environmental impacts (adverse and beneficial ) are identified and taken into account in the process. To identify the project environmental and social impacts, all the proposed activities during preconstruction, construction and operation phases are designed to be considered. In addition, concerns and issues raised by members of the community and/or project stakeholders during consultation are planned to be included in the process. Through such steps, the activities involved in the development of the projects and the possible interaction of each activity with environmental and socio-economic receptors are assessed. To achieve this, several key inputs will be used including project design documentation, feasibility study conducted on the project and similar projects implemented elsewhere. Following identification of all project activities, legal, environmental and socio-economic receptors are identified. The key inputs for the identification of the receptors include the legislative review, the environmental baseline, the socio-economic baseline and stakeholder consultation. As previously described, the environmental and socio-economic baseline has been compiled using a combination of existing data and the results of a number of data acquisition focused baseline survey and stakeholder consultation programs.

Impact identification: This involves identification of the major activities, the environmental attributes, the impacts of the activities on the environmental attributes and formulation of cause & effect' matrix. The purpose of impact identification is not to produce definitive statements about the nature, magnitude and significance of possible impacts. At this step, the scoping process is used to organize the main ESIA investigations and generate information on these issues. Accordingly, matrix method was used for impact identification since it is the most commonly used simple and inexpensive method of impact identification.

Impact Evaluation and analysis: The major steps involved for predicting, analysing and judging environmental impacts in which objective and subjective judgments were made are the following:

- Identifying major activities;
- Selecting environmental components;
- Selecting types of impacts;
- Assessing the possibilities and or probabilities of occurrences;
- Determining the degree and time frame of impacts;
- Designating impacts as positive, neutral or negative;

- Determining trade-offs among activities and impacts.

### 1.7.6 Phase III- Reporting

Our company has prepared an Environmental and Social Impact report which includes;

- Project description
- Description of the environment
- Anticipated environmental impacts and mitigation measures
- Analysis of alternative resources and technologies
- Cultural and heritage of the Society will also be incorporated
- Environmental monitoring program

### 1.8 Team of experts participated in the Project

This study from its nature requires professions of multi-disciplines as impacting of environmental and social components are potentially diverse. Accordingly, in order to undertake the study, a team of consultancy firms comprising multi-disciplinary professions providing sufficient expertise to undertake the study have fully participated.

Table 1: List of experts involved in the ESIA study

No.	Experts in Site Survey	Competence Area	Responsibility	Telephone	Sign
1	Dr. Teshome Soromssa	Biodiversity	Overall Project Manager	0911210275	
2	Ato Wosen Gulte	Land use	Expert		
3	Zerihun Abate	Chemical and Environmental Engineer	Expert	0934211237	
4	Aweke Gebre	Sociologist	Expert	0922447704	
5	Dr.Estifanos Ele	Solid waste management	Expert	0934985803	
6	Ato Wagene Getachew	Lawyer	expert		
7	Ato Solomon Asefa	Hydrologist	expert		
8	Ato Birhane Aregu	Environmental Health	expert		

### 1.9 Assumptions and/or Gap in Knowledge

The ESIA is conducted at the level of Industrial Park where different categories of industries are expected to operate. It is assumed that most of them will be light to medium activities with less environmental pollution generation and lesser negative impact due to the anticipated eco-friendly manner of the planning. However, information about the actual type and nature, size of each and every specific industry as well as volume of input and output of materials, the

nature and intensity as well as magnitude of impacts is not known at this level of study. This, of course, creates gap in required specific information and knowledge that would enable the consultant to recommend project specific mitigation measures.

However, the nature and type of expected environmental problems related to release of wastes and different types and health and occupational safety issues could only be generalized from experiences of similar categories of projects within the country and outside. Generalizations depending on broad categories and types of industries could be made in this respect. Further development of manuals and strengthening of screening and monitoring and evaluations specific to different categories of projects of similar nature which have already been initiated by the IPDC was also recommended to redress possible gaps.

## **2 ENVIRONMENTAL SCOPING**

With the aim of deciding upon the limits of the study area and drawing the list of activities and impacts to be studied during the assessment, an initial environmental examination and scoping have been carried out. The scoping exercise has been carried out with the following main objectives:

- To define the limits of the study area,
- To define list of valued ecosystem components within the study area,
- To define list of activities, type and magnitude of the proposed project, and
- To define list of Impacts to be studied.

In order to carry out the above tasks, different tools and techniques relevant to the proposed project are employed. Environmental scoping checklists and consultation of different stakeholders (experts, project affected peoples, local administrators and people, etc.) have been applied.

### **2.1 Limits of the Study Area**

The Environmental Impact Assessment study is conducted for those areas that would be influenced by the impact of the proposed project's implementation. The project site, the land adjacent to the project site and the neighbouring environment are the most impacted areas either directly or indirectly due to the implementation of the project. The socio-economic and environmental impacts can, however, be felt beyond those limits. For this study the areas within five kilometres of the project site are considered.

### **2.2 Valued Ecosystem Components to be impacted by the Project**

The proposed project site is a flat terrain with slopes and no vegetation cover. The site is basically an agricultural land and the down part of the project area which is included as part of the industrial park is very wet and grazing land. The ecological function of this site could also be impacted by implementation of the project. Nearly some few species of plants are expected to be destroyed during construction of the processing plant. Soil and employees are other key elements influenced by the plant establishment. In addition to these, due to land levelling and removal of vegetation cover coupled with steeper nature of the land can induce soil erosion problem in the area. There is no wild animal that can be affected by the implementation of the project in the area.



### **3 LEGISLATIVE AND POLICY FRAMEWORK**

This section describes the Environmental legislatives and policy frame works relevant to the manufacturing industries.

Similar to other industrial development projects, Kilinto industrial park development must comply with several policies and programs aimed at socio-economic development and environmental protection. Therefore, policies, legislations and institutional frameworks most relevant to industrial projects in general and to the proposed project in particular is assessed, reviewed and presented. The list and the salient features of these instruments are presented as follows:

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

The following paragraphs discuss the institutional and administrative framework at the Federal and Regional level and organizations responsible for the preparation of environmental policy and technical guidelines.

##### **Ministry of Environment, Forest and Climate Change**

The Ministry of Environment and Forest was the competent Environment Regulatory Organ at the Federal level in Ethiopia established by Proclamation No. 803/2013. Article 1b of the proclamation empowers the Ministry of Environment, Forest and Climate Change to establish a system for environmental impact assessment of public and private projects, as well as social and economic development policies, strategies, laws and programs. Article 1e of the same proclamation mandates the Ministry to establish a system for the evaluation of the environmental impact assessment of investment projects submitted by proponents by the concerned sectoral licensing organ or the concerned regional organ prior to granting permission for their implementation in accordance with the Environmental Impact Assessment Proclamation.

#### **3.2 Economic Development Policies and Strategies Ethiopian Investment Strategy**

A number of investment proclamation and regulations have been issued by so as to shift from ‘centralized economy’ to ‘mixed economy’ (since 1992). These policy instruments influence the project in different aspects. Above all; the following two documents that constitute the building blocks of the current Ethiopian investment strategy have a direct relevance in guiding investment in the country in general.

- Proclamation No.37/1996: Investment proclamation of the federal Democratic Republic of Ethiopia,

- Council of Ministers Regulation No. 7/1996: Council of Ministers regulations to provide for investment Incentives.

The Investment Proclamation No.37/1996 has stated that the objective of the investment policy of the federal Democratic Republic of Ethiopia(FDRE) to improve the living standard of the peoples of Ethiopia through the realization of sustainable economic and social development. Article 13 of the proclamation specifies the required information for submitting an application for investment permit. The first sub article under article 14, prescribes the procedure for issuance of investment permit, states the following:

Upon receiving an application for investment permit made in full compliance with the provisions of Article 13 of this proclamation, and after ascertaining within 10 days that the included investment activity would not be contravening the operational laws of the country and that, in particular, it complies with conditions stipulated in environmental protection laws, the appropriate investment organ shall issue an investment permit to the applicant.

The Council of Ministers regulation No. 7/1996 provides the terms and conditions under which investment incentives is provided for investors. The investment incentive is divided into the following two categories: exemption from income tax and exemption from customs duty on imported machinery and equipment. The exemption from income tax is based on the following two criteria. The first criterion is the class of the investment as pioneer investment, promoted investment, or expansion and upgrading of existing investment. The second criterion is the location of the investment with respect to its potential contribution to equitable distribution of regional development. In 1998, the government of FDRE issued the following proclamation and regulations with the objective of amending the investment proclamation and regulation issued in 1996.

- Regulation No. 116/1998: A proclamation to amend the investment proclamation
- Proclamation No. 35/1998: Council of Ministers Regulations on Investment Areas Reserved for Domestic Investors.
- Regulation No. 36/1998: Council of Ministers Regulations to Amend the Investment Incentives Regulations.

Similarly, the investment projects that are designed to be implemented in the country shall follow the labour law of the country, Proc. No. 377/2003 in which any disputes arising from the workers and the proposed expansion project will be solved. According to this Proclamation, the Labour Inspector may submit cases involving offences committed in violation of the

provisions of this Proclamation or regulations and directives issued hereunder to the authorities competent to determine labour disputes.

### **3.3 Environmental Policies and Strategies**

#### **3.3.1 The Constitution**

The constitution of the federal Republic of Ethiopia provides the overriding principles and legal basis for all policy, strategy, programs, plans, legislations etc. The concept of sustainable development and the environmental rights of the people are enshrined in the constitution by the following articles:

Article 43: The Rights of Development

1. The Peoples of Ethiopia as a whole, and each Nation, Nationality and People in Ethiopia in particular have the right to improved living standards and to sustainable development.
2. Nationals have the right to participate in national development and, in particular, to be consulted with respect to policies and projects affecting their community.
3. All international agreements and relations concluded, established or conducted by the State shall protect and ensure Ethiopia's right to sustainable development.
4. The basic aim of development activities shall be to enhance the capacity of citizens for development and to meet their basic needs.

*Article 44 - Environmental Rights*

5. All persons have the right to live in a clean and healthy environment.
6. All persons who have been displaced or whose livelihoods have been adversely affected as a result of State programs have the right to commensurate monetary or alternative means of compensation, including relocation with adequate State assistance.

These constitutional provisions have served as the guiding principle of all activities that are related to policy formulation, strategy development and the formulation of legislative and institutional framework for environmental protection.

#### **3.3.2 The Conservation Strategy of Ethiopia (CSE)**

The CSE, approved by the Council of Ministers in 1996, provides a comprehensive and rational approach to environmental management in a very broad sense, covering national and regional strategies, sectoral and cross sectoral policies, action plans and programs as well as providing the basis for development of appropriate institutional and legal frameworks for the implementation (EPA/Ministry of Economic Development and Co-operation 1996, MEDA <sup>63</sup>).

It also deals with providing a strategic framework for integrating environmental planning into a new and existing policies and projects. It mainly recognizes the importance of incorporating environmental factors into development activities from the beginning so that planners may take into account environmental protection as an essential component of economic, social and cultural development.

### **3.3.3 The Environmental Policy of Ethiopia**

The major policy framework document with respect to environmental management of Ethiopia is the Environmental Policy (EPE) of the FDRE approved by the Council of Ministers in April 1997. The Policy was prepared under the joint-effort of the Environmental Protection Authority (EPA) and the Environmental Planning Unit (EPU) of the then Ministry of Economic Development and cooperation (MEDaC). The policy contains elements for mainstreaming socio-ecologic aspects in development programs. More specifically, there are two cross-sectoral policies components are contained under the EPE. Article 4.6 of EPE covers different aspects of the importance of incorporating environmental costs and benefits in development planning process. Under this Article, the initiation of a pilot project on the application of Environmental accounting in Ethiopia was identified as one of the policies directions. Furthermore, Article 4.6 states (EPA 1997, 21):

To explicitly consider in 5- , 10-, and 100- years' time perspective the economic costs & benefits to the environment in the planning of all Major development programs, projects and activities.

Article 4.9 of EPE covers the policy directive on EIA. The Article contains eleven sub-articles covering different aspects of EIA and the conditions under which EIA must be performed. Article 4.9.g (EPA 1997, 23) provides a provision:

To create a bylaw on EIA process, this requires appropriate Environmental impact statements and environmental audits for private and state development projects.

The sectoral policies of EPE contain policy directions that may ensure the promotion of sustainable industrial development in the country. More specifically, Article 3.8 of EPE provides policy directions for the control of hazards materials and pollution from industrial waste. This sectoral policy emphasizes the importance of pollution prevention and minimization as the primary approach for pollution control. To this effect, Article 3.6 states (EPA 1997, 15):

To adhere to the precautionary principle of minimizing and where possible preventing discharge of substances and to disallow the discharge when they are likely to be hazardous.<sup>19</sup>

Article 3.8.m, more specifically (EPA 1997, 16) states:

To promote Waste minimization processes including the efficient recycling of materials wherever possible.

### **3.3.4 Sectoral Policies and Strategies**

#### **National Health Policies and Strategies**

Article 2 of General polices states the ‘development of the preventive and CURATIVE promotive components of health care’ as the basic policy element. The promotion of occupational health and safety (Article 2.2.2) and the protection and enhancement of environmental health (Article 2.2.3) are identified as priority policy areas for the health sector. Article 5.2 states that the promotional and proactive measures as instrumental to address ‘prevention of environmental pollution with hazardous chemical wastes’. Article 1.3 of the Health sector strategy that was developed in 1995 states the following under Environmental and occupational Health and safety’ (TGE 1995)

Agricultural schemes and industries will be expected to have strong health prevention and promotion program. Starting from inception, appropriate health advice has to be sought & incorporated in the project. Guidelines, standards, regulations & legislations will be prepared in order to assist the community, planners, builders, agricultural schemes and industries on safe disposal of waste, minimizing environmental pollution and incorporating appropriate health and safety standards in housing and work premises.

#### **The Federal Government Ethiopian Water Resources Management Policy**

The Democratic Republic of Ethiopia issued a comprehensive & integrated water resources management policy in 1998. The policy document outlines the following as the general policy objectives (FDRE 1998:1)

- Development of the water resources of the country for Economic and social Benefits of the people on equitable & sustainable basis.
- Allocation and apportionment of water based on comprehensive and integrated plans and optimum allocation principles that incorporate efficiency of use, equity of access, and sustainability of the resources.
- Combating and regulating floods through sustainable mitigation, prevention, rehabilitation and other practical measures.
- Conserving, protecting and enhancing water resources and the overall aquatic environment on sustainable basis.

### **3.4 Legislative Instruments and EIA Guidelines**

The Federal Government of Ethiopia is in the process of passing number of proclamations that are aimed at providing the legislative instruments for the implementation of the national environmental policy objectives and strategies. The following environmental protection proclamations were enacted by the House of Peoples Representative of FDRE.

#### **3.4.1 Proclamation on Institutional Arrangements**

This Proclamation has been amended. This proclamation has established the Environmental Protection Authority as an autonomous Federal Agency with the objective of formulating environmental policies, strategies, legislation, standards and directives. The proclamation also provides for the establishment of the Environmental Council to ensure integration of environmental concerns with development policies, strategies and plans, as well as coordination among sectors. The Environmental Council is chaired by the Prime Minister (or his designate) and is composed of ministers of the relevant line ministries, heads of other government agencies and representatives of trade associations and NGOs. The Executive Director of EPA will serve as member and Secretary of the Environmental Council. Furthermore, the proclamation requires every competent agency to establish or designate its own environmental unit, which shall ensure collaboration with EPA and be responsible to coordinate and follow-up that activities of the agency are taking place in harmony with this Proclamation and other environmental requirements.

#### **3.4.2 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. The provisions of the proclamation include:

- Projects will be subject to EIA and execution is subject to an environmental clearance from the EPA or Regional Government Environmental Agency, as applies;
- The Federal Regulatory Organ or the Regional Agency, depending on the magnitude of expected impacts, may waive the requirement of an EIA;
- All other licensing agencies shall, prior to issuing of a license, ensure that either EPA or the regional Environmental Agency has authorized implementation of project; and

- A licensing agency shall either suspend or cancel a license that has already been issued, in the case that Federal Regulatory Organ or the Regional environmental agency suspends or cancels the environmental authorization.
- Approval of an Environmental Impact Study Report (EISR) or the granting of authorization by the Federal Regulatory Organ or the REA does not exonerate the proponent from liability for damage.

The proclamation is based on the principle that each citizen has the right to have a healthy environment, as well as the obligation to protect the environment of the country.

### **3.4.3 Proclamation on Pollution and Control**

The environmental Pollution Control Proclamation (Proc. no. 300/2002) is promulgated with a view to eliminate or when not possible to mitigate pollution as an undesirable consequence of social and economic development activities. This proclamation contains general provisions on pollution control, environmental standards, powers and duties of environmental inspectors, rights to appeal and offences and penalties. The pollution control component includes provisions on management of hazardous wastes, chemicals and radioactive substances, management of municipal wastes and protection of the ozone layer. The proclamation has provisions on forfeiture, cancellation and restoration.

### **3.4.4 Provisional Standards for Industrial Pollution Control in Ethiopia**

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

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

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

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

### **3.4.5 EPA's Environmental Impact Assessment Guidelines (2002)**

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

- Providing all interested parties with a consistent approach in EIA,
- Providing background information for the context of EIA in Ethiopia,
- Assisting proponents in identifying their EIA responsibility,
- Assisting communities & NGO groups in realizing their environmental rights with regard to EIA,
- Assisting the authority in determining their roles and responsibility as decision makers in the EIA process; and
- Assisting in decision-making with regard to cost and benefits of proposed development projects.

The document details the required procedures for conducting an EIA in Ethiopia and the requirements for environmental management. These requirements are presented on a step-by-step basis in the guideline. In addition, the document specifies tools that may be considered when engaging in the EIA process. Reference is made to the legislation and policies with which potential investors and developers in Ethiopia must comply and key issues for environmental assessment in specific development sectors are detailed for consideration. In addition, the EIA Guideline provides the categories, the relevant requirements for an ERA, and lists project types under each category. In accordance with this Guideline, projects are categorized into three schedules:

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



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

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

### 3.5 The FDRE Environmental Pollution Control Proclamation No. 300/2002

This Proclamation put obligation and liabilities on the owner or operator of the facility and generators of pollutants with regard to pollution control and management of hazardous substances. Reference section is extracted from the articles of this proclamation:

A. POLLUTION CONTROL		
OBLIGATIONS	LIABILITY	SOURCE LAWS
1) shall not pollute or shall not cause another person to pollute the environment; (2) Will be given incentive for installing sound technology to prevent pollution	(1) <b>Clean up</b> or shall pay cost of cleaning up if caused pollution; (2) <b>Closure</b> or relocation of <b>business</b> site and; (3) <b>fine</b> not less than 1000 and not more than 5,000 or to an imprisonment of not less than one year and not more than ten years or both if the faulty party is a natural person; and in the case of a juridical person (a company) a fine of not less than 5000 birr and not more than 25,000 and an imprisonment of the officer in charge for a term of not less than five	Environmental Pollution Control Proclamation No. 300/2002 Articles 3(1), 3(3), 3(4), 3(5) and 16 and Commercial Registration and Business Licensing proclamation No. 686/2002 articles 39 ( 2)
B. MANAGEMENT OF HAZARDOUS WASTE		
OBLIGATIONS	LIABILITY	SOURCE LAWS
(1) <b>Generation, keeping storage, transportation, treatment or disposal</b> of any hazardous waste <b>requires permission</b> from the Environmental Protection Authority; (2) Shall take <b>appropriate precaution</b> to prevent any damage to the environment or to human health or will being while collecting, recycling, transportation, treatment or disposal of hazardous waste; (3)any person engaged in the keeping, storage, transportation or in trading in any hazardous or restricted chemical may ensure that the <b>chemical is registered, packed and labeled</b> as per the applicable standards.	(1)A natural person is liable to a fine of not less than 20,000 birr and not more than <b>50,000</b> birr and in the case of juridical person, a fine of not less than fifty thousand birr and not more than one hundred thousand birr, and to term of imprisonment of the officer in charge of not less than five years and not more than ten years, or a fine of not less than 5,000 birr and not more than 10,000 birr or both; (2) <b>confiscation</b> of any thing used in the commission of the crime; (3) Pay <b>cost of clean up</b> ; (4) <b>Restore the environment</b> if impossible pay to compensation; (5) Suspension or Cancellation of Business License.	Environmental Pollution Control Proclamation No. 300/2002 Articles 4, and 15 and Commercial Registration and Business Licensing proclamation No. 686/2002 articles 39/ 2

### 3.6 The FDRE Public Health Proclamation No. 200/02

This Proclamation place duty on the owners of the site with obligations and Liabilities:

OBLIGATIONS	LIABILITY	APPLICABLE LAWS/section
1) Shall not dispose waste in any manner which contaminates the environment or affect the health of society; (2) Shall collect waste in a specially designated place and in a manner which doesn't affect the health of the society; (3) Shall put in place clean, adequate and accessible toilet facilities to its customers	(1) Liable to pay fines from birr 1000 up to 9,000; (2) imprisonment from three months to three years; and (3)Suspension or cancellation of business license	Public Health Proclamation No. 200/02 Articles 11, 20(2); Commercial Registration and Business Licensing Proclamation No. 686/2002 Articles39/2
(1) Shall ensure the availability of occupational health services to his employees; (2) Use of machinery or instrument which generates excessive noise is prohibited; (3) If uses such machinery shall install noise reducing apparatus or instrument	Fine 1000 to 9000 birr and imprisonment from one month to one year.	Public Health proclamation No. 200/02 Articles 11, 20(2)
Without the authorization from the authority or from the relevant regional environmental agency, no person shall commence implementation of any project that requires environmental impact assessment as determined in a directive issued pursuant to article 5 (See 5.1 and 5.2 of this document) of this proclamation.		Proclamation No 299/2002, Environmental Impact Assessment Proclamation

### 3.7 The FDRE Water Resource Management Proclamationno.197/2000

This proclamation places duty on the owner of the facility using water for the industry or for any other purpose that may cause pollution:

Discharge of Hazardous waste		
Obligations	Liabilities	Regulating Laws
Any person using water for industry or for any other purposes which may cause pollution shall have an obligation :		
1.to install and use waste treatment method ;		
to discharge only the type and volume of treated waste permitted ;	Liabilities are to be determined in accordance to the	Proc.No. 300/2002
to allow the Supervising Body to take the treated waste discharge sample at any time	Criminal Code	Proc.No. 197/2000
2. To renew the treated waste discharge permit every two years , not later than one month prior to its expiry.	But thought this law does not make any reference to it	Arts. 2(10),(11),(12)
	the liabilities on Proc. No. 300/2002,(see	17(1)(d),
		Reg.115/2005, Arts.
		5, 11, 12 , 13

### 3.8 FDRE Solid Waste Management Proclamation No 513/2007

The objective of this proclamation is to enhance, at all levels, capacities to prevent the possible adverse impacts while creating economically and socially beneficial assets out of solid waste. Some of the important provisions include:

Obligations	Liabilities	Regulating Laws
Any person shall obtain a permit from the concerned body of an urban administration prior to his engagement in the collection, transportation, used or disposal of solid waste	without obtaining authorization , a person who implement a solid waste management project that requires special permit before its implementation as determined in a directive issued by the relevant environmental agency commits an offence and shall be liable to the relevant provision of the Criminal Code	513/2007 part2, sec 4.2
Head of each house hold shall ensure recyclable solid wastes are segregated from those that are destined for final disposal and are taken to the collection sites designated for such waste		513/2007 part 2, sec 11.1,11.3
It is prohibited to dispose of litter on street, waterways, bus stops, train stations, sport field, water bodies in urban areas or in other public places while litter bins are available		513/2007, part 5, sec 17

### 3.9 The FDRE Occupational Safety &Health (Labour Law 377/2003)

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

OBLIGATIONS	LIABILITY	APPLICABLE LAWS
(1) Shall take appropriate steps to ensure that workers are properly notified concerning the hazards of their respective occupations and the precautions necessary to avoid accident and injury to health; (2) Shall ensure that directives are given and also assign safety officer; (3) Establish an occupational safety and health committee of which the committee's establishment shall be determined by the Minister; (4) Provide workers with protective equipment, clothing and other materials and instruct them to use;	(1) Shall be liable for employment injuries, i.e., occupational and occupational diseases, irrespective of fault on the part of the employer; (2) Shall be liable to pay compensation to the employer if injury has been caused as a result of the fault of the employer.	Labour proclamation No. 377/2003 Articles 92 to 112.
(1) Register employer accident and occupational diseases and notify to the labour inspection of the same; (2) Arrange according to the nature of the work, at his own expense for the medical examination of newly employed workers and for those workers engaged in hazardous work; (3) Ensure that the work place and premises do not cause danger to health and safety of workers; (4) Take appropriate pre executions to ensure that all the processes of work shall not be a source or cause of physical, chemical, biological, ergonomical and psychological hazards to the health and safety of the workers.	(1) Shall be liable for employment injuries, i.e., occupational and occupational diseases, irrespective of fault on the part of the employer to pay compensation and medical expenses; (2) Shall be liable to pay compensation to the employer if injury has been caused as a result of the fault of the employer.	Labour proclamation No. 377/2003 Articles 92 to 112.

### 3.10 Regulatory Requirements of International Financial Institutions

The following provides a summary of the environmental and social requirements of the key International Financial Institutions (IFI) which may be involved in this project, such as African Development Bank, World Bank and European Investment Bank.

#### 3.10.1 African Development Bank

The African Development Bank (AfDB) has adopted an Environmental Policy and Environmental Assessment Guideline in 1990 and 1992 respectively. The Bank has also issued an Environmental and Social Assessment Procedures (ESAP) in 2004. The main purpose of this policy is to improve decision-making and results of projects in order to ensure that Bank-financed projects, plans and programs are environmentally and socially sustainable as well as in line with Bank's policies and guidelines.

The ESAP formalize the use of Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Plan (ESMP) and Environmental and Social Audits as instruments to enhance project benefits and (in order of priority) to prevent, minimize, mitigate, or compensate for adverse impacts. The ESAP describe the various steps that shall be followed to mainstream cross-cutting issues along the project cycle, from country programming to post-evaluation. At the project identification phase, the ESAP screening exercise focuses on the environmental and social dimensions of a project to categorize it in one of the following four categories:

**Category 1:** these are projects that are likely to have the most severe environmental and social impacts and require a full ESIA.

**Category 2:** these are projects that are likely to have detrimental and site-specific environmental and social impacts that can be minimized by the application of mitigation measures included in an ESMP.

**Category 3:** these are projects that do not induce any adverse environmental and social impacts and do not need further ESA action

**Category 4:** these are projects that involve investment of Bank's funds through Financial Intermediaries (FIs) in subprojects that may result in adverse environmental or social impacts. Specific requirements for this type of project include an assessment of financial institutions capacities to handle environmental and social considerations. The proposed projects are screened as Category 1 Project requiring Detailed Environmental Assessment. The following AfDB publications are relevant to the preparation of this ESIA report:

- Environmental Policy (AfDB, 1990);
- Environmental Assessment Guidelines (AfDB, 1992)
- Environmental Sectoral Policy Guidelines for the Industrial Sector (AfDB, 1995);
- Guidelines on Involuntary Displacement and Resettlement in Development Projects (AfDB, 1995);
- Involuntary Resettlement Policy (AfDB, 2003).
- Environmental Assessment Guidelines - Fisheries (AfDB, 1997);
- Environmental Assessment Guidelines - Forestry and Watershed Management (AfDB, 1997);
- Cooperation with Civil Society Organization: Policy and Guidelines (AfDB, 2000);
- Integrated Water Resources Management Policy (AfDB, 2000);
- Population Policy (AfDB, 2000); and
- Gender Policy (AfDB, 2001);

### **3.10.2 European Investment Bank**

The European Investment Bank (EIB) is the financing institution of the European Union (EU). All projects selected by the EIB have to be acceptable to, and consistent with, EU environmental policies and law. The European Community has an environmental assessment procedure, the purpose of which is to determine the likely environmental consequences of a project, and which protection measures need to be incorporated into its design, implementation and operation. Guidelines for project assessment are provided in the Sectoral Environmental Assessment Sourcebook. Accordingly, projects are screened as Category A, B or C projects:

- Category A projects are those which are unlikely to have significant environmental impacts and require no Environmental Analysis;

- Category B projects are those which have the potential to cause some significant environmental impacts but are not likely to warrant an Environmental Impact Assessment (EIA) study. These projects require a Preliminary Environmental Assessment to determine whether some Environmental Analysis should be included within the Feasibility Study or, in extreme cases, whether an EIA study is needed; and
- Category C projects require a full fledged EIA study.

The proposed projects are screened as requiring detailed Environmental Assessment.

The EIB environmental policies and procedures are set out in the EIB Environmental Procedures document. The other documents describing the general approach of the Bank to social and environmental safeguards include:

- Environmental Statement (2004);
- The EIB and its Contribution to Sustainable Development (2002);
- EIB Public Disclosure Policy, Principles, Rules and Procedures, March 2006; and
- EIB's EIA Directive 85/337/EEC, amended by Directive 97/11/EC

### **3.10.3 World Bank Safeguard policies**

In 1989, the World Bank adopted Operational Directive 4.00, Annex A: Environmental Assessment (EA): EA became standard procedure for Bank-financed investment projects. The Directive was amended as 00 4.01 in 1991 and is currently being converted to Operational Policy (OP), Bank Procedures (BP) and Good Practices (GP) 4.01: Environmental Assessment. The objective of the Operational Policies (OP) is Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank-Supported Projects. Among the OPs, OP 4.01 and OP 4.12 of the WB policies have been triggered as a result of the proposed project.

#### **OP/BP 4.01 Environmental Assessment (EA)**

The objective of this policy is to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. This policy is triggered if a project is likely to have potentially (adverse) environmental risks and impacts on its area of influence. OP 4.01 covers impacts on the natural environment (air, water and land); human health and safety; physical cultural resources; and trans-boundary and global environmental concerns.

#### **Summary of Provisions:**

- States that all projects proposed for World Bank Group funding require EIA review/analysis to ensure that they are environmentally and socially sustainable.

- An EIA evaluates a project's potential environmental impacts; examines project alternatives; identifies ways of preventing, minimizing, mitigating or compensating for adverse environmental impacts and enhancing positive impacts.
- EIA considers the natural environment (air, water and land); human health and safety; social aspects (involuntary resettlement, cultural property); as well as, trans-boundary and global environmental aspects.
- Projects are categorized based on environmental significance. Category 'A' projects require a full EIA undertaken by independent EA experts.
- Project sponsors for Category A projects must prepare a Public Consultation and Disclosure Plan (PCDP).

#### **OP/BP 4.04 Natural Habitats**

This policy recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long- term sustainable development. The Bank therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as policy dialogue and economic and sector work. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. Natural habitats are land and water areas where most of the original native plant and animal species are still present. Natural habitats comprise many types of terrestrial, freshwater, coastal, and marine ecosystems. They include areas lightly modified by human activities, but retaining their ecological functions and most native species.

#### **Summary of Provisions:**

- Aims to promote and support natural habitat conservation, protection, maintenance, rehabilitation, and improved land use.
- The World Bank Group does not support projects that involve significant conversion or degradation of critical natural habitats.
- Where impact to natural habitats is inevitable, there is an opportunity to identify an 'offset' as compensation.

#### **OP/BP 4.36 Forests**

The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development and protect the vital local and global environmental services and values of forests. Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity

and ecosystem functionality. The Bank assists borrowers with the establishment of environmentally appropriate, socially beneficial and economically viable forest plantations to help meet growing demands for forest goods and services.

**Summary of Provisions:**

- Aims to reduce deforestation, enhance the environmental contribution of forested areas, promote a forestation, reduce poverty, and encourage economic development.

**OP/BP 4.11 Physical Cultural Resources**

The objective of this policy is to assist countries to avoid or mitigate adverse impacts of development projects on physical cultural resources. For purposes of this policy, "physical cultural resources" are defined as movable or immovable objects, sites, structures, groups of structures, natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above ground, underground, or underwater. The cultural interest may be at the local, provincial or national level, or within the international community.

**3.10.4 Indigenous Peoples**

The objective of this policy is to (i) ensure that the development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples; (ii) ensure that adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated; and (iii) ensure that indigenous peoples receive culturally appropriate, gender and intergenerationally inclusive social and economic benefits.

**Summary of Provisions:**

- Operational Policy 4.10 is forthcoming; projects must comply with OP 4.20, Indigenous Peoples in the interim.
- Policy aims to ensure that indigenous people benefit from development projects and are unaffected by potentially adverse effects.
- If Indigenous peoples are affected by project development, project sponsor must develop an Indigenous Peoples Development Plan.

**OP/BP 4.12 Involuntary Resettlement**

The objective of this policy is to (i) avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; (ii) assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring

them; (iii) encourage community participation in planning and implementing resettlement; and (iv) provide assistance to affected people regardless of the legality of land tenure.

#### **Summary of Provisions:**

- Operational Policy 4.12 is forthcoming; projects must comply with OP 4.30, Involuntary Resettlement in the interim.
- Aims to avoid or minimize the involuntary resettlement of people required for projects.
- Applied wherever land, housing, or other resources are taken involuntarily from people.
- Sets out procedures for baseline studies, impact analyses and mitigation plans for affected people.
- RAP must address both physical resettlement and economic effects of displacement.

#### **OP 7.50 Projects in International Waters**

The objective of this policy is to ensure that Bank-financed projects affecting international waterways: (i) would not affect relations between the Bank and its borrowers and between states (whether members of the Bank or not); and (ii) ensure the efficient utilization and protection of international waterways. The policy applies to the following types of projects: (a) Hydroelectric, irrigation, flood control, navigation, drainage, water and sewerage, industrial and similar projects that involve the use or potential pollution of international waterways; and (b) Detailed design and engineering studies of projects under (a) above, include those carried out by the Bank as executing agency or in any other capacity.

#### **3.10.5 International Environmental Conventions and Protocols Signed or signed and ratified by Ethiopia**

Environmental issues cut across several development sectors which use natural resources as raw materials and any developmental activities which may potentially pollute the environment. In view of this, Ethiopia has developed a number of pertinent legal frameworks and guidelines to deal with these outstanding environmental issues. In addition to national environmental legislations, the Federal Democratic Republic of Ethiopia is also a party to a number of regional and international conventions and protocols on environment. The government has established an Environmental Protection Authority, and this Authority is designated as the focal point for the implementation of these conventions and protocols.

According to Article 9(4) of the Constitution of the Federal Democratic Republic of Ethiopia; once an international agreement is ratified through the accepted or established procedure, it automatically becomes an integral part of the law of the land. As a consequence, the conventions and the Protocols that are adopted by Ethiopia have become an integral part of the national laws.



There are a number of international treaties and agreements on a range of environmental and natural resource issues (e.g. ozone depletion, global warming, pollution of international waters, marine environmental protection, transport of hazardous wastes and biodiversity). It is required that these treaties and agreements be considered in environmental analyses, where relevant and feasible, with a view to minimizing possible adverse impacts on global environmental quality. Ethiopia has adopted and ratified several international conventions and agreements related to the environment. The major ones are:

#### **3.10.6 Convention on Biological Diversity**

The Convention on Biological Diversity has three goals: (i) the conservation of biodiversity; (ii) the sustainable use of the components of biodiversity; and (iii) the fair and equitable sharing of the benefits arising from the use of genetic resources. The Convention was ratified by Ethiopia by Proclamation 98/94, on May 31, 1994.

Various activities are being carried out towards the implementation of this convention. The following are some of the exemplary activities:

- Prior to 1998, the Institute of Biodiversity whose responsibility was to sample and conserve the country's plant genetic resources has now been transformed into the Institute of Biodiversity Conservation and Research with additional duties regarding animal life and microorganisms.
- A National Biodiversity Protection and Research Policy has been prepared;
- National Biodiversity Strategy and Program have been developed.

#### **3.10.7 The United Nations Convention to Combat Desertification (UNCCD)**

The objective of the Convention is to combat desertification and mitigate the effects of droughts in countries experiencing serious drought and/or desertification, particularly in Africa. Ethiopia has ratified the Convention by Proclamation No. 80/1997.

To implement the Convention the following activities are being carried out under the coordination of the Environmental Protection Authority. The following are some of the activities that have been and are being carried out:

- Completion of the drafting of a national program for combating and controlling desertification;
- Providing some capacity building support and implementing awareness raising programs in the regions;
- Preparation by some of the regions of regional programs for combating and controlling desertification.
- Using participatory approaches, pilot projects designed to demonstrate for communities how degraded land can be rehabilitated are underway in four regions.

- The drafting of a gender strategy designed to facilitate the incorporation of gender issues into the program for combating desertification is in the process of preparation.
- A draft document with respect to the establishment of a fund for combating desertification has been finalized.

### **3.10.8 The Vienna Convention for the Protection of the Ozone Layer**

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

Ethiopia has ratified and became party to the Vienna Convention and the Montreal Protocol in January 1996. The National Meteorological Services Agency has been mandated for the coordination and supervision of the implementation of this convention in Ethiopia. The following activities have so far been conducted towards implementing this convention:

- A program for controlling ozone-depleting substances in Ethiopia is in place.
- A National Ozone Team has been established under the auspices of the National Meteorological Services Agency.
- A project for the repair and reuse as well as a program with respect to the handling of CFC-based refrigerators has been developed;
- A draft legislation for the control of substances that deplete the ozone layer has been prepared; and
- Training on awareness creation has been conducted.

### **3.10.9 United Nations Framework Convention on Climate Change (UNFCCC)**

This convention takes into account the fact that climate change has trans boundary impacts. The basic objective of this Convention is to provide for agreed limits regarding the release of greenhouse gases into the atmosphere and to prevent the occurrence or minimizes the impact of climate change. Ethiopia has ratified this Convention by Proclamation No. 97/1994 on May 2/1994.

The following major activities have been undertaken to implement the Convention at national level:

- Within the National Meteorological Services Agency, a Climate Change and Air Pollution Research Team has been established;
- Major sources of greenhouse gases in the country have been registered. A preliminary research has also been conducted to verify the effect of climatic change on the water flow of the Awash River as well as on wheat production and forest resources;

- Research has been undertaken on the best possible measures to minimize greenhouse gas emissions associated' with energy utilization as well as from grazing and livestock production.
- A National Climate Change Report has been prepared for the first time in the country and submitted to the Secretariat of the Convention.

#### **3.10.10the Basel Convention**

The objective of the Basel Convention is to control and regulate the transboundary movement of hazardous waste. The Bamako Convention of 1991 plays a similar role at the level of the African continent. Ethiopia has ratified the Convention by Proclamation No. 192/2000. At present measures designed to amend the Basel Protocol is in progress. In addition, activities related to prior informed consent are being carried out. Furthermore, to implement the Convention within the country, draft policies and legislation have been prepared and submitted to the government.

#### **3.10.11the Stockholm Convention**

In the year 2002, Ethiopia fully accepted and ratified the Stockholm Convention designed to ban the use of persistent organic pollutants (POPS). The Environmental Protection Authority has the full mandate to implement the Convention at the national level. A project to develop an appropriate system for the realization of the objectives of the Convention in Ethiopia is in progress.

#### **3.10.12 the Rotterdam Convention**

This Convention relates to prior informed consent in the context of international trade in specific hazardous chemicals and pesticides. The Environmental Authority is the organ responsible for the domestic implementation of this convention, which has been ratified by Ethiopia in 2003. The Environmental Protection Authority is preparing a framework for its implementation.

#### **3.10.13 International Convention on Trade in Endangered Species, Fauna and Flora**

The objectives of the Convention are (i) to control international trade in endangered species and (ii) to ensure that international trade in non-endangered species is carried out in a manner which ensures stable markets and economic benefits for the exporting countries as well as to control and regulate illegal trade in such non-endangered species, fossils and/or their derivatives.

Ethiopia has ratified the Convention. The mandate to implement the Convention at the Federal level is bestowed upon the Ethiopian Wildlife Protection and Development Organization.

#### **3.10.14 International Standards and Guidelines**

International standards and guidelines relevant to the proposed projects assessed are presented for the purpose of the following main reasons:

- identify regulatory requirements of international financial institutions
- To compare the country's emission limit values with internationally accepted values and use them in the cases where there are gaps and limitations in the national standards
- Identify and consider examples of Good International Industry Practice (GIIP) on pollution prevention and industrial sustainability

It has been found that the following international limit values, standards and pollution control guidelines are relevant to the preparation of this EIA report and to be used in the detailed ESIA Study of the project.

1. World Bank's Pollution Prevention and Abatement Handbook (1998).
2. World Bank Group Environmental, Health, and Safety Guidelines, General (known as the "EHS Guidelines") (April, 2007).
3. Environmental, Health, and Safety Guidelines, Thermal Power Plants (December 19, 2008).
4. WHO, Guidelines for Drinking-water Quality (2008).
5. WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and Sulphur dioxide (Global update, 2005).

### **3.10.15 World Bank's Pollution Prevention and Abatement Handbook (1998)**

The handbook is specifically designed to be used in the context of the World Bank's environmental policies. It promotes the concepts of sustainable development by focusing attention on the benefits, both environmental and economic, of pollution prevention, including cleaner production and good management techniques. Part I contains a summary of key policy lessons in pollution management, derived from practical experiences inside and outside the Bank Group over the '90s.

**Part II** presents good-practice notes on implementation of policy objectives, based on experiences with the Bank Group projects and on lessons from the policies and practices of other agencies and organizations in this field.

**Part III** provides detailed guidelines to be applied in the preparation of the Bank Group projects. It represents state-of-the-art thinking on how to reduce pollution emissions from the production process. This part of the Pollution Prevention and Abatement Handbook describes pollution prevention and abatement measures and emission levels that are normally acceptable to the Bank.

However, taking into account borrower country legislation and local conditions, the EA may recommend alternative emission levels and approaches to pollution prevention and abatement for the project. The EA report must provide full and detailed justification for the levels and

approaches chosen for the particular project or site. Nevertheless, as of 30, 2007, the new versions of the World Bank Group Environmental, Health, and Safety Guidelines (known as the "EHS Guidelines") are now in use.

### **3.10.16 WHO Guidelines for Drinking-water Quality**

The Guidelines for Drinking-water Quality explains requirements to ensure drinking-water safety, including minimum procedures and specific guideline values, and how those requirements are intended to be used. The volume also describes the approaches used in deriving the guidelines, including guideline values.

### **WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulphur dioxide (2005)**

The WHO air quality guidelines (AQGs) are intended for worldwide use but have been developed to support actions to achieve air quality that protects public health in different contexts. Air quality standards, on the other hand, are set by each country to protect the public health of their citizens and as such are an important component of national risk management and environmental policies. National standards will vary according to the approach adopted for balancing health risks, technological feasibility, economic considerations and various other political and social factors, which in turn will depend on, among other things, the level of development and national capability in air quality management. The guideline values recommended by WHO acknowledge this heterogeneity and, in particular, recognize that when formulating policy targets, governments should consider their own local circumstances carefully before adopting the guidelines directly as legally based standards.

## 4 DESCRIPTION OF THE BASELINE ENVIRONMENT

**4.1 Location and General Characteristics of City Administration and the Project Area**  
Ethiopia is located in the Eastern part of Africa. Addis Ababa, the capital city is found at the central part of the country at the foothills of Mount *Entoto*. It is located at the geographical coordinate of 9° N and 38° 45' E, covering a total area of over 527 km<sup>2</sup> (527,000 hectares). The city is a base for the African Union and many other international organizations. As can be seen from the location map below, the proposed *Kilinto* Industrial Park is located in the south-eastern part of Addis Ababa.

*Akaki Kaliti* Sub City where *Kilinto* belongs to is located to the South Eastern part of Addis Ababa. It is one of the ten sub-cities of Addis Ababa and is divided into 11 Woredas. It is 20 kms from the city center and covers a total area of about 6,143.4 hectares.

Kilinto Industrial Park (KIP) is located in the south eastern part of Addis Ababa, between 8° 55' and 9° 05' North latitude and 38° 40' and 38° 50' East longitude. It is located in *Akaki-Kaliti* sub-city of Addis Ababa in Woreda 9 and 10 of the sub-city. The road to the IP diverts from the main Addis Ababa Dire Dawa and Djibouti highway at a junction of about 20 kms from the center of the city and goes about 7kms to the left in an easterly direction.

Though the KIP is geographically located within Addis Ababa, the area is more or less in a predominantly rural setting where urbanization has been encroaching only as of recent times, primarily the last 5 years. As a result, in order to reflect the actual conditions the discussion on the biophysical and socioeconomic setting will focus in as much as possible on the local conditions in around the IP or Woreda 9 and 10 of Akaki-Kaliti Sub-city. The proposed IP falls on an area of 279ha, specifically in Woreda 9 and 10 of the sub-city. It is intended to be used for mixed industrial purpose.

### 4.2 The Bio-geophysical Environment

#### 4.2.1 Relief and Topography

Addis Ababa has a general elevation of about 2,400m above sea level and as indicated above it is located at the foot of a mountain which rises up to more than 3000m above mean sea level. The general elevation decreases towards the south and south east direction.

The southern and south eastern part of Addis Ababa where KIP is situated on the southern plains of the city where the relief and topography is predominantly flat as shown in figures (photos) below. As such, the Akaki-Kaliti sub-city, where the Kilinto IP belongs, lies between

the altitudinal ranges of 1500 and 2300 m a.s.l. which fall in the two agro-ecological zones of Weyna-dega (mid-highlands 98%) and Dega (highlands 2%). The general slope of the project area is generally gentle through the site. 76.0% of the land shows a slope of below 3 degrees and 23.4% of the land is at a slope of 3 degrees to 6 degrees. There are higher grounds to the south and south east of the project which include the Yerer Mountain which is further south west and others like Yudoro and Fetch Koye hills which are nearby.

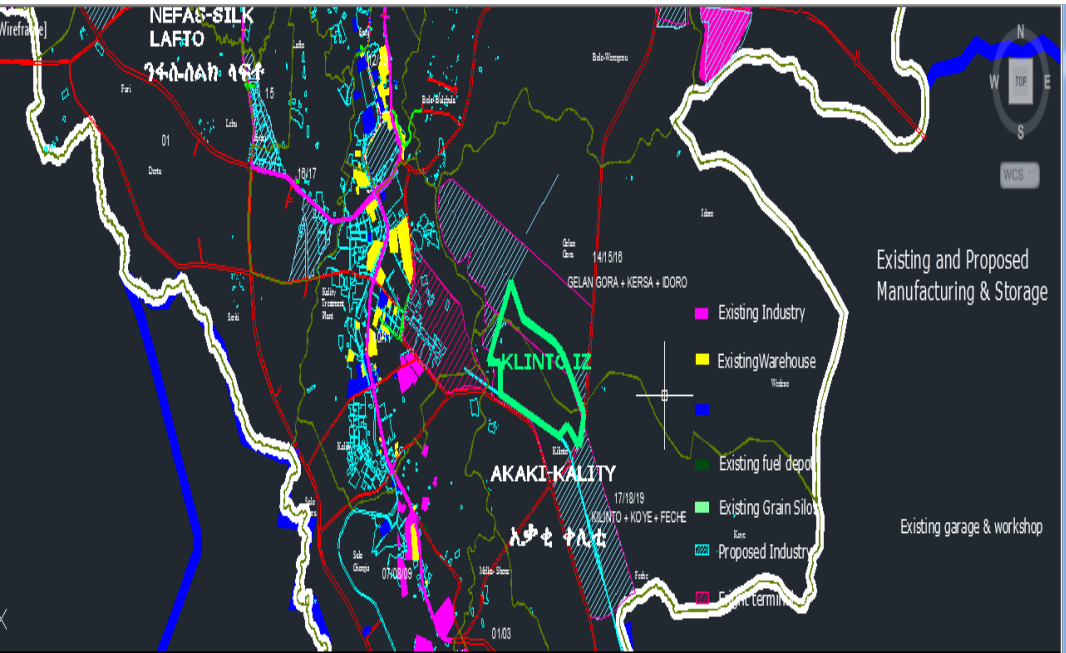


Figure 1: Location map of Kilinto IP

In general the area encompasses flat and rolling terrain. The topography of Kilinto Industrial Park is dominantly flat and rolling and it is fully agricultural land. The project route passes through elevations ranging from 2119m to 2202m above mean sea level.



Figure 2: Topography and area affected by Erosion in Kilinto

### 4.2.2 Geological structure

Addis Ababa is located on the western margin of the main Ethiopian rift valley, which was formed as a result of the fracturing of the earth crust by tension forces during the tectonic period

which affected much of the area of the central and eastern highlands. As a result, Addis Ababa is mainly constituted of volcanic rocks often covered by recent quaternary superficial deposits.

The main rock type in the rift valley is acidic, mainly quaternary rocks whereas the plateau rocks are basic and belong to the old tertiary formations. The area of Addis Ababa city including Legedadi catchment areas lies exactly on the boundary of the main blocks. All major rocks in the area are both acidic and basic. Consequently, these catchments have different geological formation influencing the base flow of the rivers and the run off coefficients.

#### **4.2.3 Climate**

As it is the case with most of the places located in the Central Highlands of Ethiopia, the climate of Addis Ababa City and its suburbs is characterized by two distinct seasonal weather patterns. The main wet season, locally known as Kiremt, extends from June to September, contributing about 70% of the total annual rainfall. A minor rainy season, locally known as Belg, contributes moisture to the region from mid-February to mid-April. The remaining months are dry season. The average annual range of maximum temperature lies between 15<sup>0</sup>C and 20<sup>0</sup>C, whereas, low temperature lies between 10<sup>0</sup>C and 15<sup>0</sup>C. The average annual range of rainfall is from 800-1200 mm.

Weather data is derived from the data collected and analysed at Bole Airport meteorological station which is only 6 kms to the north and northeast of Kilinto. Accordingly, mean maximum annual temperature over the record periods is 23.5<sup>0</sup>c, and mean minimum annual temperature value is 10.5<sup>0</sup>c. The daily variation in temperature in the area is more pronounced than the annual variation and the calculated mean annual temperature is around 17<sup>0</sup>c. The temperature of the area varies with altitude and the KIP area is expected to be slightly warmer as the general elevation of Addis Ababa decreases from north to south. The sub-city lies between the altitudinal ranges of 1500 and 2300 m a.s.l. which fall in the two agro-ecological zones of Weyna-dega (mid high lands 98%) and Dega (highlands 2%). The annual rainfall and wind speed calculated in the area are 1080mm and 0.55km/hr respectively. From field observation and consultation, the wind direction is towards west for most of the seasons.

#### **4.2.4 Soils**

The climatic condition and topography of the study area favors the development of thick soil profile by the decomposition of rocks on which it lies. From field observation, the site is dominantly covered with black cotton soil. The black cotton soil is deposited over the weathered rock. The black cotton soil in the site is characterized with high plasticity and high degree of swelling. It creates difficulty in plowing during the wet season when there is water



logging due to heavy precipitation. However, this black cotton soil is adored by the local communities as a very fertile soil that has sustained the relatively better rural livelihood nature of the area.

#### **4.2.5 Surface and Ground Water (Drainage)**

There are four rivers around or within the site: Akaki, Kilinto, and Idoro and Kerso Deso rivers. Akaki River is the biggest river running through a central Ethiopian region and it is a tributary of the Awash River on the right side. Kilinto River as a tributary of Akaki River is coming directly to the site from southeastern area and the picture below show a condition of the river in dry season. Idoro and Kerso Deso rivers are crossing the site area and bank areas of both rivers are exposed to flooding threats requiring the delineation of buffer areas for flooding prevention while developing the site.



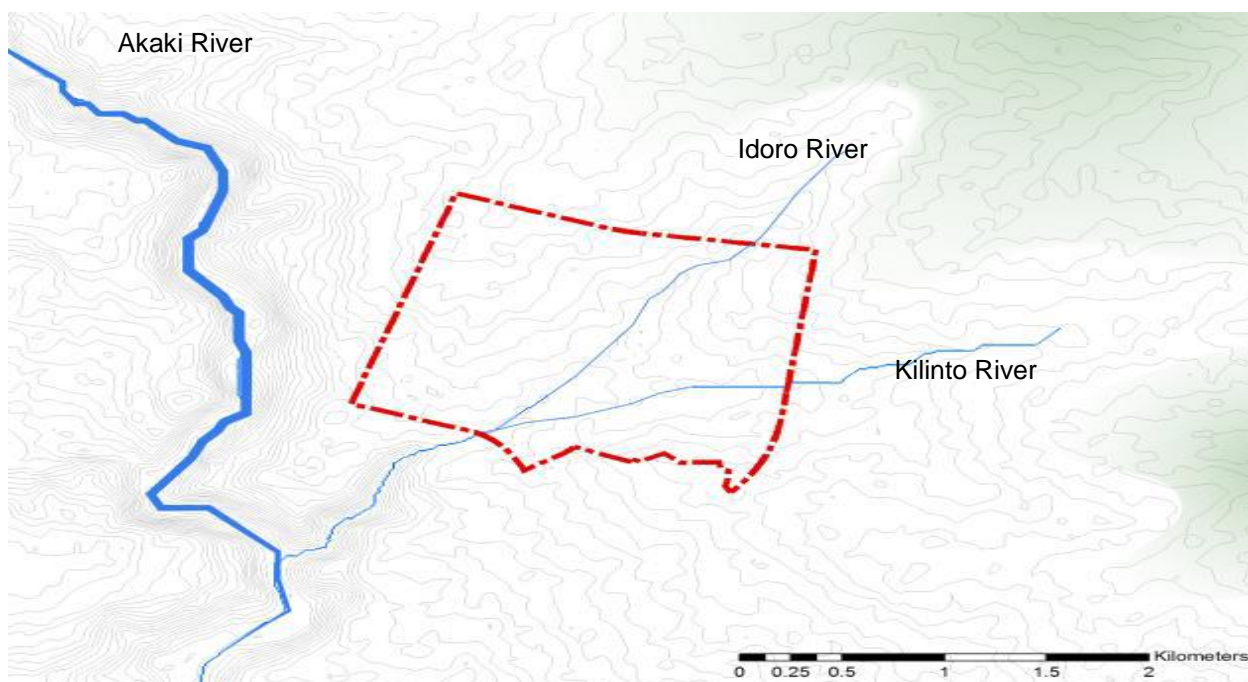
**Figure 3: Black cotton soil in Kilinto**



**Figure 4: Kilinto river in dry season**

The project area forms part of the Akaki River catchment which passes very close to the western border of the project area. It is the single most important river towards which almost all rivers in and around Addis Ababa flow. Big and Little Akaki Rivers, with their different tributaries, drain the city from north to south.

Big *Akaki* (900 km<sup>2</sup>) and little *Akaki* basin has a catchment area of about 540 km<sup>2</sup>. The streams serve as natural sewerage lines for domestic and industrial wastes, hence making them known for their offensive odour and the undergoing Eutrophication process.



**Figure 5: Drainage system**

The Big Akaki that drains the eastern part of Addis Ababa area and Little Akaki River that drains the western part of the Addis Ababa form the Akaki River, which forms one of the biggest tributaries of the Awash River. The Akaki Rivers catchment is a sub-catchment of the Awash River system. It drains to Aba Samuel and Mojo. It collects the drainage of approximately 1,462 square kilometres, with a boundary of about 216 kms. It is sited on the eastern edge of the North Western Plateau that descends southwards to the Main Ethiopian Rift. The headwaters of the catchment emanate from the surrounding mountains: in toto form the northerly drainage boundary, to the east Mount Yerer, to the west the Wechecha range of hills.

Groundwater is the main source of water supply which also includes the limited piped water system in Kilinto village and the Abba Mella Minch which also serves as a source of drinking water. The Akaki well field where a great deal of groundwater resource has already been confirmed by earlier studies, exploratory work and existing boreholes, is at around 7 kms distance to the southwest of the project area.

#### **4.2.6 Flora and Fauna**

As per the information from the local population, the area has been inhabited and utilized for a long time. As an area with a known history of farming for a long period of time, human interference with previously existing flora and fauna has made the area devoid of both vegetation cover and wildlife. However, there are some patches of eucalyptus trees in areas

very close to the villages. Natural vegetation is to a great extent diminished due to encroachment and clearance for agricultural purposes over the last century. There is no any significant grassland since much of the land is used for crop production. There is no any designated sensitive area. The most common species of wild animal found in the Kilinto IP area and the surroundings are the common wildlife such as fox and hyenas.

#### **4.2.7 Ecologically Sensitive Areas**

As indicated above, the area is devoid of any important flora and fauna. As such, there is no any important national park, animal sanctuary, reserve area, wetland, etc that can be regarded as ecologically sensitive areas and that could be impacted due to the implementation of the proposed KIP.

#### **4.2.8 Land Use of the Project Area**

Agricultural activities that include crop production, cattle breeding and planting trees covers the major proportion of the Akaki river catchment areas. The current land use of the proposed KIP is predominantly agricultural. Cereal crops like teff, wheat as well as pulses like chickpeas are dominant. As such, the existing land use type inside the Kilinto IP site is mainly characterized by cereal crop agricultural fields with scattered rural settlements.

However, the foundation and expansion of Addis Ababa was associated with the rapid conversion of land from rural to urban uses more than anywhere else in the country. Over the past many decades it has been noticed that there is an intensive conversion of rural land to urban development for uses like residential and commercial buildings, transportation networks and facilities (airports and highways), industrial establishments, recreation areas and other manmade structures. The less controlled urbanization that includes construction of residential houses, commercial centres, and transport infrastructure, various types of industry, parks, and recreational areas has covered a large portion in the urban parts of Addis Ababa. This is largely becoming the fate of the proposed KIP site as of recent times.

As of recent times, besides the scattered rural settlements a new expansion of residential areas such as condominium sites to the west of the KIP, and the recently established condominium site to the south have covered a very significant area. The newly established Addis Ababa Science and Technology University and the Heineken Beer Factory under construction have also covered a very significant area to the south and south east of the KIP. The Akaki town which is situated at around 5 to 7 kms away from the IP site is an old industrial town which harbors a number of industrial clusters that range from light to heavy industry.





**Figure 6: Land use and settlements in KIP**

#### **4.2.9 Prevailing Environmental Pollution Problems**

The status of the prevailing pollution problems particularly with reference to both surface and ground water needs due attention and emphasis in this ESIA study. The drainage of surface water flow from the proposed IP is towards the Akaki River. This will be very important with respect to the precautions and measures that would be required in the management of solid and liquid waste in the IP.

The main sources of pollution that enters urban surface water bodies are industries, municipal solid waste and oily wastes from garages and fuel stations. There are over 2,000 registered industries in Addis Ababa (65 % of all industries in the country), most of them located along the river banks. According to the Addis Ababa Environmental Protection Authority (2007, unpublished) 90% of all industries lack facilities for some degree of onsite treatment plant, and subsequently discharge any effluents into adjacent streams.

Many industries do not have appropriate solid and liquid waste management and do not possess any treatment system. A number of other studies have also indicated that among the industries located in Addis Ababa, 90 to 96 percent discharge their waste without any form of treatment to nearby water bodies and open spaces (Zerayakob and Zeru, 1999; Mohammed, 2002; EPA,

2005; Tamiru et al., 2005). This situation has been the cause for serious health and environmental consequences which affect both human and aquatic life.

According to the Sanitation, Beautification and Parks Development Agency, a city total of 2,256 m<sup>3</sup> or 851 tonnes of solid waste is being generated daily of which 65% is collected and disposed into Repi dump site, about 10 % of the waste is composted and recycled while the remaining 25% is dumped into open spaces, ditches and water bodies (CGASBPDA, 2003). In addition to solid waste, domestic wastewater is a major contributor to water pollution in Addis Ababa. According to a World Bank report (2007a), an estimated one quarter of the households in Addis lack any form of sanitation facility and as a consequence they use open spaces, shrubs and river banks to relieve themselves

Most of the solid and liquid waste generated by Addis and its environs is washed down to the river. The daily waste generation in Addis Ababa catchments is estimated to be about 0.252kg/capita/day and 65 % (1,482m<sup>3</sup>) /day of municipal waste is collected. There is an increasing concentration of heavy metal pollution, coli-form and pathogen pollution in the surface and ground water. The nitrate concentration in surface water is higher than the accepted normal concentration of 10 mg/l. In some localities, sludge water and human faces are also dumped to these rivers.

This is a result of rapid urbanization, industrialization and population increase with a lack of Environmental planning, confronting in-adequate water supply and waste disposal facilities. Even earlier, when the Ethiopian economy grew by 1.9% in the period 1980 to 1990 in real terms, the toxic load generated per unit of industrial output increased by 1.8 %, which is higher as compared to the Sub-Saharan Africa average of 1.3 % (UNIDO, 2001).

They are discharging industrial effluent into the little and Greater Akaki Rivers, which finally join the Aba Samuel Reservoir. This reservoir is now serving as an oxidation pond. Based on Zewdie Abate's (1994) report, the biochemical oxygen demand (BOD) in Little Akaki and Greater Akaki was 4665 kg/day and 1000 kg/day, respectively. About 175kg/day phosphate and nitrogen is added to Aba Samuel Reservoir. The rivers have increasingly become polluted with industrial toxics, heavy metals, fertilizers, chemicals, radioactive substances, land sediment, and oil. All rivers in the city are generally loaded with solid wastes. During dry periods, very low flow levels characterize the rivers.

For downstream areas, which lack proper water treatment and filtering facilities, public health is seriously threatened by polluted drinking water (Zewdie Abate 1994). Lead poisoning is also a serious health problem resulting from corroding water pipes (Tamiru Alemayehu et al., 2003). The growth in toxics, radioactive, heavy metals and chemicals in the water supply is alarming (Fisseha Itanna 2002). These pollutants cause long-lasting damage and are life -threatening.

One surprising aspect of these catchments is communities use the polluted/waste water from these rivers for irrigation (Walta Information 2004). Some studies indicated that 40% of the vegetable supplied to Addis Ababa City and animal feed comes from the suburb directly irrigated by these waters or fields flushed from waste water during the heavy rainy season or during the dry season. About 25,000 cattle and even people utilize the water. Tamiru Alemayehu et al., (2003) showed that there is an increasing concentration of heavy metal pollution, coli form and pathogen pollution in the surface and ground water.

Irrigation with polluted water increased accumulation of heavy metals in the soil. Consequently, irrigating with polluted Akaki River has increased Arsenic and Zinc considerably. Wastewater is used as a source of irrigation water as well as for drinking (Alemtsehay Biru 2002). Pesticides in agricultural runoff also poison plant and animal life.

Based on the Slovak Technical Standard grade system (STN, 1998) and WHO drinking water guideline (2004), the water quality of the Little and Great Akaki river basins has been classified as badly polluted to very badly polluted water (Grade IV to V). Obviously, in neither of the grade categories, is the water suitable for drinking. Table 5.3 below shows the comparison of water quality of the main rivers in Addis to that of Slovak Technical Standard and WHO drinking water quality guidelines. The presence of trace metals in the tested samples indicates that industries have a significant contribution to surface water pollution. The presence of high concentrations of *E. coli* bacteria in the samples indicates faecal matter pollution.

Table 2: Comparison of water quality characteristics of little and Great Akaki River with WHO and STN (Mersha, 2008)

	Little Akaki	Great Akaki		
Parameter	Mean ±95%CI (mg l l )	Mean ±95%CI (mg l l )	WHO* (mg l l )	STN Classification (1998)
pH	7.6±0.08	7.7±0.4	6.5-8.5	Very clean water (I)
DO	3.02±0.86	3.1±2.7	-	Badly polluted water (IV)

BOD	130±171	111.5±244	-	V. Badly polluted water (V)
COD	354.8±434	566.4±1301	-	V. Badly polluted water (V)
NO <sub>3</sub>	7.59±10.8	10.5±8.4	50	Badly polluted water (IV)
PO <sub>4</sub> <sup>3</sup>	3.94±2.3	4±0.77		
Cd	0.009±0.003	0.0076±0.01 0	.003	Polluted water (III)
Cr	0.029±0.03	0.09±0.05	0.05	Clean water (II)
Pb	0.028±0.05	0.069±0.12	0.01	PB polluted water ( IIII-V)
Co	0.048±0.03	0.067±0.05		PB polluted water (IIIIV)
<i>E.coli</i> (CFU 100ml <sup>-1</sup> )	6.61*10 <sup>9</sup>	6.68*10 <sup>9</sup>	0	V. Badly polluted water (V)

Furthermore, a review of full and partial environmental audits was conducted on some of the industries owned by Privatization and Public Enterprises Supervising Agency (PPESA) of Ethiopia in recent years. This was done for the identification of potential environmental liabilities of the State Owned Enterprises (SOE), in order to inform the new owners or investors of the existing and anticipated significant liabilities from past and ongoing activities. The environmental audit was conducted by David Sood of Novatech International (Sood report, 2004). The Sood report not only identified environmental issues but also stressed serious shortcomings related to

- health and safety practices,
- poor operating procedures,
- obsolete or poorly functioning equipment,
- weak technical management capacity,
- lack of quality assurance and quality control procedures,
- the absence of clean production practices such as recycle and reuse, and
- Finally a lack of community input signifying that current industrial activities in the country, though not large in number, are already causing huge environmental problems.

Hence, it can be concluded that, industrial activity which is concentrated mainly in and around Addis Ababa, accounting for about two thirds of the manufacturing value added (MVA) has resulted in major environmental pollution, in particular water pollution problem in Addis Ababa. The limited number of project specific river basin studies carried out so far by Government bodies, have indicated that industrial/urban pollution of water resources is a problem especially in the Awash River, of which *Akaki* is a tributary. With even further

expansion of industries along the *Akaki* in the past 10 years, the river is extremely polluted and has reached a stage where ecological restoration and rehabilitation of the river is an urgent task.

### **4.3 The Socioeconomic environment**

#### **4.3.1 Population and Settlement, Demographic Condition**

The population of Addis Ababa which is currently estimated to be around 3,384,569 (CSAs population projection for 2014 is 3, 195,000 composed of 1,515,000 and 1,680,000 male and female populations respectively) live in 10 sub-cities and 204 districts divided for administrative purposes. The ten sub-cities are: Addis Ketema, Lideta, Cherkos, Yeka, Bole, Akaki Kaliti, Nefas silk, Kolfe Keranio and Gullele each with an average of 300,000 people. However, Akaki-Kaliti has still the lowest number of people from among the 10 sub-cities. It is expected that this picture will change much within a very short time since it is now serving as a new expansion area for Addis. Addis Ababa is hosting 30% of the urban population of Ethiopia. The rapid increase in population is resulting in the expansion of boundary to south east side of the metropolitan area.

As per the 2007 census, the total population of Akaki-Kaliti sub-city was 181,270 (88,714 male and 92,556 female). According to Central Statistics Authority (CSA) projections as of July 2013, the population of the Akaki-Kaliti sub-city is estimated to reach 205,385, out of which 100,513 are male and 104,872 are female. The sub-city has a population density of 1,653.7 per square kilometre. The population is comprised of factory workers, civil servants, daily laborers, merchants, commercial sex workers, farmers and others.

However, the area proposed for the IP is largely in a rural setting inhabited by farming communities. As a result the population density given for the sub-city at large does not reflect the reality. Again as per the CSA census of 2007 Kilinto, Feche and Koye which together form Woreda 9 had a population of 5,122 (2,615 male and 2,507 female) in a total number of 1,143 HHs. Gelan which forms Woreda 10 had a total population of 3,903 (2,109 male and 1,794 female) in a total number of 746 HHs. But current estimates given by the Woreda administrations are 8,500 people for Woreda 9 and around 6,000 for Woreda 10. No data of hh with family size could be obtained. However, based on the 2007 census, the average size of a household can be taken as slightly more than 5. But, the above picture is changing fast with time since the population is currently increasing at an alarming rate due to increase in migrant labour that is engaged in the numerous construction activities going on in and around the project area.



The inhabitants of the woredas are settled in villages locally known as ‘**menders**’ and zones within each village locally known as ‘Ketana’ which include Kilinto, Feche and Koye in Woreda 10 and Gelan Gura, Kotoma, Gende Dawa and Bowa in Woreda 10. Houses are concentrated in villages in a sort of nucleus settlement established during the villagization program of the previous Military Government. Most of the houses have compounds of about 1000m<sup>2</sup> in area. The settlements were established during the villagization program that was implemented in 1977 Ethiopian Calendar by the then military government in the pursuit of avoiding scattered settlements and making potential agricultural land free from settlements that were scattered here and there. It was also thought to be convenient for the provision of social, economic and physical infrastructures and services.

#### **4.3.2 Livelihood of the Project Area Population**

As explained above, though quite a large number of the population in the sub-city earn their living from various types of activities of urban nature such as employment in services and trade, manufacturing or factory workers, civil servants, etc. The livelihood in the project woredas is predominantly agrarian and rural. It is based on mixed farming with a predominance of cereal farming with little area left for grazing. The livestock economy is largely based on crop residue, straws after harvests and the very little available grazing land. Average land holding is around 2.5ha which is relatively on the higher side compared with other sedentary farmers in the country.

According to the livelihood zone analysis of Ethiopia the project area belongs to Livelihood zone 13 characterized by early sedentary agriculture and relatively abundant rainfall, rain-fed production of a wide-range of highland cereals (teff dominated) and deeply entrenched, traditional crop and livestock husbandry practices under temperate climatic conditions in the highlands, in which long years of extractive forms of production, high population and livestock densities have led to advanced levels of natural resources degradation (Dr. Girma Medhin in consultation with FAO).

The basis of the livelihood system is the production of cereals, pulses and oil crops along with livestock that is kept on natural pasture and crop residues. Before the depletion of the natural forest cover to its present precarious level, sale of fire wood and wood for construction as well as sale of forest products used to contribute significantly to farmers’ livelihoods. Farmers in this system are also engaged, to a certain extent, in petty trade to augment their income.

As per the discussions and data from the Woreda offices, key informants as well as the Project Affected Populations (PAPs) themselves, the area is known for its good potential in agricultural production especially cereal based. It is known for its production of one of the best varieties of teff (very important staple food in Ethiopia) known as ‘manga Teff’. Other annual crops such as wheat, chickpeas, lentils, and different types of beans are also grown based on established rotation of crops.

In addition to crop farming, the economy of quite a large number of the households is supported by the possession of a good number of livestock which include oxen used for ploughing, cows for reproduction and milking and pack animals used for transporting themselves and their produces. In general, integration of cereal and livestock production system has been remarkable in Kilinto. Obviously, livestock, cattle in particular, is crucial part of the production system in project affected communities. Most farmers keep a pair of oxen and few cows - the former for ploughing the fields and the latter both for reproduction and dairy products. Aftermath, Teff straw in particular, is both a significant sources of cash income for farm households and important source of fodder for animals. Apart from animal fodder and cash sales, farmers in project affected communities use Teff straw as a binding material for plastering their houses with mud. The purpose of Teff straw sold in markets in metropolitan Addis is mainly for use as a binding material for mud plastered houses.

Figure 7: Heaps of agricultural production in Alan Gura Figure 8: Houses at KIP at Alan Gura village



According to Akaki Kaliti Sub-City Urban Agriculture Development Office, irrigation is practiced in an area of 120ha by 223 farming households in the sub-city. The sub-city has the highest practice of urban agriculture in Addis Ababa. Among the population of the Sub-City,

about 4,437 households practice urban agriculture. It is based on the practice of growing of vegetables (gardening), ownership of milking cows, chicken farming, fattening, etc. A total of 910 and 789 farmers practice urban agriculture in Kilinto and Gelan Gura respectively. An average of 2 milking cows which give around 10 litres per day and around 50 chickens is very common in addition to the availability of some oxen and pack animals in most of the households.

**Housing condition** in and around the proposed KIP is also better than many of the rural settlements in the rest of the country. As indicated earlier, initially, during the villagization program, an area of 1000 m<sup>2</sup> was allotted for a household for the construction of houses. As such each HH has an average of three houses within the same compound in addition to a separate kitchen and separate cattle sheds within the compound. The houses are mostly made of corrugated iron sheet and walls made of wooden material and mud plastered with a mix of sand and cement.

#### **4.3.3 Economic and Industrial Activities**

Generally speaking, the Sub-City is an industrial zone where about 60% of the metal, paints, garment and food processing industries of Addis Ababa are found. Currently, there are more than 300 industries with estimated labour force of 80,000. The residents of the sub city are factory workers, daily labourers, people working in urban agriculture, civil servants, military personnel, commercial sex workers, unemployed youth and women, etc. From this factory workers and civil servants constitute the majority population segment.

However, coming to the project area proper (Woreda 9 and 10), as explained earlier the economy has been largely agrarian and rural engaged mainly in crop and livestock production. But, as the recent data from Woreda 9 Administration shows, there is an encroachment of some other economic developments including industrialization. The construction industry is now a very important economic sector in the project area. The construction of around 57,000 condominium housing units employing more than 1000 workers has reached its finishing stage and a corner stone for the construction of another 50,000 condominium houses has been laid recently, all in all occupying hundreds of hectares.

There is also Heineken Beer Factory, the construction of which is completed on 25ha of land, designed to produce 1.5 million hectolitres per year. It is more than 3 years now since the Addis Ababa Science and Technology University started operation on an area of 156 ha (with possibility of future expansion to include the new Beijing-Turunesh Dibaba Hospital). ~~50~~

conclusion what can be said is the economy in the area is changing fast from cereal based mixed farming to other types of economies where only a practice of urban agriculture in small land holding can have the possibility of being included. It is expected that economic activity based on crop and livestock production will soon give way to other types of economic activities since more and more of the farmland is annually being converted to other forms of economic activities as mentioned above.

#### **4.3.4 Conditions of employment and labour force**

As per the information from the construction office, Heineken factory is employing 500 laborers currently and 250 permanent workers of different skills will be employed at the operation stage. Among the local population, 40 guards have already been employed in the factory each earning a monthly gross salary of Birr 1,500.00. Besides, Addis Ababa Science and Technology University and Tirunesh Beijing Hospital which started operation in the immediate neighbourhood of the IP and created job opportunities for over 10,000 people. The condominium housing construction project is by far the largest job creation scheme employing more than 25,000 temporary employments. The local administration offices of woreda 9 and 10 also have about 600 employees providing public services for the inhabitants. In addition the area has bright prospect in creating large job opportunities associated with the new commercial and industrial developments in the area.

#### **4.3.5 Social infrastructure**

##### **i) Education**

Both woredas only cater kindergarten and primary schools up to grade 8. High schools and other specialized schools are only found in and around the proper Akaki and Beseka urban area which is more than 7 kms away. There are 2 Technical and Vocational Education Training (TVETs) in Akaki that train different skills that can accommodate short term skill training for farmers in different types of urban agriculture and other construction skills.

##### **ii) Health services**

Health services are being provided by health posts only at health extension level in the two project woredas. Both have one health post each. There is no clinic, higher clinic or health centre around. The health service focuses mainly on prevention and awareness creation level. The ongoing health extension program implements around 16 packages in the area of sanitation, family planning and HIV. However, the program is poorly managed and implemented due to lack of required medical personnel. One new Health Post is under construction in Kilinto (Woreda 10).

However, there are 7 health posts and one hospital at sub-city level. Currently patients are referred for treatment to the nearby Akaki Health Centre and then to the Beijing -Tirunesh Dibaba Hospital which are 7 to 8 kms away respectively They have to walk or travel by the available intermittent transport service to get higher health services located in Akaki Kaliti Sub city.

As per the information from the Akaki Health Centre, the top ten diseases diagnosed in the health centre for the last 3 to 5 years are given in table 3.

The major health problems diagnosed are related to infection of the upper respiratory system particularly with reference to those who come from residences in nearby industrial areas.

**Table 3: Top ten diseases diagnosed at Akaki Health Centre (2006)**

No.	Name of Disease	Percentage
1	Acute upper respiratory infections	28.94
2	Acute febrile illness	14.41
3	Dyspepsia	8.44
4	Diarrhoea (non bloody)	8.29
5	Urinary tract infection	8.19
6	Trauma (injury, fracture, etc.)	8.14
7	Disease of the musculoskeletal system and connective tissue	7.68
8	Infections of the skin and subcutaneous tissue	6.69
9	Other or unspecified diseases of the digestive system	4.17
10	Dental and gum diseases	4.49

**iii) Potable water supply**

The city of Addis Ababa is at present supplied with surface and ground water sources. It is supplied with three surface water reservoirs: Geffersa, about 30,000m<sup>3</sup>/day, Legedadi and Dire Dam, about 165, 000m<sup>3</sup>/day. Ground water from Akaki Well Field 01 is about 83,000m<sup>3</sup>/day, from existing wells and springs in the suburbs about 58,186 m<sup>3</sup>/day and from Akaki GWA1 and Fanta well field some 48, 300m<sup>3</sup>/day. Therefore, the current total supply of water from all sources to the city is about 384, 486m<sup>3</sup>/day



**Figure 9: water supply facility at Kilinto**

Water supply is very scant in the project area. Kilinto Industrial Park is close the Akaki Well field but there are no water lines existing on site. Alan Gura village does not have any potable water supply facility at all. They have to fetch water from the public fountains located in Kilinto village which is far away. Kilinto has a public fountain from a borehole drilled earlier with the assistance of the Grassroots and Humanitarian Grant Aid of Japanese Government through Embassy of Japan. Water from existing Addis Ababa Water Supply Authority (AAWSA) wells on the left bank of the Akaki River in the Bole Lemi area is also very far. Boreholes are currently being utilized by existing industry and the Kilinto community, University, the Prison in the vicinity of site.

#### **4.3.6 Physical Infrastructure**

##### **i) Transportation**

One could easily observe from the field survey that communities in and around the proposed KIP are suffering a lot as far as existing transport services are concerned. Especially those who reside and work in Gelan Gura, which is the seat of Woreda 10 administration, are suffering due to lack of any regular transport service. The only available transport is the horse driven carts that transport people and goods from the area to the market place in Akaki. As much as Birr 15.00 is paid for transport for a distance which is actually short comparatively speaking. There is no access to Alan Gura during the wet season. However, woreda 10 has better service due an existing gravel road which is now being converted to a standard two way asphalt road.

Transport service is expected to significantly improve in the area very soon. A new 3.6 km two-way asphalt road, with a span of 40 meters that goes up to the main gate of the Addis Ababa Science and Technology University, is on its final stage of construction. The Consultant has been informed by the Woreda administration that there is a possibility of an extension of this high grade asphalt road to Kilinto Woreda Administration and Feche-Koye area where massive condominium houses construction is going on. A preparation is also under way for the construction of an outer ring road that passes through the east side of Kilinto IP. This outer ring road is expected to be connected to the Addis-Adama Express Way starting from the toll gate at Tullu Dimtu. This east branching road is also expected to cross via Bole Lemi and goes up to the eastern part Addis Ababa known as Goro and Summit area.

Therefore, after establishing the outer ring road, accessibility to the industry and traffic processing will be satisfactory. The outer arterial roads that pass through the selected park will greatly enhance competitiveness due to fast delivery of materials and outcomes.

##### **ii) Electricity and Telecommunications service**

Currently, the area is connected to the main electric grid system of the country. Both woredas have been connected to the national hydropower electrical grid system that provides 24 hours service. Besides, traditionally, like all other food crop farmers in the rest of Ethiopia, farmers in the two villages due to the growing scarcity of firewood, used cow dung as fuel. Currently, cow dung is one of the most important source of cooking energy for households in the two project affected communities. Dried dung cakes are stored in nicely made heaps and plastered with a layer of cow dung for protection from rain. In addition to its use as fuel, Cow dung cakes are also crucial source of revenue for the farming community in Kilinto. At current market price, a single pile can fetch up to Etb 10,000 in the market. As to telecommunication service, the communities have access to landline and mobile telephone services.

### iii) Sewerage

Addis Ababa is currently having a very poor sewerage system. However, a lot of development works are presently undergoing to cope with the rapid modernization of city and to attain the Millennium Development Goals (MDGs) with respect to health and sanitation. According to funding by WB, Kaliti Wastewater Treatment Plant should be expanded and rehabilitated. Also, expansion of sewerage lines in the Kaliti sewerage catchment is required. Currently, wastewater is not being treated in the vicinity of the project site.

### iv) Solid Waste Management

Currently, there is a landfill or dump site which is located in the South-Western part of the city, in Koshe Reppi, on the territory of Kolfe Keranio sub-city, in Woreda 23/ Kebele 16, about 8 kilometres away from the city centre. The total area is 30.5 ha, of which 26 ha are occupied by the waste deposit. Koshe Rapi Landfill site is totally open, without any closure around it. But Koshe Reppi Landfill shall be closed in 2015. A new modern sanitary landfill is being operational in the Sendafa area and can easily be accessed from the KIP by outer ring road under construction.

According to the Global Methane Initiative report (2011), overall about 5% of solid waste produced should be **recycled** and about the same proportion is composted after sorting by informal operators.

**Table 4: Summary of public Services and infrastructure in Woreda 9 and 10**

S/ N	Public Services and Infrastructure	Woreda 9	Woreda 10	Remarks
1	Potable Water Supply	Yes	No	Water is supplied to Woreda 10 daily using truck-tankers
2	Schools	Primary	Primary	Nearest Secondary School 7 to 10 kms

3	Public Health Facilities	Under Construction	No	Nearest service 7 to 8 kms
4	Electricity	Yes	Yes	Majority informally hooked-up in <i>Woreda</i> 10
5	Access Roads	Yes	Yes	Dilapidated dirt roads in <i>Woreda</i> 10
6	Drainage Structures	No	No	
7	Solid Waste Management	No	No	
8	Sanitation (Public, Private Toilets)	Few Private Toilets	No	Neither public nor private toilets in <i>Woreda</i> 10
9	Cooking Energy Supply	Cow Dung	Cow Dung	Cow dung is the major source of cooking
10	Telecom Connectivity	Yes	Yes	
11	Local Market	No	No	Nearest market 5 to 7 kms
12	Grain Grinding Mills	No	No	Nearest service 4 to 5 kms
13	Recreation, Public Parks	No	No	
14	Financial Institutions	No	No	Nearest service 8 to 10 kms
15	<i>Woreda</i> Admin. Offices	Yes	Yes	In a very poor condition in both <i>Woredas</i>
16	Community Hall (e.g., Iddir)	No	No	
17	Means of Transportation	Yes	No	Horse carts & a few Bajajs in <i>Woreda</i> 10

#### 4.3.7 Religious, cultural, historical and archaeological Resources

Site investigation by the ESIA Consultant and discussions with relevant stakeholders and the inhabitants of the area themselves confirm that there are no recorded historical, cultural and archaeological heritage sites in the area. Similarly, there are no monuments, historical buildings, holy trees/springs or old burial grounds identified within the project area. But there are two churches of St. Gabriel and the Trinity church that serve the area. The majority of the inhabitants, particularly in Alan Gura (99%) are followers of the Ethiopian Orthodox church. There are some followers of Islam in the Kilinto area.

#### 4.3.8 Environmental and Social Liabilities

Discussions with elders and key informants in the community revealed the fact that there is no known activity to have happened in the past that would negatively affect the area. Hence, there is no environmental and social liability.



5 DESCRIPTION OF THE PROPOSED PROJECT

5.1 General

The description of the proposed IP project is given here under based on what has been provided by the feasibility and master plan studies for which the ESIA is done. The project is focused exclusively on the construction of pharmaceutical industry, where the desired industrial/manufacturing development is implemented in association with essential business offices, commercial, customs, recreation and required infrastructure developments to make it a state of the art **Industrial Park**. Accordingly, a summary of the classification of the major activities that will operate in the Kilinto Industrial Park is given in table 5. Hence, in order to fully understand and propose an appropriate environmental management by way of the ESIA, the nature and type of industries, proposed supporting facilities and businesses, land use and layout of all activities as well as the infrastructural development necessary need to be explained in order to arrive at a comprehensive ESIA.

Table 5: Classification of activities and major components in KIP

Classification	Major components
Industrial /Manufacturing	·Food & Beverage, Electric / Electronics, Pharmaceutical and medical, Furniture/Fixture ·Miscellaneous Manufacturing ·Logistics, Warehousing
Business Support  / Public offices	·R&D, Incubation Center  ·Business Support Center  ·Public Office / Exhibition hall  ·Police Station, Fire Station
Commercial / Business	·Store / services (Commercial, laundry, restaurants etc.)
Recreation / Leisure	·Parks, green areas (buffer zones)  ·Pedestrian roads  ·Lounge, health center, day care center
Infrastructure	·Roads  ·Parking lots

5.2 Project location

The proposed Kilinto IP is located in the south eastern part of Addis Ababa in Woreda 9 and 10 of Kaliti Sub-city, which is one of the 10 sub cities of Addis Ababa. It is located at about 20 kms from the city centre and has an area of 279 ha as has been mentioned earlier.

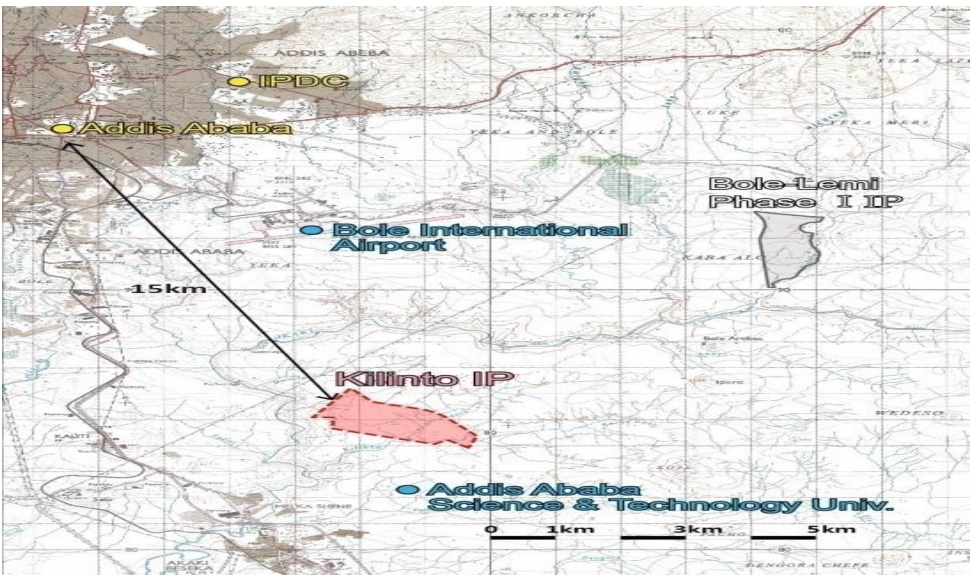


Figure 10: location map of kilinto

5.3 Project Schedule

The *Kilinto* IP design period is 6 months and the actual activity from commencement of site preparation to completion of civil works construction is expected to last 12months.

5.4 Proposed Land Use and Layout

The proposed land use of the IP and proportions in terms of area occupied by the selected functions and facilities is given in table 6, while the proposed layout of the different uses as finally provided by the master plan is given in figures 11

Table 6: Land use proportions

Legend	Area(m <sup>2</sup> )	Proportion (%)	Remark
Total	2,657,911	100.0	The total area including public roads is 2,790,788m <sup>2</sup>
Leasable Area	1,767,862	66.5	
Manufacturing	1,661,582	62.5	
Logistics/Warehousing	31,918	1.2	
Residential Areas	74,362	2.8	Future Reserved Area
Infrastructure Facilities	890,049	33.5	
Customs/Public Office/Service	40,404	1.5	Including gate areas
Green Area	255,414	9.6	Including Cliff areas
Road	420,782	15.8	

River Buffer	87,180	3.3	
Parking Area	30,998	1.2	
Transfer Station for Solid Waste	7,271	0.3	
WWTP	48,000	1.8	

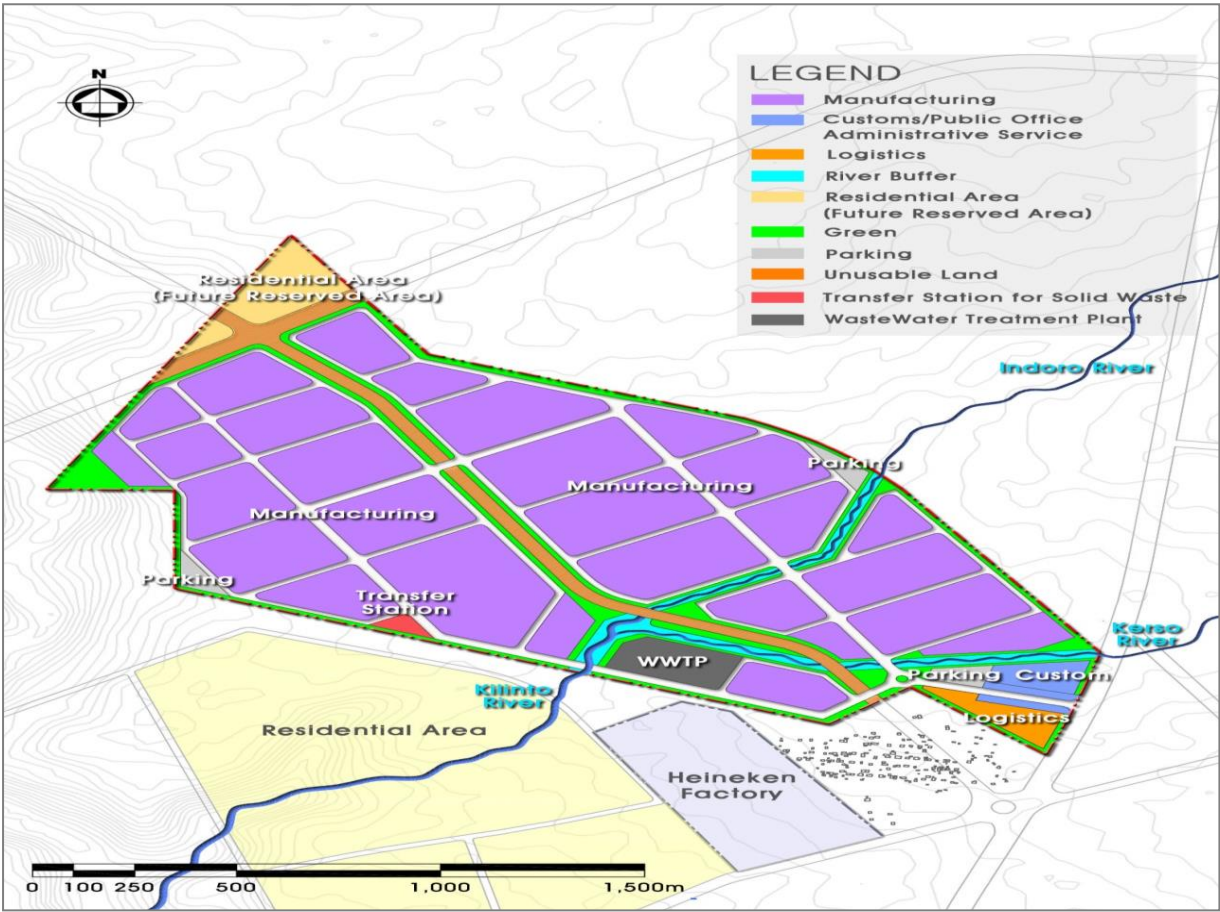


Figure 11: land use plan of the Kilinto IP

The boundaries of Bole-Lemi II & Kilinto IPs have been modified due to changes in the Addis Ababa City structural plan. For the purpose of generating better performance, site investigations have been conducted several times to identify reasonable site boundaries.

The main considerations of the site boundaries are as follows:

1. The land use and road network as per the current Structural Plan should be reflected in both sites.

2. For Kilinto IP, the exclusion of existing village near Heineken Factory is recommended in consideration of the difficulties of compensation and resettlement.
3. For Kilinto IP, the Kerso Deso River and the Southern areas of the river causing irregular site shape, inefficient land use and the increase of construction cost, could be excluded.

**Parks /Green Areas** will be centrally located so as to maintain a view of the industrial park and minimized environmental pollution. The green areas will be arranged along with parks to enhance the enjoyment of natural scenery through securing leisure space that will include rest areas and sports facilities for workers.

### 5.5 Proposed Industrial Categories and Classification

As per the feasibility study and the master plan, four main categories of industries namely, Food and Beverage, Pharmaceutical and Medical, Electronic/electronics, Furniture and Fixtures, and other miscellaneous manufacturing plant have been recommended for the Kilinto IP in the given order of priority as can be seen from tables 7 and 8. The ratio has been given out of the total area allotted for manufacturing excluding other uses in the land use plan. As can be seen from the figures, it is anticipated two major categories i.e. the food and beverage and the pharmaceutical and medical are going to be dominant.

**Table 7: Categories Industries (Master plan Study)**

Types of Manufacturing	Area ( <i>m</i> <sup>2</sup> )	Proportion (%)	Remark
Total	<b>1,661,582</b>	<b>100.0</b>	
Food and Beverage	<b>761,834</b>	<b>45.9</b>	
Pharmaceutics and Medical	<b>299,393</b>	<b>18.0</b>	
Miscellaneous	<b>600,355</b>	<b>36.1</b>	Including Electricity/Electronics, Furniture/ Fixtures industries

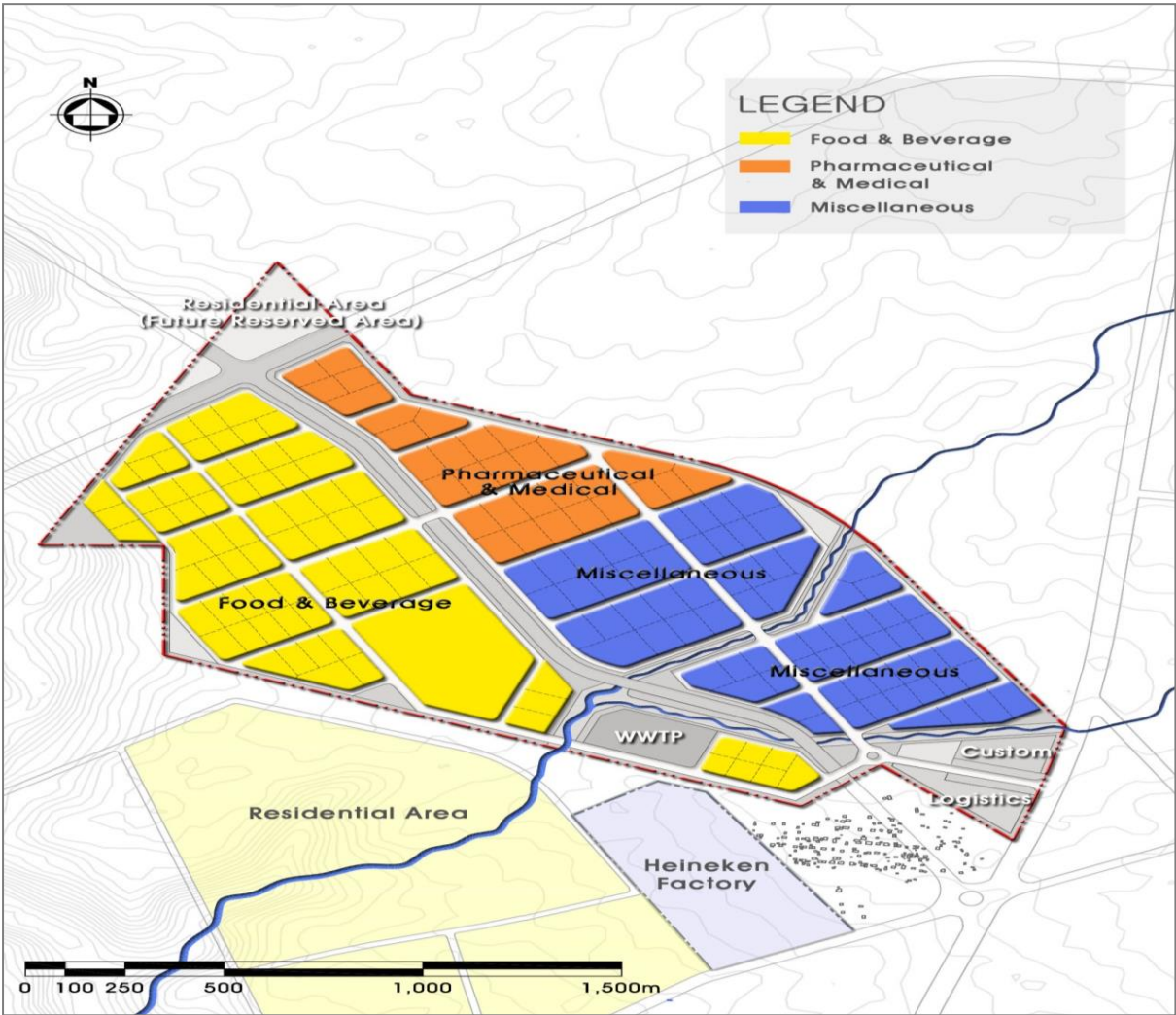
**Table 8: Strategic industrial Grouping for Kilinto Industrial park**

Strategic Grouping	Classification	Detail Classification
Agro-processing	Food and Beverage	Meat, Dairy; Canned, Frozen, And Preserved Fruits, Vegetables, and Food Special, Grain Mill, Bakery, Sugar and Confectionery, Fats and Oils, Beverages, Miscellaneous Food Preparations and Kindred Products.
Future growth engine	Pharmaceutical and medical	Drugs, Pharmaceutical preparation
	Electric/electronics	Electric transmission and distribution equipment, Electrical industrial apparatus, Household appliances, Electric lighting and wiring equipment, Household audio and video equipment, and audio recordings, Communications equipment,



		Electronic components and accessories, Miscellaneous electrical machinery, equipment, and supplies
	Furniture and fixtures	Household furniture, Office furniture Public building and related furniture, Partitions, shelving, lockers, and office and store fixtures, Miscellaneous furniture and fixtures.
Support service	Logistics	
	Warehousing	

The allotment size for each categorized business shall be determined by the results of a review of the demand survey. The food and beverage section will be located near the main entrance for preferential development due to a larger demand ratio compared to other categories. Pharmaceutical and medical as well as electric/electronic facilities will be located near the business park/R&D facilities in order to strategically promote them as new growth industries and enable them to form an industrial cluster. Furthermore, electric/electronic facilities, which discharge less waste matters, should be located in the southern part of the selected area, close to the residential areas. The proposed layout of the different categories of the different manufacturing (businesses) is given in Fig 12.



**Figure 12: Business arrangements plan**

The land demand for the different industries was done by the master plan based on the work done earlier by consultants on Ethiopia Site Assessment and Comparative Ranking for Kilinto and Dire Dawa Industrial Parks.

The industrial facility land of the project site is made up of plot for sheds and serviced land plot. The plot for sheds should be planned with around 40-60% building coverage ratio for efficiency use of outside space, supply standardized plot for convenient factory module, the serviced land plot should set standard plot size at 0.6-1.0ha in consideration of the size of individual factories proposed in FS at 0.5~1.5 ha, and introduce flexible plotting system that could cope with various demands through division and merger. The Kilinto IP will only provide the serviced land as per demand analysis because the potential investor's for permitted industries prefer to move-in with their own design of sheds.

**5.6 Public Facilities Plan**

The facility plan should provide multi-level public service facilities to ensure development flexibility and meet the investors' diverse demands in a convenient fashion. The Primary public facilities needed in general are a fire station, police station, health post, customs office, administrative office, day care center, lounge, gates, guard house, and fences. Most of service facilities are included in the administrative building which will be constructed nearby main gate. As indicated earlier, Kilinto IP is planned to possess a number of other facilities that are intended to contribute towards the implementation of an efficient industrial park. The proposed facilities are given in table 7-5 below.

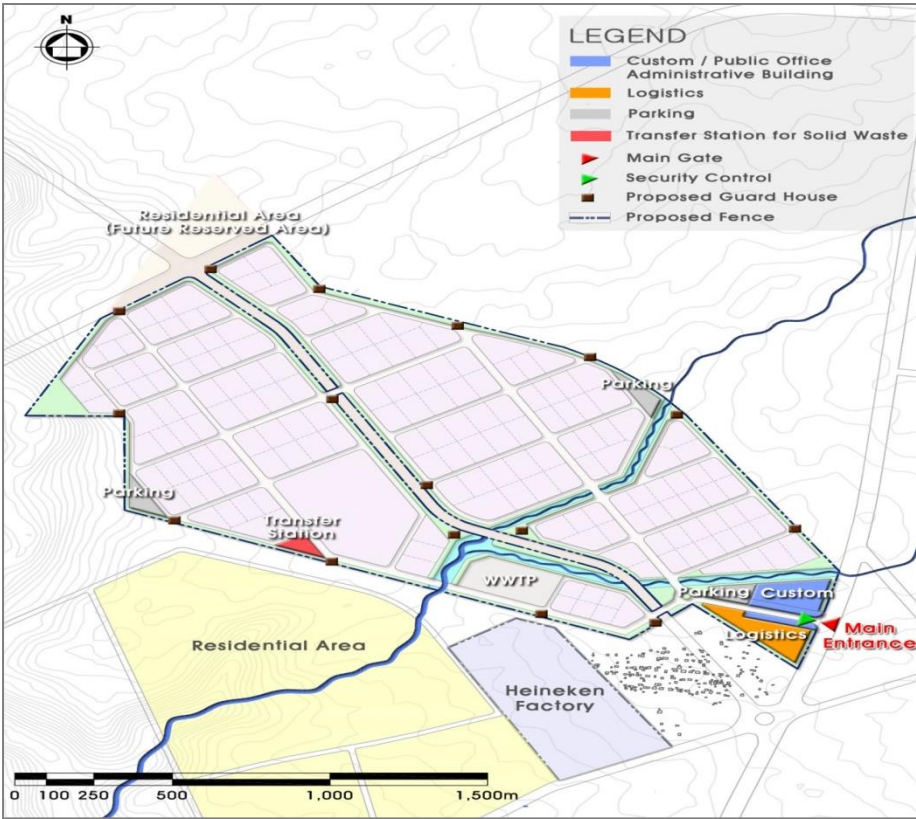


Figure 13: facility layout plant

5.7 Infrastructure Plan

5.7.1 Water Supply

The amount of water use varies from industry to industry by and large depending on the type and quantity of production. Industrial demand in Kilinto includes water used for production and water consumption by the employees including canteen.

5.7.2 Domestic Water Demand

Domestic water demand is basically the water demand for factory employee for drinking washing and canteen services. According to Ethiopian Building Code (EBC) 9, 1995, the per capita water demand for factory with canteen is 45 l/capita/day. This per capita water demand has been adopted for the draft design.

5.7.3 Industrial Demand

Industrial water demand refers to huge industries that would consume significant amount of water for processing of their products. According to a water demand projection for the City of Addis Ababa in Water III project, the following factors are used to estimate industrial water demand.

Table 9: Industrial demand for new areas

Year	2011	2020	2025

Demand (m <sup>3</sup> /day-ha)	30	40	45
Demand (m <sup>3</sup> /day-m2)	0.003	0.004	0.0045

The above factor is not specifying the type of factory to be established and there is no further information regarding the survey conducted and the source which leads to the above mentioned figures

Table 10: Unit water Demand to be used in the estimate

Business Type	Employee	Water Supply	
		Industry	Domestic
	Person/m <sup>2</sup>	m <sup>3</sup> /m <sup>2</sup> /day	l/person/day
Food and beverages	0.02933	0.01070	45.00
Pharmaceutical and medicine	0.008000	0.03026	45.00
Electric	0.01900	0.01444	45.00
Furniture+ Fixtures	0.06000	0.00624	45.00
Miscellaneous	0.023333	0.00267	
Residential			
Custom		0.0080	
Logistic		0.00180	

Table 10 shows the average factor recommended by the consultant in the projection of industrial water demand for Bole Kilinto Industrial Park. According to Ethiopian Building Code (EBC) 9, 1995. Page 37 of Plumbing Code, 45 l/capita /day is recommended to estimate water demand for the employee. This figure is used to update the water demand for the draft final design.

#### 5.7.4 Water Requirement for Fire Fighting

Fire hydrants will be provided at some critical places depending on the pressure in the distribution system. The amount of water required for firefighting for one fire outbreak will not be more than the amount of water distributed during the maximum day water demand for the period of the fire. Therefore, water required for firefighting would be stored in the reservoirs a reserve for critical days when the reservoir is empty. This will be 10% of the storage volume of the reservoir and water for firefighting will be met from the storage but not from the source.

#### Water Losses

Water losses are normally calculated as a percentage of the average water demand. According to a study conducted for the City of Addis Ababa, 30% of the average water demand was taken



as unaccounted for water for projection purposes. However, the network for industrial park is small compared to the network of the City. It is recommended to use 10% of the average water demand to estimate unaccounted for water.

**Table 11: Summary of water Demand**

Kilinto Industrial Park Summary of Water Demand							
Description	Estimated Demand						Total
Type of Business	Residential Area	Furniture & Fixture	Pharmaceutica I & Medical	Electric & Electronic	Food & Beverage	Custom & Logistic	
Total Maximum Day Demand (m³/d)	-	2,526	2,748	6,498	11,687	419	23,877
Total Maximum Day Demand (l/s)	-	29.23	31.80	75.21	135.27	4.84	276.36
Peak Hour Factor		2	2	2	2	2	2
Peak Hour Demand (m³/day)	-	5,051	5,495	12,997	23,374	837	47,755
Peak Hour Demand (l/s)	-	58.46	63.60	150.43	270.54	9.69	<b>552.72</b>

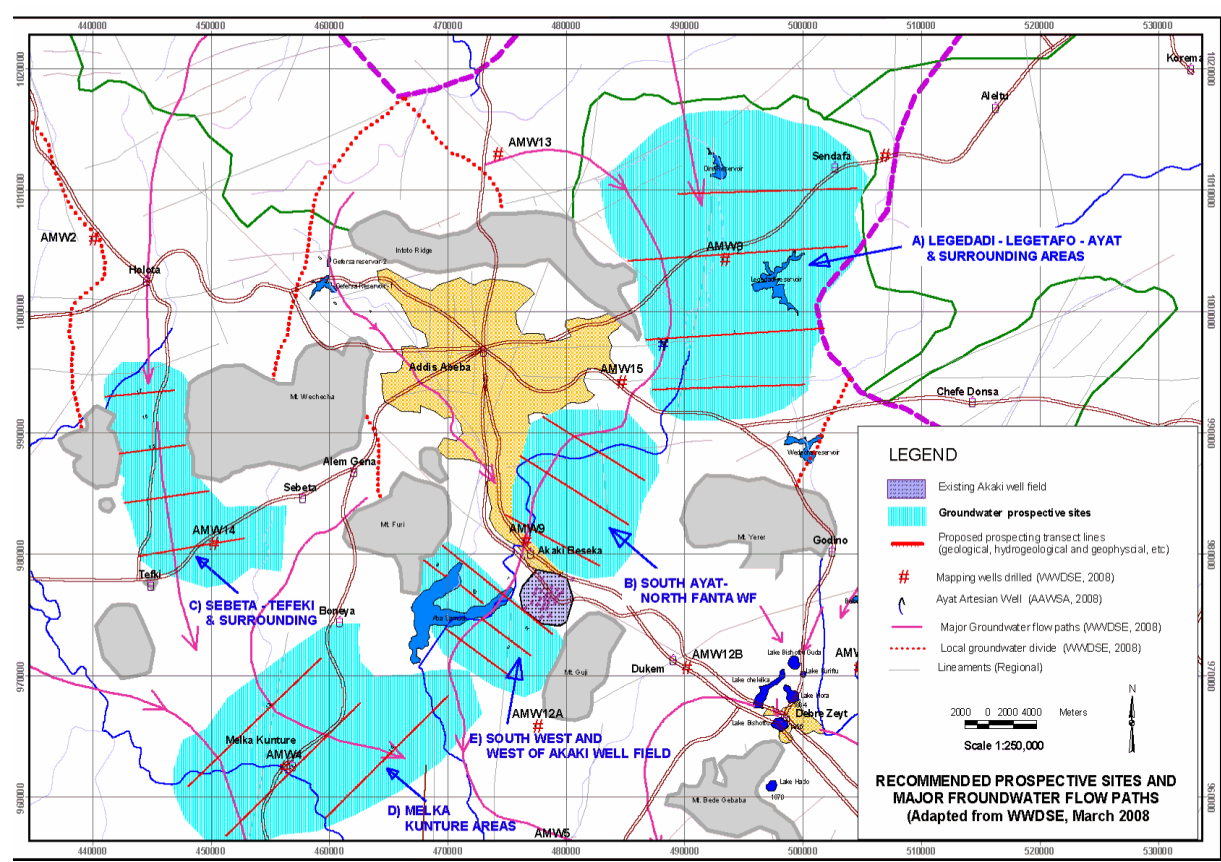
### 5.7.5 Water Source

Borehole is expected to be the water sources for the Kilinto Industrial Park. The capacity of the source should meet the estimated maximum day demand. Six boreholes are sited with estimated average yield of 50l/s per borehole. The total water demand for the KIP is 24,210m³ per day out of which 21,327m³ (88%) is allotted for industrial consumption while the remaining 2,883m³ (22%) is allotted for potable water supply.

It has been assessed that the AAWSA’s present water system will not be enough to operate the Addis Ababa Industrial Park (AAIP, Bole-Lemi and Kilinto area) in spite of the AAWSA’s endeavour to expand. The Akaki Well field ground water cannot support any further exploitation. Hence, the water supply problem is expected to be resolved by drilling suitable deep-wells in about 2 km radius from the project area.

Currently, out of the five deep groundwater prospective areas under investigation around Addis Ababa city, a study has been carried out on South Ayat- North Fanta well field in which the project is located. The potential of the well field is not yet evaluated. However, results from deep test wells drilled up to 500m depth during the study have shown high prospect of groundwater potential and believed to be as one of the major well fields in the future to supply water to the City of Addis Ababa. In addition to the existing three deep test wells, five production wells are under drilling by AAWSA for water supply to Tulu Dimtu, Koye Feche and Klinto condominiums which are under construction in the vicinity of the project area.

This is currently the best alternative since this well field known as South Ayat North Fanta Well Field has been assessed to have a substantial ground water reserve by AWSSA even for other future activities in the area (see fig14).



**Figure 14: Ground water prospective areas of Addis Ababa**

According to hydro geological investigation report<sup>1</sup>, the underground water near Bole-Lemi Phase II has good water quality. 5 boreholes with a yield of 25~50ℓ/sec each are recommended. The location and number of boreholes will be decided after hydrological investigation within a radius of 2km from the project site.

Water supply pipe size and the capacity will be decided in consideration of the water requirement to be determined during the detailed design. The consultant will review waterworks planning standards, water consumption unit and water demands and conduct mathematical calculations referring to Urban Water Supply Design Criteria.

Source: Consultancy Service for Non – Revenue – Water Reduction, Hydraulic Modelling and GIS Development for Addis Ababa City Water Supply System

For water supply reliability, water reservoir shall be designed as a redundancy. The capacity of the reservoir will be calculated with specific water demand.

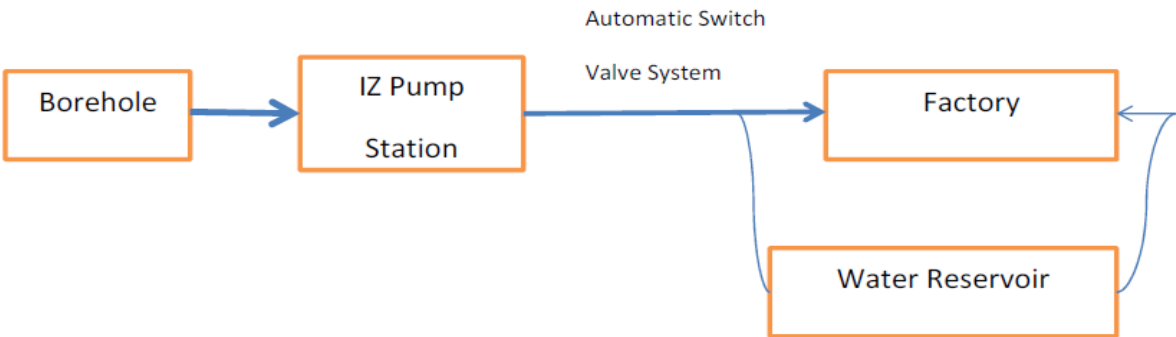


Figure 15: Water supply system

**5.7.6 Sewerage, drainage (Sewage Flows)**

This IP has been planned for the production of Food and Beverage, Pharmaceuticals and Medical equipment, Electric and Electronics, and Furniture and fixtures on an area of covering around 944,437m<sup>2</sup>, 81,573m<sup>2</sup>, 386,251m<sup>2</sup>, and 256,815m<sup>2</sup> respectively. Moreover, there are other facility which includes custom building covering 40,387m<sup>2</sup> and logistic building on an area of 31918m<sup>2</sup>.

Inside these factories other facilities, several industrial employees are going to work in addition to the particular supporting administrative staffs. As a result, domestic sewage is going to be generated from flushing of toilets, bathing, washing hands, kitchen use etc. In these developments in addition to domestic wastes, it is anticipated to be a large quantity of industrial sewage mainly composed of chemicals due to different process are going to be generated. 80 percent of the supplied water to the industrial and other uses is considered as the net waste water. Hence, total sewage load to be generated is 19,369m<sup>3</sup>/day. The consultant has separated storm water and waste water in the industrial park. For human wastewater and industrial waste water disposal, the treatment plant is planned to be located according to the detailed infrastructure master plan. The consultant has reviewed the Ethiopian discharge water quality to select appropriate treatment method.

**5.7.7 Sewerage Treatment Plant**

The design consultant will review the local conditions, disposal efficiency, economic feasibility, and future plans for the location of the wastewater treatment plant (WWTP) for storm water and wastewater generated in Bole-Lemi Phase II and Kilinto IP.

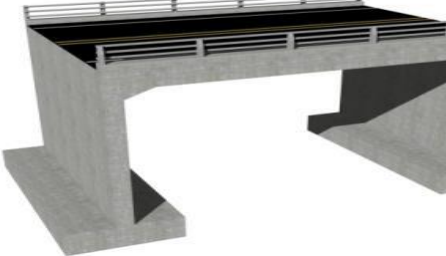
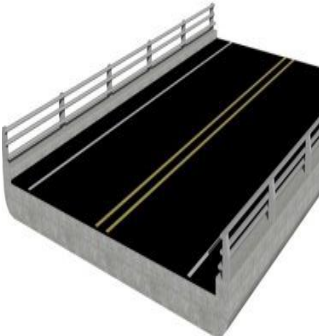
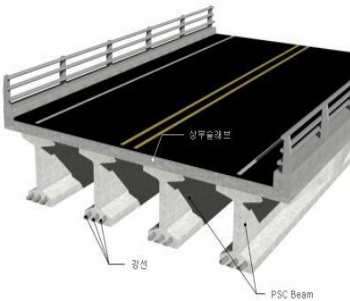
Type	Individual	Integration
Outline	<ul style="list-style-type: none"> <li>• Installation of a treatment plant to discharge the waste water on the site</li> </ul>	<ul style="list-style-type: none"> <li>• The waste water collected from the site would be directly discharged the treatment plant</li> </ul>
Strengths	<ul style="list-style-type: none"> <li>• Shorter sewer line than integration.</li> <li>• Lower construction cost to discharge waste water than integration.</li> </ul>	<ul style="list-style-type: none"> <li>• Establish an integrated waste water treatment system in consideration of the environment and future expansion.</li> <li>• Waste water treatment plant area on site is unnecessary.</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>• Reduce the industrial areas due to inclusion of Waste water treatment plant area.</li> </ul>	<ul style="list-style-type: none"> <li>• Lower sewer line than individual</li> <li>• Need the relay pumping station and pressure sewer pipe to connect from WWTP.</li> <li>• More construction cost to discharge waste water than individual.</li> </ul>

Through a careful study of the area the design Consultant will make a preliminary and final design of the storm water and waste water disposal system. The sewage collected separately will be treated in a treatment plant that has to be designed separately at each IP.

#### **5.7.8 Storm water drainage**

In consideration of local climate and rainfall, the consultant has conducted a hydrological analysis to design storm sewer network for efficient storm water drainage and design facilities in order to prevent frequent drainage problems (blockage, sedimentation). In order to minimize harm to existing residential area located at the bottom of riverside from rainfall flow, it is recommended to increase impermeable layer of building detention ponds.

For hydraulic calculation for drainage pipeline, the consultant has set minimum pipe size 375mm, minimum fluid velocity 0.76m/sas full bobbin and place it bigger than outflow/ inflow pipes to apply non-pressure flow if possible<sup>2</sup> and prevent backward flow of rainwater by reviewing backwater. The consultant has laid the pipe tape 50cm above top of pipe for maintenance and repair.5.7.9 Structure.The bridge is installed at the crossing of the roads width 11~15m with between Idoro River and Kerso River. It is planned to maximize river side and is reviewed in consideration of structure safety, economic feasibility, constructability, view, and maintenance.

	Slab Bridge	Girder Bridge
		

Using structure calculation based on Box Culvert standard, safety is secured, and reinforcement measures are taken into consideration to prevent construction joints, water leak and differential settlement.

### Wastewater Treatment Facility

According to wastewater treatment requirements and current terrain, the wastewater treatment plant is divided into 3 areas: pre-treatment area, administration area and main treatment area. The pre-treatment area and the administration area are located in the south of the plant, and the

main treatment area is located in the rear of the plant. The middle is the reserved land for zero emission.

In order to enable gravity flow of the living waste water and the industrial waste water, the pre-treatment area (including fine grid and sink tank, regulating tank and pump room) is designed to be located in the most south of the plant. The platform elevation is about 2,209.2 m. The administration area will include an office building and the guard. In the front of the office building will be a square with trees and flower beds. The office building will face south. The plant roads will be used to widen the distance between the administration area and the production area. The empty space between the office building and the plant roads will be planted with some trees, shrubs and grass, making a complete greening system of the administration area with the above said trees and flower beds. It will both meet the office requirements and beautify the surrounding environment.

The production area is arranged in the north of the plant, including mixing, flocculation and initial sink tank; UASB tank; A/O tank; secondary tank; mixing, flocculation and flotation tank; sand filter tank; pump room and other structures according to the process. The ozone generator room and ozone contact tank, carbon filter tank and backwater pump room, contact disinfection tank and other third-stage treatment structures are arranged in the same area. The sludge thickener tank, sludge digestion tank, and sludge drying field are arranged in the same area. The blower room, dosing room, diesel generator room, substation and other ancillary buildings are arranged in the same area. The areas are divided by roads, pavements and greening belts, making functional zoning more obvious and reasonable. A protection green belt with proper width is left around the plant to reduce environmental pollution caused by sewage sludge treatment.

#### Power Distribution Network

Kilinto substation will take power from the nearest Koyo-Abbo 230KV line by 185mm<sup>2</sup> double conductors. According to Ethiopian Power Utility (EEU's) feasibility study on industrial zones, EEU will build a substation for Kilinto industrial park with the following capacity. This substation is dedicated only to Kilinto Industry Park.

- 1x230KV outgoing line bay.
- 1x230KV incoming line bay
- 2x230KV transformer bay
- 2x230/33KV, 63 MVA transformers
- 33KV, 15MVar capacitor bank

➤ 33KV indoor and outdoor equipment (Ten feeders)

The total capacity of this substation is 126 MVA and the power factor on the design is 0.9.

The total active power output of this substation is 113.4 Mw. This substation has ten 33Kvfeeder lines to supply the industry zone. As shown on the load estimate table 1.1, the total active power demand for Kilinto IP is190MW and the total apparent power demand is 211MVA. The planned EEP substation's capacity is below the estimated load demand. Therefore EEP shall revise the planned substation capacity from 2x63MVA transformers to 2x110MVA transformers.

#### Road Network

The road network is to be designed incorporating the mid-term structure plan of Addis Ababa. The traffic plan for the industrial park is to be established with emphasis on efficiency and incorporation of the road characteristics as well as future traffic demand. For the efficient handling of cargo traffic volume, a comprehensive traffic network linked with all the internal and external roads is being established. They will be designed in such a way that they will help to distribute entering and exiting traffic, relieve traffic jams, and create a smooth approach for pedestrians and passenger cars. The safety of pedestrians will be ensured through the separation of pedestrian roads and vehicle roads. Furthermore, to promote an eco-friendly industrial park, encourage bicycle use by setting up a green road network system and provide enough width on the road for the use of bicycles.

## **6 IMPACT IDENTIFICATION AND ANALYSIS**

### **6.1 General**

It is recognized that such an organized IP development is the first of its kind in Ethiopia. The country's preference for IP is based on experience elsewhere in some other countries, mainly Asian countries. IP development emanates from the desire to solve land use constraints, management, environmental constraints, etc., that arise due to unplanned dispersed industrial establishments.

At this stage, emphasis was given to the most general and common types of environmental impacts that can arise as a result of the implementation of the three types of industries of *food and beverage, furniture and fixture, pharmaceutical and medical and electric/electronics* that are expected to operate in the IP.

### **6.2 Pre-construction**

#### **6.2.1 Potential Positive Impacts**

In addition to contributing to the fulfilment of higher national objectives of job creation, increased export earnings and more import substitution is considered to be the main benefits from the establishment of KIP. The development of the Kilinto IP will also have other major benefits that include, but not limited to the following:

##### **(i) Creation of employment opportunity during construction**

The construction of the IP involves massive works of excavation and land levelling and grading, roads and pipelines construction, masonry, plumbing, carpentry, electrical and water supply works that create huge job opportunity. It is expected that this opportunity in job creation can improve the incomes of the project area communities and other migrant workers. It can also be very supportive to the efforts that are expected to be made in restoring the livelihood of project affected populations particularly the young, both male and female alike.

The requirement for the construction of the numerous manufacturing industries, office and public buildings as well other support facilities of IP on an area of more than 300ha is estimated to be in the order of several thousands.

##### **(ii) Enhancement of capacity building and technology transfer**

The proposed IP will also very important for skill transfer and capacity building in all components for future endeavours of similar nature since it is expected to be the first of its kind. Those engaged in the construction work can later on be employed for jobs that require



better skills and make them earn more such as in the area of masonry, carpentry, plumbing, wood and electrical work, etc.

(iii) Enhancement of market and investment in the construction and service sector economy

It is also clearly recognized that such a huge construction work as that of the IP will boost investment in the construction sector due to requirements of various construction materials and equipment and services and transit work that need to be provided locally and from abroad.

### **6.2.2 Potential Negative Impacts**

#### **Socio-Economic Impacts**

##### **Impacts of Land Acquisition and Loss of Income Generation**

Based on the data and information provided by the Resettlement Policy Framework (RPF) prepared for the Kilinto IP earlier (*Kilinto* RPF, MoI, November, 2013), the list of PAPs and loss of property and income provided by both the MoI and the Akaki Kaliti Sub-city (see attached list in the annex section) and further scoping and assessment made by the Consultant, the major negative impact is the expropriation of productive land for the construction of the KIP.

The Project has acquired 279.10ha of land. The most adverse socioeconomic impacts of the project are, therefore, the dispossession of farmland and displacement of farmers from their agricultural land and some (15 HHs) from their residences. The major impact is, therefore, directly linked to affecting economic activities of households as well as disruption of their social, language and cultural setting.

Accordingly, 272 households or 1,445 PAPs which were using the 279.10ha of land to be taken by the Industrial Park development project will face socio-economic challenges unless provided with the necessary livelihoods and community development supports. Likewise, in addition to the previously incorporated land (288ha of farmland and 57ha of grazing land); due to the boundary revision which took place recently, an additional 50ha of land will be taken from another 57 HHs. This obviously affects the livelihoods of the specified farming community which is entirely dependent on agricultural practices. The bottom line for the socio economic impact is the amount of money paid per square meter of land in the name of compensation; which is much less than a bottle of beer or coca cola and the term compensation by itself which doesn't mean lively hood restoration of the re-settlers.

As to the impact of land acquisition by the recent boundary revision, the details of loss of farmland and grazing land and the number of households affected by the IP project both from Woreda 9 and 10 is given in the table below.

Table 12: Land acquisition by KIP (before and after boundary revision)

Woreda	No. of HHs	Farm Land (in ha)	Grazing Land (in ha)	House & Homestead (in ha)	Quarry, River valley, Footpaths	TOTAL LAND (in ha)	Remark
Woreda 09	148	163.46	0.3	0	13.5	177.26	as revised
	74	49.44	0.26	0	0.3	50	
Woreda 10	97	45.04	5.3	1.5	0	51.84	
Woreda 09 & 10	245	275.94	5.86	1.5	13.8	279.1	

(a) Impacts on Farmland

Land is the main asset and source of livelihood for the PAPs. Farming is the most important activity and unlike other areas where some marginal land is found in between, almost all the land (~283.3ha) allotted permanently for the IP have been used as a good agricultural land. It consists of about 276ha of farmland and nearly 6ha of grazing land. Since the PAPs have lost an average land size of about 1.3ha which is almost half of the average 2.5ha of the productive land initially owned by the households, the impact on the general livelihoods of the PAPs is considerable and it is the main social and economic impact for the farmers.

(b) Impacts on Housing Structures and Homesteads (Involuntary Resettlement)

The implementation of the Kilinto Industrial Park development project will involve the demolition and relocation of 15 households located within the project site. The major impact of displacement has been observed in Woreda 10 (Alan Gura Kebele). The households to be resettled comprised of about 75 family members. The farmers were not willing to resettle. They explained that the area ‘keye’ belongs to their pre-ancestors, their culture, language and identity is defined there not somewhere else.

(c) Disruption of Social and Cultural Ties

During the consultation, it was expressed by some members of the population that their relocation is a disturbing experience in a sense that they feel some discomfort by the very idea of moving away from their original place or place of their ancestors and the disruption of their social and cultural ties. However, they stated that this might be compensated through better housing provisions in the resettlement area if implemented as promised, which is at Yeshi Debele TOTAL area situated along Addis Ababa - Debrezeit main highway. The resettlement site selection has been made in a participatory manner and considering the proximity to the old neighbourhood, access to basic social services and amenities.

(d) Impacts on Vulnerable Groups

The negative impacts of the resettlement program mentioned above will be even harsher on those who cannot adequately cope. As has been indicated earlier, out of the total number of 245 households affected by the earlier demarcation, 84 of them (34%) are women headed and there are around 20 PAPs with ages ranging from 65 to 90 years old that can be regarded as vulnerable. Children under 14 years of age are also close to 1/3 of the population. There is one person with disability among the PAPs using a wheel-chair. However, his house is not to be relocated. The mechanisms of assistance to vulnerable groups are discussed under the chapter on mitigation. In relation to the recently revised boundary of 279.10ha for which IPDC secured the title deed certificate, there are about 433 PAPs that fall within the category of vulnerable groups due to their sex, age and the likely economic dependency status. Therefore, a total of about 537 PAPs who are potentially in need of special consideration based on their vulnerability conditions

(e) Impacts on Public and Community Institutions

As far as the formerly demarcated area of around 308ha of land and the revised boundary (279.10ha) for KIP is concerned, observations made by transect walking and discussion held with the project affected Kebele representatives, community elders and Google map of the site indicate that it is largely occupied by farm lands with a very small proportion of grazing land. As such, there is no impact on social services and facilities like public buildings, schools, health facilities, water supply and religious institutions (churches and mosques). However, there are four quarries finalizing their lease period which have already been notified for relocation with no compensation requirement. Therefore, there will be no appeal related to compensation for public or social infrastructure.

(f) Impacts on the Land Use

The IP site requires a large piece of land. The plots of land required for this purpose would be permanently transformed by the construction of different categories of industries, public offices, garages and warehouses, parks, etc. This will permanently transform the former agricultural land under a rural land use setting to an Industrial Park with a completely different and modern land use. The extent and impact on the land use change can be easily understood when one looks into the land use categories recommended by the master plan in the previously demarcated area of about 308ha. The same impact will be exhibited associated with the implementation of IP project on the revised boundary of Kilinto Industrial Park.

(g) Labour Requirement/Recruitment of Work force

Increased financial flow, social vices (drug abuse, exposure to HIV/AIDS, unwanted pregnancies and violence), boom and bust phenomenon associated with temporary labour contracts. The increase in financial flow could lead to social problems such as violence,

alcoholism, attraction of commercial sex workers (CSW), substances abuse, and teenage pregnancies. This could lead to increase in sexually transmittable diseases (HIV/AIDS, syphilis, among others), injuries, and loss of life or properties. This impact is rated as direct, negative, short term, local, reversible and major.

(h) Pressure on social and health infrastructure

Migrant labour could be attracted to the project area. This increase in population of the area could put pressure on the already deficient infrastructure. This could lead to overcrowding with potential for increase in communicable diseases like respiratory tract infections and skin diseases.

(i) Conflicts

Labour issues are always a source of friction between companies and communities and also among community members. The agitation could be either due to requests for a certain number of workers that could not be met or sharing the labour slots in the community.

(j) Increased level of disease vectors (mosquitoes, rats, cockroaches, flies, etc.)

Wastes disposed haphazardly form micro-environments for breeding of disease vectors. The crevices could provide habitats for mosquitoes, rats, cockroaches, flies.

It is anticipated that there will be increase in disease conditions, like diarrhoea, and respiratory tract diseases consequent on disposal of wastes without proper adherence to sanitary guidelines, discharge of sewage into the water bodies, and the preponderance of disease vectors. The impact is direct, negative, short term, local and reversible. The rating is moderate.

### **6.3 Construction phase impacts**

(i) Air Quality

Demolition and construction activities will result in localized high level of dust and vehicular emissions. The dust rising from earthwork and vehicle movement could be significant, particularly during dry season and can cause disturbances to the nearby villages. Potential impacts from dust emissions on site will be significantly reduced by careful management and the implementation of mitigation measures to reduce dust generation.

Other sources of air pollutants include:

- Internal combustion engines of construction machinery;
- Welding and drying equipment on construction site;
- Unloading and storage of inert materials (crushed stoned, sand)
- Dust from the ground surface disturbed by earthmoving operations during dry season.

In addition, welding activity in the proposed IP will emit manganese dioxide and welding aerosol emissions. Transport vehicles and construction machinery release exhaust gas

comprising numerous components divided into several groups based on similar impact on environment and human health. These include:

- Carbon monoxide, the presence of which in large amounts (up to 12%) is characteristic of exhaust gas from internal combustion engines using gasoline;
- Nitrogen oxides;
- Hydrocarbons, aromatic compounds, including carcinogen;
- Non-toxic substances such as nitrogen, hydrogen, carbon dioxide and water vapour, and
- Spent gas components.

The emissions are short-termed and localized to the immediate site area.

#### (ii) Noise

The heavy equipment used in site excavation and construction works; diesel generators used for on-site power generation and the road vehicles used for transportation of material and workers to site will have an adverse impact on ambient noise levels.

With respect to the ambient noise levels, since noise is attenuated by distance (typically noise levels drop by about 40dBA at 100m distance from source) the activities on-site are unlikely to adversely affect receptors at a significant distance. However, during the night time when the ambient noise levels are low, the level of perception to noise by communities may be more acute. Noise from transport vehicles will be only transient for a given location and can be considered as a nuisance during night-time.

According to MEF, 75 decibels (dB) for industrial areas, 65 and 55 dB for commercial zones and for residential districts respectively during day time, whereas 70, 55, and 45 dB respectively for industrial, commercial and residential areas are the limits during night time. Hearing impairment could occur from prolonged exposure to high noise level. However, it is envisaged that the site will be demarcated and an exclusion zone created. Thus, it is unlikely that villagers will be exposed to harmful noise level. The noise impact is rated short-termed and localized to the immediate site area.

#### (iii) Pressure on existing roads/ accidents

The activities of building and construction would result in the increase of road usage due to movement of personnel, equipment and construction materials. The aftermath of this could be accidents as a result of immense pressure put on the roads. This impact is direct, negative, short term, local and reversible. It was rated moderate.

#### (iv) Pressure on available water for domestic and other uses

Building and construction works will involve a good number of workers on site, and could put unwarranted pressure on communities' domestic water supply and other resources.

(v) Impacts on the water environment

Water environment pollutants in the construction phase consist of:

- Waste water (WW) from construction;
- Domestic WW of workers;
- WW created by cleaning and maintaining machinery;
- Rainwater runoff at the construction site rolls dusts, soil, sand, rocks, materials namely, cement, petrol and gas, paint, etc., scattered to cause impacts on water quality;

Main impacts on the water quality during the construction phase of the Project are domestic WW of workers. Main contents of the pollutants in the domestic WW are waste matter, suspended solid (SS), organic compounds (BOD/COD), nutrients (N, P) and pathogenic organisms (Coliform, E.Coli). Domestic WW contains biodegradable organic substances, residues, nutrients and microorganisms to cause contamination of surface water and ground water, if they are not treated.

The process of sanitation, maintenance of machinery and equipment in the construction site will generate a large amount of organic matters, oil, etc. In general, the construction phase does not cause much impact on groundwater resource. However, the construction phase can pollute groundwater. Fuel compositions (gasoline, oil, organic solvents, etc.) can be leaked out from means of transportation and equipment used, stored on site, which are swept by rainwater to rivers to penetrate into the soil as the groundwater pollutant in the Project site. In addition, leaked water in the process of concrete mixing, bored piles, cleaning machinery and equipment may pollute groundwater.

According to the World Health Organization (WHO), the concentration of pollutants in rainwater running off has the typically range from 0.5 to 1.5 mg N/L, from 0.004 to 0.03 mg P/L; 10-12 mg COD/L and 10-20 mg TSS/L. Rainfall water running off is relatively clean, if flowing through the construction area, it will entail soil, sand, packages, etc... it will increase the SS contents. If there is any trash rack to separate trash before flowing to the discharging sources, its influence on water quality will not be significant.

Construction of wastewater has pollutant concentrations of BOD, COD and suspended solids if the waste water is discharged directly to the discharging source and this will cause local

sediment and pollution. Therefore, this wastewater must be treated by sedimentation method before discharging to the flow sources, which will significantly limit the impact.

Solid wastes during construction of this project are divided into two types as domestic wastes and construction solid wastes.

- Domestic waste: Average volume of domestic waste will be calculated in the detailed design phase. Domestic waste will mainly comprise of organic substances from the left food, plastic bags, and cardboard.
- Construction waste: Mainly construction material spilled or damaged packages of materials, machinery. Due to the construction nature of just using some simple materials such as cement, steel, bricks, stones. This waste can be reused.
- Hazardous solid waste: Lubricants of construction equipment, oiled mops and gloves, broken bulbs, adhesive waste, other chemical containers, etc. Solid waste and hazardous waste if not being collected will cause unsanitary, impact on landscape and health of construction workers.

(vi) Soil Erosion

Given the anticipated huge construction and excavation work both on-site and off-site of the IP, soil erosion is a menace. to be properly mitigated. Since the *Kilinto*, *Idoro* and *Kerso* rivers pass through KIP, the river banks of these rivers are subjected to flooding during rainy season.

## **6.4 Operation Phase**

### **6.4.1 Potential Positive Impacts**

In addition to what has been explained above, the implementation of the IP will create and employment opportunity, enhance capacity building and technology as well as investment opportunities, due to its chain effect, in all spheres of commercial activities. Especially, the creation of job opportunities and empowerment of women will be very important to the communities in and around the project, not only in terms of the opportunities created by the operation of the project, but also in terms of the other income generating opportunities that are created around the project in areas of diverse businesses and services that cater to the different needs of the permanently engaged skilled and unskilled labour in the manufacturing and support activities. As indicated in the master plan, the operation of the KIP will create job opportunities for more than 60,000 people. Around 10% (6,000) of them can later on be employed in jobs that require better skills such as in the area of masonry, carpentry, plumbing, wood and electrical work, etc, and make them earn more income.

This will be very important in creating business opportunities where project affected populations can work as part of the expected plan and development for impact mitigation and livelihood restoration if it is utilised wisely by all those responsible. For instance, urban agriculture, which is the priority of almost all of the PAP's, can easily flourish.

However, the operation phase is the most important phase for achieving the larger objectives of export enhancement and import substitution as envisaged by the industrial policy and strategy of the country. As such it will contribute significantly to:

(i) Import substitution:

The country is spending relatively huge amount of money for imports of various products that are expected to be manufactured in the IP. This would allow it to save the hard currency it earns and spend it for the purchase of other crucial materials and services in the development process it is undertaking.

(ii) Promotion of export and generation of foreign exchange

(iii) Employment generation

More than 60,000 people at different levels are expected to be employed in the proposed IP during construction and operation phase.

(iv) Improving the quality and living standards of citizens

(v) Increment in the Gross Domestic Product (GDP)

The GDP is expected to grow through the expansion of a chain of business and income generation opportunities.

(vi) Creation of eco-friendly environment

As part of the establishment of the state of the art industrial park, which offers more amenities and large scale green parks along existing streams and boundaries and that will make the place more pleasant and attractive for workers and communities alike.

(vii) Good Experience

Being the first of its kind and creating good experience, it will lay smooth ground for the establishment of eco-friendly industrial zones in the future of a country which is still at the earliest stage of industrial development.

## **6.4.2 Potential negative Impacts**

### **General**

#### **Pharmaceuticals and Medicines**

The potential for environmental pollution is large if the required facilities are not in place or are not run properly resulting in the release of toxic waste caused by residues from



manufacturing and discarded medication and improperly disposed of medical waste that find its way to streams and drinking water negatively impacting humans, wildlife and agriculture.

**Furniture and Fixtures:** The main environmental considerations in furniture manufacture are:

- Volatile organic compounds (VOCs) from coating,
- Particulates and dust,
- Hazardous wastes e.g. solvent-containing materials,
- Other environmental considerations including timber resource depletion, noise, energy use, and wash water.

The main waste streams and environmental impacts from furniture manufacture are

Waste Stream	Source
Air emissions	Solvents – from coating, gluing, etc.
Dust/particulates -	from sanding, sawing, etc.
Waste wood	Off-cuts, chips and dust
Waste materials	Any collected waste solvent. Rags contaminated with solvent. Any collected dried paint (e.g. on dry filters) Solid off-spec. materials out of date coatings Empty coating containers
Wastewaters	From water curtain spray booths (where used)

Food and beverage industries are famous for their generation of huge waste, especially organic waste. In the process of changing the raw agricultural products and materials into the finished goods they are characterised by the creation of waste water, solid waste and air pollution that affect the environment negatively.

**Electric/Electronic:** The main environmental concerns in the electric/electronic sector stem from soil and water contamination, resource depletion, energy use and waste. At the production stage, obtaining raw metal for the production consumes a large amount of energy, especially the process of extracting resources, which can also lead to degradation of the surrounding environment.

**E-waste**—often contains high levels of hazardous or toxic substances that can seep into the soil and groundwater, harming both human health and the environment. The sharp increase in e-waste has been linked to technological innovation and the expansion of market chains, which

result in products being replaced sooner and an increase waste. Inappropriate storage and recycling processes have been associated with harm to human beings and the environment.

Hence, industries constitute a formidable source of pollution with large quantities of waste products. Many of these pollution problems are inherent in the technology. Considerable amount of research and developmental efforts are needed to overcome these drawbacks. The negative impact of almost all industries is manifested through the processes carried out to manufacture the desired material and output that can create health and safety problems and the release of undesired waste in the form of solids, liquids, gases, heat and noise which are discharged into the environment which is again translated in terms of its negative impact on human beings and other bio-geological and physical phenomena as given in details below.

**Impacts of Pollution (Ambient environmental qualities):** Pollution of the receiving environment such as water, air, soil, and noise pollution, etc, that occurs due to:

(i) Release of waste water and associated pollutants

The release of waste water from the various manufacturing activities, offices, residential and other facilities within the IP affects ambient water quality negatively. Water is an essential raw material in almost all manufacturing plants. After the usage the remainder becomes a waste material contaminant, to a smaller or larger degree, depending on its usage in the plant.

Industries which are considered the principal of sources of pollution may be classified as apparel (clothing), food and drugs, chemicals, materials and energy. Industries which belong to food and beverage, pharmaceuticals and medical as well as electrical/electronic and furniture and fixtures are expected to be important activities.

As such potential water pollution becomes very significant in the case of Kilinto IP when one takes into consideration the total water demand of the IP for industrial and other uses (21,845 m<sup>3</sup>/day) and the estimated sewerage generation which is 65 percent of the supplied water which is released as net waste water. This is expected to be a total of 14,000 m<sup>3</sup> per day out of which industrial release of sewerage is around 11,875 m<sup>3</sup> which accounts for is 84.40 percent of the total waste while the remaining 16.40 percent is contributed by supporting facilities and public offices of the IP.

Of primary importance is the possible hazard to public health and safety. There is also damage to surface and ground water resources and the economic value of clean natural waters as has happened to the nearby Akaki River for more than 50 years. There is a possibility of huge negative impact in terms of public health and safety from polluted streams due to presence of

pathogenic bacteria from toilets, waste of office, public facilities, possible residences in the IP, toxic materials (acids, alkalis, specific poison like cyanide and heavy metals, salts) and materials from industrial waste which can affect both surface and ground water resources. If the sanitation systems in the IP are improperly sited, designed, constructed, or maintained, they can allow contamination of the ground water by bacteria, nitrates, viruses, synthetic detergents, household chemicals, and chlorides. Given that ground water from 8 wells is proposed to be the main source of water supply for all purposes there is an expected threat of pollution of the ground water too.

Given such a magnitude of sewerage, pollution of natural waters by sewage and industrial wastes is objectionable and damaging to the project area and surrounding surface and ground water resources. This is particularly serious when one takes into account the prevailing level of pollution in the Akaki River, considered as the most polluted river in the country (baseline assessment).

If untreated waste water is allowed to enter the river the impact will be further

- Spread of disease caused by bacteria, viruses, and parasitic organisms
- Removal of oxygen from the water of the river even downstream which receive the waste water.
- Poisoning of the river water and lake (reservoir) at Aba Samuel by chemicals and metals originating from the industries
- Enrichment of the natural waters by salts such as nitrates and phosphates which then, cause abnormal growths of algae and other plants, etc., with undesirable results on human health, the already heavily affected aquatic life, and irrigation water requirement and water quality downstream.
- Contaminated water from the IP can also result in corrosive effects on materials which it passes through including pipe lines.

(ii) Generation of Solid Waste (Hazardous/Non-hazardous)

**Solid waste** from industries consist of a large number of materials including factory rubbish, packaging material, organic wastes, acids, alkalis, and metals, etc. Industrial solid wastes are sources of toxic metals and hazardous wastes, which may spread on land and cause changes in physiochemical and biological characteristics negatively thereby affecting productivity and use of water bodies and land and soils in and around the project area. Toxic substances may leach or percolate to contaminate the ground water. Improper accumulation and disposal of solid

waste in and around industrial plants can also produce foul smell and breeds various types of insects and infectious organisms besides spoiling the aesthetics of the site.

(iii) Release of Gaseous Waste and other Suspended Particulates Causing Air Pollution: Human interference, mainly the introduction of industries, has been observed to disrupt the ambient concentration of the different atmospheric constituents thereby upsetting the normal cycles of certain natural phenomenon and the ecosystem. Industries are considered to be one of the potential known sources that release toxic gases, fumes, vapours and particulate matter into the immediate work environment and the general living environment, which causes deterioration in the quality of air that we breathe and ultimately affects health.

It is proposed that the IP will utilize hydroelectric energy for most of its functions. This is positive in terms of the significant release of carbon dioxide expected from combustion of fuels like coal and other fuel oil that would largely responsible for global warming, greenhouse effect and ozone depletion. However, air pollution from automobile exhaust gases, incinerator smoke, and stack gases from the combustion of various organic substances as well as the release of dust from construction expansion and operation of industries in the IP can significantly impact ambient air quality.

Hence, release of

- Gaseous pollutants which include oxides of Sulphur (mostly  $\text{SO}_2$ ,  $\text{SO}_3$ ) oxides of nitrogen (mostly  $\text{NO}$  and  $\text{NO}_2$  or  $\text{NO}_x$ ) carbon monoxide ( $\text{CO}$ ), volatile organic compounds (mostly hydrocarbons);
- Gaseous waste causing air pollution and odour and stench
- Particulate pollutants which include smoke, dust, soot, fumes, aerosols, liquid droplets, pollen grains etc. as well as Ammonia, Ozone( $\text{O}_3$ ), hydrogen sulfide, lead, hydrochloric acid; etc., etc.

Such releases from the different types of manufacturing in the IP will affect human health, plant life and other materials through corrosive and abrasive effects and can contribute to global warming contrary to the Green Economy the country is currently promoting unless regulatory measures are implemented by concerned organizations of the IP.

Vehicular activities or automobile exhaust in the IP is also another major source of air pollution. Automobiles release gases such as carbon monoxide (about 77%), oxides of nitrogen (about 8%), and hydrocarbons (about 14%). Heavy duty diesel vehicles spew more  $\text{NO}_x$  and suspended particulate matter (SPM) than petrol vehicles which produce more carbon monoxide and hydrocarbons (Anubha Kaushik and C.P Kaushic, 2005). Carbon monoxide is produced

by the incomplete combustion of organic material, and automobiles are notorious for their production of this gas.

#### **(iv) Noise Pollution**

Noise which is expressed as unpleasant and unwanted sound and often measured in dimensionless unit, decibel (dB) which is a measure of loudness can emanate from the different sources of noise such as modes of transportation (like road and rail transportation), industrial operations which release sounds of engines and machines, cutting, sawing, welding and many other repair and maintenances works in garages and warehouse, construction activities, celebration, etc. expected in the IP.

This has effect on like interference with man's communication, hearing damage as well as physiological and psychological changes. Continuous exposure to noise affects the functioning of various systems of the body like hypertension, insomnia (sleeplessness), gastrointestinal, behavioral, emotional changes affecting the health and safety of the workers and nearby residents of the IP.

#### **(V) Impacts on health and safety in the IP**

Industrial activities in the IP can negatively affect occupational health and safety. Lack of appropriate training and awareness of general facility design and operation of industries is the major cause. . It can also be manifested by physical hazard (accidents), chemical, biological, radiological hazards. Hazards related to inappropriate utilization or lack of personal protective equipment (PPE), safety and machinery and equipment utilization manuals and lack of knowledge of special hazard environments and their monitoring are common in industrial activities of mainly developing countries.

Community health and safety can also be negatively affected by poor water quality and availability. Defects in structural safety of project infrastructure, life and fire safety, traffic safety, disease prevention, emergency preparedness and response are also major problems that can occur in the KIP.

### **6.4.3 Summary of Environmental Issues**

To conclude, the significance of the different impacts explained above and other unforeseen potential impacts in the KIP has been summarized based on the different environmental issues of industrial development indicated by Ministry of Environment, Forest and Climate change below in table 13 by indicating whether the issue raised is significant or not with respect to the KIP (EPA Guidelines, 2000).

**Table 13: Issues for environmental assessment in the industrial sector**

<b>Issue</b>	<b>Sources/Causes</b>	<b>Impact</b>	<b>Significance (‘S’ Significant And ‘Ns’ Not Significant)</b>
Pressure on the natural resource base (effect on the overall ecosystem operation)	Extraction of raw materials Water consumption Energy consumption Prospect of employment and influx of people	Unsustainable utilization of natural resources (E.g., water, trees, coal, soil)	S
Water quality	Discharges of solid/dissolved substances. e.g., mineral waste, animal and vegetable waste, waste-containing fibres, hazardous waste	Pollution of ground & surface water, silting, sedimentation, eutrophication	S
Soil quality	Discharges of solid/dissolved Substances. e.g. mineral waste, animal and vegetable waste, waste-containing fibres, hazardous waste	Salination, pollution of soil	S
Air quality	Emissions of dust Emission of gases Noise	Air pollution-damage or discomfort to natural environment & humans	S
Hazardous substances	Environmentally hazardous substances e.g. toxins, carcinogenic substances, ozone depleting substances, explosive or inflammable materials, radioactive substances	<b>Environmental health</b>	S
Sensitive ecosystems / species	Structure & layout of industrial plant & roads	Barrier to migration & dispersal-isolation & Extinction Expropriate important areas from fauna & flora	NS

<b>Issue</b>	<b>Sources/Causes</b>	<b>Impact</b>	<b>Significance (‘S’ Significant And ‘Ns’ Not Significant)</b>
	Operation of industrial plant & associated infrastructure	Threaten vulnerable, or conservation worthy Species	NS
Introduction of exotic species & pests	Transport - Introduction of exotic species Industrial site - Suitable living conditions for pests	Exotics threaten indigenous species Pests pose health risk	NS
Associated infrastructure	Transport-roads, traffic, Power supply Telecommunications	Pollution Noise Threat to pedestrian & animal safety Threat to biodiversity Soil erosion Water pollution Visual impacts	S
Maintenance of the historical, cultural, or religious landscape	Construction, operation of industry	Intrusion in landscape Migration of people Negative impact on aesthetics Destruction and/or damage to significant buildings, areas	NS
Change in social structure and way of life	Location of industry	Resettlement (See 6.10)	S
	Introduction of industrial way of life	Change in power structures Shifts in division of labour between genders Child labour	

<b>Issue</b>	<b>Sources/Causes</b>	<b>Impact</b>	<b>Significance (‘S’ Significant And ‘Ns’ Not Significant)</b>
	Rural-urban migration	Slum settlements Conflicts between new and old residents, Change in land-use	S
Competition between land-uses	Occupation of land, impacts of industry	Negative economic impacts on other sectors e.g. agriculture	S
Human health	Use, accidental discharge & transportation of inflammable, toxic, explosive, chemical substances Industrial activities such as painting, welding, electroplating, and battery manufacture result in exposure to heavy metals e.g. lead, mercury, cadmium, zinc, cobalt and beryllium Noise Factories that release mineral dust e.g. silica and asbestos glass manufacturing industry, foundry, cement, asbestos plants Factories that release organic dust are those that process grain, cotton, coffee, sisal, wood, etc. Solvents in printing industry, thinners in the manufacture of paints & glues, dyes in textiles, leather & shoes, organic materials used in chemical industries	Ill-health Hearing impairment, disturbance of sleep in the vicinity of the factory Inhalation of dust in high doses over a long duration can result in pneumoconiosis (asbestosis & carcinoma of the lung) Organic materials may cause kidney & liver Damage, hematopoietic system damage, neurotoxicity and cancer.	S
Human safety	Mechanical equipment	Injury, death	S



Issue	Sources/Causes	Impact	Significance (‘S’ Significant And ‘Ns’ Not Significant)
	Explosions, fires e.g. manufacture of chemicals		

#### 6.4.4 Assessment of Cumulative Environmental Impacts

Given the existing reality, it is important that the ESIA of the proposed Kilinto IP is analysed in relation to its location and surrounding land uses. This is done in order to see the potential cumulative impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertake such other actions. The combined, incremental effects of human activity, referred to as cumulative impacts, pose a serious threat to the environment. While they may be insignificant by themselves, cumulative impacts accumulate over time, from one or more sources and can result in the degradation of important resources.

Generally speaking, the Sub-City is an industrial zone, where the majority of the metal, paints, garment and food processing industries of Addis Ababa are found. However, coming to the project area, the economy has been largely agrarian inhabited by people engaged mainly in crop and livestock production. But, recently, there has been an encroachment of some other urban economic developments including industrialization.

Recent developments related to urban and industrial developments are changing the area fast into one of mixed and industrial land use. The construction of Heineken Beer Factory on 25ha of land has been completed. It is more than 3 years now since the Addis Ababa Science and Technology University has started operation on an area of 156 ha (with possibility of future expansion that includes the new Beijing-Turunesh Dibaba Hospital). The construction industry is now a very important economic sector in the project area. The construction of around 57,000 condominium housing units employing more than 1,000 workers has reached its finishing stage and a corner stone for the construction of another 50,000 condominium houses has been laid recently all in all occupying hundreds of hectares.

In addition to these, it has also to be noted that the project is located in one of the Upper Awash Basin areas and forms part of the Akaki River Sub-basin and watershed. The drainage from the project area forms part of the Big Akaki that drains the Eastern part of Addis Ababa area which

further to the south joins Little Akaki River that drains the western part of the Addis Ababa. The two rivers finally enter Abba Samuel Lake and form one of the biggest tributaries of the Awash.

As explained earlier, this sub-basin receives household, commercial and industrial wastes (solid, liquid and gaseous) of Addis Ababa, making it the most polluted sub-basin in the country. Great Akaki River unlike the Little Akaki River passes through residential and commercial areas in the northeastern and southeastern part of the city and is comparatively less polluted. However, the fast change into a mixed type of land use (residential, industrial, commercial, etc.) that is being witnessed in the area currently is expected to pose an ever more pollution threat to the biophysical and socioeconomic environment in and around the project area.

Determining a threshold beyond which cumulative effects significantly degrade a resource, ecosystem, or human community is sometimes very difficult because of a lack of data particularly in the case of the area affected by the project. However, whatever scant studies are available indicate that there are over 2,000 registered industries in Addis Ababa (65 % of all industries in the country) most of them located along the river banks. According to the Addis Ababa Environmental Protection Authority (2007, unpublished), 90% of all industries lack facilities for some degree of onsite treatment plant, and subsequently discharge any effluents into adjacent streams. Many industries do not have appropriate solid and liquid waste management and do not possess any treatment system. A number of other studies have also indicated that among the industries located in Addis Ababa, 90 to 96 percent discharge their waste without any form of treatment to nearby water bodies and open spaces (Zerayakob and Zeru, 1999; Mohammed, 2002; EPA, 2005; Tamiru et al., 2005). This situation has been the cause for serious health and environmental consequences which affect both human and aquatic life. The poor sewerage system, uses of old technology, low level of awareness on waste management, weak enforcement mechanisms on pollution prevention and control and low level of income of the city dwellers have aggravated the pollution problem and can be considered as the major constraints of wastewater management.

The fact that downstream the water of this sub-basin is intensively used for agricultural development (irrigated crop, vegetables and livestock) and is the basis of livelihood for the majority of the people residing downstream aggravates the situation further. Hence, the combined effects of pollution from past establishments, expected pollution from the IP itself

and future trends of increased pollution resulting in from changes in land use explained above makes cumulative pollution impact on the environment a major threat.

Whatever the case, discharge of untreated effluent from industries, solid wastes and wastewater from households and institutions, are the major sources of pollution of the rivers flowing through the city. For existing industries, pollution control mechanisms such as discharge permits and limits to the disposal of effluents into the environment should be enforced. It is recommended to properly treat effluents from the Kilinto IP as well. Regular samples of waste water should be taken from the inlet and the outlet of the common treatment facility for analysis to ascertain that the treatment plant of the proposed industrial park is properly functioning and rectify in case of failure to treat the industrial waste water to the required effluent standard set by the Ministry of Environment, Forest and climate change. The local and state governments should enhance public sensitization programs on hygiene, sanitation and environmental issues. These all require the implementation of mitigation and environmental and social management measures recommended in the next section.

## **7 MITIGATION MEASURES OF THE ANTICIPATED ENVIRONMENTAL IMPACTS**

### **7.1 General**

As indicated earlier, the implementation of the KIP creates a lot of opportunities for improvement of livelihood. Opportunities and chances in job creation and employment, training in different skills aimed at capacity building, many other opportunities for livelihood improvement, etc, to PAPs and surrounding populations and the wider potential benefits at national level related to export promotion, export substitution, etc, are huge.

However, there seems to be gaps and limitations in exploiting such a fertile ground for the livelihood restoration and improvement particularly with respect to the PAPs in the affected woredas at both woreda and sub-city level.

For instance, in-terms of livelihood restoration and improvement for PAPs, the KIP is fortunately enough having a very fertile ground. In addition to the KIP itself numerous development activities of different type and nature are being undertaken. However, there are evident gaps in harnessing such a potential and opportunity for the benefit of the PAPs as well as surrounding populations in terms of giving organizing, training and creation of businesses and enterprises required. This has been asserted by the PAPs during the consultation process and it is mainly due to lack of focus and the creation of capable organizations and institutions. Existing government organizational institutions and structures in Kaliti sub city seem to have been engulfed by the requirement of huge activities and performances to cop up with the numerous developments going around in the area and compensation and livelihood restoration and improvement actions that need to be performed in an urgent and ardent manner. The same may apply in the process of utilizing the opportunities created by the KIP at national level.

Hence, the following actions need to be taken properly by all responsible institutions and organizations in order to realize the benefits.

- Detail study of all opportunities and benefits expected in terms of volume and magnitude
- Study and establish institutions and organizations required at all levels that would enable positively exploit opportunities created in a better way
- Prepare detail plans of activities and interfaces required
- Assign appropriate personnel
- Implement training capacity building programs required to properly realize the opportunities of the IP

- Development of appropriate public/private business enterprises

The engagement of the public/private sector in studies and designs of the above is very important.

## **7.2 Mitigation Measures**

### **Basic Principles**

As it is a case of an establishment of an Industrial Park with the possibility of having different types industries the mitigation measures have been proposed in such a way that they apply mainly to the four categories of industries recommended by the master plan. But magnitude of impacts and desired specific mitigation measures can also differ depending on the nature and size of the industrial entity. The proposed mitigations measures can be used for the creation of awareness and training programs and have also been detailed in such a way that they can serve as an input to the tailored and detailed industry specific operation and safety manuals which need to be developed and the legislative and enforcing mechanisms that need to be implemented in the IP.

### **7.2.1 Impact mitigation measures for pre-construction phase**

#### **Land Acquisition and Loss of Housing and property and Income generation**

- Minimizing of land acquisition to what is essentially required, put it differently 100% of a farmer's grazing, crop land or settling home must not be taken otherwise he/she must be given equivalent crop or grazing land from similar farming zone.
- Lively hood restoration must be planned not compensation. This may include giving an appropriate share in the development projects. Basic training of skill which includes managerial and technical skill which enables the PAPs to be participant of the economy. A farmer must not be a guard on his father land.
- Implementation of proper resettlement for those PAPs who lost their housings in areas not far away. This enables them to rebuild their economy and culture.

#### **Livelihood and Socio Cultural Aspects**

In order to mitigate the livelihood and social impacts that emanate from the implementation of the KIP as discussed in the previous chapter, implementation of a comprehensive package/program for livelihood restoration through capacity buildings and tailored trainings will be important. These have to be designed in such a way that will allow PAPs

- To get employment in the potential on-site job opportunities that will be created in the industries proper.

- To get employments in the many other off-site job opportunities expected to flourish in the provision of different services required for the huge population to be employed in the KIP at different income levels such as catering for food and lodging, shopping, entertainment, hair dressing, laundry, etc.
- To be self-employed in the different areas of business such as hotel, product distributor and urban agriculture activities such as dairy, fattening, chicken farm, etc which are very prospective in terms of existing and future demand for their produces.

Employment in the proposed industrial park and in the other proposed areas of work should not be viewed as something very sophisticated. As per the assessment of the education profile of the PAPs, there are tens and hundreds of PAPs who already have basic education which can serve as a springboard for the trainings and capacity buildings required to be engaged in many of the jobs to be created. Short-term training assessments have been conducted by the consultant with the collaboration of the Technical and Vocational Educational Training (TVETs) and the Woreda Micro and Small Scale Enterprises Promotion Office which assert the possibility of realizing the proposed livelihood restoration program.

It has to be clearly endorsed institutionally that, given the same skill and capability to handle a job, priority of employment in this respect has to be given to PAPs who have lost their means of income fully or partially due to land acquisition by IP. Gaps have already been witnessed in such arrangement which requires clear motivation and dedication on the part of government organs to create necessary awareness and readiness among PAPs.

Institutional interface designed to implement such a program among relevant sectors is already being entertained by Akaki-Kaliti Sub city. It has to be dully encouraged and supported by institutional mechanisms to make it practical.

Awareness and sensitizing programs by way of organizing meetings and workshops need to be implemented to enable the surrounding population and PAPs to protect and distance themselves from undesirable engagements that violate cultural norms and attitudes to work negatively.

### **7.2.2 Construction Phase Mitigation Measures**

The proposed mitigation measures for the associated potential impacts during the construction phase are addressed below.

#### **(i) Air Quality**

The main potential sources of emission are from combustion engines and dust, during construction related activities. These emissions will be short termed and local. Measures to prevent dust and GHG emissions from becoming a source of nuisance include:

- Implementation of best available technology (BAT);
- Regular maintenance of vehicle and construction equipment to keep the engines in good operating condition to reduce emission from internal combustion engines;
- Construction site shall be periodically dampened with water to minimize dust;
- Regular maintenance of vehicle and construction equipment to keep the engines in good operating condition to reduce emission from internal combustion engines;
- Use of road/ground watering equipment and observation of speed limits in unpaved areas as necessary in dry conditions to reduce dust emissions;
- Training of workforce in safe driving practices that reduces both the risk of accidents and fuel consumption including measured acceleration and driving within safe speed limit;
- Maintenance of plant and vehicles in good working order, e.g., exhausts, tyres etc;
- turning off engines when not in use, and
- Designation of transport routes to minimize distance travelled and overall fuel use and emissions;

#### (ii) Noise

Site workers requiring hear protection devices shall be provided with it and the use shall been forced. Noise sensitive areas clearly delineated with a ‘NO NOISE” sign post, and construction activities should be restricted to daytime to avoid irritation of neighbouring communities.

Diesel engine construction equipment should be fitted with silencers, and heavy vehicle movements prohibited at night.

#### (iii) Water pollution mitigation measures

- Domestic wastewater from the operations of the workers should be collected and treated into the septic tank before being discharged to the environment. Mobile toilets are used as an impact mitigation measure for domestic wastewater of workers.
- To repair, maintain and replace the construction equipment accessories, oil, etc., must be collected comprehensively to avoid unexpected spilling on site.
- To design rainwater drainage ditches surrounding the site to prevent from contamination of impurities before discharging to the environment

#### (iv) Mitigation Measures for Impacts of SW and HW

Solid waste, during construction phase, damages building materials such as rubble, sand and gravel, dead cement, the waste external protection devices, etc and domestic waste of workers on site as protective objects, cement bags, etc. The SW must be treated in a regular, concentrated and classified manner.

Construction waste: Limit to generate waste in construction by reasonable calculation and use of raw materials; reminding workers the sense of saving, strict management and supervision of the works. The waste is inert, non- toxic such as broken bricks, sand residual sand and soil which will be used for site clearance. The Contractors shall collect, classify and store construction waste regularly in the prescribed locations on site. The storage locations must be convenient for dumping. They should be designed with hard walls, cover, and temporary drainage ditches, etc to avoid losses and leakage of waste into the environment. The construction waste will be transported every day to proper sites. Other wastes such as cement bags, protective equipment, steel pieces, welding rods, etc are collected and transported to designated places for reuse or resale to the wanting units. The contractors shall sign the contracts with the functional units which are specialized in transportation of waste under strict and regular supervision of the Project Management Unit, to avoid illegal dump of construction waste.

Domestic waste will be collected in dust bins near the tents and temporary works to secure to protect the environment and hygiene and to sign the contracts with the local Environment Service Suppliers to collect and dispose waste under current regulations.

The created hazardous solid waste such as oily rags and wasted oil must be collected in the specialized storage tanks and cans with sealed cover to secure hygienic storage and treated by hired functional agencies.

#### (v) Ground Water Quality

As the construction activities are not expected to impact adversely on groundwater flow and quality, no mitigation measures are recommended. However, the handling, storage and disposal of materials and wastes at all stages of the construction of the facility should be based on the ESMP developed for the project. Training on safe practices for personnel involved in handling, storage and disposal of materials and wastes should be provided.

The regular maintenance and inspection of equipment and vehicles will be ensured to prevent potential sources of leaks.

#### (vi) Soil Quality



Mitigation measures for the management of erosion and soil contamination will include:

- Application of appropriate erosion protection measures including river training methods on Idoro and Kerso Deso Rivers; such as concrete blocks revetment, and stone gabion mattress, would be considered depending on the slope, types of soil of the river bank, amount of discharge, and velocity of the flow and appropriate method of improvement should be employed.
- careful execution of excavation works under aggressive weather conditions(rains, strong winds);
- storage of any hazardous wastes, as well as sanitary and cleaning wastes shall be done in storage facilities (tanks/containers) and at approved sites;
- Tanks for fuel storage shall be leak proof and installed on concrete platform with gutters and grease separators. Fuel storage tanks shall be checked daily and in case of leakage will be replaced until repaired;
- Treatment of waste water from maintenance workshops in oil separators prior to discharge, and
- In case of any contamination, removal of contaminated soil and treatment/disposal of in a manner appropriate to the type of contamination.



Figure 16: stone Gabion Mattress

#### (vii) Socio-economics

Construction of the IP will have a positive impact on the state and local government economies. New jobs will be created and these beneficial impacts shall be enhanced through the adoption of policies that encourage hiring, as practicable, of appropriately qualified workers from areas in the vicinity of the project for non-specialized positions.

(viii) Cultural Resources

There are no known historical or archaeological sites within the proposed project site. The probability of discovering historical or archaeological resources during construction activities is low. However, in the event of a discovery, qualified personnel will be retained to evaluate the find.

### **7.2.3 Operation phase mitigation measures**

(i) Control of Pollution by Wastewater

- Efficient utilization and reuse of water as required. Only essential amount shall be used for the different industrial purposes and consumptions since uncontrolled utilization of water means production of more wastewater which makes pre-treatment and treatment more difficult and expensive.
- Good housekeeping by way of appropriate storage of any oil and grease, toxic materials and making industrial plant clean and neat by cleaning and removing greases and other lubricants from machines and any spills on floors that can be easily washed by water is very important.
- Pre-treatment at the level of each plant in as much as possible. Primary treatment at plant level is very important. Particularly, a lot can be done with physical characteristics. Wastewater usually contains large quantities of floating rubbish. Floating matter, matter in suspension, colloidal matter can be removed by metal bars, coarse or fine screens, trickling filters, grit chambers, grease traps, plain sedimentation tanks.
- Provision of separate drainage for rain water and sewage to prevent overflow of sewage with rain water

### **Technical Specification of the ZLD WWTP**

As it is clearly stated above, the impacts during operation phase of the industrial park are mainly solid and liquid wastes. The wastes will pollute the air, land and water (surface and ground water). There is a great potential risk of contamination of the natural resources due to contaminants and pollutants that emanate from the different activities of the IP at both construction and operation Stages. However pollution during the operation stage is the most significant.

### **Mitigation measures for wastewater generated from the factory**

The proposed KIP will employ a “Zero Liquid Discharge” treatment plant with a capacity of 14,000m<sup>3</sup>/day, for the details please refer the design document separately attached with this ESIA. Design criteria are presented for each component of Effluent Treatment Plant (ETP) for each design discipline including Process, Civil, Electro-mechanical. These Design criteria will be applied to the

tasks identified ZLD Plant and will be used to perform final design of the plant.

#### **Plant Flow Details**

S.no	Parameter	Value	Remarks
1	Raw Effluent Inflow	14000 Cum/Day	
2	Recovered Water outflow	13810 Cum/ Day	
3	Recovery (%)	98.0%	Moisture Loss in Sludge, salt etc.

#### **Process Description**

##### **Receiving Chamber**

The sewage from the factory shed will be collected through the closed piping network from the entire park by gravity to the receiving chamber in the ZLD plant. A coarse bar screen chamber is installed in the inlet point at receiving chamber to remove the solids and other foreign materials from the sewage and then the sewage is pumped to the screen and grit chambers by sewage lifting pumps.

Specification:

##### **Stilling Chamber**

The stilling chamber is provided to reduce the velocity of sewage which helps in further carryover of sand and soil with grit materials.

##### **Bar Screen Chamber**

Coarse screen & Fine Screen including automatic bar screen raking systems provided for removal of rags, sticks, large solids and other debris ranging from 0.25 to 6 inches. They can be as simple as a trash rack or as complicated as a mechanically cleaned bar screen. The simplicity of design and efficient debris handling make it an ideal solution for cost-effective screening of water and wastewater.

##### **Grit removal Chamber**

Further fine screened sewage pass through grit chamber to settle down sand particles, clay soil, and grit. The grit is drained from the bottom and disposed to municipal wastes sites combine with screened materials.

##### **Equalization Tank**

The sewage received from the industry comprises of various quality and it needs a proper homogenization before its feeding to the further treatment process. The equalization tank is provided with Surface Jet Aerators for proper mixing to ensure the homogenization of the sewage and also to avoid the septic conditions, smell problem and sedimentation of solids in to the tank. pH correction dosing system is provided for the correction of pH at the outlet of Equalized Effluent Transfer Pump.



### **Jet Mixer**

### **Pipe Flocculator**

The coiled pipe flocculator is a novel concept, which facilitates accelerated flocculation with flocs having extremely low variation in size distribution, shape and structure. This phenomenon strongly improves settling or rising characteristics, thus having a favorable effect on the subsequent flotation or sedimentation process.

In conventional flocculators, the settling or rising properties are effects of short-circuiting flows and back mixing, three to five times longer residence time is often required. The pipe flocculator circumvents these problems and results in accelerated flocculation with the extremely flocculated particle. The residence time in the pipe flocculator is normally under half a minute. Thus, the strongly improved settling or rising characteristics have a favorable effect on the subsequent flotation or sedimentation process.



### **High Efficiency Air Flotation**

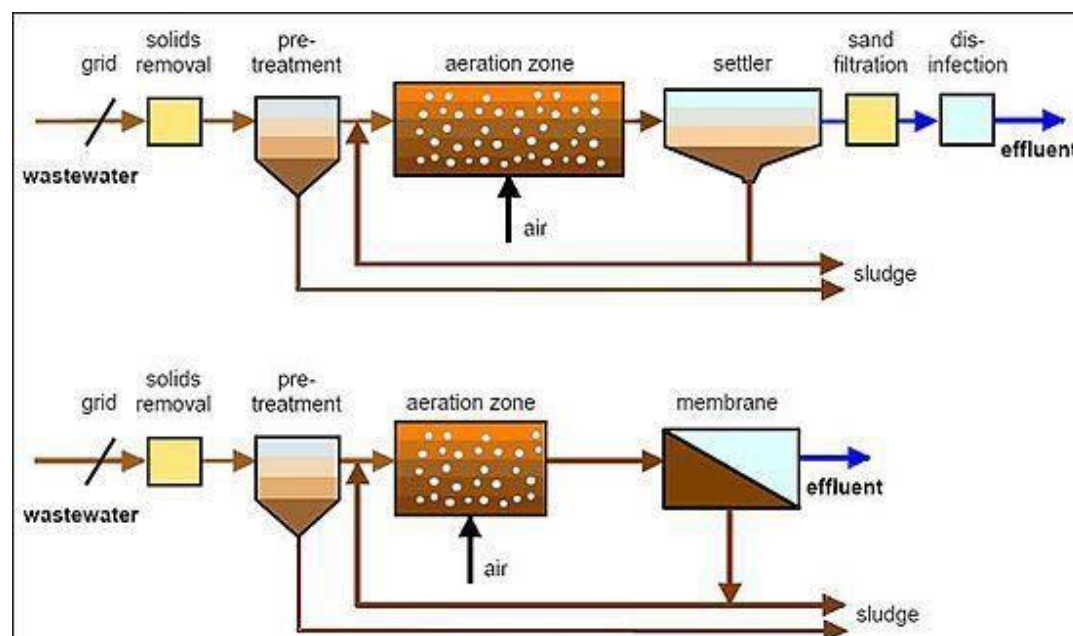
High Efficiency Air Flotation technology is the process where suspended solids, oils & greases, and other insoluble impurities are separated from water slurries by a process of dissolving air into water under pressure. Upon release of the pressure, microbubbles form. These micro-bubbles interact with the particles to cause them to float to the surface of a vessel where they are skimmed and separated. This stage is also expected to reduce BOD and COD by about 30%.

Dissolved air flotation (HEAF) is a water treatment process that clarifies wastewaters (or other waters) by the removal of suspended matter such as oil or solids. The removal is achieved by dissolving air in

the water or wastewater under pressure and then releasing the air at atmospheric pressure in a flotation tank or basin. The released air forms tiny bubbles which adhere to the suspended matter causing the suspended matter to float to the surface of the water where it may then be removed by a skimming device. The feed water to the HEAF float tank is often (but not always) dosed with a coagulant to coagulate the colloidal particles and/or a flocculant to conglomerate the particles into bigger clusters. A portion of the clarified sewage water leaving the HEAF tank is pumped into a small pressure vessel (called the Air Saturation Vessel) into which compressed air is also introduced. This results in saturating the pressurized sewage water with micron air bubble.

### MBR-Membrane Bio Reactor

MBR processes can produce sewage of high quality enough to be discharged to coastal, surface or brackish waterways or to be reclaimed for urban irrigation. Other advantages of MBRs over conventional processes include small footprint, easy retrofit and upgrade of old wastewater treatment plants. It is possible to operate MBR processes at higher mixed liquor suspended solids (MLSS) concentrations compared to conventional settlement separation systems, thus reducing the reactor volume to achieve the same loading rate. Two MBR configurations exist: internal/submerged, where the membranes are immersed in and integral to the biological reactor; and external/side stream, where membranes are a separate unit process requiring an intermediate pumping step.



**Fig - Schematic of conventional activated sludge process (top) and external (side stream) membrane bioreactor (bottom)**

Recent technical innovation and significant membrane cost reduction have enabled MBRs to become an established process option to treat wastewaters. As a result, the MBR process has now become an attractive option for the treatment and reuse of industrial and municipal wastewaters, as evidenced by their constantly rising numbers and capacity.

Membrane bioreactors can be used to reduce the footprint of an activated sludge sewage treatment system by removing some of the liquid component of the mixed liquor. This leaves a concentrated waste product that is then treated using the activated sludge process. As compared to traditional waste water treatment technologies, MBR has the following advantages:

- Effective and efficient separation of solids and liquids, resulting in higher quality permeate

This permeate of near zero turbidity can be directly reused, thus achieving maximum resource utilization.

- The retention of microbes within the MBR leads to more flexible / reliable operations as HRT (Hydraulic Retention Time) and SRT (Sludge Retention Time) can be processed independently.
- Highly concentrated microorganisms in the MBR that minimize the loading impact from the fluctuation of feed water with varying quality.
- More favourable for the retention, cultivation and reproduction of slow-growing nitrifying bacteria thus improving the nitrifying effect of the treatment system resulting in improved biological treatment process.
- Longer SRT as compared to traditional processes. Membrane separation allows for the improved degradation of macro organic compounds (especially those that are not easily degradable).
- MBR with high volume loading, low sludge loading and long SRT, will realize a reduction of sludge discharge.
- Land area requirements are significantly reduced with the elimination of secondary clarifiers. Full automation of MBR systems can be achieved by PLC control.

### **CIP Cleaning**

Similar to the filtration medium the cleaning solution is fed into circulation through the membrane from the feed side. For this purpose, either the circulation pump or a separate cleaning pump can be used. Clear effluent from MBR outlet will be disposal quality will meet standards specified by desired quality.

### **MBR Permeate Tank**

MBR Permeate Tank is provided for the storage of treated water.

### **Disinfection**

Hypo solution dosed at outlet of MBR permeate to removal of pathogens, fecal coliform etc. disinfected for RO feed.

### **Sludge management**

The Chemical sludge from High efficiency Air flotation system feed the Centrifuge for further dewatering. The Biological Sludge from aeration tank taken into sludge thickener for Sludge thickening. After Thickening the sludge feed into the Centrifuge for further dewatering.

The dewatered sludge cake from centrifuge sent for disposal to sludge Storage yard.

### **RO -1 System**

The feed water shall be pumped by means of a RO Feed pump & high pressure pump through the MCF followed membrane assembly. With required pressure and flow, water passes through RO module. The permeate water will be available as permeate from RO system and balance will be in reject stream which will be treated in second stage RO. Antiscalent, SMBS and Acid dosing system will be provided for proper functioning of RO system. For cleaning of RO membranes CIP system will be provided.

### **RO-2 Feed Tank**

The RO- 1 reject will be stored in RO-2 feed tank & feed to RO -2 stream.

### **RO -2 System**

The RO-1 reject water shall be pumped by means of a RO Feed pump & high pressure pump through

the MCF followed membrane assembly. With required pressure and flow, water passes through RO module. The permeate water will be available as permeate from RO system and balance will be in reject stream which will be treated in third Stage RO. Antiscalent, SMBS and Acid dosing system will be provided for proper functioning of RO system. For cleaning of RO membranes CIP system will be provided.

#### **Hardness Removal system (HRSCC)**

Before feeding to RO-3 System, this reject water is further treated for NaOH – Na<sub>2</sub>CO<sub>3</sub> hardness removal process to safeguard the membrane from the carbonate scaling. High Rate Solids Contact Clarifier is widely used for clarification of raw water and wastewater. It incorporates the design of internal solid recirculation thereby optimizing the chemical consumption and making it more economical than conventional filter. Raw water entering the reactivator is immediately mixed with previously formed precipitates and chemicals, obtaining intimate contact with solids for the full retention time provided in the mixing zone. By the time the water enters the outer settling zone, the bulk of the precipitate particles are large, dense and settle rapidly. It is necessary to maintain a deep bed of accumulated precipitates in the settling zone, as required by sludge blanket units, since sufficient solids contact has been achieved before the water enter this zone. Only enough sludge is accumulated to maintain optimum solids concentration in the recirculation zone, generally 8 –10 feet of clear water is available below the outer treated water collector. Sludge carry over possibilities due to sudden increases in flow rate or to periods of improper chemical treatment are minimized.

#### **Features**

- Flash mixer, flocculation and thickener mechanism are inbuilt.
- Intimate and prolonged contact with large quantities of previously formed floc which act as seed or nuclei
- Positive uniform recirculation up to 15 times of inlet flow
- Inbuilt thickening pickets concentrate the settled sludge.

#### **Pressure sand filter**

Clarified water from the primary clarifier is feed to filter. Filter is ideal for filtration of water having very fine suspended matter like mud, rust particles and biological growth. Filter is a vessel constructed of welded mild steel and provided with manhole with cover / top and bottom flanged covers, supports, raw water distributor, under drain collection and backwash water jet system. Treated water flows downwards through the filter bed, and the turbidity and Suspended matter is retained on the sand surface. Filtered water is evenly collected by an under drain system in the bottom of the vessel and flows through the outlet to service. At normal flow-rates a clean filter bed presents little resistance to the passage of water but the suspended matter is removed from the water, steady rise in the loss of head occurs across the bed. Cleaning of filter bed is effected by passing a reverse upward flow of water through the filter for approximately 3 to 5 minutes.

#### **RO -3 System**

The RO-2 reject water shall be pumped by means of a RO Feed pump & high pressure pump through the MCF followed membrane assembly. With required pressure and flow, water passes through RO module. The permeate water will be available as permeate from RO system and balance will be in reject stream which will be further treat into crystallizer. Antiscalent, SMBS and Acid dosing system will be provided for proper functioning of RO system. For cleaning of RO membranes CIP system will be provided.

#### **RO Permeate Tank**

RO permeate tank is provided for the storage of RO permeate, which is collected from RO-1, RO-2, RO-3 stream.

### **Crystallizer**

The crystallizer is a multi-stage thermal separation system. The flash evaporator is a forced circulation suppressed boiling evaporator utilizing a shell and tube heat exchanger to heat the product to above its boiling temperature. Boiling is prevented from taking place on the heat transfer area by applying a backpressure to the outlet and the product is then flashed into a separator. The flash vapors that result is condensed in a surface condenser and the concentrated product is pumped out of the separator.

For products, which tend to crystallize during concentration or those that contain a high percentage of suspended solids, flash evaporation is the most suitable method. This compact unit combines a heat exchanger, an external separator, and a vacuum system with a condenser for vapors generated. It is designed to operate as a forced circulation, suppressed boiling evaporator.

By using liquid static head above the heat exchanger or a special orifice piece in the discharge line, vaporization is arrested until the product liquor flashes into the separator. Any crystallization then occurs and a suspended slurry results. High liquid velocity flow combined with induced turbulence deters scaling on heat transfer surfaces, and promotes longer production runs.

The solution with crystals is taken to centrifuge for salt separation and the salts are reused in the process.

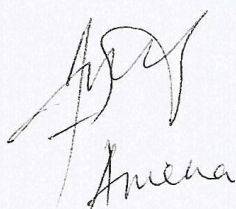


Design Parameters for ZLD based Common Effluent Treatment Plant (CETP) of Killinto IP

S.No	Parameter	Unit	Before treatment	After treatment	Remark
1	Temperature	°C		40	
2	pH		7.0-9.0	6.5-8	
3	BOD5 at 20°C	mg/l	300-500	<5	
4	COD	mg/l	1,500-2,000	<15	
5	Total phosphorus (as P)	mg/l	12	<1	
6	Total nitrogen (as N)	mg/l	76	<5	
7	Total Suspended solids	mg/l	200-350	BDL	
8	Oils, fats, and greases	mg/l	10	BDL	
9	Absorbable organic halogen compounds (AOX)	mg/l	6	BDL	
10	Organochlorines	mg/l	1	BDL	
11	Active ingredient each	mg/l		BDL	
12	Arsenic (as As)	mg/l	0.5	BDL	
13	Chromium (as total Cr)	mg/l	1	BDL	
14	Chromium (as Cr VI)	mg/l	0.5	BDL	
15	Phenols	mg/l	5	BDL	
16	Copper (as Cu)	mg/l	2	BDL	
17	Mercury (as Hg)	mg/l	0.05	BDL	
18	Color	Ptcb scale	<100	colorless	
19	TDS	mg/l	3,000-5,000	<400	
20	Benzene, Toluene & xylene combined	mg/l	7	BDL	

**N.B.**

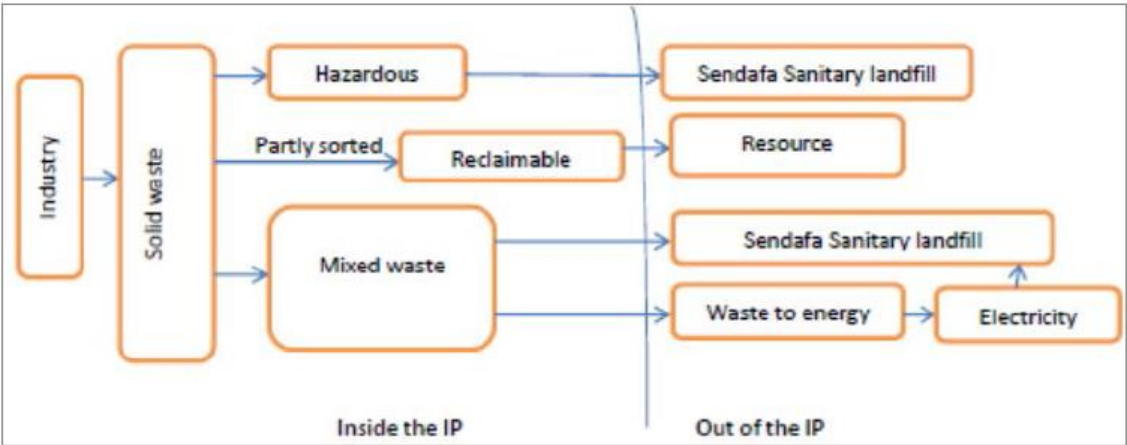
- Previously communicated design parameters were based on the assumption that the industry park will include both API & Formulation pharmaceutical industries. But now it has been proved that there are only formulations.
- All industries discharging their industrial effluents are supposed to release their effluents to the CETP after doing their preliminary actions like solvent recovery and toxic treatment systems so that the quality of the effluent will match to the above values.

  
Anura

Given that most significant environmental and social concerns are associated with the operational phases of the pharmaceutical industries, the WB's Environment, Health and Safety Guideline for pharmaceuticals and biotechnology manufacturing will also be applicable as part of the proposed ZLD WWTP.

**(ii) Control of Solid Waste (Both hazardous and non-hazardous)**

The solid waste generated by move-in factories of the industrial park shall be collected and source sorted on site, transported and temporarily stored at the transfer station. The solid waste collected at the transfer station shall be further sorted according to its type and reclaimable materials will be diverted to recycling and the residual and hazardous wastes hauled for a disposal to the municipal landfill.



Planned sorting, collecting and recycling system for the industrial waste

A sufficient space for storing a waste for three days shall be secured for transfer station and facilities. The waste generated within the KIP can be classified into combustible, incombustible, hazardous, domestic and recyclable wastes. According to the waste management standard of the municipality, the waste can be first collected in accordance with its type and then sent to the existing landfill area for final disposal.

**Disposal**

The solid wastes from the wastewater treatment plants and organic wastes from different units of the factory are proposed to be composed and given to the surrounding farmers while the non-recyclable wastes will be disposed to the municipality sanitary landfills and agreement must be made with city government.

Implementation of an appropriate waste management program and facilities is very essential. Adequate drainage, sanitation and waste disposal should be provided at workplaces through maintaining appropriate waste disposal systems for solid, liquid and hazardous wastes. This includes the implementation of central WWTP, transfer stations for solid waste and proper management and disposal of hazardous waste. Maintaining sanitary conditions in camp sites and work places and provision of sanitation facilities to the workers is also very crucial

Installation of proper solid waste management based on ‘three R’s – Reduce, Reuse and Recycle before destruction and maintaining safe storage of waste at the level of each industrial plant, public buildings and other areas within the IP is a very important control measure to start with.

- Reduction on use of raw materials: This will correspondingly decrease the production of waste.
- Reuse of waste materials: Refillable containers which are discarded after used can be re used.
- Recycling of materials in the reprocessing of discarded materials into new useful products.
- Where possible installation of composting technology, devices and equipment should be encouraged at plant and IP level where conditions of type of waste generated are suitable as compost raw materials. This can be practical in the food and beverage industries.

All in all, the process of reducing, reusing and recycling saves money, energy, raw materials, land space and also reduce pollution. After all these processes the IP should dispose of any remaining solid waste (hazardous and non-hazardous) in their appropriate separate spaces. No solid waste shall be dumped in open spaces and along the banks of streams or in the streams and rivers themselves.

The IP management would be responsible for the collection, storage and disposal of solid waste at the IP level but each factory would be charged for the waste management cost. Each factory would also be obliged to collect and segregate its waste and expected to have standard waste bins. The frequency of waste collection will depend on the characteristics of the waste: organic waste would be collected daily but non-degradable materials can be collected twice or three times per week. Hazardous waste would be collected once in a month but the exact schedules can be fixed after studying the generation rate of the waste.

Resource recycling facility will be available in the IP. The purpose is to maximize the eco-efficiency of the whole area. This facility will implement a central sorting and recycling for both non-hazardous industrial and municipal solid waste. Main functions include:

- Operating as a transfer station: The transfer station sorts and recycles industrial and municipal waste such as waste glass, waste plastic and waste paper. The transfer station can get not only economic benefit from resource recovery and decrease the amount of waste for transportation, but also can gain environmental benefit by

reducing the amount of solid waste sent to the landfill. However, if not managed well, this station may be a potential source of pollution to the local surrounding, such as dust. Consequently, the transfer station will be designed as a closed facility.

- Treating wastes and turning them into new resources.
- Selling new products reclaimed from wastes.
- Providing storage facilities for those wastes with large amounts and potential value but irreclaimable currently, such as waste batteries.

### **Mitigation measures for impacts on health**

- Conducting awareness creation and training programs to workers on machine and equipment handling and safety measures.
- Awareness creation program for drivers and other machine operators to show maximum restraint and discipline with regards to saving life and property;
- Awareness creation of safety measures of surrounding communities in collaboration with the administration and traffic police;
- Provide all necessary protection gadgets, equipment and clothing materials to workers which are prone to hazardous risks and enforce their use;
- A clause of instructions on safety and protection measures that is normally provided as part of the ESIA should be to design and bid documents during the construction phase;
- Put signboards that show necessary protection and safety measures at appropriate locations inside and outside the IP. Signboards should also be utilized for traffic safety precautions with established speed limits.

With regards to potential health impacts implementation of a proper Health Extension Program that works on:

- Preventive medical care
- Availing First Aid Kits
- Training and awareness on prevention and treatment of HI V/AIDs and other Sexually transmitted diseases (STDs).
- Handling waste and waste disposal shall be given to workers at both construction and operation phase of the IP.

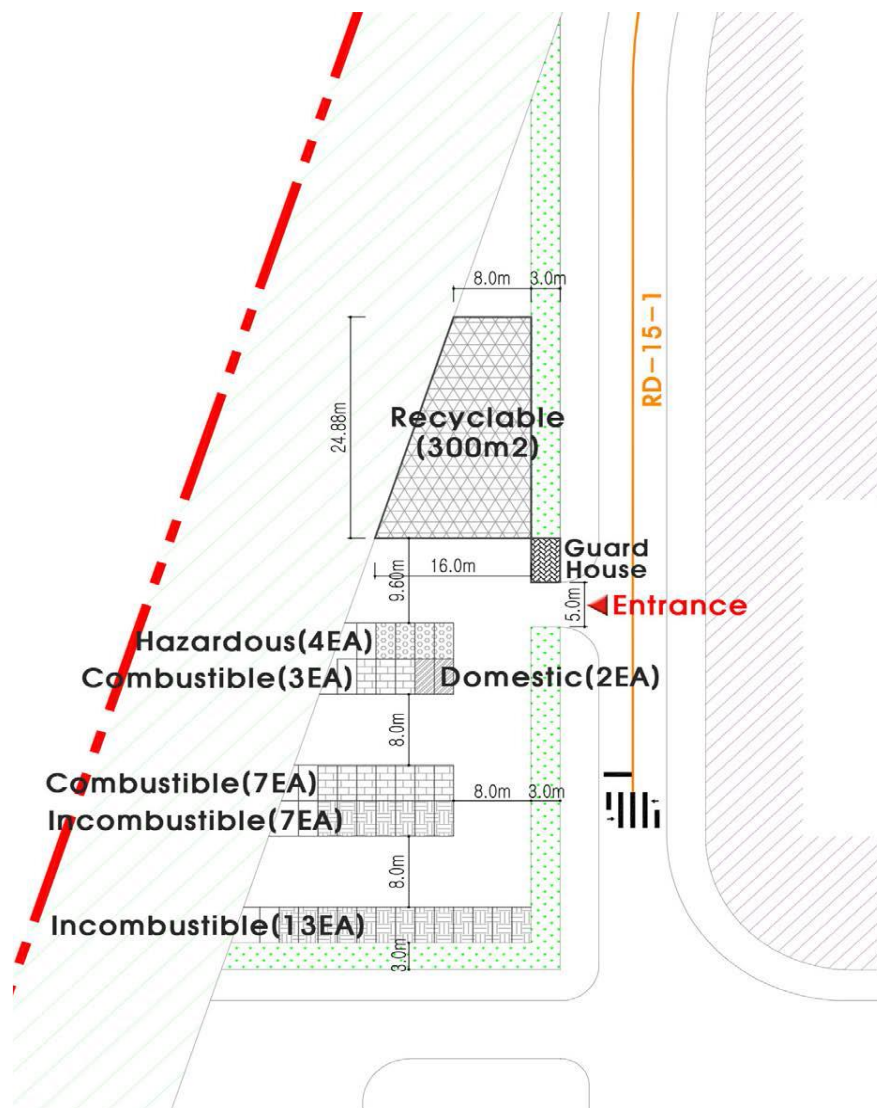


Figure 17: layout design of transfer stations

Landfills are the most common way of waste disposal and important component of an integrated waste management system. The currently operational waste disposal site ('*koshe*') is located approximately 13km.

#### *Mitigation of Air Pollution*

Air pollution control from fixed sources may be accomplished by two fundamental approaches, which are categorized as control by dilution in the atmosphere by dispersion, or control at the source designed to reduce the air pollution emitted to the bare minimum.

- **Control by dilution in the atmosphere by dispersion:** The most positive way to abate air pollution is to prevent it. However, if available, smock stacks can be used to reduce ground level concentration of pollutants by giving natural atmospheric turbulence an



opportunity to dilute the pollutant before it reaches ground level receptors in harmful concentrations.

- **Control at source:** This may be accomplished by controlling the pollutant from coming into existence or by destroying, altering, trapping it before it reaches the atmosphere.
- Measures such as source relocation, source shutdown, fuel or energy substitution, process changes, good operating practices, and utilization of air pollution control devices or techniques can be implemented as deemed necessary and as per standard regulations in place in the IP.
- Vehicular pollution can be checked by regular tune-up of engines; replacement of more polluting old vehicles; installing catalytic converters; by engine modification to have fuel efficient (lean) mixtures to reduce CO and hydrocarbon emissions; etc.
- Using mass transport systems for workers and residences around can be used as mechanism. Given the topography bicycles and other low fuel consuming transport systems can be important.
- Using biological filters and bio-scrubbers
- Planting more trees especially appropriate implementation of the green areas and parks recommended by the Kilinto IP master plan.
- Open burning of vegetation and other solid waste should, where possible, be avoided.
- Protect and enhance sinks and reservoirs of greenhouse gases (GHGs);
- Carry out continuous air emissions monitoring; and
- Regular dust suppression with water sprinkler on the haul roads will be practiced;

Last but not least, as a regulatory measure, emission standards set by the Ministry of Environment, Forest and Climate change, formerly Ethiopian Environmental Protection Authority have to be strictly followed.

#### *Mitigation of Noise Pollution*

- **Reduction in sources of noise:** Sources of noise pollution like heavy vehicles and old vehicles have to be restricted to areas which are far from public offices and facilities, residences and far from areas where concentration of industrial workers as well as community residences are located.
- Noise making machines should be kept in **containers with sound absorbing media** to interrupt the noise path.
- Proper **oiling** will reduce the noise from machinery
- **Use of sound absorbing silencer** by using various types of fibrous materials can be used
- **Planting more trees** having broad leaves is also recommended.

- Appropriate signs should be placed at areas where hearing protection for staff will be required;
- Workers operating the power generators will be provided with hearing protection in areas with high noise levels,

#### *Mitigation of Soil Erosion*

Though much of the area is not any more expected to continue as a crop production area where soil erosion could be serious, still efforts have to be made to reduce soil erosion and loss of fertile top soil since a reasonable portion of the IP is expected to serve as a green and park area with a lot of plantation work where soil condition matters.

#### *Occupational Health (Health and safety of Workers)*

Issues related to the mitigation of potential occupational health and safety of workers and the community are many and very much varied. As indicated earlier they have to be addressed by the implementation of awareness creation and trainings and the development of industry type and nature tailored best practice guidelines and health and safety manuals as is common in countries that operate well planned and studied and designed to IPs.

They can only be general and have to address appropriateness of general facility design and operation from the outset and other potential problems related to

- Gaps in communication and training programs
- Installed preventive measures for the different type of industrial hazards (physical, chemical, biological, radiological, special hazard environments) and their monitoring.
- Water Quality and Availability, Structural Safety of Project Infrastructure, Life and Fire Safety (L&FS), Traffic Safety, Transport of Hazardous Materials, Disease Prevention, Emergency Preparedness and Response
- Personal Protective Equipment (PPE)

Giving the details of the mitigation of each and every potential problem in the area of occupational and community health and safety at a level of IP planning makes it very difficult. It will be cumbersome and will make the ESIA document amorphous. Rather, as indicated earlier the development of regulations and tailored manuals for an industrial category or each specific industry as deemed necessary in the following areas is recommended.

- **Responsibilities** with respect to enforcement and management of regulations and manuals, safety policy and safety management
- **Occupation Health and Safety** with respect to protection of employees, warning signs, mandatory signs, occupational risks, occupational precautions, housekeeping, etc, etc.

- **Public Health** with respect to prohibited discharge, littering, infections, sanitary facilities, medical examination and availability and nature of health services to be provided
- **Fire Regulations:** protection, prevention, control and action
- **Electrical Regulations:** workmanship & material, conductors, over-current protective devices, etc.
- **General Guideline notes for indoor/outdoor premises**

#### *Socio-economic*

The IP is expected to contribute to the socio-economic enhancement of the surrounding area, specifically in employment generation, which will result in increased earnings for local artisans and small-scale businesses. However, the following negative socio-economic effects are likely:

- Socio-cultural conflicts between industries/contractor personnel and stakeholder communities due to difference in customs and beliefs;
- Changes in demographic/socio-cultural pattern leading to degradation of cultural values in local communities; and
- Pressure on existing infrastructure.

Measures in place to mitigate these possible impacts include:

- Continued consultation with the local communities to understand customs and beliefs;
- Education of non-local workers on the socio-cultural norms of and on proper conduct within stakeholder communities prior to mobilization and commencement of operations;
- Provision of follow-up awareness training of workers regarding the importance of proper conduct within the stakeholder communities, and
- Hiring, as practicable, appropriately qualified workers from the communities in the vicinity of the project for possible specialized and non-specialized positions.

#### **Public Safety**

With regards to public safety, IPDC will ensure the following:

- adequate protection and signalling of work environment (loading and hauling) in particular with clear markings of the safety boarders on the work perimeter;
- establishment of traffic plans at location of (partial) blockage of roads and implementation of appropriate traffic control at such locations;
- Prohibition of access to work sites by any person not having a permit to work, in particular where it concerns areas marked as 'restricted'. The latter shall include at least



places occupied by operating mechanical and electrical equipment, open trenches, manholes and chambers.

**Table 14: Examples of industrial wastes: Their origin, character and treatment**

<b>No.</b>	<b>Industries producing wastes</b>	<b>Origin of major wastes</b>	<b>Major Characteristics</b>	<b>Major treatment and disposal methods</b>
<b>1</b>	Dairy products	Dilutions of whole milk, separated milk, butter milk and ghee	High in dissolved organic matter, mainly protein, fat and lactose	Biological treatment by trickling filtration, activated sludge
<b>2</b>	Brewed and distilled beverages	Steeping and pressing grain, residue from distillation of alcohol condensed from spillage evaporation	High in dissolved organic solids, containing nitrogen or their fermented products	Recovery, concentration centrifugation and evaporation, trickling filtration, used feeds, digestion of slops
<b>3</b>	Meat and poultry products	Stockyards, slaughtering of bones and fats, residues of concentrates, grease and wash water, picking chickens	High in dissolved and suspended organic matter, blood, other proteins and fats	Screening, settling and/flotation, trickling filtration
<b>4</b>	Canned goods	Trimming, cutting, juicing and blanching of fruits and vegetables	High suspended solids, colloidal and dissolved organic matter	Screening, lagooning, soaking absorption or spray irrigation
<b>5</b>	Pharmaceutical products	Mycelium, spent filtrate and wash waters	High in suspended and dissolved organic matter including vitamins	Evaporation drying feed
<b>6</b>	Coffee processing	Pulping and fermenting of coffee bean	High BOD and suspended solids	Screening, settling and trickling filtration
<b>7</b>	Soft drinks	Bottle washing, floor and equipment cleaning, syrup storage tank drains	High pH, suspended solids and BOD	Screening, plus discharge in municipal sewer.

<b>No.</b>	<b>Industries producing wastes</b>	<b>Origin of major wastes</b>	<b>Major Characteristics</b>	<b>Major treatment and disposal methods</b>
<b>8</b>	Bakeries	Washing and greasing of pans, floor washings	High BOD, grease floor washings, sugar, flour and detergents	Amenable to biological oxidation.
<b>9</b>	Glass works	Polishing and cleaning of glass	Red colour, Alkaline non-settle able suspended solids	Calcium chloride precipitation.
<b>10</b>	Wood preserving	Steam condensates	High in COD, BOD, solids, phenols	Chemical coagulation, oxidation, pond and other aerobic biological treatment.
<b>11</b>	Plywood manufacturing	Glue washing	High BOD, pH, phenols, potential toxicity.	Settling ponds, incineration
<b>12</b>	Plastics and resins	Unit operations from polymer preparation and use, spills and equipment wash downs	Acids, caustic dissolved organic matter such as phenols formaldehyde etc.	Discharge to municipal sewers, reuse, and controlled discharge.
<b>13</b>	Pulp and paper	Cooking, refining, washing of fibres, screening of paper pulp.	High or low Ph, colour, high suspended colloidal and dissolved solids inorganic filters	Settling, lagooning, biological treatment, aeration, recovery of products
<b>14</b>	Rubber	Washing of latex, coagulated rubber, exuded impurities from crude rubber	High BOD and odour, high suspended solids, variable pH, high chlorides.	Aeration, chlorination, sulfonation, biological treatment

To summarize, for the overall mitigation of negative environmental impacts, best practices in manufacturing which can be expressed as general best practices to all manufacturing are

- Appropriate choice of raw materials
- Efficient utilization of resources (energy, chemicals, additives, etc.)
- Recycling and reuse
- Continuous improvement in product design

They have to be maintained with due care to

- simple resource tracking
- raw material stocks and storage
- operating procedures
- process control
- product handling and storage
- reducing finished goods damage rate
- housekeeping measures
- maintenance procedures
- waste handling

Another very important point to consider is that industrial research should not be limited only to the development of materials, methodologies and their management but it should also include investigation on the effective methods of waste disposal, more so, recycling of waste for productive purposes. The reasoning is quite simple – recycling will not only be cost effective, but, also will reduce to a considerable extent contamination to our environment-pollution of air, water and land.

Hence, there must be a very stringent policy and strategy as well as plans and programs that have to be worked out jointly by all stakeholders in the IP in the implementation of awareness creations and trainings and realistic steps to reduce the potential pollution of solid wastes, both hazardous and non-hazardous and gear R&D towards such a goal. The Industrial Parks Development Corporation in general and the Environment Office at IP level in particular should take the lead as will be shown in the next chapter on Environment and Social Management Plan (ESMP).

### **7.3 Project alternatives**

The consideration of alternatives to a proposal is a requirement of many ESIA systems. It lies at the heart of the EIA process and methodology. During the scoping process, alternatives to a proposal can be generated or refined, either directly or by reference to the key issues identified. A comparison of alternatives will help to determine the best method of achieving project objectives while minimizing environmental impacts or, more creatively, indicate the most environmentally friendly or best practicable environmental option.

The initial step in defining a project is to identify, at a conceptual level, viable alternatives to the project so that a viable base-case design may be realized. Consideration of project alternatives occurs at two levels as follows:

- At the initial stage where we consider the “no development” option

- At the design stage where we will explore engineering alternatives within the selected project design definition which includes project area selection.

The consideration of alternatives is likely to be most useful when the EIA is undertaken early in the project cycle. Depending on timing, the type and range of alternatives open to consideration might include:

- Demand alternatives (e.g. using energy more efficiently rather than building more generating capacity);
- Input or supply alternatives (e.g. Where a Mix of Energy Sources Permits);
- Activity alternatives (e.g. providing public transport rather than increasing road capacity);
- Location alternatives, either for the entire proposal or for components (e.g. the location of a dam and/or irrigation channels);
- Process alternatives (e.g. use of waste-minimizing or energy-efficient technology); and
- Scheduling alternatives (e.g. for airport and transport operations, reservoir raw down).

The World Bank recommends a tiered approach to the analysis of alternatives, which broadly corresponds to the headings above. It is designed to bring environmental considerations into all stages of development planning.

This approach, ideally, begins with strategic environmental assessment (SEA) to analyse broad alternatives within a sector (such as power) or for a region. When this framework is not in place, as is frequently the case, the key alternatives are examined as part of a project-specific ESIA.

As such, when the Ministry of Industry (MoI) requested the city administration to select a viable site for the development of an industrial park the kilinto site was chosen.

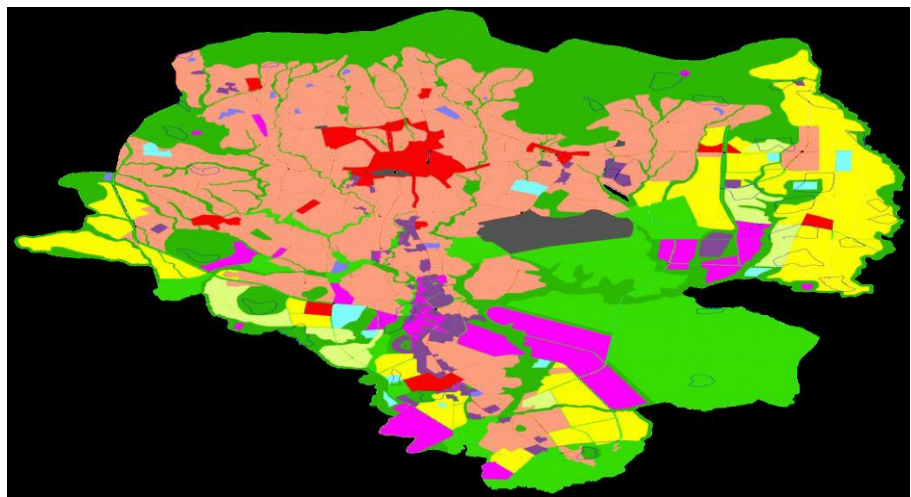
According to the Addis Ababa structure plan, there are seven land use classes:

- main/sub-center zone
- mixed use development zone
- forest/green/park zone
- agriculture service area
- industry zone
- terminal/airport area
- reserved area

The site for kilinto industrial park is located in the southern area of Addis Ababa and is designated as an industrial park. The surrounding areas of the project site are designated

primarily as mixed-use, industry zones, and green zones. As such, the site has an ideal location in terms of its proximity to other existing and future industrial sites and major highways and railway line, availability of nearby groundwater water supply, flat terrain with some gentle slopes, almost no vegetation to clear, etc., as indicated in the chapter on Master Plan of this study.

As such the “no development/ no project” option is not applicable at this stage since it is assumed that such exercise might have been duly considered during the preparation of the current master plan of Addis Ababa and the local development plan of the site which has designated the project area as an Industrial area. Hence, though this is an example of a case where a proposal is submitted to ESIA when planning is nearly complete and the components and location are fixed already, the Consultant also believes Kilinto is a preferred site for the establishment of an IP based on the parameters considered in the master plan. Furthermore, taking into consideration the industrial development which is still at its infant stage in this country, the proximity of the site to the capital city of the country and the envisaged higher land value of industrial development vis-a-vis the current agricultural practice in the area, allocating the area for industrial development is a more profitable venture compared to current agricultural activities taking place in the area if it is designed in an environmentally friendly manner. Once the site is chosen, the other option of project alternatives should be looking into what can be done at the design stage where possible alternatives are assessed and compared on financial, logistical, technical design, safety and environmental/socio-economic criteria. The project alternative that is determined to likely result in the best balance against these criteria will be typically the one that moves forward into the detailed design phase.



**Figure: Structural plan of Addis Ababa**

Accordingly, this exercise has been done while preparing the master plan for the Kilinto IP specific and two alternatives (alternative 1 and 2) were put forward by way of comparison of land use alternatives considering efficiency of land use and transportation as well as emphasis on green area as shown figure 18.

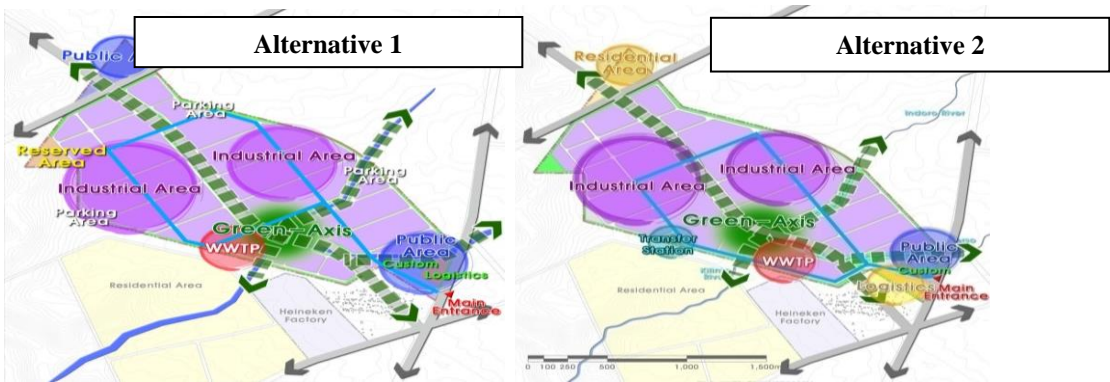


Figure 18: Alternatives 1 and 2 for KIP

The master plan has compared the merits and demerits of both alternatives. Alternative 2 has been chosen by the master plan study for reasons that include

- The spatial structure of Alternative 2 emphasises connectivity with all the serviced land with one main gate. On the other hand, Alternative 1 has lack of connectivity of the land plots.
- Alternative 2 is selected for the integrated management and operation of industrial park by constructing multipurpose building at main gate. Furthermore, Alternative 2 has an advantage of improving land use efficiency due to the integrated use of public facilities like the main entrance and customs office.

The ESIA study has also weighed the merits and demerits of both alternatives from the point of view of required environmental protection. As such, the already chosen Alternative 2 is more feasible. This has been chosen because of the fact that, in addition to what has been indicated in relation to other components of the master plan, it also gives much more emphasis to park and green areas by providing adequate green and park area allotted around the streams that can serve as a buffer and abatement of some of the water pollutants that could easily join the

streams. It also allows the formation of larger buffer between industries and condominium residences to the south by the allocation of a relatively larger of park and green areas in between. In addition to the alternatives explored with respect to location and the master plan, other project alternatives could be seen by way of alternative schemes and layouts of the development and services as well as the nature and type of each manufacturing processes. This may be further developed under alternative management or operational practices which can be further developed under mitigation measures in the detail design of each and specific industry and specific designs for each and specific industry to be incorporated for waste management and pollution abatement at the detail design stage.

The case of providing enough green space has been a very important criterion with respect to choosing and looking into possible project alternatives due to the fact that the provision of adequate green space in industrial parks will not only be more eco-friendly but will provide more open space and a better working environment for the workers. Supplying enough green space to create a green network system inside the industrial park will also enable a linkage to surrounding forest/green/park areas in order to create an efficient system that is in harmony with the natural environment. It can also serve as a buffer contributing to minimization of pollution.

## **8 ENVIRONMENTS AND SOCIAL MANAGEMENT PLAN**

The base line assessment, the nature and type of industrial projects proposed to be implemented as well as the potential impacts and mitigation measures proposed have been discussed at length in the preceding chapters. As such this is a chapter where recommended mitigation measures and monitoring measures are translated into specific plan of actions by way of an Environmental and Social Management Plan (ESMP).

This ESMP provide a mechanism for the assessment of potential negative environmental and social impacts and suggest mitigation measures and define the roles and responsibilities of various stakeholders for ensuring smooth implementation and monitoring of the KIP operations.

The primary objective of this ESMP is to provide an implementation mechanism to address the environmental and social impacts arising from the KIP integrate environmental and social mitigation measures in the KIP project operation to reduce its adverse impacts. The secondary objectives of the ESMP are to comply with WB Operational Policy for environmental and social safeguards as well as the National Environmental Laws and Regulations.

As such the ESMP will outline the significant adverse impacts, its recommended mitigation measure, the responsible organs to implement it, time of implementation, responsible organs to monitor its implementation as well training and capacity building as well as resources/budget needed for the implementation of the mitigation measure all summarized in a tabulated form.

It will be necessary to monitor and audit project development and operation. Monitoring will provide the information necessary for feedback into the environmental management process and will assist in identifying where additional mitigation effort or where alteration to the adopted management approach may be required. The monitoring plan will describe the various environmental management strategies and generic procedures for their implementation. Further, it will identify the management roles and responsibilities for ensuring that monitoring is undertaken and that the results are analysed and any necessary amendments are identified and implemented in a timely manner.

Accordingly, the activity items in the second step of Task 3 of the ToR will be undertaken here. A description of the beneficial impacts that can be enhanced to improve the project environmental and social performance will also be presented as part of the ESMP.



The ESMP is intended to form the basis for impact management during project construction and operation. It is based on the Environmental and Social Management Framework (ESMF) and Resettlement Policy Framework (RPF) prepared for the project already. The ESMP should contain commitments that are binding on the proponent. It can be translated into project documentation and provide the basis for a legal contract that sets out the responsibilities of the proponent. In turn, the proponent can use the ESMP to establish environmental performance standards and requirements for those carrying out the works or providing supplies. The ESMP will also be used to prepare an environmental management system for the operational phase of the project.

### **8.1 Environmental Management Department**

Apart from having an Environmental Management Plan, it is also necessary to have a permanent organizational set up charged with the task of ensuring effective implementation. A designated team consisting of managers, officers, engineers, chemists, technicians, operators and other required personnel shall be formed to co-ordinate the activities concerned with environmental management and implementation of pollution control measures. The department shall keep a close watch on the performance of the pollution control equipment, emissions from the sources and the quality of surrounding environment in accordance with the monitoring program. The department shall undertake the monitoring of environment pollution level internally and also by appointing external agency whenever necessary. In case the result of monitoring environment pollution found to be exceeding the prescribed value, the environmental management department shall suggest remedial actions and get these suggestions implemented through the concerned plant authorities. The department shall also co-ordinate all the related activities such as safety & disaster/emergency management, hazard & risk prevention/control, collection of statistics of health of workers, population of the regions, a forestation and green belt development.

The department shall also monitor for general and preventive maintenance of pollution control system done by the maintenance department to achieve optimum efficiency of the control equipment and to maintain the quality of the environment. The department shall be also responsible for maintaining the records of all data, documents and information in line within the legislative requirement and will regularly furnish the same to the relevant authorities. The setup of the Environmental Health & Safety (EHS) Management Department for proposed IP project will be as presented below.

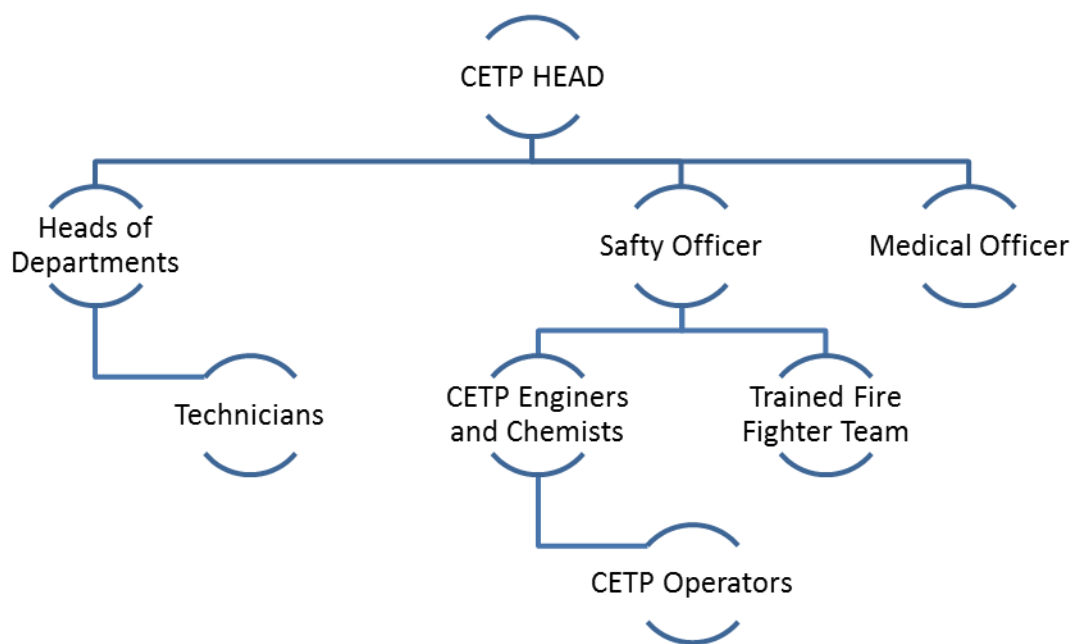


Figure 19: Organizational structure of Environmental management department

## 8.2 Roles of Institutions in the Implementation ESMP

### 8.2.1 Construction phase

During the construction phase the contractor will be responsible for implementing the proposed environmental mitigation measures in the ESIA report. The contractor will implement the proposed mitigation measures and the environmentalist assigned by EPA/ or IPDC as per its delegation will monitor the proper implementation of the mitigation measures as per the plan.

The contractor has full responsibility for ensuring that all works are carried out as per the environmental requirement specified in the ESIA study. It is also envisaged that environmentalist with broad range of knowledge and experience in environmental management system of the industrial sector be assigned intermittently to supervise proper implementation of the mitigation measures. Moreover, the environmentalist conjunction with the Ministry of industry has the responsibility of the overall coordination of the environmental management activities during construction. The environmentalist is also expected to guide and advise the construction supervisor and the local authorities as regards to the implementation of the mitigation measures and the monitoring of impacts.

### 8.2.3 Operation phase

During the operation period, the environmental parameters indicated in the previous chapter and also shown below will be monitored by IPDC Environmental unit.

#### **Capacity Building Needs for the Implementation of ESMP**

The implementation of ESMP and number of environmental management measures of Industrial Parks Development Corporation (IPDC) are dependent on the capacity of the implementing agencies in environmental management. In order to ensure this, a program of capacity building for MoI, IPDC, AAEP, sub – project proponents, Consultants and contractors and the other stakeholders will be put in place to ensure that, the capacity to carry out environment management activities for industrial park development projects.

From the consultation that has been made with stakeholders it has been realized that the institutions responsible for the implementation of the proposed mitigation measures have limited capacity to implement the proposed ESMP. However these institutions have regulatory and institutional framework to assure IP project compliance with the national and international environment policies. It is therefore required to build the capacity of the above indicated institutions to enhance their environmental management skills by providing training in the following areas:

- screening impacts, scoping assessments, planning mitigation options, public consultation to assess feasibility and acceptability options;
- project design to minimize environmental impacts and social disruption; restoration of drainage patterns, land use etc.; including mitigation measures in contracts; management of impacts during construction and operation and monitoring of the effectiveness of implementation;
- Monitoring environmental performance, reporting, supervision use of various formats during implementation and operation phase, documentation, complaint response, record keeping and other procedures;

To this effect comprehensive training plan needs to be designed to enhance capacity of relevant stakeholder and meet the following objectives.

- identify, prepare, implement & manage environmental aspects of sub-projects;
- ensure that the agencies have the capacity to assist in preparing sub-project proposals, mitigation plans; and
- Ensure that the implementing agencies have the capacity to appraise, approve and

supervise the implementation of subprojects; and training plans.

The above indicated training programs are proposed to be provided to the institutions responsible for the implementation of ESMP to meet the above indicated objectives.

- familiarization with GOE Environmental management policies and WB safeguard policies;
- procedures and methodology in the preparation and implementation of EIA;
- review of environmental assessment reports;
- Conducting Public Consultation;
- Implementation of monitoring program;
- Establishment of environment database;
- Evaluation of environmental impacts;

These training activities and capacity building program will be developed and implemented by professional agencies with adequate experience in imparting such training programs. The resources for implementing the program will be allocated from the respective component of IPDP and will be co-ordinate by the Environment Management Department of the Industrial Parks Development Corporation and CJC Project.

The details of the Environmental and Social Management and Mitigation Plan of Kilinto Industrial Park Development Project prepared in accordance with institutional responsibilities set by Federal EPA and the MoI, Guidelines for Environmental Management Plans of EPA and practice at the World Bank has been given in Table 15.

**Table 15: Environmental and social Management and mitigation plan**

TYPES OF IMPACTS	MITIGATION PLAN		MONITORING PLAN		
	MITIGATION ACTION	RESPONSIBILITY	MONITORING ACTION	RESPONSIBILITY	COST ESTIMATE IN Eth. Birr
<b>CONSTRUCTION PHASE</b>					
Land Acquisition and Loss of Housing and property	Implementation of compensation measures as per legislation and regulations (as per rules and regulations of the country and the WB given in RAP) Implementation of proper resettlement action plan (RAP) for those PAPs who lost their housings.	Ministry of industry/Industry Park Development and Protection Directorate	Supervision and Verification through PAPs participation	-Woreda 09 and 10 of Akaki Sub-city, Akaki Sub-city and Addis Ababa administration.	55,549,788.60 (Farmland - 53,297,556.00, Grazing-land - 621,740.00 Housing & house rent, transportation - 1,630,492.60)
	MITIGATION ACTION	RESPONSIBILITY	MONITORING ACTION	RESPONSIBILITY	COST ESTIMATE IN Eth. Birr
<b>CONSTRUCTION PHASE</b>					
<b>LOSS OF INCOME AND LIVELIHOOD</b>					
Loss of livelihood and income generation Disruption of socio cultural values and activities (potential for violation of cultural norms and safety of local residents by construction crew). Proliferation and transmission of diseases particularly HIV and STD and any	Implementation of a comprehensive package/program for livelihood restoration through capacity buildings, tailored trainings and employment creation, awareness creation, need assessment study, loan fund and support to vulnerable groups. Preparation of awareness and sensitising programs by way of organising meetings and workshops need to be implemented to enable the surrounding population and PAPs to protect and distance themselves from undesirable engagements that violate cultural norms and attitudes to work	Ministry of industry, Addis Ababa Administration & Akaki Sub –City	Supervision and Verification through PAPs participation	-Woreda 09 and 10 of Akaki Sub-city, Akaki Sub-city and Addis Ababa administration.	6,400,000.00 (Livelihood restoration 245,000.00, Awareness creation 50,000.00, Need assessment study 125,000.00, Loan fund 5,880,000.00, Support to vulnerable groups 100,000.00, supervision, monitoring and evaluation 50,000.00)

TYPES OF IMPACTS	MITIGATION PLAN		MONITORING PLAN		
	MITIGATION ACTION	RESPONSIBILITY	MONITORING ACTION	RESPONSIBILITY	COST ESTIMATE IN Eth. Birr
<b>CONSTRUCTION PHASE</b>					
	negatively, implementation of health services, etc.				
<b>ENVIRONMENTAL POLLUTION AND ANTICIPATED HEALTH AND SAFETY PROBLEMS</b>					
Construction and traffic accidents Health effect from noise and dust releases during construction of the factory buildings due to land levelling and other earthmoving and heavy duty machinery operations Generation of solid and liquid waste (turbid water, dust, exhaust gases and other solid and liquid wastes generated due to construction works including construction debris)	Implement construction and traffic safety measures. Supply of personnel protection equipment such as ear masks Use of mufflers on construction equipment spill control/response plan is made and implemented Maintenance of construction materials will be done in regular manner Procedure with regard to cleaning hazardous substances shall be prepared As part of construction manual and implemented Limit earth moving machineries from working in late night hours. Moisten soil by sprinkling water during construction	Construction Contractor          Contractor,	Monitoring as per design and construction manual      Measuring particulate matter (PM2.5, PM5 and PM10), measuring wastewater generated both in quantity and quality, measuring solid waste	Construction Consultant Supervisor      Industry park, AAEPa,	Included in construction cost          550,000.00
<b>IMPACTS ON THE BIOPHYSICAL ENVIRONMENT</b>					
Soil erosion during construction and land levelling and earthmoving works	Minimize area of excavation to what is required by design only Stock pile soil excavated and use it for land levelling and use top soil in areas designated for green and park	Construction Contractor	Monitoring as per design and construction manual	Construction Consultant Supervisor	Included in construction cost

TYPES OF IMPACTS	MITIGATION PLAN		MONITORING PLAN		
	MITIGATION ACTION	RESPONSIBILITY	MONITORING ACTION	RESPONSIBILITY	COST ESTIMATE IN Eth. Birr
<b>CONSTRUCTION PHASE</b>					
	areas and plantation buffers as required Appropriate backfilling of trenches Planting grasses to cover deep cuts Rehabilitate any quarries or damaged land surface				
<b>OPERATION PHASE</b>					
Impacts on occupational health (Health and safety of Workers)	Implementation of awareness creation and training programs Develop industry type and nature tailored best practice guidelines and health and safety manuals Develop appropriate facility design and operation from the outset Solve other potential problems related to Gaps in communication and training programs Installed preventive measures for the different type of industrial hazards (physical, chemical, biological, radiological, special hazard environments) and their monitoring. Water Quality and Availability, Structural Safety of Project Infrastructure, Life and Fire Safety (L&FS), Traffic Safety, Transport of Hazardous Materials, Disease Prevention, Emergency Preparedness and Response Personal Protective Equipment (PPE)	Factory owners and managers Industrial Park Corporation in case of general IP compound and premises occupational health and safety designs	Industrial Parks Development Corporation branch office for environment Environmental and Social Safeguards Directorate office in IP.	Regular monitoring and follow up -Enforcing legislations, regulations, manuals , procedures and emission standards (permissible limits)	Cost of individual manufacturing and business firms in the IP and Industrial Park Corporation general IP compound and premises occupational health and safety designs

TYPES OF IMPACTS	MITIGATION PLAN		MONITORING PLAN		
	MITIGATION ACTION	RESPONSIBILITY	MONITORING ACTION	RESPONSIBILITY	COST ESTIMATE IN Eth. Birr
<b>CONSTRUCTION PHASE</b>					
<p>Pollution of surface and ground water resources by waste water from the IP.</p> <p>Improper management of liquid waste in the new industrial park is expected to pollute and contaminate water, soil and the surrounding biological environment in and around the industrial park including nearby rivers and downstream. These include:  Organic content, BOD, COD,  Nitrogen, phosphorus  Salinity, Acids, alkalis,  Detergents, Emulsifiers, surfactants, disinfectants  Microbial load  Suspended and dissolved solids  Metal oxides and salts  Phenol, grease, oil and fat  Residues of solvents, pesticides</p>	<p>Efficient utilization and reuse of water as required.  Good housekeeping by way of appropriate storage of any oil and grease, toxic materials and making ones industrial plant clean  Pre-treatment at the level of each plant in the electronic industries in as much as possible before connecting to the WWTP. Primary treatment at plant level is very important.  Develop a complete internal sewerage network with a centralized on-site wastewater treatment.  Provision of separate drainage for rain water and sewage to prevent overflow of sewage with rain water  Prevention of untreated waste water from entering Idoro, Kerso Doro and Kilinto streams and Akaki River in and around the project area.</p>	<p>Factory owners and managers  Contractor</p>	<p>IP branch office for Environment  IP and AAEPa</p>	<p>-Regular monitoring and follow up  -Enforcing legislations, regulations, manuals and procedures (permissible limits)</p>	<p>Cost of individual manufacturing and business firms in the IP    400,000.00</p>



TYPES OF IMPACTS	MITIGATION PLAN		MONITORING PLAN		
	MITIGATION ACTION	RESPONSIBILITY	MONITORING ACTION	RESPONSIBILITY	COST ESTIMATE IN Eth. Birr
<b>CONSTRUCTION PHASE</b>					
<p>Generation of solid waste (Both hazardous and non-hazardous) from IP.</p> <p>Improper management of solid in the new industrial park is expected to pollute and contaminate water, soil and the surrounding biological environment in and around the industrial park including nearby rivers and downstream</p>	<p>Reduction on use of raw materials: This will correspondingly decrease the production of waste.</p> <p>Reuse of waste materials: Refillable containers which are discarded after used can be re used.</p> <p>Recycling of materials in the reprocessing of discarded materials into new useful products.</p> <p>Establish waste screening system that segregates hazardous waste from other wastes.</p> <p>Where possible installation of composting technology, devices and equipment should be encouraged at plant and IP level where conditions of type of waste generated are suitable as compost raw materials. This can be practical in the food and beverage industries.</p> <p>Establish a formal system within IP that consists of collection, transport recycling (i.e. composting) and safe disposal of solid waste and other contaminants.</p> <p>Implement plan to regularly transport hazardous waste to a properly designed sanitary landfill</p> <p>Install waste bins of different colours at each industrial shed, along the passage ways for collecting and</p>	Factory owners and managers	IP branch office for environment	<p>Regular monitoring and follow up</p> <p>-Enforcing legislations, regulations, manuals standards and procedures (permissible limits)</p>	Cost of individual manufacturing and business firms in the IP

TYPES OF IMPACTS	MITIGATION PLAN		MONITORING PLAN		
	MITIGATION ACTION	RESPONSIBILITY	MONITORING ACTION	RESPONSIBILITY	COST ESTIMATE IN Eth. Birr
<b>CONSTRUCTION PHASE</b>					
	segregating organic & inorganic solid wastes separately Investigation of external markets for waste recycling by other industrial processing operations located in the neighbourhood or region of the facility (e.g., waste exchange) Integrate the industrial park waste management system with the primary waste collection scheme of the city Dispose-off remaining solid waste in designated sanitary landfills of the city				
Air Pollution (Air pollution from the factories and utilities which include) Exhaust gas emissions (carbon dioxide [CO <sub>2</sub> ], nitrogen oxides [NO <sub>x</sub> ], Sox, PM, VOCs and carbon monoxide [CO]) result from the combustion of gas and fossil fuel oil or diesel in turbines, boilers, compressors and other engines for power and heat generation. Emissions of particulate matter/dust (of various	Control at source and introduce appropriate emission reducing measures (source relocation, source shutdown, fuel or energy substitution, process changes, good operating practices, and utilization of air pollution control devices or techniques) Use cleaner production options in the manufacturing process. Install exhaust ventilation equipped with retention systems such as cyclones, scrubbers, electrostatic precipitators or bag filters Use biological filters and bio-scrubbers Control by dilution in the atmosphere by dispersion	Factory owners and managers	IP branch office for environment	Regular monitoring and follow up -Enforcing legislations, regulations, manuals, procedures and emission standards (permissible limits)	Cost of individual manufacturing and business firms in the IP

TYPES OF IMPACTS	MITIGATION PLAN		MONITORING PLAN		
	MITIGATION ACTION	RESPONSIBILITY	MONITORING ACTION	RESPONSIBILITY	COST ESTIMATE IN Eth. Birr
<b>CONSTRUCTION PHASE</b>					
materials) during processing/handling activities (in exhaust, fugitive, and leakages) Odour emissions from various processes, on-site wastewater treatment, Volatile Organic Carbon (VOC) emissions are caused by the use of solvents, lubricants Fumes of metallic oxides, acid/alkali vapours	Use of common boiler for industries Enclose production activities that cause odour and operate under vacuum; with a caustic, alkaline, or ozone scrubber system or incinerate the gas in a boiler plant. Substitute less volatile substances, such as aqueous solvents Collect vapours through air extractors and subsequent treatment of gas stream by removing VOCs with control devices such as condensers or activated carbon absorption; Collection of vapours through air extractors and subsequent treatment with destructive control devices Use fume suppressants as additives to electroplating baths to reduce air emissions of electroplated metals				
Noise Pollution from manufacturing machines and equipment operations	Reduction in sources of noise: Sources of noise pollution like heavy vehicles and old vehicles have to be restricted to areas which are far from public offices and facilities, residences and far from areas where concentration of industrial workers as well as community residences are located. Noise making machines should be kept in containers with sound	Factory owners and managers Industrial Park Corporation in case of planting of trees and establishment of buffer zones	IP branch office for environment	Regular monitoring and follow up -Enforcing legislations, regulations, manuals , procedures and emission standards (permissible limits)	Cost of individual manufacturing and business firms in the IP and Industrial Park Corporation for plantation and establishment of buffer zones

TYPES OF IMPACTS	MITIGATION PLAN		MONITORING PLAN		
	MITIGATION ACTION	RESPONSIBILITY	MONITORING ACTION	RESPONSIBILITY	COST ESTIMATE IN Eth. Birr
CONSTRUCTION PHASE					
	absorbing media to interrupt the noise path. Proper oiling will reduce the noise from machinery Use of sound absorbing silencer by using various types of fibrous materials can be used Planting more trees having broad leaves is also recommended				
Exacerbation of the already prevailing shortage of water supply and energy in and around IP.	Drill own boreholes or use some of the boreholes in and around the project area that have not been connected to the system to supplement the potential water shortage problem. Intervention to minimize impact of water and energy use include: Increase the efficiency of water and energy use through improving the production processes, raw material use , awareness of the employees and stakeholder involvement; Insulating steam pipes / tubes; Eliminating steam leakage and using thermostatically controlled steam and water blending valves return condensate to the boiler house for re-use Minimize the number of boilers or heaters used to meet loads. Typically	Industrial Parks Development Corporation Factory owners and managers	Monitoring existing water and energy resources reserve, yield and use during design, construction and operation	Ministry of Water Energy and Irrigation Addis Ababa Water Supply and Electric Power Authorities Ministry of industry/Industry park Development and Environment Protection Directorate	Part of IPDC and manufacturing investments

TYPES OF IMPACTS	MITIGATION PLAN		MONITORING PLAN		
	MITIGATION ACTION	RESPONSIBILITY	MONITORING ACTION	RESPONSIBILITY	COST ESTIMATE IN Eth. Birr
CONSTRUCTION PHASE					
	more efficient to run one boiler at 90% of capacity than two at 45%. Minimize the number of boilers kept at hot-standby use economizers to recover heat from flue gases to pre-heat boiler feed water or combustion air Introduce measures for adequate water collection, spill control and leakage control system (introduce flow control optimization system				

### 8.3 Cost Estimate for ESMP

The cost estimate for ESMP given hereunder is based on the requirements of proposed mitigation activities and recommended livelihood restoration programs. The main budget requirements are provision of compensation payment of PAPs for the loss of income and lost assets, cost estimate for livelihood restoration programs (orientation, skill training and other capacity building programs) of 272 PAPs), which includes all sorts of for monitoring of the implementation and administrative costs for the compensation committees established at woreda level and below. The environmental costs include costs for the installation of waste water and storm water treatment, costs for the erosion protection structures, site restoration, waste recycling facility, road safety provisions, natural plantation of parks and buffer zones, training cost and, etc. The other cost items include:

- Cost of additional studies recommended as per the request of the Sub-city Administration
- Budget for loan fund for establishment of businesses which is 80% of the total amount required based on the 20% contribution required from PAPS and 80% loan fund required for livelihood restoration activities, with special attention to the vulnerable groups
- Cost for housing
- Cost for other awareness and sensitization and training programs required for the implementation of ESMP

The assessment has been made by and large based on existing legislations (proclamations) and regulations since there is rich experience in the project area in this respect. Accordingly, the total budget estimate is Birr 296,974,878.95 (Two Hundred Ninty Six Million Nine Hundred Seventy Four thousand and Eight Hundred Seventy Eight Birr only).

The following table summarizes the total amount of the fund that is required for the implementation of this management plan.

Table 16: Budget Estimate for ESMP

No.	Cost Item	Cost Estimate in Eth. Birr	Remarks
1.	Compensation for permanent loss of farmland	53,297,556.00	Replacement cost for loss of income
2	Compensation for permanent loss of grazing land	50,398.52	Replacement cost for loss of income
3	Cost estimate for housing and other structures (building cost )	5,714.007	Replacement cost
4	Cost estimate for house rent of 12 months	576,000.00	15hhs x 40birr x 12 months x built-up area (m2)

5	Transport and mobilization for 15 households who required resettlement.	7,500.00	15x500 = 7,500.00
6	Cost estimate for livelihood restoration programs (orientation, skill training and other capacity building programs) of 272 PAPs), health and safety sensitization programs, etc.	3,525,000.00	
7	Cost for other awareness and sensitization programs	50, 000.00	Lump sum
8	Cost for need assessment study to identify additional livelihoods restoration measures study recommended	125,000.00	Lump sum
9	Loan fund for establishment of 245 businesses based on agricultural production (fattening, dairy cows, chicken farm, mushroom production, irrigated agriculture, etc) preferred by PAPs as per survey result. 80% of (30,000x272 = 7,350,000)	5,880,000.00	Based on Birr 30,000 average business establishment cost given by the office of micro and small scale enterprises.
10	Support for vulnerable groups	100,000.00	Lump sum
11	Cost of waste water treatment plant	242,833,412.26	
13	Natural tree and vegetation for river buffer and park development	1,000,000	
14	Environmental awareness creation training for construction workforce and local community	50,000	
15	Erosion Control		
16	Technical engineering measures (including river training structures)	500,000	
17	Site restoration and artificial landscaping	5,000,000	
18	Road safety provisions (road signs, traffic signs, etc.)	100,000	
19	Building cost of transfer station(solid waste management)	13,788,750.42	Used as a transfer station and waste sorting site.
20	Capacity Building cost to IPDC and government experts for the Implementation of ESMP.	500,000	Lump sum
21	Cost estimate for supervision, monitoring and evaluation	100,000.00	Lump sum
	Total	269,977,162.68	
	10% contingency	26,997,716.27	
	Grand Total	296,974,878.95	

## 9 MONITORING PLAN

KIP's monitoring plan will include a detailed environmental and social monitoring plan which will be implemented by IPDC Environmental Unit, CJC and the consultant. This plan will be modified and updated as the project develops and in response to the outcomes of monitoring activities and in discussion with stakeholders as new issues arise. The purpose of this section is to outline the key monitoring requirements identified through the ESIA process to monitor the environmental and social performance of the project. These requirements will be incorporated into the KIP's ESMP. The overall objectives of the monitoring activities are to:

- Ensure regulatory requirements are met;
- Check that impacts do not exceed environmental standards prescribed;
- Verify predictions made in the ESIA by obtaining real time measurements;
- Verify that mitigation measures are effective and implemented in the manner prescribed in the ESIA document;
- Provide early warning of potential environmental impacts; and
- Inform about future operations and contribute to continuous improvement in the management of environmental and social issues related to the project.

### 9.1 Monitoring Approach

Monitoring will be carried out by the IPDC-EU, CJC and the consultant pursuant to their contractual obligations to undertake inspections, monitoring and reporting. The oversight officer for the monitoring system shall be the IPDC-EU.

The following four types of inspections and monitoring will be employed.

- Inspections planned and conducted on a regular basis to ensure that mitigation measures and commitments are properly maintained and implemented, and that specific management procedures are being followed (e.g. practices on waste storage and disposal).
- Receptor monitoring undertaken to verify predictions made in the ESIA and to confirm that the activities at the site are not resulting in an unacceptable deterioration in the quality of habitats or infrastructure (e.g. monitoring disturbance to affected residents through a grievance mechanism).
- Compliance monitoring involving periodic sampling or continuous recording of specific environmental quality indicators or discharge levels to ensure compliance of discharges and emissions with project standards (e.g. produced water discharges and air emissions), and



- Auditing (internal and external) to assess compliance of the site activities with both regulatory and site management system requirements (e.g. waste management procedures and systems).

The frequency of inspections, monitoring and audits and subsequent reporting will be based on the IP risks. The outputs will be used in the following ways:

- To provide early warning for site management, to adjust mitigation measures on a day to day basis to suit evolving conditions;
- To enable contractors to demonstrate that mitigation measures and procedures laid down in mitigation plans are being followed and operations are being conducted within compliance limits, and
- To provide formal assurance to IPDC, CJC, MEF&CC and third parties, such as World Bank, that the project is compliant with regulations and agreed limits and that relevant mitigation / enhancement measures are being adhered to.

Monitoring results will be presented in regular reports and reviewed at IPDC on a monthly basis, or as required. The monitoring plan and parameters will be reviewed periodically and, if necessary, will be modified to include any additional parameters necessary to ensure good environmental and social performance. Similarly, the monitoring methods and frequencies will be subject to periodic review by IPDC.

## 9.2 Monitoring Plan for Specific Mitigation Measures

The outline monitoring plan is presented in table 17. Issues are addressed following the approach used in the ESIA. The plan describes what potential impact is to be measured and the frequency.

**Table 17: Monitoring plan for specific Mitigation**

Impact	Monitoring	Frequency of monitoring
<ul style="list-style-type: none"> <li>Impacts on surface and groundwater quality</li> </ul>	<ul style="list-style-type: none"> <li>Discharged effluent water will be sampled and analysed for the following parameters in accordance with Federal MEF requirements: pH, temperature, Electrical Conductivity, TDS, TSS, Chloride as Cl<sup>-</sup>, THC, TPH, BTEX, PAH, COD, BOD5, sulphide as H<sub>2</sub>S, ammonia as NH<sub>4</sub><sup>+</sup>, Total Phosphorus as PO<sub>4</sub><sup>2-</sup>, nitrate as NO<sub>3</sub><sup>-</sup>, Heavy Metals: Ni<sup>+</sup>, Cr<sup>+6</sup>, Pb, Cu, Zn, V, Ti, Cd, Fe<sup>+3</sup>, Hg.</li> </ul>	<ul style="list-style-type: none"> <li>Effluent will be sampled and chemically analysed weekly and reported monthly during operation;</li> </ul>
Impacts to terrestrial fauna and flora	<ul style="list-style-type: none"> <li>IPDC-IPEP will undertake checks that work areas have been demarcated and that construction vehicles and workers stay within the work areas;</li> </ul>	<ul style="list-style-type: none"> <li>Daily during construction;</li> </ul>

	<ul style="list-style-type: none"> <li>• Monitor growth of rehabilitated vegetation along pipeline route.</li> </ul>	<ul style="list-style-type: none"> <li>• Monthly after backfilling of pipeline trench until vegetation is established</li> </ul>
Impacts to air quality	<ul style="list-style-type: none"> <li>• IPDC-IPEP will visually monitor dust levels and effectiveness of dust suppression methods;</li> <li>• IPDC-IPEP will undertake visual inspection to check that generators and machinery are in good working condition;</li> <li>• Ambient VOC concentrations will be monitored along the perimeter of the facility site.</li> </ul>	<ul style="list-style-type: none"> <li>• Daily during construction;</li> <li>• As required by the project Preventative Maintenance Plan and procedures;</li> <li>• Continuous monitoring downwind and upwind of facility site during operation and reported monthly.</li> </ul>
Noise impacts	<ul style="list-style-type: none"> <li>• IPDC-IPEP will undertake noise monitoring at communities closest to the site to ensure that the project does not raise ambient noise levels at this receptor by more than 3 dB as a result of their construction activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Daily monitoring and weekly reporting against baseline levels during construction phase.</li> </ul>
Waste segregation, storage and transport	<ul style="list-style-type: none"> <li>• IPDC-IPEP will verify compliance with the IP Waste Management Plan, in particular: <ul style="list-style-type: none"> <li>○ Field inspections of storage areas, and transfer and transport equipment and systems to ensure that appropriate mitigation and measures are enforced;</li> <li>○ Report of waste volumes generated;</li> <li>○ Reporting of waste volumes and types of wastes transported;</li> <li>○ Report and record all leaks and spills, including type and quantities of substances spilled.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Monthly inspection of fuel and chemical storage and transfer equipment (or more frequent dependent on risk);</li> <li>• Monthly field inspections and routine reporting throughout project;</li> <li>• Annual audit of storage facilities and systems</li> </ul>
Waste Management and Waste Disposal	<ul style="list-style-type: none"> <li>• IPDC-IPEP will undertake waste management audits of contractors and waste reception facilities</li> </ul>	<ul style="list-style-type: none"> <li>• Audit of waste contractors prior to agreeing any formal contracts;</li> <li>• Six monthly in first year and thereafter annual audits of facilities that receive IP wastes.</li> </ul>

Traffic	<ul style="list-style-type: none"> <li>• IPDC-IPEP will monitor project related traffic volumes and maintain a record of all HDVs (Heavy Duty Vehicles) travelling to and from the site;</li> <li>• IPDC-IPEP will check that HDVs remain on prescribed routes and adhere to prescribed speed limits. All transgressions will be recorded;</li> <li>• IPDC-IPEP will undertake periodic checks that trucks waiting for loading do not park next to the road;</li> <li>• IPDC-IPEP will undertake routine inspection of integrity of road surfaces, safety hazards and safety sign along transport routes;</li> <li>• IPDC-IPEP will commission a detailed traffic study to determine required capacity of road networks, confirm road surface integrity and identify safety hazards and problem intersections along transport routes.</li> </ul>	<ul style="list-style-type: none"> <li>• Daily monitoring and weekly reporting throughout project as required by Traffic Management Plan;</li> <li>• At least monthly as required by Traffic Management Plan;</li> <li>• At least monthly as required by Traffic Management Plan;</li> <li>• At least monthly as required by Traffic Management Plan;</li> <li>• Prior to start of operations.</li> </ul>
Livelihoods and micro-economics	<ul style="list-style-type: none"> <li>• IPDC-IPEP will continuously monitor safety exclusion zones and record all vessel interactions between project vessels and other users of the area;</li> <li>• IPDC-IPEP will develop and implement a system for inspection and maintenance of navigation, communication and safety equipment;</li> <li>• IPDC-IPEP will record all complaints/suggestions through the Community Liaison Officer and assign specific remedial actions and responsibilities.</li> <li>• IPDC-IPEP will monitor employment levels and local staff content against targets for IP and its contractors.</li> <li>• IPDC-IPEP will liaise with a development NGO to identify and implement community investment projects.</li> <li>• IPDC-IPEP will monitor training (skill, health community relations and awareness) provided to industry management and employs and local community.</li> </ul>	<ul style="list-style-type: none"> <li>• Auditing with Accident Reporting Procedure;</li> <li>• Monthly audit of equipment inspection reports;</li> <li>• Six monthly reviews of interaction/grievance records and audit of actions arising throughout project.</li> <li>• Quarterly review of HR data and recruitment and organisational development plans;</li> <li>• Prior to start of construction;</li> <li>• Quarterly reviews of training records.</li> </ul>

Social infrastructure	<ul style="list-style-type: none"> <li>• IPDC-IPEP will record all complaints/suggestions through the Community Liaison Officer and assign specific remedial actions and responsibilities.</li> <li>• IPDC-IPEP will record all communications with local community regarding project operations and use or upgrade of local infrastructure, utilities and transport networks.</li> <li>• IPDC-IPEP will investigate the possibility of providing additional water to the affected communities.</li> </ul>	<ul style="list-style-type: none"> <li>• Six monthly reviews of interaction/grievance records and audit of actions arising throughout project;</li> <li>• Six monthly reviews of community interaction / communication records;</li> <li>• Prior to operation of the facility</li> </ul>
Socio-cultural cohesion	<ul style="list-style-type: none"> <li>• IPDC-IPEP will monitor movements of workforce in and out of the compound;</li> <li>• IPDC-IPEP will monitor skills, health, community relations and awareness training provided to the industry staffs and local community.</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous monitoring and weekly inspection of records throughout project;</li> <li>• Quarterly reviews of training records.</li> </ul>
Transport and Access	<ul style="list-style-type: none"> <li>• IPDC-IPEP will continuously monitor project HDV traffic volumes and traffic related incidents;</li> <li>• IPDC-IPEP will continuously monitor safety exclusion park and record all vessel interactions between the IP vessels and other users of the area.</li> </ul>	<ul style="list-style-type: none"> <li>• Auditing with Accident Reporting Procedure.</li> </ul>
Cultural Sites	<ul style="list-style-type: none"> <li>• IPDC-IPEP will check that cultural sites/sacred places are protected during construction;</li> <li>• IPDC-IPEP will monitor levels of complaints through the grievance procedure and check actions taken to resolve complaints.</li> </ul>	<ul style="list-style-type: none"> <li>• Daily throughout construction;</li> <li>• As required in response to complaints and six monthly reviews of records and audit of actions arising throughout project</li> </ul>
Health	<ul style="list-style-type: none"> <li>• IPDC-IPEP will monitor movements of workforce into and out of the compound;</li> <li>• IPDC-IPEP will monitor skills, health, community relations and awareness training provided to industry/contractors staff and local community;</li> <li>• IPDC-IPEP will implement monitoring requirement for waste, air emissions and surface and groundwater.</li> </ul>	<ul style="list-style-type: none"> <li>• Continuous monitoring and weekly inspection of records throughout project;</li> <li>• Quarterly reviews of training records.</li> </ul>

Occupational Health and Safety	<ul style="list-style-type: none"> <li>• IPDC-IPEP will monitor the working environment for occupational hazards relevant to the IP. Monitoring will be designed and implemented by accredited professionals as part of the Health and Safety Plan. IPDC-IPEP will also maintain a record of occupational accidents and diseases and dangerous occurrences or accidents.</li> </ul>	<ul style="list-style-type: none"> <li>• Throughout project as required by Health and Safety Plan</li> </ul>
Public Safety	<ul style="list-style-type: none"> <li>• IPDC-IPEP will maintain records of drivers' training and non-compliance with Traffic Management Plan;</li> <li>• IPDC-IPEP will monitor road accidents in collaboration with the local authority to detect trends and introduce necessary measures;</li> <li>• IPDC-IPEP will investigate road accidents involving IP vehicles and maintain records of these accidents and actions taken;</li> <li>• IPDC-IPEP will maintain log of all emergency management training and exercises;</li> <li>• IPDC-IPEP will monitor levels of complaints through the grievance procedure and check actions taken to resolve complaints;</li> <li>• IPDC-IPEP will implement monitoring requirements relating for surface and groundwater.</li> </ul>	<ul style="list-style-type: none"> <li>• Throughout project as determined by Traffic Management Plan;</li> <li>• Auditing with Accident Reporting Procedure;</li> <li>• Auditing with Accident Reporting Procedure;</li> <li>• Six monthly reviews of training records throughout project;</li> <li>• As required in response to complaints and six monthly reviews of records and audit of actions arising throughout project.</li> </ul>
Fires and Explosion	<ul style="list-style-type: none"> <li>• IPDC-IPEP will develop and implement a system for inspection and maintenance of fire suppression equipment;</li> <li>• IPDC-IPEP will perform further risk assessment studies to assist in identifying further risk reduction measures;</li> <li>• IPDC-IPEP will maintain log of all emergency management training and exercises.</li> </ul>	<ul style="list-style-type: none"> <li>• Weekly inspection of critical equipment and quarterly audit of inspection and maintenance reports;</li> <li>• During detailed design;</li> <li>• Six monthly reviews of training records throughout project.</li> </ul>

## **10 CONCLUSION AND RECOMMENDATIONS**

Given the very low industrial development in the country at large, the development of industries and manufacturing that would help for import substitution, export earnings, job creation and overall livelihood and development in the country is long overdue. As a result, the development of the KIP is most welcome due to the anticipated benefits that can enhance the growth and development of the country in general and the project communities and surrounding areas in particular.

The most important thing is to ensure, in as much as possible, that potential positive and negative impacts of the establishment of the proposed Kilinto Industrial Park (KIP) are identified at the early stage of a feasibility study in order to develop enhancement and mitigation strategies. The implementation of the IP should be carried out without creating much adverse impacts on the biophysical and socioeconomic environment.

It is a foregone conclusion that a project as big as the establishment of an Industrial Park will not come without some significant negative impacts. As such, the assessment of environmental impacts made has identified activities that are likely to give rise to significant adverse impacts and one should work for ways and means of avoiding or minimizing the anticipated negative impacts by amending the design, operational processes or technologies applied; thereby ensuring the environmental sustainability of the project.

The negative impacts are mainly related to displacement of people; loss of farm land, houses and properties, as well as the potential for the spread of communicable diseases, the spread of HIV/AIDS, safety and health problems of employees and traffic accidents and injuries. Hence, the assessment made and the mitigation measures recommended have to be developed further at the detail design stage and translated into programs and actions during operation through the development of manuals and working procedures. In the preparation of its tender document for the construction of the IP project, the Project needs to ensure that clauses both for the environmental and social issues are included as suggested in this study and from other relevant studies and best practice experiences.

The contractor should also be obliged to implement environmental and social clauses included in the contract document. The monitoring of the project implementation has to be done on a regular basis by Industrial Parks Development and Environmental Safeguard Directorate (IPDESD). Other stakeholders, such as , AAEPAs local authorities and the public also need to

be invited and consulted by IPDC from time to time and give their opinion and suggestion regarding the implementation of the project. The contractor also has to work in close cooperation with consultant designated as well as with the local authorities and strictly adhere to local regulations and avoid conflict and misunderstanding with local population and government.

As per our assessment, the population residing in the project area and many of the stakeholders in the area would like to see the construction of the project as soon as possible. Public consultations held with different groups of the local community, and government officials as well as professional experts working in the project, indicate that the local population, PAPs and other stakeholders have expressed positive support for the project. There is no any significant environmental and social issue that would prevent the implementation of the project as long as the negative impacts are managed and proposed environmental management measures are adhered to by all concerned bodies.

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## ANNEX 1: LIST OF CONSULTED PERSONS

No.	Name	Position/Institution	Telephone No.
1	Ato Yinabu Mekonen	MoI, D/Director, Industrial Park Corporation	
2	Wt. Adunga Mengiste	MoI, Environment Safeguard	
3	Ato Tena Yimam	MoI, Industrial Park Development Expert	0963041174
4	Dr. Chudi Okafor	World Bank	
5	Wro Senidu Fanuel	World Bank	
6	Dr. Asferachew Abate	World Bank	
7	Ato Mulluneh	Chief Executive , Akaki-Kaliti Sub-city	0911130258
8	Ato Yosef Argaw	Manager, Akaki-Kaliti Sub-city	0911693117
9	Ato Arega Teklemariam	Compensation Project Officer, Akaki-Kaliti	0913564084
10	Ato Sasahu Tilaye	Livelihood Restoration (Resettlement) Case Team Officer, Akaki-Kaliti Sub-city	0911747136
11	Ato Habtamu Tolessa	Chief Executive, Woreda 09 Administration	0917555310
12	Ato Debebe Yami	Chief Executive, Woreda 10 Administration	0913144350
13	Ato Matias Zemedie	Public Relations Advisor	
14	Ato Zemedie Bitew	PAP affected by resettlement	
15	Ato Alemu Abdi	Trade & Industry Officer, Akaki-Kalit Sub-city	0911753285
16	Ato Tarekegn	Micro and Small Scale Enterprises Head, Akak-Kaliti Sub-city	0935481461
17	Ato Tibebu Tefera	Head Finance and Economy, Woreda 10	0923273130
18	Ato Teshome Geremew	Health Service Delivery Process Owner, Akaki Health Center	0911859225
19	Ato Abiyu Yenealem	Public Relations Officer, Addis Ababa Science & Technology University	0924526480

**N.B.** Many farmers who came across during the sight visit and assessment work were also contacted and interviewed.

## ANNEX 2: TERMS OF REFERENCE FOR ESIA

An environmental and social impact assessment (EIA) report for CJC Project should focus on the significant environmental and social issues of the proposed project, whether it is/or includes new construction or rehabilitation. The report's scope and level of detail should be commensurate with the project's potential impacts.

The EIA report should include the following items (not necessarily in the order shown):

**Executive summary:** Concisely discusses significant findings and recommended actions.

**Policy, legal, and administrative framework.** Discusses the policy, legal, and administrative framework within which the EIA is carried out. Identifies relevant international environmental agreements to which the country is a party.

**Project description.** Concisely describes the proposed project and its geographic, ecological, social, and temporal context, including any offsite investments that may be required. Indicates the need for any resettlement plan. Normally includes a map showing the project site and the project's area of influence.

**Baseline data.** Assesses the dimensions of the study area and describes relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the project commences. Also takes into account current and proposed development activities within the project area but not directly connected to the project. Data should be relevant to decisions about project location, design, operation, or mitigation measures. The section indicates the accuracy, reliability, and sources of the data.

**Environmental and social impacts.** Predicts and assesses the project's likely positive and negative impacts, in quantitative terms to the extent possible. Identifies mitigation measures and any residual negative impacts that cannot be mitigated. Explores opportunities for environmental enhancement. Identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions, and specifies topics that do not require further attention.

**Analysis of alternatives.** Systematically compares feasible alternatives to the proposed project site, technology, design, and operation—including the “without project” situation—in terms of their potential environmental impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local conditions; and their institutional, training, and monitoring requirements. For each of the alternatives, quantifies the environmental impacts to the extent possible, and attaches economic values where feasible. States the basis for selecting the particular project design proposed and justifies recommended emission levels and approaches to pollution prevention and abatement.

Environmental management plan (EMP). Covers mitigation measures, monitoring, budget requirements and funding sources for implementation, as well as institutional strengthening and capacity building requirements.

## ANNEX 3: MINUTES OF CONSULTATION MEETINGS

### 1. CONSULTATIONS WITH AKAK-KALITI SUB-CITY LEADERSHIP

**Project:** Kilinto Industrial Park Development

**Date:** 07/02/14

**Location:** Akaki-Kaliti Sub-city Chief Executive Office

**Time:** 10:00am

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#### **Attendees:**

1. Ato Mulluneh	Chief Executive, Akaki-Kaliti Sub-city
2. Ato Yosef Argaw	Manager, Akaki-Kaliti Sub-city
3. Ato Arega Teklemariam	Compensation Project Officer, Akaki-Kaliti
4. Wro Senayit Solomon	Head Youth, Women & Children's Affairs
5. Ato Habtamu Tolessa	Chief Executive, Woreda 09 Administration
6. Ato Debebe Yami	Chief Executive, Woreda 10 Administration
7. Ato Tamerat Mulugeta	Head TVET Office
8. Ato Teweldebirhan W/gerima	Environment Consultant

#### **Meeting Agenda and Purpose:**

1. To discussion on the nature and type of the Proposed Kilinto Industrial Park Development Project
  2. To clearly present to the leadership of Akaki-Kalit Sub-city about the potential positive and negative impacts of the project
  3. Gather their opinion and recommendations on the project in general and the modalities of compensation for lost assets and properties and livelihood restoration of Project Affected Population (PAPs) in particular
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#### **Brief Summary of the Meeting**

The Chief Executive opened the meeting by explaining the purpose and expected outcomes of the meeting and invited the Environment Consultant to briefly introduce the project at hand and expectations. The environmental consultant briefed the meeting participants on the nature and type of the proposed Kilinto Industrial Park Development, the rationale for the implementation of the project, the potential positive impacts of the project at both country and local level. He also explained the potential negative social and environmental impacts of the project and how it would affect particularly the PAPs and the surrounding populations in the form of permanent land acquisition and loss of asset and income, the requirement of resettlement and the modalities of compensation as per the countries and World Bank's rules and regulations, etc.. Finally he invited the Chief Executive to proceed with the facilitation of the meeting in order to get the views and opinions and recommendations of the participants.

The Chief Executive, who acted as the chairperson of the meeting also reiterated about the roles and responsibilities of the Sub-city administration with regards to the required support and facilitation required in the process of the implementation of the project as well as the roles and responsibilities of the line offices particularly that of the livelihood Restoration (Resettlement) Case Team, Land management, Micro and Small Scale Enterprises, the project woredas and Technical and Vocational Education Training of the Sub- city.

Problems and challenges faced so far and required corrective measures in relation to the ongoing preparation for resettlement and livelihood restoration measures particularly job creation for PAPs were dealt at length and the meeting ended with deliberations of recommendations and actions that need to be taken on the part of all responsible stakeholders in the sub-city, city, MoI, and the PAP committees.

**N.B.** Results of the consultation meetings can be seen from the chapter on public Consultations and the annexed minutes of the meeting below.

## **2. CONSULTATIONS WITH WOREDA 10 LEADERSHIP**

**Project:** Kilinto Industrial Park Development

**Date:** 05/02/14

**Location:** Woreda 10 Administration Office

**Time:** 9:00am

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**Attendees:**

1. Ato Debebe Yami	Woreda Administrator
2. Ato Matias Zemedede	Head Public relation
3. Ato Tadesse Tulu	Head Micro & Small Scale Enterprise Office
4. Ato Lema Zemedede	Head Woreda health Office
5. Ato Tilahun Chiquala	Head Peoples Mobile Pation
6. Wro. Yesunesh Tekola	Head Women, Children and Youth office
7. Ato Demes Gashaw	Deputy Administrator
8. Ato Endeshaw Ababu	Woreda Administration office Manager
9. Ato Addisu Balcha	Head Woreda Justice Office
10. Teweldebirhan W/gerima	Environment Consultant

**Meeting Agenda and Purpose:**

1. To discussion on the nature and type of the Proposed Kilinto Industrial Park Development Project
2. To clearly present to the leadership of Woreda about the potential positive and negative impacts of the project
3. Gather their opinion and recommendations on the project in general and the modalities of compensation for lost assets and properties and livelihood restoration of Project Affected Population (PAPs) in particular

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**Brief Summary of the Meeting**

The Woreda Administrator opened the meeting by explaining the purpose and expected outcomes of the meeting and invited the Environment Consultant to briefly introduce the project at hand and expectations. The environmental consultant briefed the meeting participants on the nature and type of the proposed Kilinto Industrial Park Development, the rationale for the implementation of the project, the potential positive impacts of the project at both country and local level. He also explained the potential negative social and environmental impacts of the project and how it would affect particularly the PAPs and the surrounding populations in the form of permanent land acquisition and loss of asset and income, the requirement of resettlement and the modalities of compensation as per the countries and World Bank's rules and regulations, etc.,. Finally he invited the Woreda Administrator to proceed with the facilitation of the meeting in order to get the views and opinions and recommendations of the participants.

The Woreda Administrator, who acted as the chairperson of the meeting also reiterated about the roles and responsibilities of the Woreda Administration administration with regards to the required support and facilitation required in the process of the implementation of the project as well as the roles and responsibilities of the Woreda line offices particularly that of the Woreda Land Management, Public Relations, Peoples Mobilization and Organization, Micro and Small Scale Enterprises, etc.,.

Problems and challenges faced so far and required corrective measures in relation to the preparation for ongoing resettlement and livelihood restoration measures particularly job creation for PAPs were dealt at length and the meeting ended with deliberations of recommendations and actions that need to be taken and follow ups necessary on the part of all responsible stakeholders in the Woreda, sub-city, city, MoI, and the PAP committees.

**N.B.** Results of the consultation meetings can be seen from the chapter on public Consultations and the annexed minutes of the meeting below.

### **3. CONSULTATIONS WITH PROJECT AFFECTED POPULATIONS**

**Project:** Kilinto Industrial Park Development

**Date:** March 24, 2014

**Location:** Kilinto Primary School

**Time:** 10:00am

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**Attendees:**

1. Ato Dejene Dollo                                      Woreda Representative
2. Ato Teweldebirhan Weldegerima                Environment Consultant
3. PAPs Committee Members and around 56 number of PAPs and their representatives (see annex)

**. Meeting Agenda and Purpose:**

1. To discussion on the nature and type of the Proposed Kilinto Industrial Park Development Project
2. To clearly present to the PAPs about the potential positive and negative impacts of the project
3. Gather their opinion and recommendations of the PAPs on the project in general and the modalities of cooperation in relation to the ongoing resettlement and livelihood restoration program.

### **Brief Summary of the Meeting**

The Woreda Representative opened the meeting by explaining the purpose and expected outcomes of the meeting and invited the Environment Consultant to briefly introduce the project at hand and expectations to the PAPs. The environmental consultant briefed the PAPs and Committee members on the nature and type of the proposed Kilinto Industrial Park Development, the rationale for the implementation of the project, the potential positive impacts of the project at both country and local level. He also explained the potential negative social and environmental impacts of the project especially at local level in relation to PAPs and how it would affect particularly the PAPs and the surrounding populations in the form of permanent land acquisition and loss of asset and income, the requirement of resettlement and the modalities of compensation as per the countries and World Bank's rules and regulations, etc.,

The Woreda Representative, who acted as the chairperson of the meeting also reiterated about the roles and responsibilities of the Woreda Administration with regards to the required support and facilitation required in the process of the implementation of the project as well as the roles and responsibilities of the Woreda line offices particularly that of the Woreda Land Management, Public Relations, Peoples Mobilization and Organization, Micro and Small Scale Enterprises, the PAP committee and the PAPs themselves.

Finally he invited the Woreda Representative to proceed with the facilitation of the meeting in order to get the views and opinions and recommendations of the participants.



The PAPs unanimously expressed that it has to be clearly understood that their livelihood is based on agriculture i.e. on the crops they produce from the land and the animals they rear still on the same land. They expressed their entitlements to the land have to be respected. But in the event there is no other alternative and if their land needs to be taken for project purposes they would agree to the condition based on fair compensation and livelihood measures that would be implemented based on existing policies and regulations.

Among the most important points raised by the PAPs are

- Invariably PAPs made it clear that they know that the development activities going on in their respective areas and the surroundings are for the benefit of the country at large and the population around in terms of job creation and improvement in livelihood.
- Performance of similar projects in compensation and livelihood restoration in and around their areas was rated as poor and recommended lessons should be drawn and the current RAP has to be implemented in a better and more efficient way.
- It was revealed that every one of those PAPs who lost larger part or all of their farmland own areas as large as 1000m<sup>2</sup> under their homestead possession. They expressed such a large compound land can be utilized for livelihood restoration programs or businesses if this is taken in to account in the RAP.
- The meeting also emphasized the need for ownership and commitment of government to ensure the timely release of the necessary funds for implementing livelihood restoration plan within a short period of time.
- Participants raised concern that priorities for project benefits such as job employment and other opportunities may not be given to the affected (local residence) and clearly stated that they will cooperate in measures that will be taken for livelihood restoration.

Problems and challenges faced so far and required corrective measures in relation to the ongoing resettlement and livelihood restoration measures particularly job creation for PAPs were dealt at length and the meeting ended with deliberations of recommendations and actions that need to be taken and follow ups necessary on the part of all responsible stakeholders in the Woreda, PAP Committee, etc.

**N.B.** Results of the consultation meetings can be seen from the chapter on public Consultations and the annexed minutes of the meeting below.

## ANNEX 4: MINUTES OF MEETINGS

00/10/06

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 21st 21/10/2000 00:00 00:00 00:00 00:00  
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 2. አካላዊ - የሕይወት ሁኔታ      የሕይወት ሁኔታ

- 2- አቶ ሃይለማርያም የገንዘብ ጥያቄ
- 2 ወ/ሮ ሠላሳ አሰላሳ " ድቅና ስራ ልማት
- 3 አቶ ገብረ ሙሉ " የግንባታ ልማት
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2. Գործը պետք է իրականացվի անհամաձայնության առկայության դեպքում  
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အပူအသွေး - ဘာလို့လဲ? ပိုမို တောင့်တမှု ရှိနေသေးသောကြောင့်

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June 2009  
J. R. Lee



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7. ማንኛውም ሰነድ	ሰነድ	0910025898
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በደረጃ፡ የኢንፎርሜሽን ቴክኖሎጂ ማህተም ማስፈጸም፡  
ተፈጻሚነት ማሳካት፡ የሚመከሩት ማህተም ማስፈጸሙ፡  
ከግብርና ጋር፡ የመለከት ማለፊያ፡ ከግብርና፡ በተመለከተ  
የተሰጠው ማረጋገጫ፡

ቀን፡ 15/03/06

ቦታ፡ ቅርንጫፍ

ሰዓት፡ 4:00 ሰዓት

በአጠቃላይ፡ የተገኙት ማህተም ማስፈጸሞች፡ ተፈጻሚነት ማሳካት፡

የአጠቃላይ ማረጋገጫ፡ የሚሰጠው፡ ማረጋገጫ፡

በመጨረሻ፡ የመለከት ማለፊያ፡ ከግብርና፡ የሚፈጸም፡  
ከግብርና ጋር፡ የኢንፎርሜሽን ቴክኖሎጂ ማህተም ማስፈጸሙ፡  
አጠቃላይ፡ የሚፈጸም፡ ከግብርና ጋር፡ የሚፈጸም፡  
ከተሰጠው ማረጋገጫ ጋር፡ የሚፈጸም፡ የሚፈጸም፡  
በዚህ ሰዓት፡ የሚፈጸም፡ የሚፈጸም፡ የሚፈጸም፡  
ከግብርና ጋር፡ የሚፈጸም፡ የሚፈጸም፡ የሚፈጸም፡

በመጨረሻ፡ ተፈጻሚነት ማሳካት፡ የሚፈጸም፡  
ከግብርና ጋር፡ የሚፈጸም፡ የሚፈጸም፡

የግብርና ማረጋገጫ

1) የተሰጠው ማረጋገጫ፡ የሚፈጸም፡ የሚፈጸም፡  
ተፈጻሚነት ማሳካት፡ የሚፈጸም፡ የሚፈጸም፡  
ከግብርና ጋር፡ የሚፈጸም፡ የሚፈጸም፡  
በዚህ ሰዓት፡ የሚፈጸም፡ የሚፈጸም፡

2) ከግብርና ጋር፡ የሚፈጸም፡ የሚፈጸም፡  
የተሰጠው ማረጋገጫ፡ የሚፈጸም፡ የሚፈጸም፡  
የተሰጠው ማረጋገጫ፡ የሚፈጸም፡ የሚፈጸም፡  
የተሰጠው ማረጋገጫ፡ የሚፈጸም፡ የሚፈጸም፡

3) ከግብርና ጋር፡ የሚፈጸም፡ የሚፈጸም፡  
የተሰጠው ማረጋገጫ፡ የሚፈጸም፡ የሚፈጸም፡  
የተሰጠው ማረጋገጫ፡ የሚፈጸም፡ የሚፈጸም፡  
የተሰጠው ማረጋገጫ፡ የሚፈጸም፡ የሚፈጸም፡

4) ከግብርና ጋር፡ የሚፈጸም፡ የሚፈጸም፡  
የተሰጠው ማረጋገጫ፡ የሚፈጸም፡ የሚፈጸም፡  
የተሰጠው ማረጋገጫ፡ የሚፈጸም፡ የሚፈጸም፡  
የተሰጠው ማረጋገጫ፡ የሚፈጸም፡ የሚፈጸም፡







3

7) በካርታ ላይ አገልግሎት ሰጪ ሰው  
የሚሆን ለአገልግሎት ሰጪ ሰው ስም  
የሚሆን (ለአገልግሎት 1000 ሜ<sup>2</sup>) ሰው ስም  
የሚሆን ስም ስም ስም ስም ስም ስም ስም  
የሚሆን ስም ስም ስም ስም ስም ስም ስም  
የሚሆን ስም ስም ስም ስም ስም ስም ስም  
የሚሆን ስም ስም ስም ስም ስም ስም ስም



11/15/07/2006 በቁጠራ: በሕንጻው ስጦታ:

ዘን: ያህረ: ያህረ: የመጠን: ማረፊያ: ሕንጻው  
ወጪ: ከፊት: የተገኘ: ሕንጻው: የተገኘ: የተገኘ:

ክ.ቁ.	ሰዓት:	ሰዓት/ቀን/ሰዓት	ሰዓት/ቀን/ሰዓት	ሰዓት/ቀን/ሰዓት
1	ከፊት: ሕንጻው:	ከፊት/ቀን/ሰዓት:		
2	"	በከፊት: ሕንጻው:	ከፊት/ቀን/ሰዓት:	
3	"	በከፊት: ሕንጻው:	"	"
4	"	በከፊት: ሕንጻው:	"	"
5	"	በከፊት: ሕንጻው:	"	"
6	"	በከፊት: ሕንጻው:	"	"
7	ወጪ: ሕንጻው: ሕንጻው:			
8	ከፊት: ሕንጻው: ሕንጻው:			
9	ወጪ: ሕንጻው: ሕንጻው:			
10	ወጪ: ሕንጻው: ሕንጻው:			
11	ከፊት: ሕንጻው: ሕንጻው:			
12	ከፊት: ሕንጻው: ሕንጻው:			
13	ከፊት: ሕንጻው: ሕንጻው:			
14	ከፊት: ሕንጻው: ሕንጻው:			
15	ከፊት: ሕንጻው: ሕንጻው:			
16	ከፊት: ሕንጻው: ሕንጻው:			
17	ከፊት: ሕንጻው: ሕንጻው:			
18	ከፊት: ሕንጻው: ሕንጻው:			
19	ወጪ: ሕንጻው: ሕንጻው:			
20	ወጪ: ሕንጻው: ሕንጻው:			
21	ከፊት: ሕንጻው: ሕንጻው:			
22	ከፊት: ሕንጻው: ሕንጻው:			
23	ወጪ: ሕንጻው: ሕንጻው:			
24	ከፊት: ሕንጻው: ሕንጻው:			
25	ከፊት: ሕንጻው: ሕንጻው:			
26	ከፊት: ሕንጻው: ሕንጻው:			
27	ወጪ: ሕንጻው: ሕንጻው:			
28	ከፊት: ሕንጻው: ሕንጻው:			





5

ወርዐ

8. ወ/ሮ: ካሳ፣ ጎሽ
9. አቶ: ሸመልካ: ዎህገናዳክ:
10. ወ/ሮ: አለመዝ: አባሪ
11. አቶ: ሰለፋ: አደም
12. ወ/ሮ: ሰዓምታ: ይጓዝ
13. ወ/ሮ: ገዢነት: ወቴ
14. አቶ: ታላላቅ: ገለጽ
15. ወ/ሮ: ሕንጻዎች: አሳታፊ
16. ወ/ሮ: የገንዘብ: ተ/ሰራጭ
17. ወ/ሮ: አዳኝ: ገራ
18. ወ/ሮ: አገልግሎት: ሸመልካ
19. አቶ: ደምታ: ገራ: ወርሻ፣
40. አቶ: ረዕሰ: አገልግሎት አገልግሎት ሰራጭ: ወርሻ፣
41. ወ/ሮ: ጽሑፍ: ደምታ
42. አቶ: ተመሳሳይ: ወርሻ፣
43. አቶ: ሕገ: አሳታፊ
44. ወ/ሮ: መሪ: መሪ
45. አቶ: አለመ: ገራ: ወርሻ፣
46. አቶ: አባ: መሪ
47. ወ/ሮ: የገ: ተሳ
48. ወ/ሮ: ሰራ: አቶ
49. አቶ: ገብረ: ወርሻ፣
50. አቶ: ደብ: ተሳ ወርሻ፣
51. አቶ: ደምታ: መሪ
52. አቶ: ገራ: ገራ
53. አቶ: አለመ: መሪ
54. አቶ: ደምታ: ወርሻ፣
55. አቶ: ሕገ: ደብ
56. ወ/ሮ: ተመሳሳይ: አለመ



የደብ  
 ተመሳሳይ  
 ሰራ  
 ሕገ  
 የገ  
 ደምታ  
 ሕንጻዎች  
 የገንዘብ  
 አዳኝ  
 አገልግሎት  
 ጽሑፍ  
 ተመሳሳይ  
 ሕገ  
 አሳታፊ  
 መሪ  
 አለመ  
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 የገ  
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 ገብረ  
 ደብ  
 ደምታ  
 ገራ  
 አለመ  
 ደምታ  
 ሕገ  
 ደብ  
 ተመሳሳይ  
 አለመ

**ANNEX 5: ACTION PLAN FOR THE IMPLEMENTATION OF LIVELIHOODS RESTORATION & COMMUNITY DEVELOPMENT ACTIVITIES FOR KILINTO PAPS**

S-N.	MAJOR ACTIVITY	No. of Beneficiaries	TIME TABLE BY QUARTER (2016-2019)			
			2016	2017	2018	2019
<b>I.</b>	<b>LIVELIHOODS RESTORATION ACTIVITIES</b>	<b>272 HHs</b>				
1.	Job creation through Urban Agriculture scheme		X	X	X	X
	<i>Livestock Development – Establishing 4 Dairy enterprises</i>	40hhs	X			
	<i>Construction of. 4 dairy sheds</i>		X	X	X	X
	<i>Procurement of Equipment for 4 dairy sheds</i>			X	X	X
	<i>Procurement of Fodder for 40 dairy cows</i>			X	X	X
	<i>Training on dairy farm management</i>			X	X	X
	<i>Procurement of 40 dairy cows</i>			X	X	X
	<i>Livestock Development – Est. 2 Fattening enterprise</i>	20hhs	X			
	<i>Construction of. 2 fattening sheds</i>		X	X	X	X
	<i>Procurement of Fodder for 20 Oxen</i>			X	X	X
	<i>Training on beef farm management</i>			X	X	X

S-N.	MAJOR ACTIVITY	No. of Beneficiaries	TIME TABLE BY QUARTER (2016-2019)			
			2016	2017	2018	2019
	<i>Procurement of 20 Oxen</i>			X	X	X
	<i>Livestock Development – Establishing 1 Poultry enterprise</i>	40hhs	X			
	<i>Construction of. 1 Poultry shed</i>		X	X		
	<i>Procurement of Equipment for 1 Poultry shed</i>			X	X	X
	<i>Procurement of Feed for 500 Hens</i>			X	X	X
	<i>Training on poultry farm management</i>			X	X	X
	<i>Procurement of 500 Hens</i>			X	X	X
2.	Job creation through Self-Employment scheme		X	X	X	X
	<i>Self-Employment in manufacturing activities</i>	15	X	X	X	X
	• <i>Estab. MSE on hollow-block production</i>		X	X	X	X
	• <i>Estab. MSE on metal work</i>		X	X	X	X
	• <i>Estab. MSE on wood work</i>		X	X	X	X
	• <i>Estab. MSE on plumbing</i>		X	X	X	X

S-N.	MAJOR ACTIVITY	No. of Beneficiaries	TIME TABLE BY QUARTER (2016-2019)			
			2016	2017	2018	2019
	• <i>Estab. MSE on electricity</i>		X	X	X	X
	• <i>Estab. MSE on building &amp; carpentry</i>		X	X	X	X
	• <i>Training on each skill, book-keeping &amp; entrepreneurship</i>			X	X	X
	• <i>Facilitate access to credit through MSE scheme</i>			X	X	X
	<i>Self-Employment in service &amp; trade activities</i>	53	X	X	X	X
	• <i>Estab. MSE on food &amp; beverage – Bakery, hotel &amp; tea room</i>		X	X	X	X
	• <i>Estab. MSE on Beauty salon - Hair dressing/Barberry</i>		X	X	X	X
	• <i>Estab. MSE on Shop/petty-trade</i>		X	X	X	X
	• <i>Training on book-keeping &amp; entrepreneurship</i>			X	X	X
	• <i>Facilitate access to credit through MSE scheme</i>			X	X	X
3.	Project Related Employment	205	X	X	X	X
	3.1. <i>Temporary Construction-Related Employment</i>	85	X	X		
	3.2. <i>Long Term Industrial Employment</i>	120	X	X	X	X

S-N.	MAJOR ACTIVITY	No. of Beneficiaries	TIME TABLE BY QUARTER (2016-2019)			
			2016	2017	2018	2019
4.	Women-Specific Interventions - <i>Fuel-Saving Stoves</i>	118	X	X		
<b>1.</b>	<b>COMMUNITY DEVELOPMENT ACTIVITIES</b>					
1.	Construction of 1 grain mill house		X	X		
2.	Procurement & installation of the grain mill	>200 HHs	X	X		

# **ANNEX 6: LIST OF PAPS, LOSS OF ASSETS AND PROPERTY AND COMPENSATION ESTIMATE**

No	Name of PAPs	Woreda	Sex	Compensation for Loss of property by Kilinto IP			
				Farm land (in m <sup>2</sup> )	Housing Structure	Grazing land (in m <sup>2</sup> )	Remarks
1.	Abaye Tayu Tulu	9	M	102480.84	189603.54		
2.	Abaynesh Menjota	9	F	41171.38			
3.	Abdusemed Hassen	9	M	18,812.20			
4.	Abebe Abaye	9	M	20333.81	376175.48		
5.	Abebe Belay	9	M	17,937.50			
6.	Abedo Mohmmmed	9	M	13887.7			
7.	Abuderahim Manmudsir	9	M	7085.57			
8.	Adobely Desta	9	M	20497.56			
9.	Aguna Ferlegn	9	M	11,806.37	218417.84		
10.	Alemayehu Bekele Eshetu	9	M	13253.42			
11.	Alemitu Dadi Tufa	9	F	53043.00			
12.	Alemu Gurmu	9	M	13567.21			
13.	Alemu Mohmmmed Mustefa	9	M	12135.00			
14.	Alganesh Amede	9	F	14226.32			
15.	Ali Kdere	9	M	12638.59			
16.	Almaz Abera	9	F	25613.79	473855.11		
17.	Angatu Dery Batoly	9	M	15467.33			
18.	Aregash Robele Legesse	9	F	23,286.80			
19.	Asefa Herpo	9	M	19752.61	365423.28		
20.	Aseggedech W/mariam	9	F	13,180.32			
21.	Aserat Kefele	9	M	17445.74			
22.	Ashageri G/giorgis	9	M	18854.13	163801.40		
23.	Aternesh Asenake	9	F	19460.94			
24.	Ayelech Dadi	9	F	12324.99			
25.	Balchitu Hirko	9	F	13384.21			
26.	Banchi Tesema Bedosha	9	F	19,003.05			
27.	Bejega Gelashie	9	M	11,700.79			
28.	Bekele Niguse Worashoch	9	M	16434.81			
29.	Belachew Asefa	9	M	42641.77			
30.	Belay Adem	9	M	19851.41			
31.	Belay Gelashe	9	M	17,680.93			
32.	Berbo Gobena	9	M	11246.13			
33.	Beritu Gulema	9	F	15037.76			
34.	Berke Mergiyaye	9	M	16,109.37			
35.	Beshada Beyene Mamo	9	M	14067.71			
36.	Bezu Kura Gezaw	9	F	13745.81			
37.	Bezunesh Wete	9	F	27634.39			



No	Name of PAPs	Wereda	Sex	Compensation for Loss of property by Kilinto			
				Farm land (in	Housing Structur	Grazing land (in m²)	Remarks
38.	Biamele Wakene	9	F	17888.65			
39.	Biawle Wakyny	9	M	15661.02			
40.	Birbo Gobena	9	M	24348.76			
41.	Bogalech Tadesse Abahele	9	F	14337.26			
42.	Dabi Tulu	9	M	17248.23			
43.	Dadi Gudeta	9	M	189603.54			
44.	Damete Mekonnen	9	M	77170.53			
45.	Degu ahmed	9	M	348025.70			
46.	Dejene Werashoche	9	M	376175.48			
47.	Demesie Shenkute	9	M	146843.75			
48.	Dese Gurm Qkene	9	M	71922.45			
49.	Didi Gudeta	9	M	131083.04			
50.	Disu Abebe	9	M	379204.86			
51.	Dmety Mekonnen	9	M	218417.84			
52.	Ehete Gebreal H/Giyorgis	9	M	245188.27			
53.	Elias Shefa	9	M	10981.295			
54.	Endalkachew Gemechu	9	M	65993.38			
55.	Engeda Tasew	9	M	224497.50	189603.54		
56.	Eseyete Teshome	9	F	78186.92			
57.	Eshetu Shawele	9	M	233813.91			
58.	Eshetu W/Semaiat	9	M	473855.11	376175.48		
59.	Eshety Tekola	9	M	101145.60			
60.	Fekadu Gelashe Oda	9	M	430805.80			
61.	Fekadu Menjeta	9	M	365423.28			
62.	Fetaleb Dada	9	M	243835.92			
63.	Gashaw Abera	9	M	137746.19	218417.84		
64.	Gelashe Balecha	9	M	163801.40			
65.	Gerema Cherenet	9	M	175027.39			
66.	Geremew Atenafu	9	M	43012.31			
67.	Getachew Abebe	9	M	62607.88			
68.	Getachew Damte Techane	9	M	351556.42			
69.	Getachew Demeke	9	M	216464.61			
70.	Getaneh T/Mariam	9	M	119043.98	473855.11		
71.	Gete Ashenafi	9	F	788872.74			
72.	Girema Shawule	9	M	182251.08			
73.	Girma Beyene	9	M	142097.20			
74.	Girma Cherent	9	M	208053.40			
75.	Girma Taye	9	M	93198.56			
76.	H/selasie Desalegn	9	M	113023.34			
77.	Haile Bedany	9	M	75252.63			

No	Name of PAPs	Wereda	Sex	Compensation for Loss of property by Kilinto IP			
				Farm land (in m²)	Housing Structure	Grazing land (in m²)	Remarks
78.	Hailu Degega Birru	9	M	69297.48			
79.	Hailu Gurmu Wakyny	9	M	511236.21			
80.	Hirpo Beyen	9	M	145940.02			
81.	Kasech Goshu	9	F	104728.87			
82.	Kebebusu Edu	9	F	450452.06			
83.	Kebede Hey	9	M	80239.31			
84.	Kebede Wordofa	9	M	134092.25			
85.	Kebenesh Wely	9	F	69398.86			
86.	Kebenesh Werku	9	F	515984.42			
87.	Kebnesh Shawle	9	F	76186.14			
88.	Kedir Ahemed	9	M	113981.83			
89.	Kefelgne Tesgaye	9	M	169032.46			
90.	Kokebe G/welde	9	F	965159.24			
91.	Kefle G/tsadik	9	M	91303.60			
92.	Kenei Lemecha	9	F	111718.35			
93.	Kenni Kegna Boru	9	F	114554.22			
94.	Ketene Bacha Wakene	9	M	302520.88			
95.	Kokebe G/Welde	9	F	121755.71			
96.	Lomi Ayano	9	F	141548.68			
97.	Mamite Denberu	9	F	531800.63			
98.	Mecha Mehdin	9	F	159964.69			
99.	Mekonnen Shenkutie	9	M	209562.82			
100.	Menbere Dejene	9	F	70351.61			
101.	Mengestu Kebebusu Ido	9	M	286804.20			
102.	Merga Bejega	9	M	57433.99			
103.	Meseret Ayalew	9	F	170937.96	189603.54		
104.	Meteke Degefa Biruu	9	F	230006.24			
105.	Mifeta Shefa	9	M	460692.92			
106.	Misbah Mohammed	9	M	332250.75	376175.48		
107.	Motu Dire	9	M	44690.63			
108.	Mudsir Bawne	9	M	318839.54			
109.	Mulu Worke Ijoresa	9	F	384489.20			
110.	Mulunesh Bacha	9	F	188145.37			
111.	Musebeha Mehamed	9	M	149137.93	218417.84		
112.	Nasibe G/hiwot	9	M	165582.03			
113.	Negash Getaneh	9	M	1220393.94			
114.	Negash Mamo	9	M	2515.07		3665.89	43605.76
115.	Negat Bekele Legesse	9	F	159988.00			
116.	Rorisa	9	M	141502.61			
117.	Sefeyu Ahmed	9	M	2168.14			

No	Name of PAPs	Wereda	Sex	Compensation for Loss of property by Kilinto IP			
				Farm land (in m²)	Housing Structure	Grazing land (in m²)	Remarks
118.	Senbeto dibaba	9	M	444064.19	473855.11		
119.	Senkenesh Asenake	9	F	104772.71			
120.	Shemeles Mesegana	9	M	61407.97			
121.	Shume Beyene	9	F	75794.31			
122.	Sisaye Deble	9	M	216780.22			
123.	Tadesse Bacha	9	M	284871.51			
124.	Tameru Negusi	9	M	981135.10			
125.	Taye Gelashe	9	M	360202.95			
126.	Tekalegn Girma	9	M	72479.67			
127.	Temame Mehommed	9	M	135452.56			
128.	Terunesh Wordofa	9	F	109737.19			
129.	Terunesh Yemame	9	F	35820.25			
130.	Tesfaye Degefa	9	M	111176.30			
131.	Tola Dibaba	9	M	836853.23			
132.	Tsegy W/Giorgise	9	M	145063.86			
133.	Wekitu Lema	9	F	66413.89			
134.	Werku Telila	9	M	415934.20			
135.	Woineshet Haile	9	F	209562.82			
136.	Worku Lema	9	M	87724.59			
137.	Worku Tufa	9	M	488795.90			
138.	Ato Bacha Wakene	9	M	267324.63			
139.	Menbare Dejene	9	F	139438.20			
140.	Yeshi Drisa	9	F	546611.54			
141.	Yeshi Gosa Zeleke	9	F	118400.92			
142.	Yeshi Rorisa Mojo	9	F	113981.83			
143.	Yetemwork T/Mariam	9	F	77737.74			
144.	Yetmewerk Aregawe	9	F	403158.47			
145.	Zenbech Regassa	9	F	244465.66			
146.	Zinash Kebede	9	F	236742.83			
147.	Alemi Nedi Edo	10	F	383823.57			
148.	Alemitu Gurmecha	10	F	164438.73		1647.84	
149.	Doyo Bedane	10	M	1459.09			
150.	Getachew W/mariam	10	M	131083.04			
151.	Jufie Fure Awase	10	M	294671.14			
152.	Lema Chequla	10	M	119068.59			
153.	Mulugeta Gulema	10	M	31676.62			
154.	Alemi Dadi	10	F	149210.08			
155.	Alemnesh Yetsafu	10	F	45086.90			
156.	Asenake Gameda Edea	10	F	960596.22			
157.	Bacha Abebe	10	M	151924.77			

No	Name of PAPs	Wereda	Sex	Compensation for Loss of property by Kilinto IP			
				Farm land (in m²)	Housing Structure	Grazing land (in m²)	Remarks
158.	Bekele Deble	10	M	110748.58			
159.	Birhanu Hunde	10	M	176993.01			
160.	Debele Telila	10	M	121016.82			
161.	Demese Ketyebel	10	M	229566.31			
162.	Demesy Seboka	10	M	595336.66			
163.	Doyo Bedani	10	M	392536.88			
164.	Ejige Tekola	10	F	304567.16		7150.27	82228.105
165.	Geremachew Elema Betle	10	M	210365.53			
166.	Getachew W/mariam	10	M	155046.65			
167.	Gete Negere Jema	10	M	57433.99			
168.	Jufi fyr	10	F	216814.82			
169.	Kebede Alema	10	M	180147.45			
170.	Kebenesh Werku	10	F	469670.23			
171.	Lema Chekela	10	M	105859.96			
172.	Lema Dadi	10	M	97970.45			
173.	Lubaba Sheberu	10	M	107640.03			
174.	Megeresa Bedane	10	M	175588.31			
175.	Mekonnen Lema	10	M	436022.06			
176.	Menebere Dejene	10	M	71685.28			
177.	Mulugeta Gulema	10	M	104772.71			
178.	Senbetu Dibaba	10	M	204448.31			
179.	Shafy Feri Awase	10	M	491405.32			
180.	Tilahun Debele Telila	10	M	88426.11			
181.	Welem Gurmecha	10	M	99063.43			
182.	Werketu Lema	10	F	47794.01			
183.	Werku Tufa Desu	10	M	401691.98			
184.	Worke Elema	10	F	577741.68			
185.	Yami Erba	10	M	141204.95			
186.	Ye Ato Asefa Dadi	10		8318.71			
187.	Ababo Abdi Telila	10	M	189294.03			59943.244
188.	Aberash Wedajo Welde	10	F	205315.59			
189.	Alemayehu Dabi	10	M	804408.49			
190.	Alemu Anbesa	10	M	76133.23			
191.	Anbesa Tilila	10	M	139764.35		2135.84	24562.26695
192.	Asefa Dabi	10	M	268984.45			
193.	Asekale Seboka Debaba	10	F	119013.83			
194.	Ashenafi Hirpa	10	M	33087.43			
195.	Askale Seboka Dibaba	10	F	573083.75			
196.	Deble Telila	10	M	804408.49		1985.34	11331.43645
197.	Fekadu Seboka Debaba	10	M	139387.32			

No	Name of PAPs	Wereda	Sex	Compensation for Loss of property by Kilinto IP			
				Farm land (in m²)	Housing Structure	Grazing land (in m²)	Remarks
198.	Gemechu Seboka	10	M	248668.86			
199.	Genet Eido Telila	10	F	122642.97			
200.	Genet Eido Wareyo	10	F	185149.11		1621.71	7149.6696
201.	Getu Guremecha	10	M	46755.97			
202.	Gezachew Yami	10	M	270762.48			
203.	Habtam Bekele	10	M	89219.58			
204.	Hunde Abdi Telila	10	M	277854.27		1901.80	21870.7299
205.	Jofie Furie Hawase	10	F	139764.35			
206.	Keneni Abdi Telila	10	F	286804.20			
207.	Ketema Ayano	10	M	498653.44		16362.90	188173.35
208.	Legese Debele Telela	10	M	268984.45			
209.	Lomi Wako Eido	10	F	463823.49			
210.	Mebrate Mamo	10	M	119013.83		14083.42	161959.33
211.	Mulu Aychew	10	F	254847.12			
212.	Seboka Herpo	10	M	109737.19			
213.	Shetaye Hiyo	10	F	33087.43			
214.	Shume Wako Oda	10	M	122278.89			
215.	Sisaye Shume Wake	10	M	180187.41			
216.	Tafisu W/Amelak	10	F	179407.82			
217.	Tasew Seboka	10	F	334012.50			
218.	Terunesh Seboka Dibaba	10	F	99063.43			
219.	Tesfaye Debele	10	M	573083.75			
220.	Tesfaye Kedida Furi	10	M	121016.82			
221.	Tolosa Wake Oda	10	M	119013.83			
222.	Tsedale Gurmecha	10	F	142680.14		340.58	3916.7183
223.	Tsege Gurmecha Chengere	10	F	100077.78			
224.	Tsehay Seboka Debaba	10	F	167915.80			
225.	Welebo Gurmecha	10	M	128241.81			
226.	Zelakesh Belachew	10	F	523828.05		1624.38	7180.40795
227.	Alemi Nedi Edo	10	F	37653.97			
228.	Alemitu Gurmecha	10	F	143555.37		1647.84	7450.23245
229.	Doyo Bedane	10	M				
230.	Getachew W/mariam	10	M	139454.51			
231.	Jufie Fure Awase	10	M	108334.71			
232.	Lema Chequla	10	M	495197.10			
233.	Mulugeta Gulema	10	M	284168.15			
234.	Alemi Dadi	10	F	120723.01			
235.	Alemnesh Yetsafu	10	F	41187.88			
236.	Asenake Gameda Edea	10	F	279643.03			
237.	Bacha Abebe	10	M	22521.91			

No	Name of PAPs	Wereda	Sex	Compensation for Loss of property by Kilinto IP			
				Farm land (in m²)	Housing Structure	Grazing land (in m²)	Remarks
238.	Bekele Deble	10	M	107561.05			
239.	Birhanu Hunde	10	M	54544.18			
240.	Debele Telila	10	M	117773.64			
241.	Demese Ketyebel	10	M	93813.00			
242.	Demesy Seboka	10	M	88884.82			
243.	Doyo Bedani	10	M	37137.49			
244.	Ejige Tekola	10	F	186846.51		7150.27	82228.105
245.	Geremachew Elema Betle	10	M	114995.60			
246.	Getachew W/mariam	10	M	164379.62			
247.	Gete Negere Jema	10	M	223860.11			
248.	Jufi fyr	10	F	549873.49			
249.	Kebede Alema	10	M	1050413.35			
250.	Kebenesh Werku	10	F	261788.32			
251.	Lema Chekela	10	M	174181.93			
252.	Lema Dadi	10	M	159973.77			
253.	Lubaba Sheberu	10	M	207915.33			
254.	Megeresa Bedane	10	M	326098.91			
255.	Mekonnen Lema	10	M	68285.06			
256.	Menebere Dejene	10	M	573341.56			
257.	Mulugeta Gulema	10	M	317921.39			
258.	Senbetu Dibaba	10	M	554033.56			
259.	Shafy Feri Awase	10	M	142328.07			
260.	Tilahun Debele Telila	10	M	76403.46			
261.	Welem Gurmecha	10	M	223021.40			
262.	Werketu Lema	10	F	441269.46			
263.	Werku Tufa Desu	10	M	205783.45			
264.	Worke Elema	10	F				
265.	Yami Erba	10	M	117602.45			
266.	Ye Ato Asefa Dadi	10		47932.19			
267.	Ababo Abdi Telila	10	M	37230.94			
268.	Aberash Wedajo Welde	10	F	357099.87	139454.51		
269.	Alemayehu Dabi	10	M	804408.49			
270.	Alemu Anbesa	10	M	76133.23			
271.	Anbesa Tilila	10	M	139764.35		2135.84	
272.	Asefa Dabi	10	M	268984.45			
TOTAL				19,610,754.43	5,714,007.16	50,398.52	

**ETIMATED BUDGET for LIVELIHOODS RESTORATION:**

- Total budget for Works[for Construction of 1 Grain mill, 2 dairy sheds, 3 fattening & 1 poultry sheds]:2,610,000.00 ETB
- Total budget for Goods [for Livestock: 20Cows, 30 Oxen, 1,000 Poultry], [For 85 fuel saving stoves], [for a Grain mill, Equipment & utilities for dairy, fattening & poultry sheds] & their feeds & fodders:620,000.00 ETB
- Total budget for training [for Hollow-block, Woodwork, metalwork, electricity, plumbing, beauty salon/barberry, bakery, dairy, fattening and poultry management, associated skills like book-keeping & entrepreneurship]:135,000.00 ETB
- Total budget for construction consultancy & supervision [for Construction of 1 Grain mill, dairy, fattening & poultry sheds & 1 Kindergarten]:160,000.00 ETB

**GRAND TOTAL: 3,525,000.00 ETB**

## ANNEX 7: ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST (ASPER RECOMMENDATIONS OF ESMF)

### 1. General data for the investment project

<b>IPD investment project name:</b>	<i>Kilinto Industrial Park Development</i>
<b>Location (include map/sketch):</b>	<i>Woreda 09 and 10 of Akaki-Sub-city in SE Addis (see map in main document)</i>
<b>Type of activity : (e.g. new construction, rehabilitation, periodic maintenance)</b>	<i>New construction of an IP that includes manufacturing, logistics and warehousing, customs/public offices, Business Park / R&amp;D, Store / Service , Infrastructure Facilities, River &amp; Green, Park , Road &amp; Pedestrian Road, Sporting Facility, Parking, etc.</i>
<b>Estimated Cost: (Birr)</b>	
<b>Proposed Date of Works Commencement</b>	

### 2. Site Selection:

<b>Physical data:</b>	<b><i>Yes/No.</i></b>
Site area/shade/ in ha	Document
Extension of or changes to existing alignment	Yes
Any existing property to transfer to project	Yes
Any plans for new construction	Yes



### 3. Checklist of impacts

Integrated multiple infrastructure & services to industrial development& SMEs	Potential for Adverse Impacts				
	None	Low	Med	High	Unknown
Soil erosion or flooding concerns (e.g., due to highly erodible soils or steep gradients)		x			
Number of stream crossings or disturbances		x			
Creation of quarry sites or borrow pits				x	
Significant vegetation removal	x				
Environmentally sensitive areas disturbed	x				
Cultural or religious sites disturbed	x				
Economic or physical resettlement required				x	
New settlement pressures created				x	
Risk of generating Hazardous wastes				x	
Risk of releasing gaseous emissions in higher quantity to affect the ambient air quality				x	
Risk of handling, storage and processing of highly toxic and flammable chemicals that can affect public health and the environment upon intended or unintended releases				x	
Risk of generating solid or semi solid residues, by-products and wastes in higher quantities				x	
Risk of generating industrial wastewater with toxicity, high temperature, or high/low pH.				x	
Risk of generating high BOD and COD laden wastewater in higher quantity				x	
Risk of emitting harmful radiations to human health	x				
Risk of releasing higher level of noise and vibration.				x	
Risk of the scheme create four odour				x	
Risk of the scheme to cause any health hazard			x		
Risk of causing the contamination of drinking water and possibility of water spillage or water stagnation		x			
Result in the generation of solid or liquid waste, or result in an increase in waste generation during construction or operation				x	
Risk of affecting the quantity or quality of surface waters (e.g. rivers, streams, wetlands), or groundwater (e.g. wells).				x	
Compatibility of the industrial activity with the IP and its existing member/tenant/ companies.			x		
Other (specify):					

When considering the location of an IPD investment project, rate the sensitivity of the proposed site in the following table according to the given criteria. Higher ratings do not necessarily mean

that a site is unsuitable. They do indicate a real risk of causing undesirable adverse environmental and social effects, and that more substantial environmental and/or social planning may be required to adequately avoid, mitigate or manage potential effects. The following table should be used as a reference.

#### 4 Impact Identification and Classification

Issues	Site Sensitivity		
	Low	Medium	High
Natural habitats	No natural habitats present of any kind	No critical natural habitats; other natural habitats occur	Critical natural habitats present
Water quality and water resource availability and use	Water flows exceed any existing demand; low intensity of water use; potential water use conflicts expected to be low; no potential water quality issues	Medium intensity of water use; multiple water users; water quality issues are important	Intensive water use; multiple water users; potential for conflicts is high; water quality issues are important
Natural hazards vulnerability, floods, soil stability/ erosion	Flat terrain; no potential stability/erosion problems; no known volcanic/seismic/ flood risks	Medium slopes; some erosion potential; medium risks from volcanic/ seismic/ flood/ hurricanes	Mountainous terrain; steep slopes; unstable soils; high erosion potential; volcanic, seismic or flood risks
Cultural property	No known or suspected cultural heritage sites	Suspected cultural heritage sites; known heritage sites in broader area of influence	Known heritage sites in project area
Involuntary resettlement	Low population density; dispersed population; legal tenure is well-defined; well-defined water rights	Medium population density; mixed ownership and land tenure; well-defined water rights	High population density; major towns and villages; low-income families and/or illegal ownership of land; communal properties; unclear water rights
Indigenous peoples	No indigenous population	Dispersed and mixed indigenous populations; highly acculturated indigenous populations	Indigenous territories, reserves and/or lands; vulnerable indigenous populations

**ANNEX 8: STANDARDS FOR INDUSTRIAL POLLUTION CONTROL INDUSTRIAL SECTORSIN ETHIOPIA (AS GIVEN BY EPA AND AS RELEVANT TO ANTICIPATED INDUSTRIES IN KILINTO)**

**1. SLAUGHTERINGMEAT PROCESSING AND RENDERING**

**Limit Values for Discharges to Water from Slaughtering and Meat Processing Plants**

<b>Parameters</b>	<b>Limit Value</b>
Temperature	40 °C
pH	6 – 9
BOD5 at 20°C	80 mg/l
COD	250 mg/l
Suspended Solids	80 mg/l
Total ammonia (as N)	20 mg/l
Total nitrogen (as N)	40 mg/l
Total phosphorus (as P)	5 mg/l
Oils, fats, and grease	15 mg/l
Mineral oils at the oil trap or interceptor	20 mg/l
Total coliform bacteria (number per 100ml)	400 mg/l

**Limit Values for Emissions to Air from Slaughtering and Meat Processing Plants**

Parameters	Limit value (mg/Nm <sup>3</sup> )
Total particulates (at a mass flow of 0.5 kg/h or above)	100
Hydrogen chloride (as HCl) (at a mass flow of 0.3 kg/h or more)	30

**Limit Values for Emissions to Air from Rendering Plants**

Substance	Limit value
Total particulates	100 mg/Nm <sup>3</sup>
Ammonia	50 ppm v/v
Amines	5 ppm v/v
Hydrogen sulphide, and mercaptans	5 ppm v/v

**2. MALTING, BREWING, DISTILLING, PRODUCTION OF WINES AND OTHER ALCOHOLIC LIQUOURS****Limit Values for Discharges to Water**

Parameter	Limit Value
Temperature	40 °C
pH	6 – 9
BOD <sub>5</sub> at 20°C	60 mg/l
COD 250 mg/l	250 mg/l
Suspended solids	50 mg/l
Total ammonia (as N)	20 mg/l
Total nitrogen (as N)	40 mg/l

Total phosphorus (as P)	5 mg/l
Oils, fats, and grease	15 mg/l
Mineral oils at the oil trap or interceptor	20mg/l

#### Limit Values for Emissions to Air

Parameter	Limit value (mg/Nm <sup>3</sup> )
Total Particulates (at a mass flow of 0.5 kg/h or above)	100
Hydrogen chloride (as HCl) (at a mass flow of 0.3 kg/h or more)	30

### 3. PHARMACEUTICAL MANUFACTURING

#### Limit Values for Discharges to Water

Parameter	Limit Value
Temperature	40 °C
pH	6 – 9
BOD <sub>5</sub> at 20 °C	50 mg/l
COD	250 mg/l
Total phosphorus (as P)	5 mg/l
Total nitrogen (as N)	30 mg/l
Suspended solids	30 mg/l
Oils, fats, and greases	15 mg/l
Absorbable organic halogen compounds (AOX)	2 mg/l

Organ chlorines	0.1 mg/l
Active ingredient (each)	0.05 mg/l
Arsenic (as As)	0.2 mg/l
Chromium (as total Cr)	1 mg/l
Chromium (as Cr VI)	0.1 mg/l
Phenols	1 mg/l
Copper (as Cu)	2 mg/l
Mercury (as Hg)	0.01 mg/l

#### Limit Values for Emissions to Air

Parameter	Limit value (mg/Nm <sup>3</sup> )
Total particulates	50
Active ingredients	0.2
Organic compounds	(Listed in Annex 1)
Class I	20
Class II	100
Class III	300

## ANNEX 9: EPA SCHEDULE 1 PROJECT LIST

<b>Schedule 1:</b>	Projects which may have adverse and significant environmental and social impacts, and <b>may</b> , therefore, require full EIA;
	<p><b>1. Petroleum Industry.</b></p> <ul style="list-style-type: none"> <li>• Oil and gas fields exploration and development, including Construction of offshore and</li> <li>• onshore pipelines</li> <li>• Construction of oil and gas separation, processing, handling and storage facilities.</li> <li>• Construction of oil refineries</li> <li>• Construction of product deposits for the storage of petrol, gas, diesel, tar and other products within commercial, industrial or residential areas.</li> <li>• Transportation of petroleum products</li> </ul> <p><b>2. Food and beverage industries</b></p> <ul style="list-style-type: none"> <li>• manufacture of vegetable and animal oils and fats</li> <li>• oil refinery and ginneries</li> <li>• processing and conserving of meat</li> <li>• manufacture of dairy products</li> <li>• brewing distilling and malting</li> <li>• fish meal factories</li> <li>• slaughter - houses</li> <li>• soft drinks</li> <li>• tobacco processing</li> <li>• canned fruits, and sources</li> <li>• sugar factories</li> <li>• other agro-processing industries</li> </ul> <p><b>3. Textile industry</b></p> <ul style="list-style-type: none"> <li>• cotton and synthetic fibbers</li> <li>• dye for cloth</li> <li>• ginneries</li> </ul> <p><b>4. Leather Industry</b></p> <ul style="list-style-type: none"> <li>• tanning</li> <li>• tanneries</li> <li>• dressing factories</li> <li>• other cloth factories</li> </ul> <p><b>5. Wood, Pulp and Paper Industries</b></p>

	<ul style="list-style-type: none"> <li>• manufacturing of veneer and plywood</li> <li>• manufacturing of fibre board and of particle - board</li> <li>• manufacturing of Pulp, Paper, sand-board cellulose – mills</li> </ul> <p><b>6. Building and Civil Engineering Industries.</b></p> <ul style="list-style-type: none"> <li>• industrial and housing Estate</li> <li>• major urban projects (multi-storey building, motor terminals, markets etc)</li> <li>• tourist installation</li> <li>• construction and expansion/upgrading of roads, harbours, ship yards, fishing harbours, air fields (having an air strips of 2,500m or long) and ports, railways and pipelines</li> <li>• River drainage and flood control works.</li> <li>• hydro - electric and irrigation dams</li> <li>• reservoir</li> <li>• Storage of scrap metal.</li> <li>• military installations</li> <li>• construction and expansion of fishing harbours'</li> <li>• developments on beach fronts</li> </ul> <p><b>7. Chemical industries</b></p> <ul style="list-style-type: none"> <li>• manufacture, transportation, use and storage of pesticide or other hazardous and or toxic chemicals</li> <li>• production of pharmaceutical products</li> <li>• storage facilities for petroleum, petrochemical and other chemical products (i.e. filling stations)</li> <li>• Production of paints vanishes, etc.</li> </ul> <p><b>8. Non-metallic industries (Products)</b></p> <ul style="list-style-type: none"> <li>• manufacture of cement, asbestos, glass, glass-fibre, glass-wool</li> <li>• processing of rubber</li> <li>• plastic industry</li> <li>• lime manufacturing, tiles, ceramics</li> </ul> <p><b>9. Metal and Engineering industries.</b></p> <ul style="list-style-type: none"> <li>• manufacture and assembly of motor - vehicles</li> <li>• manufacture of other means of transport (trailers, motor-cycles, motor-vehicle bicycles cycles)</li> <li>• body - building</li> <li>• boiler - making and manufacture of reservoirs, tanks and other sheet containers</li> </ul>
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	<ul style="list-style-type: none"> <li>• foundry and Forging</li> <li>• manufacture of non - ferrous products</li> <li>• iron and steel</li> <li>• electroplating</li> </ul> <p><b>10. Waste treatment and disposal (Toxic and Hazardous waste)</b></p> <ul style="list-style-type: none"> <li>• construction of Incineration plants</li> <li>• construction of recovery plant (off-site)</li> <li>• construction of waste water treatment plant (off-site)</li> <li>• construction of secure landfills facility</li> <li>• construction of storage facility (off - site)</li> <li>• Collection and transportation of waste.</li> <li>• installation for the disposal of industrial waste</li> </ul>
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## **ANNEX 10: ENVIRONMENTAL GUIDELINES FOR CONSTRUCTION CONTRACTORS**

### ***ENVIRONMENTAL GUIDELINES FOR CONSTRUCTION CONTRACTORS***

#### **GENERAL: APPLICABILITY OF THESE ENVIRONMENTAL GUIDELINES AND ESMP**

1. These general environmental guidelines apply to any work to be undertaken under the UWSS Project. For certain work sites entailing specific environmental and/or social issues, a specific Environmental and Social Impact Assessment, including an Environmental and Social Management Plan (ESMP), has been prepared to address the above-mentioned specific issues in addition to these general environmental guidelines. In addition to these general environmental Guidelines, the Contractor shall therefore comply with any specific ESMP for the works he is responsible for. The Contractor shall be informed by the Client about such an ESMP for certain work sites, and prepare his work strategy and plan to fully take into account relevant provisions of that ESMP. If the Contractor fails to implement the approved ESMP after written instruction by the works supervisor to fulfil his obligation within the requested time, the Client reserves the right to arrange for execution of the missing action by a third party on account of the Contractor.
1. Notwithstanding the Contractor's obligation under the above clause, the Contractor shall implement all measures necessary to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards, and abide by any environmental performance requirements specified in an ESMP where such an ESMP applies.
2. These Environmental Guidelines, as well as any specific ESMP, apply to the Contractor. They also apply to any sub-contractors present on Project work sites at the request of the Contractor with permission from the Client.

#### **GENERAL ENVIRONMENTAL PROTECTION MEASURES**

3. In general, environmental protection measures to be taken at any work site shall include but not be limited to:
  - a. Minimize the effect of dust on the environment resulting from earth mixing sites, vibrating equipment, construction related traffic on temporary or existing access roads, etc. to ensure safety, health and the protection of workers and communities living in the vicinity of work sites and access roads.
  - b. Ensure that noise levels emanating from machinery, vehicles and noisy construction activities (e.g. excavation, blasting) comply with Ethiopian standards and are generally kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and nearby communities.
  - c. Ensure that existing water flow regimes in rivers, streams and other natural or irrigation channels are maintained and/or re-established where they are disrupted due to works being carried out.

- d. Prevent any construction-generated substance, including bitumen, oils, lubricants and waste water used or produced during the execution of works, from entering into rivers, streams, irrigation channels and other natural water bodies/reservoirs.
- e. Avoid or minimize the occurrence of standing water in holes, trenches, borrow areas, etc...
- f. Prevent and minimize the impacts of quarrying, earth borrowing, piling and building of temporary construction camps and access roads on the biophysical environment including protected areas and arable lands; local communities and their settlements. Restore/rehabilitate all sites to acceptable standards.
- g. Upon discovery of graves, cemeteries, cultural sites of any kind, including ancient heritage, relics or anything that might or believed to be of archaeological or historical importance during the execution of works, immediately report such findings to the Client so that the Ministry in charge of Culture may be expeditiously contacted for fulfilment of the measures aimed at protecting such historical or archaeological resources.
- h. Prohibit construction workers from engaging in the exploitation of natural resources such as hunting, fishing, and collection of forest products or any other activity that might have a negative impact on the social and economic welfare of the local communities. Prohibit explicitly the transport of any bush meat in Contractor's vehicles.
- i. Prohibit the transport of firearms in Project-related vehicles.
- j. Prohibit the transport of third parties in Project-related vehicles.
- k. Implement soil erosion control measures in order to avoid surface run off and prevent siltation, etc.
- l. Ensure that garbage, sanitation and drinking water facilities are provided in construction workers camps.
- m. Ensure that, in as much as possible, local materials are used to avoid importation of foreign material and long distance transportation.
- n. Ensure public safety, and meet Ethiopian traffic safety requirements for the operation of work to avoid accidents.
- o. Ensure that any trench, pit, excavation, hole or other hazardous feature is appropriately demarcated and signposted to prevent third-party intrusion and any safety hazard to third parties.
- p. Comply with Ethiopian speed limits, and for any traffic related with construction at UWSS Project sites, comply with the following speed limits unless Ethiopian speed limits are lower:
  - Inhabited areas: 50 km/h
  - Open road: 90 km/h.
- q. Ensure that, where unskilled daily-hired workforce is necessary, such workers are hired from neighbouring communities.
- r. Generally comply with any requirements of Ethiopian law and regulations.

4. Besides the regular inspection of the sites by the supervisor appointed by the Client for Adherence to the Contract conditions and specifications, the Client may appoint an environmental inspector to oversee the compliance with these environmental conditions and any proposed mitigation measures. State or Regional Environmental Authorities may carry out similar inspection duties. In all cases, as directed by the Client's supervisor, the contractor shall comply with directives from such inspectors.

## **DRILLING**

5. The Contractor will make sure that any drilling fluid, drilling mud, mud additives, and any other chemicals used for drilling at any UWSS Project construction site complies with Ethiopian health and safety requirements. In general, only bio-degradable materials will be used. The Contractor may be required to provide the detailed description of the materials he intends to use for review and approval by the Client. Where chemicals are used, general prescriptions of the World Bank's safeguard policy OP 4.09 "Pest Management" shall be complied with.
6. Drilling fluids will be recycled or disposed of in compliance with Ethiopian regulations in an authorized disposal site. If drilling fluids cannot be disposed of in a practical manner, and if land is available near the drilling site that is free of any usage rights, the contractor may be authorized to dispose of drilling fluids near the drilling site. In this occurrence, the Contractor will be required to provide to the Client due evidence of their total absence of potential environmental impacts, such as leachate tests certified by an agreed laboratory. In this case, drilling fluids will be dried at site, mixed with earth and spread at site.
7. Any site affected by drilling work will be restored to its initial condition. This applies to drilling pads, access roads, staging areas, etc... Topsoil will be stripped ahead of any earthmoving, stored near the construction site, and replaced in its original location after the recon touring of the area affected by the works.
8. Where successive aquifers are intersected by the drilling works and upon order by the work supervisor, the Contractor may be required to take measures to isolate aquifers from contamination by each other.
9. The Contractor will take all measures to avoid bacteriological or chemical contamination of the intersected aquifers by the drilling equipment. Similarly, the Contractor will take all measures to avoid bacteriological or chemical contamination of the intersected aquifers from the surface by providing an adequately sealed well-head.
10. When greasing drilling equipment, the Contractor will avoid any soil contamination. In the event of a limited hydrocarbon spill, the Contractor will recover spilled hydrocarbons and contaminated soils in sealed drums and dispose of them in an authorized waste management facility.
11. Unless duly requested by the Contractor and authorized by the supervisor, no servicing of drilling equipment or vehicles is permitted at the drilling site.

## **PIPELINES**

12. No trench shall be left open for more than 7 days, unless duly authorized by the supervisor upon Contractor's request. Trenches and other excavation works shall be demarcated and/or signposted to avoid third party intrusion.
13. General conditions related with topsoil stripping, storage and restoration apply.
14. The Contractor will take measures to dispose of water used for pressure tests in a manner that does not affect neighbouring settlements.

## **WASTE MANAGEMENT**

15. All drums, containers, bags, etc. containing oil/fuel/surfacing materials and other hazardous chemicals shall be stored at construction sites on a sealed and/or bonded area in order to contain potential spillage. All waste containers, litter and any other waste generated during the construction shall be collected and disposed of at designated disposal sites in line with applicable Ethiopian government waste management regulations.
16. All drainage and effluent from storage areas, workshops, housing quarters and generally from camp sites shall be captured and treated before being discharged into the drainage system in line with applicable government water pollution control regulations.
17. Used oil from maintenance shall be collected, properly stored in sealed containers, and either disposed of appropriately at designated sites or be re-cycled.
  18. Entry of runoff into construction sites, staging areas, camp sites, shall be restricted by constructing diversion channels or holding structures such as berms, drains, dams, etc. to reduce the potential of soil erosion and water pollution.
  19. Construction waste shall not be left in stockpiles along the road, but removed and reused or disposed of on a daily basis.
  20. Where temporary dump sites for clean excavated material are necessary, they shall be located in areas, approved by the Client's supervisor, where they will not result in supplemental erosion. Any compensation related with the use of such sites shall be settled prior to their use.
  21. Areas for temporary storage of hazardous materials such as contaminated liquid and solid materials shall be approved by the supervisor and appropriate local and/or relevant national or local authorities before the commencement of work. Disposal of such waste shall be in existing, approved sites.

## **QUARRIES AND BORROW AREAS**

22. The Contractor shall obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas. The location of quarries and borrow areas shall be subject to review and approval by relevant local and national authorities.
23. New extraction sites:

- a. Shall not be located less than 1km from settlement areas, archaeological areas, cultural sites, including churches and cemeteries, wetlands or any other valued ecosystem component, or on high or steep ground.
  - b. Shall not be located in water bodies, or adjacent to them, as well as to springs, wells, well fields.
  - c. Shall not be located in or near forest reserves, natural habitats or national parks.
  - d. Shall be designed and operated in the perspective of an easy and effective rehabilitation.
  - e. Areas with minimal vegetation cover such as flat and bare ground, or areas covered with grass only or covered with shrubs less than 1.5m in height, are preferred.
  - f. Shall have clearly demarcated and marked boundaries to minimize vegetation clearing and safety hazards for third parties.
24. Vegetation clearing shall be restricted to the area required for safe operation of construction work. Vegetation clearing shall not be done more than two months in advance of operations.
25. Stockpile areas shall be located in areas where trees or other natural obstacles can act as buffers to prevent dust pollution, and generally at a distance from human settlements. Wind shall be taken into consideration when siting stockpile areas. Perimeter drains shall be built around stockpile areas.
26. The Contractor shall deposit any excess material in accordance with the principles of these guidelines, and any applicable ESMP, in areas approved by local authorities and/or the supervisor.

#### **REHABILITATION OF WORK AND CAMP SITES**

27. Topsoil shall be stripped, removed and stored for subsequent rehabilitation. Soils shall not be stripped when they are wet. Topsoil shall not be stored in large or high heaps. Low mounds of no more than 1 to 2m high are recommended.
28. Generally, rehabilitation of work and camp sites shall follow the following principles:
- a. To the extent practicable, reinstate natural drainage patterns where they have been altered or impaired.
  - b. Remove toxic materials and dispose of them in designated sites. Backfill excavated areas with soils or overburden that is free of foreign material that could pollute groundwater and soil.
  - c. Ensure reshaped land is formed so as to be stable, adequately drained and suitable for the desired long-term land use, and allow natural regeneration of vegetation.
  - d. Minimize erosion by wind and water both during and after the process of reinstatement.
  - e. Compacted surfaces shall be deep ripped to relieve compaction unless subsurface conditions dictate otherwise.

#### **MANAGEMENT OF WATER NEEDED FOR CONSTRUCTION PURPOSES**

29. The Contractor shall at all costs avoid conflicting with water needs of local communities. To this effect, any temporary water abstraction for construction needs from either ground or surface water shall be submitted to the following community consultation process:
  - a. Identification of water uses that may be affected by the planned water abstraction,
  - b. Consultation with all identified groups of users about the planned water abstraction,
  - c. In the event that a potential conflict is identified, report to the supervising authority.
  - d. This consultation process shall be documented by the Contractor (minutes of meeting) for review and eventual authorization of the water withdrawal by the Client's supervisor.
30. Abstraction of both surface and underground water shall only be done with the consultation of the local community as mentioned and after obtaining a permit from the relevant authority.
31. Abstraction of water from wetlands is prohibited.
32. Temporary damming of streams and rivers is submitted to approval by the supervisor.
33. It shall be done in such a way as to avoid disrupting water supplies to communities downstream, and to maintain the ecological balance of the river system.
34. No construction water containing spoils or site effluent, especially cement and oil, shall be allowed to flow into natural water drainage courses. Similarly, wash water from washing out of equipment shall not be discharged into water courses or road drains. Washing bays shall be sited accordingly. Unless site conditions are not favourable, it will generally be infiltrated through soak pits or similar.
35. Site spoils and temporary stockpiles shall be located away from the drainage system, and surface run off shall be directed away from stockpiles to prevent erosion.

#### **TRAFFIC MANAGEMENT AND COMMUNITY SAFETY**

36. Location of temporary access roads shall be done in consultation with the local community and based on the screening results, especially in important or sensitive environments. Temporary access roads shall not traverse wetland areas or other ecologically sensitive areas. The construction of any access roads shall be submitted to a prior consultation process with potentially affected communities that will have to be documented (minutes of meetings) for supervisor's review and approval.
37. Upon the completion of civil works, all temporary access roads shall be ripped and rehabilitated.
38. Measures shall be taken to suppress dust emissions generated by Project traffic.
39. Maximum speed limits for any traffic related with construction at UWSS Project sites shall be the following, unless Ethiopian speed limits are locally lower:
  - Inhabited areas: 50 km/h
  - Open road: 90 km/h.

#### **SALVAGING AND DISPOSAL OF OBSOLETE COMPONENTS FOUND BY REHABILITATION WORKS**

40. Obsolete materials and construction elements such as electro-mechanical equipment, pipes, accessories and demolished structures shall be salvaged and disposed of in a manner approved by the supervisor. The Contractor has to agree with the supervisor which elements are to be surrendered to the Client's premises, which will be recycled or reused, and which will be disposed of at approved landfill sites.
41. Any asbestos cement material that might be uncovered when performing rehabilitation works will be considered as hazardous material and disposed of in a designated facility.

#### **COMPENSATION OF DAMAGE TO PROPERTY**

42. Compensation of land acquired permanently for Project purposes will be handled under Client responsibility based on the provisions of the RPF. However, in the event that the Contractor, deliberately or accidentally, damages property; he shall repair the property to the owner's satisfaction and at his own cost. For each repair, the Contractor shall obtain from the owner/user a certificate that the damage has been repaired satisfactorily in order to indemnify the Client from subsequent claims.
43. In any case where compensation for inconveniences, damage of crops etc. are claimed by the owner, the Client has to be informed by the Contractor through the supervisor.

#### **CONTRACTOR'S HEALTH, SAFETY AND ENVIRONMENT MANAGEMENT PLAN (HSE-MP)**

44. Within 6 weeks of signing the Contract, the Contractor shall prepare an HSE-MP to ensure the adequate management of the health, safety, environmental and social aspects of the works, including implementation of the requirements of these general conditions and any specific requirements of an ESMP for the works. The Contractor's EHS-MP will serve two main purposes:
45. The Contractor's HSE-MP shall provide at least:
  - a. A description of procedures and methods for complying with these general environmental management conditions, and any specific conditions specified in an ESMP;
  - b. A description of specific mitigation measures that will be implemented in order to minimize adverse impacts;
  - c. A description of all planned monitoring activities and the reporting thereof; and
  - d. The internal organizational, management and reporting mechanisms put in place for such.
46. The Contractor's HSE-MP will be reviewed and approved by the Client before start of the works. This review should demonstrate if the Contractor's HSE-MP covers all of the identified impacts, and has defined appropriate measures to counteract any potential impacts.

#### **HSE REPORTING**



47. The Contractor shall prepare bi-monthly progress reports to the Client on compliance with these general conditions, the sub-project ESMP if any, and his own HSE-MP. The Contractor's reports will include information on:
- a. HSE management actions/measures taken, including approvals sought from local or national authorities;
  - b. Problems encountered in relation to HSE aspects (incidents, including delays, cost consequences, etc. as a result thereof);
  - c. Non-compliance with contract requirements on the part of the Contractor;
  - d. Changes of assumptions, conditions, measures, designs and actual works in relation to HSE aspects; and
  - e. Observations, concerns raised and/or decisions taken with regard to HSE management during site meetings.
48. The reporting of any significant HSE incidents shall be done as soon as practicable.
- Such incident reporting shall therefore be done individually. The Contractor should keep his own records on health, safety and welfare of persons, and damage to property. It is advisable to include such records, as well as copies of incident reports, as appendixes to the bi-monthly reports. Details of HSE performance will be reported to the Client.

#### **TRAINING OF CONTRACTOR'S PERSONNEL**

49. The Contractor shall provide sufficient training to his own personnel to ensure that they are all aware of the relevant aspects of these general conditions, any project ESMP, and his own HSE-MP, and are able to fulfil their expected roles and functions. Specific training will be provided to those employees that have particular responsibilities associated with the implementation of the HSE-MP. Training activities will be documented for potential review by the Client.
50. Amongst other issues, training will include an awareness session for all employees on HIV-AIDS addressing the following topics:
- a. What is HIV/AIDS?
  - b. How is HIV/AIDS contracted
  - c. HIV/AIDS prevention.