DRAFT
STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) REPORT
(NEMA/SEA/5/2/044)

PROPOSED ELDORET ICDC INDUSTRIAL PARK MASTER PLAN
BLOCK 15/1757 ELDORET MUNICIPALITY, UASIN GISHU COUNTY

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VOLUME 1
CERTIFICATION

This Draft Strategic Environmental Assessment Report for the Eldoret ICDC Industrial Park Master Plan has been prepared under the leadership of Dr. Fridah W. Mugo, NEMA Lead Expert Reg. No. 0084 of University of Nairobi Enterprise and Services Ltd. The report has been prepared with reasonable skills, care and diligence in accordance with the Environmental Management and Co-ordination Act of 1999, Environmental (Impact Assessment and Audit) Regulations of 2003, and the National Guidelines for Strategic Environmental Assessment of 2012.

We certify that the particulars given in this report are correct to the best of our knowledge.

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INTRODUCTION

The Eldoret ICDC Industrial Park (EIIP) Master Plan was conceived in accordance with the government’s objective to realize industrial growth as enshrined in its development blueprint, Vision 2030 and out of the desire to create employment opportunities, support innovation, promote interactive learning and commercialization of research outputs. The park is also expected to be a conduit for exploitation of local entrepreneurial potential. Within the context of an overall development strategy, the industrial park will be a valuable instrument to increased regional and national industrial competitiveness, as well as arrest negative externalities associated with urban congestion and ‘brain drain’.

A Strategic Environmental Assessment (SEA) was carried out on the EIIP Master Plan in fulfillment of Regulation 42 of the Environmental (Impact Assessment and Audit) Regulations of 2003 that requires all Policy, Plans or Programmes to be subjected to a SEA. The purpose of this draft SEA report is to share the findings of the SEA study. The study sought to identify possible impacts on the bio-physical and socio-economic environment upon implementation of the EIIP Master Plan. It also sought to provide mitigation measures for identified negative impacts, an environmental management plan and a monitoring plan to ensure effective implementation of the mitigation measures.

The broad objective of the SEA was to systematically integrate environmental considerations into the Master Plan and support decision making processes. The specific objectives of this SEA were to: provide guidelines for sustainable management of environmental aspects of the industrial park, incorporate environmental sustainability measures in the design phase of the master plan, provide guidelines for incorporation of environmental issues in the sub-projects of the master plan, provide environmental quality bench marks for monitoring future environmental quality of the park, and recommend institutional arrangements for sustainable management of environmental aspects of the industrial park.

APPROACH AND METHODOLOGY

The SEA study was conducted concurrently with the Master Plan formulation. It was done through three stages that included screening, scoping and detailed SEA study. The methods involved extensive review of literature on relevant policies, legislations, regulations and institutional frameworks. Other local and global SEA studies were also reviewed. The team used a rigorous participatory approach involving consultations with both the client and key stakeholders such as statutory officers, industrial investors and political leaders. Local communities also participated through a stakeholder consultation, a public forum and household interviews. The multidisciplinary SEA
team generated most of their decisions through structured continuous brainstorming sessions. A detailed site survey and inventory were carried out to document site characteristics, and measure baseline conditions of environmental indicators such as bio-diversity, water and air quality, soil health, noise and vibration levels, and radiation levels. Six possible alternative land uses were assessed based on compatibility with the surrounding land uses, zoning regulations, value chain benefits and environmental risks. Potential bio-physical and socio-economic impacts were identified for all the alternatives using a matrix that recorded the estimated intensity and duration of each possible impact. Mitigation measures were also identified for each negative impact, and implementation and monitoring plans proposed.

THE ELDORET ICDC INDUSTRIAL PARK MASTER PLAN

The Eldoret ICDC industrial park occupies approximately 135 acres of land on block 15/1757, in Eldoret Municipality - Uasin Gishu County. The Vision of this Industrial Park is to be a leading frontier in industrial estate design, setting standards in sustainability, social amenity and building efficiency. The Master Plan for the park has been designed to foster sustainable industrial development through an integrated approach. This approach has embraced the principles of eco-industrial parks that focuses on achieving a community of manufacturing and service businesses that are keen on enhanced economic and environmental performance through collaboration in managing environmental and resource issues, including energy, water, and materials. Subsequently, the park promotes a system of planned materials and energy exchanges that seek to minimize energy and raw materials use, minimize waste, and build sustainable economic, ecological and social relationships. The Master Plan broadly provides rationale for land use activities within the site in addition to providing detailed infrastructure plans for roads, power distribution, sewerage, drainage, telecommunication, and utility installations.

This park is largely envisaged to be an Agro-Industrial Park. ‘Agro Industry’ means a unit, which adds value to agricultural products/intermediates/residues, both food and non-food, by processing into products, which are marketable or usable or edible; or by improving storability, or by providing the link from farm to the market or a part thereof. The proposed park will house 5 different broad types/clusters of industries including:

- Light Heavy Industries Cluster entailing primary processors, secondary processors and tertiary processors based on their value chain systems. For instance, a wheat milling industry as a primary processor will have a bakery as the secondary processors using its outputs (wheat flour).

- The Light Industrial Cluster is composed of two main industrial activities, namely food processing and textile industries. However, other compatible
industries based on both material exchanges and value addition may be located in the cluster.

- Research and Incubation Cluster which will accommodate institutions specialized in industrial research and development and training young industrial ventures. Some of the targeted entities include the Kenya Industrial Research Development Institute (KIRDI), Moi University, Eldoret Polytechnic, and KAM Research Division.

- Commercial Cluster to complement the industrial functions. Some of the commercial provisions in the park include: restaurants and fast-food outlets, convenience stores, banks, travel agencies, dry cleaners, health clubs, barber shops and beauty salons, automobile service stations, truck stops, copy centers, mailing and delivery services, office supply stores, and other support retail businesses.

- Service and Logistics Cluster categorized into go-downs/warehouses, production of packaging materials, and logistics business outsourcing.

During the scoping stage, stakeholders made suggestions on the type of industries that should be included and those that should be left out. After completing the land use planning process, the plan was presented to stakeholders in a pre-validation workshop and the included industries discussed one by one. All the proposed were accepted.

POLICY, LEGAL AND INSTITUTIONAL FRAMEWORKS’ REVIEW

A total of 8 international conventions, 12 national policy documents and 19 laws and rules were reviewed. This review was done to integrate the global, national and sectoral policies and principles into the EIIP Master Plan and determine compliance of the Master Plan with the existing policies and laws. It helped identify indicators and determine legally acceptable thresholds on environmental standards for environmental quality (e.g. air, noise, water, radiation) and protection of sensitive ecosystems, standards for solid and liquid waste management, land use guidelines, ecological and social-economic issues. Requirements arising out of the policy documents that needed to be incorporated in the Master Plan were addressed as detailed in Chapter 4 and those that require mitigation have been addressed in Chapters 8 & 9 and 10. Overall, the EIIP Master Plan appeared to be an answer to most of the policy needs expressed in the documents. Examples include the industrialization policy whose objective is to promote industrial development and the livestock policy which aims to promote agro-processing of livestock products since currently, only 16% of the products are processed.

Bio-physical and socio-economic issues arising out of the legislations and regulations have been addressed by the EIIP Master Plan by including preventive measures in the design works of the Master Plan, as detailed in Chapter 3 of this report and Chapters
8, 9 and 10 for those that require mitigation measures. The key institutions identified as critical for the success of the EIIP Master Plan environmental strategy include: ICDC; The National Environment Management Authority (NEMA); Ministry of Industrialization and Trade; Ministry of Water and Irrigation; Ministry of Environment and Natural Resources; The County Committee Responsible for Environmental Matters, Eldoret Water and Sanitation Company (ELDOWAS) and the Neighboring Residents Associations. Each key institution has designated responsibilities to ensure environmental sustainability of the Park.

RESULTS ON THE SPECIFIC SEA OBJECTIVES

a) Incorporation of environmental sustainability measures in the design phase of the master plan has been provided for in the land budget where by 7.7% (10.4 acres) of the land has been allocated for green/open space. In addition to this, all the roads, pedestrian walk ways, parking spaces will be lined with trees, shrubs and ornamental plants that have multiple functions of absorbing pollutants such as SO₂ and CO₂ as they release oxygen in the air. The effective land coverage for the green space will therefore exceed 10%. The trees, shrubs and other plants will also improve the aesthetics of the Industrial Park. Exploitation of natural lighting, ventilation, rain and storm water has been incorporated in the building and infrastructure designs.

b) Guidelines for sustainable management of environmental aspects of the industrial park includes ensuring efficient utilization of energy, water and material resources. Energy, water and material resources use will be monitored closely during the construction and operation phases through energy and water efficiency audits to ensure their efficient utilization. All the infrastructure to be installed have been carefully designed to ensure that there is sufficient percolation of water to the underground aquifers. In addition, a management plan has been formulated for Cherunya riparian reserve to ensure minimum negative impacts on the river and no squatter settlements along the reserve.

c) Guidelines for incorporation of environmental issues in the sub-projects of the Master Plan includes ensuring that individual sub-projects of the Industrial Park undertake an environmental impact assessment which shall generate detailed information on how environmental matters for the individual projects should be handled. Each sub-project will be expected to formulate an environmental policy to guide management of environmental issues during the operation phase. In addition to this the Industrial Park managers will ensure that the sub-projects follow the laid down rules in the development control plan of every aspect of building construction and infrastructure development as detailed in the Master Plan.
d) Baseline Bio-physical and Environmental Conditions: The summary results of the bio-physical and socio-economic baseline environment are as indicated below:

i. Biophysical-environment

**Bio-diversity:** Biodiversity of the site is very low with only about nine plant species identified. No large wild animals were found on the site. Domestic animals such as goats, sheep, donkeys and cows are occasionally brought to the site for grazing. The plant and animal diversity is expected to change significantly during the operation phase of the park.

**Geology:** The alignment of the soil falls within S1 sub-grade class as classified by the Roads Design Manual Part III (Material and Pavement Design for New Roads). This soil is structurally weak for pavement laying and require capping or chemical treatment for pavement support. The foundation bearing capacity of the soil was 188kN/M$^2$ assuming a 2.5m deep square 3m footing and safety factor of 4.

**Soils:** There were visible signs of surface land degradation especially through erosion. The soil health such as PH, Electrical Conductivity (EC), Lead (Pb), Zinc (Zn), Copper (Cu), and Potassium (K), Sodium (Na), Calcium (Ca), Magnesium (Mg), Manganese (Mn) and Iron (Fe) were all within acceptable limits.

**Water:** The water table was found to be shallow between 10-25 metres. There is a well at the site whose water quality was found to be poor exceeding the recommended acceptable limits. The water is used by NYS.

**Wetlands:** There is a minor wetland on the lower end of the western side with a spring originating at the same site. The spring develops into river Cherunya.

**Air quality:** Emissions at the site were mainly dust and vegetation debris. Greenhouse gas emissions such as Carbon monoxide, Carbon dioxide, Sulphur dioxide and Volatile Organic Compounds were all found to be within limit. Overall, the air quality was within limit. However, a baseline operational assessment should also be done.

**Noise levels:** The noise levels range of 27.0dB(A) and 51.1dB(A) was found to be within limits for commercial zones. The target for construction sites is 75dB (A). Noise generated during operation phase is not expected to impact negatively on the environment beyond 200m after mitigation. The effect of the development on the acoustic environment should be investigated further during construction and operation phases to additional baseline data.

**Landscape:** Landscape and townscape appearance was very poor. The site is largely covered by green vegetation with a few areas especially those currently being used as paths with bare soil exposure.
Concrete surface: There was no concrete surface at the site but this is expected to increase enormously as construction of both buildings and infrastructure commences.

Temperature: Average temperature was 16.6 °C in the warmest months of February and March. In the coldest months of June-July, it averages 9 °C.

Compatibility with the surrounding land uses: To the North is KURA, NYS and Private Properties mainly residential houses. The eastern side has residential and mixed uses, southern side has informal settlement (Langas Estate), while the western side is agricultural land planted with maize and beans. EIIP is compatible with the surrounding land uses.

ii. Socio-economic environment

Employment: The baseline unemployment and underemployment level of the County is high estimated at 46%? The county absolute poverty level for 2012 was 49%. Urban food poverty was 38% in 1997, while rural food poverty for the county was 43% in 1997. Female headed households had higher poverty levels. Agricultural performance is low due to mainly lack of value addition and organized markets for agricultural produce. There were complaints of gender discrimination during hiring of employees with preference being given to men.

Human health: Currently there is no human health issues at the site since it is not yet occupied.

Social amenities: The site is used for social meetings and as a play ground by different people, particularly youth groups. There is no educational or health facility within the site.

Population: In 2009, the Uasin Gishu County population was 894,179 and is projected to increase to 1,201,853 in 2017 with a growth rate of 3.8% compared to the national average of 2.4%. The population is expected to grow significantly from people coming in to seek jobs, entrepreneurs coming in to set up their own businesses and from immigrant labor for increased agricultural, livestock and forestry production to supply raw materials to industries.

Security: There is no police post nearby. Mugging, rape and murder cases have been reported to occur at the site, but records were not available. There are no street lights hence the site is in complete darkness at night.

Foreign Direct Investment: There is no current FDI at the site but many investors are expected to come and invest especially after the infrastructure is installed.
Value Chain Benefits: There is no data for value chain benefits but it is expected to increase significantly through the backward and forward linkages that will be created by the Industrial Park.

Institutional arrangements for sustainable management of environmental aspects of the industrial park

Environmental issues tend to be ignored in many development projects even when planned for and targets are set. To ensure that what this SEA has proposed is implemented, the study proposes creation of an environmental unit by ICDC. It should be housed at the ICDC Complex within the Industrial Park. The Unit which will work very closely with the County Environmental Committee and NEMA should have a minimum of three qualified fulltime employees to run it. This will consist of an Environmental Manager and two assistants. Their work will include ensuring that all investors have environmental policies and targets for their individual sub-projects and also ensure implementation of all the recommended mitigation measures. This will be done in collaboration with all the relevant line agencies/sectors.

STAKEHOLDER AND PUBLIC ENGAGEMENT

The stakeholders were identified in accordance with the areas/sectors that are affected directly or indirectly by the EEIP Master Plan. The relevant stakeholders identified and consulted included the National Government Sectoral Development and Law Enforcement Agencies such as (ICDC, NEMA, Kenya National Chamber of Commerce and Industry, ELDOWAS, KURA, WRMA etc.), the Uasin Gishu County government, private companies and groups of affected individuals. Other stakeholders that were consulted include the: Educational Institutions such as Moi University, Eldoret Polytechnic, the Kenya Industrial Estates (KIE), Community Residents Associations, Women and Youth Associations as well as the public.

ALTERNATIVES TO THE INDUSTRIAL PARK LAND USE OPTION

Five alternatives to the preferred EIIP Land Use Option were studied. This included mixed Housing-Commercial Option, Commercial Only Option; Housing Only Option; Agricultural Use Option and No Intervention Option. When choosing the preferred option, factors such as zoning regulations, environmental sustainability, aggregate benefits along the products value chain and objectives of the client were considered. All the six land use options were subjected to a matrix containing the principles of SEA as enumerated in the National SEA guidelines of 2012 and other environmental and socio-economic concerns raised by the stakeholders. The Industrial Park Option was picked as the preferred option because, the land is zoned as industrial, it emerged strong on Value Chain Benefits, had overall highest aggregate scores on combined biophysical and environmental parameters as detailed in Table 7.
PREDICTED POSITIVE AND NEGATIVE IMPACTS

Positive Impacts: The predicted bio-physical impacts of implementing the EIIP Master Plan are: increased bio-diversity, conservation of green/open spaces, improved landscape, townscape appearance and the parks complementarity with the surrounding land uses during the operation phase. The positive socio-economic impacts include increased employment, social amenities, population, improved security, Foreign Direct Investment, and increased value chain benefits from backward and forward value chain linkages.

Negative Impacts: The negative bio-physical impacts include: Decrease in bio-diversity during the construction phase, land degradation and increased water use in the construction phase and waste water generation in the operation phase. Others are landscape appearance during construction and increase in concrete surface during the operation phase. The negative socio-economic impacts are mainly on human health from dust pollution during construction and gaseous pollutants during the operation phase.

STRATEGIC ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environmental and Social Management Plan (ESMP) was developed to facilitate implementation of mitigation measures to all the predicted negative impacts of implementing the EIIP. The Environmental monitoring plan on the other hand is to ensure that the ESMP has been implemented.

RECOMMENDATIONS

For the EIIP Master Plan to achieve its intended strategic objectives with minimum negative impacts on the bio-physical and socio-economic environment, through the proposed environmental strategies, the following are recommended: The proposed Environmental and Social Management Plan should be implemented effectively ensuring that all the recommended mitigation measures are taken into consideration; ICDC should establish an Environmental Management, Coordination and Monitoring Unit to oversee implementation and monitoring of all the environmental aspects of the Industrial Park; The Cherunya River Riparian management plan should be implemented effectively to ensure no negative impacts on the river occur. The formulated Development Control guidelines for construction and infrastructure development should be followed strictly by all investors.
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<th>Description</th>
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<tr>
<td>EA</td>
<td>Environmental Audit</td>
</tr>
<tr>
<td>ICDC</td>
<td>Industrial and Commercial Development Corporation</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
</tr>
<tr>
<td>EMCA</td>
<td>Environmental Management and Coordination Act</td>
</tr>
<tr>
<td>ESMP</td>
<td>Environmental and Social Management Plan</td>
</tr>
<tr>
<td>ELDOWAS</td>
<td>Eldoret Water and Sanitation Company</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
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<td>Industrial and Commercial Development Corporation</td>
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<td>IPMP</td>
<td>Industrial Park Master Plan</td>
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<td>KAM</td>
<td>Kenya Association of Manufacturers</td>
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<td>KFA</td>
<td>Kenya Farmers Association</td>
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<td>KIRDI</td>
<td>Kenya Industrial Research and Development Institute</td>
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<td>Kenya Urban Roads Authority</td>
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<td>KVDA</td>
<td>Kerio Valley Development Authority</td>
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<td>NEMA</td>
<td>National Environment and Management Authority</td>
</tr>
<tr>
<td>NCPB</td>
<td>National Cereals and Produce Board</td>
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<tr>
<td>NCTTCA</td>
<td>Northern Corridor Transit and Transport Coordination Authority</td>
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<tr>
<td>PPP</td>
<td>Policy Plans and Programmes</td>
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<tr>
<td>SEA</td>
<td>Strategic Environmental Assessment</td>
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<tr>
<td>UNES</td>
<td>University of Nairobi Enterprise and Services Limited</td>
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</tbody>
</table>
CHAPTER ONE
INTRODUCTION

1.1: BACKGROUND OF THE MASTER PLAN

Under Kenya Vision 2030, a number of flagship projects were identified in every sector to be implemented over the period and to facilitate the desired national growth rate. The identified projects directly address priorities in key sectors of the economy, manufacturing being one of them. This sector is crucial in the transformation and development of the country’s economy into a newly industrializing country. The sector’s role in Vision 2030 is to support the country’s social economic development agenda by creating jobs, generating wealth and attracting Foreign Direct Investments (FDI). In its attempt to achieve this, the sector is expected to use the state-of-the-art technology that is both efficient and environmentally friendly in an effort to make Kenya a dynamic industrial nation. Small and Medium Enterprises (SMEs) in the manufacturing sector are at the heart of the industrialization process in Kenya. This is informed by the important role SMEs and industries have played in the industrialization of many developing economies.

The Industrial and Commercial Development Corporation (ICDC) was established in 1954 under the ICDC Act cap 445 of the Laws of Kenya as a Development Finance Institution whose mandate is to facilitate industrial and economic development of Kenya by providing various financial services. ICDC undertook a feasibility study and determined that there is a business case for development of an Industrial (SME) Park in Eldoret Municipality in Uasin Gishu County. Consequently, the corporation commissioned the University of Nairobi Enterprises and Services (UNES) Ltd. to develop a Master Plan for the Industrial Park and carry out a Strategic Environmental Assessment (SEA) for the same. This report is for the Strategic Environmental Assessment (SEA) of the Eldoret Eco-Industrial Park.

An industrial park or estate is a community of manufacturing and service businesses located together on a common property. Given their unique nature they are in most cases operated and managed by the owners. In most cases they are considered as part of the plant and equipment required to conduct industrial business. This is however quickly changing largely due to the development of industrial parks as real estate by private developers across the globe. Today there are more industrial properties owned by Real Estate developers that are operated by tenants and managed by independent real estate firms.

The proposed Industrial Park is expected to, among others, serve as focal point for supporting innovation, commercialization of industrial research findings, technology transfer, sub-contracting, cluster formation and promoting best practice in production and work environment for the benefit of the local community and the region at large. In addition, the Eldoret ICDC Industrial Park is expected to provide Physical and
Business Development Services (BDS) facilities to support the local and foreign enterprises and facilitate their growth in various industrial sub sectors such as agro processing, agro machinery, as well as support services sectors i.e. packaging, ICT, etc.

1.2: RATIONALE OF THE PROPOSED ICDC INDUSTRIAL PARK

Kenya requires new industries and technologies to modernize, diversify and to realize the goal of sustainable industrial development. Industries in Kenya face challenges such as accessing information, new technological knowledge and finance. Weak institutions and a lack of regulations is also a challenge thus inhibiting progress towards realizing development objectives. This proposed industrial park could be used to overcome these obstacles and accelerate economic development by attracting innovative businesses, leading to more jobs and a larger tax base. The park is expected to support start-ups, new enterprise incubation, the development of knowledge-based businesses, and offer an environment where local and international firms can interact with centers of knowledge creation.

Moreover, the park will act as an innovation hub, promoting interactive learning and the commercialization of research outputs, and a conduit for exploitation of local entrepreneurial potential. In addition, within the context of an overall development strategy, this industrial park will be a valuable instrument to increase regional and national industrial competitiveness, as well as arresting negative externalities associated with urban congestion and ‘brain drain’.

This park has been designed to provide an institutional framework, modern administrative services and a physical infrastructure that may not be available to individual industries, which are not agglomerated. Fundamentally, agglomeration or clustering of various industries into an industrial park ensures that these industries take advantage of public infrastructure, economies on construction and common facilities, and gain access to nearby skilled labour markets, research and education facilities and other critical inputs.

1.3: LEGAL CONTEXT OF THE SEA

According to the Constitution of Kenya 2010, Article 42, every person has the right to a clean and healthy environment which includes the right to have the environment protected for the benefit of present and future generations through legislations and other measures particularly those contemplated in Article 69; and to have obligations relating to the environment fulfilled under article 70.

Section 58 of the Environmental Management and Coordination Act, (EMCA, 1999), addresses itself primarily to Environmental Impact Assessment, however, Environmental (Impact Assessment and Audit) Regulations, 2003 recognizes Strategic Environmental Assessment as a measure of Environmental Impact Assessment at Strategic level such as Policy, Plan and Programme (PPP). The regulations section 42 and 43 address SEA; Section 42(1) requires lead agencies in consultation with NEMA
to subject all policies, plans and programmes for implementation to a SEA. Regulation 42(3) commits the government and all lead agencies to incorporate principles of SEA in the development of sector or national policies.

For European Union (EU) countries, SEA became a statutory requirement following adoption of European Union Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment. The objective of SEA as defined in Directive 2001/42/EC is “To provide high level protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to contributing to sustainable development.”

For Kenya, indicative areas that need to be subjected to SEA include: Sector specific policies, plans and programmes, spatial and land use plans, regional development programmes, natural resource management strategies, legislative and regulatory bills (Acts), investment and lending activities of international aid and development assistance. In principle, the proposed Eldoret Eco-Industrial Park Master Plan (land use plan and infrastructure plan) is considered as a policy plan which must therefore be subjected to a Strategic Environmental Assessment.

1.4: OBJECTIVES OF THE SEA

1.4.1: Overall Objectives

The broad objective of Strategic Environmental Assessment is to systematically integrate environmental considerations into policy, planning and decision-making processes, such that environmental information derived from examination of the proposed policies, plans, programs or projects is used to support decision making. For this study, it is to:

a) To guide the master plan proposals to ensure they are compatible with sustainable environmental planning and management;

b) To ensure the full consideration of alternative plan options including the do nothing option, at an early time when the agency has greater flexibility;

c) To enable consistency to be developed across different sector policies especially where trade-offs need to be made between the objectives of the sectors;

d) To guide investment programmes involving multiple sub-projects or sector policies;

e) To identify environmental impacts and opportunities of mitigation measures into programme designs during the formulation stage of the plan and programmes, and in the process enhance environmental management plans;
f) To ensure that the cumulative, indirect or secondary impacts of diverse multiple activities are considered, including their unintended consequences;

g) To obviate the needless reassessment of issues and impacts at project level where such issues could have been more effectively dealt with at a strategic level, and offer time and cost savings;

h) To provide information to decision makers by evaluating alternative options that meet proposal objectives based on the best practicable environmental options;

i) To ensure that environmental principles such as sustainability, polluter pays and the precautionary principle are integrated into the development, appraisal, and selection of plan and policy options;

j) To give proper place to environmental considerations in decision making as concerns economic and social issues, in view of the fact that in some contexts they may be traded off against each other;

k) To provide an early opportunity to check whether or not the proposal complies with national and international environmental policy and consequent legislative obligations;

l) To contribute to the establishment of context that is more appropriate to nest future development proposals;

m) To provide a publicly available and accountable decision making framework.

1.4.2: Specific SEA Objectives

Drawing from the broad SEA objectives in 1.3.1, the following specific objectives have been formulated to ensure sustainable environmental management of the proposed Industrial Park:

a) Provide guidelines for sustainable management of environmental aspects of the industrial park;

b) Incorporate environmental sustainability measures in the design phase of the master plan;

c) Provide guidelines for incorporation of environmental issues in the sub-projects of the Master Plan;

d) Provide environmental quality benchmarks for monitoring future environmental quality, and
e) Recommend institutional arrangements for sustainable management of environmental aspects of the Industrial Park.

1.5: GUIDING PRINCIPLES OF THE SEA

There is growing interest in sustainable development that focuses on balancing environmental, community, and business interests in Kenya. Equally, borrowing from the above National SEA guidelines of 2012. The principles used to guide the study include the following as provided by the National SEA guidelines of 2012:

a) The sustainable use of natural resources.
b) The enhanced protection and conservation of biodiversity.
c) Inter-linkages between human settlements and cultural issues.
d) Integration of socio-economic and environmental factors.
e) The protection and conservation of natural physical surroundings of scenic beauty.
f) The protection and conservation of the built environment of historic or cultural significance.
g) Public and stakeholder engagement.

1.6: SEA SCOPE

1.6.1 Spatial Dimensions

The spatial dimensions will depend on the sector under consideration. For sourcing of agricultural and forestry raw materials for the industries, the area will be mainly the North Rift Region. For infrastructure e.g. road network, airports, and telecommunication it is generally national, while for management of environmental parameters of the park, it is limited to the 135 acres of land and its environs.

1.6.2 Institutional Dimensions

As per the NEMA screening response letter, the SEA study will extended to consult various institutions, stakeholders and the regional players using the Northern Economic Corridor as far as the proposed ICDC industrial park is concerned. These included inter alia: KURA, KFA, Kenya Railways, Maize Board & NCPB Uasin Gishu County, Military complex, RAIPLY and KPC, transportation stakeholders both the PSV (North Rift Shuttle, Eldoret Express, Eldoret shuttle, Matatu SACCOs in Eldoret, Kenya Taxi Association etc.) and transit goods transporters. Others include the Government agencies with the mandate of industrial development and trade, regulatory agencies such as NEMA, WRMA and Occupational Safety and Health Services.

1.6.3 Temporal Dimensions

This deals with the lifespan and reversibility of impacts. The SEA study covered short term, medium term and long-term environmental and socio-economic effects. Short-
The medium term will consist of direct impacts from the operation phase while long-term will consist of the Master Plan outcomes and restoration phase. The exact timing will vary since individual investors will start and complete at different times. The type of effects and impacts covered by the SEA includes positive and negative impacts, short, medium and long-term impacts, cumulative, synergistic and secondary impacts, temporary and permanent impacts.

1.7: PROJECT SITE

1.7.1: Proposed Site Location

The industrial park site is situated about 3 km from Eldoret CBD along Eldoret-Kisumu road in Block 15/1757. The site occupies a total of 135 acres and is bound by a 20m road reserves on the Northern, Eastern and Southern edges. The site boundaries are well delineated. The southern road has a pipeline way leave, with a sewer line running on the western section of the site, with some manholes situated within the site boundary. The site is largely covered by green vegetation with a few areas especially those currently being used as paths with bare soil exposure.
1.7.2: The Northern Economic Corridor

At the wider scale the SEA study has covered the Northern Economic Corridor (NEC). The NEC is the busiest and most important transport route in East and Central Africa, providing a gateway through Kenya to the landlocked economies of Uganda, Rwanda, Burundi and Eastern DR Congo. It also serves Southern Sudan since it broke away from Khartoum. The main Northern Corridor transport network is connected to the Port of Mombasa and includes a road network; railway line; rail-lake transport; inland water routes; container terminals commonly regarded locally as ICDs (Inland Container Depots); Tororo Inland Port and an oil pipeline. The proposed ICDC Eldoret Industrial Park lies close to this major transit gateway hence the foreseen benefits include the following:

a) Provision of a convenient transport solution for the ICDC Industrial Park food, agro-based, textile and leather products.
b) Strengthening the Industrial park position as a gateway, economic and logistics hub to the North Rift and East African sub-region through trade, regional economic integration and interconnectivity.

c) Providing massive development opportunities for the ICDC Industrial Park and the County at large through employment creation, investment, and economic growth.

d) Facilitating the proposed ICDC Industrial Park to tap resources, introduce high-value investments and new technologies, supply of raw materials and export locally and internationally from the park not only through NEC but also the Eldoret International Airport.

Map 2: Position of Eldoret Town within the Northern Economic Corridor

1.8: SEA STUDY TEAM

This SEA for the proposed ICDC Industrial Park Master Plan has been prepared by the University of Nairobi Enterprise Services Limited (UNES) under a joint consortium of practicing professional and project assistants listed below:
## Table 1: The SEA Study Team

<table>
<thead>
<tr>
<th>Consultant</th>
<th>Profession</th>
<th>Project Assistants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dr. Fridah Mugo</td>
<td>SEA/EIA Expert</td>
<td>Brian Okoth</td>
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<td>Environmental Law Expert &amp; Coordinator</td>
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<td>3. Dr. Ngayu Margaret</td>
<td>Sociologist</td>
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<td></td>
<td>Bessy Thuranira</td>
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<tr>
<td></td>
<td></td>
<td>Philip Olale</td>
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<tr>
<td></td>
<td></td>
<td>Naibe Peter</td>
</tr>
<tr>
<td>5. Arch. Erastus Abonyo</td>
<td>Architect</td>
<td>Simwichi Nicholas</td>
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<td>6. Arch. Margaret Njoroge</td>
<td></td>
<td>George Wekesa</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Edith Tonui</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wendy Nelima</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Josephine Ngatia</td>
</tr>
<tr>
<td>7. Eng. Abuodha Sylvester</td>
<td>Civil Engineer</td>
<td>Jafferson Omollo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Charles Abuodha</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Muthama Joel</td>
</tr>
<tr>
<td>9. Prof. Abungu Nicodemus</td>
<td>Electrical Engineer</td>
<td>Ongalo Stephen</td>
</tr>
<tr>
<td>10. Dr. Musyoka Mulei</td>
<td>Land Surveyor</td>
<td></td>
</tr>
<tr>
<td>11. Qs. Olivia Otieno</td>
<td>Quantity Surveyor</td>
<td>Bellis Ochieng’</td>
</tr>
<tr>
<td>12. Dr. Luke Obala</td>
<td>Land Valuer</td>
<td></td>
</tr>
<tr>
<td>13. Mr. Osengo Charles</td>
<td>Economist</td>
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1.9: REPORT STRUCTURE

The SEA report has been organized as follows:

**Non-Technical Summary**: This section presents a summary of the SEA report. It broadly covers the SEA background, study methodology, study findings, baseline environmental conditions of the project area and northern economic corridor, environmental impacts, mitigation, environmental management plan, conclusions and recommendations.

**Chapter 1 - Introduction**: This chapter gives a background of the project, location, objectives and the SEA study team.

**Chapter 2 - Approach and Methodology**: This chapter describes the approach and detailed methodology used to achieve the study objectives.

**Chapter 3 - The Eldoret ICDC Industrial Park Master Plan**: This chapter gives a detailed description of the Eldoret ICDC industrial park master plan.

**Chapter 4 - Review of Policy, Legal and Institutional Framework**: This chapter provides an overview of the policies, legislation and institutional frameworks relevant to the SEA study and implementation of the Eldoret ICDC Industrial Park master plan.

**Chapter 5 - Baseline Environmental Conditions**: This chapter describes the existing physical, biological and socioeconomic environmental conditions of the project context.

**Chapter 6 - Stakeholder and Public Consultations**: This chapter details the stakeholders consulted, public consultations held and emerging issues.

**Chapter 7 - Alternatives to the Industrial Park**: This chapter discusses alternatives to the proposed industrial park and justification for each option.

**Chapter 8 - Impact identification, prediction and Mitigation**: This chapter presents an analysis of the potential environmental and socioeconomic impacts and possible mitigation measures.

**Chapter 9 - Environmental Initiatives and Strategies**: This chapter describes the environmental initiatives and management strategies plan the Eldoret ICDC Industrial Park had adopted. This is broadly presented in relation to the following factors: dynamics in land use, air pollution, riparian reserve mitigation plan, waste management, biodiversity, population influx, energy conservation and development control guidelines.

**Chapter 10 - Strategic Environmental and Social Management and Monitoring Plan**: This chapter describes the management plan of the environmental and socioeconomic impacts. The chapter further describes the monitoring plan that includes costs and timelines.

**Chapter 11 - Conclusion and recommendations**: This chapter provides the conclusion and recommendations of the SEA study.
CHAPTER TWO
APPROACH AND METHODOLOGY

2.1: OVERVIEW

The International Association for Impact Assessment (IAIA) defines an environmental impact assessment (EIA) as, "the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made. Strategic Environmental Assessment (SEA) on the other hand is a process of preliminary identification and consideration of the possible negative impacts into the environment and human health caused by implementation of any policy, plan or programme (PPP). Essentially, SEA is used to integrate environmental considerations into PPP. The goal of a SEA is to improve policies, plans or programmes in such a way as to minimize their potential negative environmental impacts, maximize positive impacts and ensure that negative impacts that cannot be avoided are properly managed and offset during implementation of the PPP.

2.2: SEA STUDY PROCESS

Three broad steps were followed in the SEA study of the proposed Eldoret ICDC Industrial Park (EIIP). They included screening, scoping and the detailed SEA study.

2.2.1: Screening

Screening was undertaken to determine whether the proposed Industrial Park Master Plan required a Strategic Environmental Assessment. After consultations with NEMA, it was recommended that the Master Plan undergoes a SEA. In response, NEMA instructed the study team to carry out a strategic environmental scoping exercise and submit a SEA scoping report to NEMA for review. The NEMA screening response is attached in Appendix 1 of this report.

2.2.2: Scoping

Following the determination that a SEA was necessary for the Industrial Park Master Plan, the scoping study was done to identify the key issues to be studied during the detailed SEA study. This was done through literature review and wide stakeholder and public consultation in order to identify and describe the key environmental effects of the proposed industrial park as conceptualized by the professionals, key stakeholders and the public (see chapter 6). A scoping report was submitted to NEMA and approved via Reference No. NEMA/SEA/5/2/044- See appendix 1 and 2.
2.2.3: Detailed SEA study

The detailed SEA study included: baseline data collection of the site; review of relevant policies, legislation and institutional framework; analysis of reasonable alternatives; identification, analysis and prediction of environmental and social impacts; identification of appropriate mitigation measures and impact management strategies. Other steps included formulation of an Environmental and Social Management Plan (ESMP); Environmental Monitoring Plan (EMP); Environmental Impact Statement (EIS); decision-making and a follow up plan.

2.3: METHODOLOGY OF THE SEA STUDY

2.3.1: Consultation Meeting with the Client

The SEA scoping process started with a consultative meeting with the Client ICDC. This was specifically to get a clear background of the project, clarify the main objectives of the Industrial Park Master Plan and establish the environmental, socio-economic and institutional concerns that need to be addressed in the master planning process.

Plate 1: Consultation Meeting with the Client

2.3.2: Site Visits

The consultative meeting shown in Plate --- above was followed by a field visit to site. The purpose of the visit was to observe the features on the ground and establish facts
that needed to be considered in the SEA scoping process. These included facts on the type of terrain (landscape), slope, vegetation, sensitive ecological features, site land uses, neighboring land uses, status of the land quality and observable environmental and socio-economic challenges.

2.3.3: Review Of Policy, Legislative And Institutional Frameworks

The study was also informed by the review of policy, legal and institutional frameworks which included the Millennium Development Goals (MDGs) of 2002, Sustainable Development Goals of 2015 (SDGs), Kenya’s Vision 2030, National Industrialization Policy, National Land Policy of 20--, the Strategy for Revitalization of Agriculture of 20 --, the Water Policy of 20 -----, Energy Policy of 20---- and the draft Environmental Policy of 20--. The legal and regulatory documents reviewed included, the Kenya Constitution, the Environmental Management and Coordination Act of 1999, National Guidelines for Strategic Environmental Assessment of 2012, the Water Act of 2002 and Physical Planning Act Cap 286 of 1996, the Directive 2001/42/EC of the European Parliament and the Council of 27/6/2001 among others. The new institutional arrangements at the National and County level were also reviewed with the intention of identifying those that will be affected by the development and implementation of Eldoret ICDC’s Industrial Park Master Plan.

2.3.4: Review of SEA Studies and Related Information

Review of past SEA studies aid in the deeper understanding of the process and possible type of outcomes. Some of the SEA studies reviewed includes the Strategic Environmental Assessment for Nairobi Integrated Urban Plan (NIUPLAN, 2013), Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland, (2001-DS-EEP-2/5) Synthesis Report, the Tana-River Catchment SEA of 2012 and the SEA study of revoking the West Midlands Regional Strategy 2012 of the United Kingdom. The preliminary field reports by the different study teams such as the survey team, the civil engineering and infrastructure team, the power distribution team were also reviewed to identify key environmental issues at the site.

2.3.5: Key Informant Interviews

Key informants were identified by the study team assisted by the client ICDC and the County Government of Uasin Gishu. Identification was based on their potential role in the Industrial Park Master Plan formulation and implementation. A total of 19 key informants were interviewed using key informant interview guides. They consisted mainly of ICDC Officials, Officials from the National Government, Uasin Gishu County Officials, Government Parastatals such as Kenya Power, Kenya Urban Roads Authority (KURA), Water Resources Management Authority (WRMA), National Environment Management Authority (NEMA); and officials from private companies in Eldoret, such as Eldoret Water and Sanitation Company Ltd (ELDOWAS) and Rift Valley Textiles.
(Rivatex). Elected political leaders such as the MCA for the area were also interviewed. Others included Officials from Associations such as the Chamber of Commerce, the SME association, NGOs and CBOs among others.

2.3.6: Key Stakeholder Consultation

A Stakeholders’ Consultation Forum was held at the Star-Buck Hotel in Eldoret on September 1, 2015. Participants in the consultation consisted of the key informants already interviewed and others who had not been interviewed earlier particularly officials from NGOs, CBOs, Youth Groups and representatives of different religious groups. The objective of the consultation was to present to stakeholders preliminary proposals on categories of land uses, prototype industries and key environmental and socio-economic issues of concern. The information gathered using the approaches described above and from brainstorming sessions of the study team was compiled and presented to a Stakeholders’ Consultation Forum over 60 participants (Appendix 6) by the lead land use and environmental consultants. The purpose was to create awareness, and have additional analysis and inputs.

2.3.7: Public Consultation

The Stakeholder Consultation Forum was followed by a Public Consultation at the Eldoret ICDC grounds in which over 1000 participants attended. The approach that was used to inform the different stakeholders included: letters particularly to leaders such as politicians and administrators, posters and fliers in strategic locations, announcements in religious gatherings, neighboring secondary and primary schools, telephone calls and e-mails to key officers. A public address system was hired to ensure that all the people hear and participate in the interactions.

The Conceptual Master Plan and the Proposed Prototype Industries were presented to participants by the lead land use consultant. This was followed by a presentation on the SEA and a summary of environmental and socio-economic issues raised in the Stakeholder Consultation Forum. Due to the large number of participants, it was not possible to listen to all the questions, which participants wished to raise. However, participants who did not have a chance to air their views were requested to write them on a paper and hand them over to any member of the study team for inclusion in the analysis and documentation. Many of them did so.

2.3.8: Household Interviews

To capture detailed quantitative and qualitative data on the opinions of members of the communities neighboring the Industrial Park site, household interviews were conducted in three of the residential estates. Six research assistants (two from each estate) were recruited and trained on how to conduct the household interviews. A pilot test was conducted to test the suitability of the research instrument. A total of 140 households from Langas (67), Pioneer (37) and Kipkaren (36) Estates were interviewed.
The questionnaire touched on queries related to demographic and socio-economic status of respondents, their opinions on the type of industries to be included and those, which should not be in the Industrial Park Master Plan. Respondents were also requested to indicate what needs to be included in the Master Plan to ensure environmental sustainability of the park and Eldoret City as a whole. They were also requested to make suggestions on how the Industrial Park can enhance the socio-economic status of the surrounding communities.

2.3.9: Study Team Brain Storming Sessions

Brain storming sessions on all emerging issues were held throughout the scoping period to identify, analyse and synthesize the key issues of land use, environmental and socio-economic concerns that need to be addressed in the Master Plan. The issues agreed on were directly incorporated in the plan.

Plate 2: Study Team Brain Storming Sessions

2.3.10: Measurement of baseline water quality levels

An assessment was carried out on 18th April, 2016 to establish the baseline water quality at the proposed Eldoret ICDC Industrial Park site before development and to obtain data that can be used to form a basis for planning the control measures to eliminate or minimize pollution to water and the environment after development.

The water samples were collected by a NEMA Lead Expert and Laboratory representative and taken to Eldoret Water and Sanitation Company Limited; a NEMA accredited Laboratory for analysis. The Following parameters were checked: Turbidity,
pH, Total Dissolved Solids, Nitrates, Phosphates, Conductivity, Faecal Coliform, Total Hardness, Iron, Fluoride, Sulphates, Manganese, Chloride and Zinc.

2.3.11: Measurement of Baseline Air Quality Levels

The air quality assessment was carried out at the proposed site by an Expert from Eco-service Laboratory on 6th April 2016 from 9.30 am to 1.05 pm. with the aim of establishing baseline air quality and noise levels at the proposed development site to obtain data that can be used to form a basis for planning the control measures to eliminate or minimize human and environment exposure to noise & negative air quality impacts from the proposed development activities. An assessment of concentration of greenhouse gases emission namely; Carbon monoxide (CO), Carbon Dioxide (CO2), Sulphur Dioxide, (SO2) and Volatile Organic Compounds (VOC) was also carried out.

Static dust samples (total dust) of size less than 10μm aerodynamic diameters were taken on Millipore cellulose 0.08μm membrane filter by placing pre-weighed filters at the site of interest for ten to twenty minutes. A close supervision on the sampling instrument was taken to make sure that the sampler was operating as expected.

The concentration of suspended particulate matter (dust) is determined by a gravimetric method. The sampling time and frequency corresponded to the character of the sampling site. The amount of dust captured on the filter (mg) is determined gravimetrically as a difference between the weight of the filter before exposure to dust and the weight of the filter and dust after exposure.

Air quality measurements were undertaken using a Drager Tube Flue Gas Analyser. This is a direct reading instrument that has the capacity to measure and display the products of combustion from a domestic or commercial fossil fueled appliance. It can also measure ambient air quality in rooms or buildings. The measurements are carried out by placing the probe at the general area in/along proposed site and directly reading the levels of the parameters on the tubes.

The air concentration levels obtained after analysis were compared with the EMCA 1999 Air Quality Regulations Legal Notice No.34 and World Health Organization (WHO) standards Guidelines, while the Noise levels were compared with the EMCA 1999 (Noise and Excessive Vibration Regulations) standards.

2.3.12: Measurement of Baseline Noise and Vibrations Levels

A precision integrating sound level meter type CR 262A S/No. B21122FA with Omni-directional microphone set at a slow response was used. The instrument was calibrated using Bruel and Kjaer sound level calibrator type 4230 for sound level meter at 94 dB (A) and 1000 Hz. The calibration was used to check the sensitivity of the instrument immediately before and after the measurement period.
The meter was set to measure the A-weighted noise level, which varies with the frequency and intensity like the sensitivity of the human ear and vibration. The sound level meter was held at 1 metre from ground and L eq (the continuous equivalent sound pressure level) sample measurements at and around the proposed project road was taken.

2.3.13: Measurement of Baseline Soil Health Conditions

The soil samples were collected by NEMA Lead Expert and taken to NEMA accredited Laboratory for Analysis. The following parameters were checked; pH, Electrical Conductivity (EC), Lead (Pb), Zinc (Zn), Copper (Cu), Potassium (K), Sodium (Na), Calcium (Ca), Magnesium (Mg), Manganese (Mn) and Iron (Fe).

2.3.14: Measurement of Baseline Radiation Levels

The measurements for radiation levels were carried out on 06/04/2016 during day time. Radiation Monitor with 1.2 Meter Telepole Detector [Type: Rm 703] was used to assess the soil health condition in terms of radioactivity. RADMON (micro) Type : RM703A is a G.M. Detector based, battery powered, hand-held, general purpose radiation Survey Meter. This will be useful for dose rate measurements in Nuclear installations, Radiochemical plants, Reprocessing plants, etc. Additionally it will be useful in medical, agricultural, industrial and other installations where radioactive isotopes are used for a variety of applications. This product is designed around a Microcontroller Chip. It is provided with alpha Numeric LCD display for indicating the dose rate in digits, dose rate as a bar graph, cumulative dose in digits. It covers wide range from 0 to 20 R/hr above the 20 R/hr it will indicate the OVR in the display. This unit has a facility for storing the data into built-in EEPROM along with real time. The stored data can be recalled on to the display or transmitted to the PC. The soil samples collected at the proposed Eldoret ICDC Industrial Park were subjected to radiation measurement. The soil radiation levels are within limit. This indicates that the proposed land does not have radioactive source.

2.4: ENVIRONMENTAL IMPACTS IDENTIFICATION AND ANALYSIS

2.4.1: Scoping out of industrial typologies

Various approaches and methods were used for scoping out undesirable developments. They included: i. analysis of the industrial and business typologies considering viability as concerns availability of raw materials and value-chain-wide benefits; analysis of alternatives to the industrial park and potential environmental and social impacts of the proposed Master plan.

For the study team to determine industries to be scoped out, it relied on the outcome of the key stakeholder consultations, public consultations and expert judgment of SEA team members. The industries scoped out were: (i) A tannery, (ii) Slaughter house and
(iii) Agro-chemical Industries mainly on the grounds of excessive environmental emissions.

2.4.2: Analysis of Alternatives

The alternatives considered were identified from the proposal by the client ICDC of desiring to invest in an industrial park. Others were identified from the common land uses in the neighborhood. They included agriculture, housing, commercial and combination of housing and commercial. Six possible development options for the 135 acres of land were therefore identified as: (a) no intervention option, (b) agricultural land use option, (c) commercial only development option, (d) housing only development option (e) mixed commercial-housing development option and (f) industrial park development option.

Environmental impacts of the six alternatives were identified and scored based on the activities likely to be implemented if each of them was to be adopted. The scoring was based on the likely impacts on the bio-physical and socio-economic environment parameters derived from the six SEA principles and stakeholder views.

The color codes scheme for scoring and weighting for quantitative analysis was as indicated in Tables 1 & 6.

**Table 2: Scoring and Weighting Scheme for Impacts Analysis**

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>Significant Negative</td>
</tr>
<tr>
<td>-1</td>
<td>Minor Negative</td>
</tr>
<tr>
<td>0</td>
<td>Neutral</td>
</tr>
<tr>
<td>+1</td>
<td>Minor Positive</td>
</tr>
<tr>
<td>+2</td>
<td>Significant Positive</td>
</tr>
</tbody>
</table>

**Time horizon:**
- S–Short Term (0-12 months), M–Medium (> 12 Months < 5 Years), L–Long Term (> 5 years)

The six alternatives were evaluated on their rating on 11 sub-themes of the bio-physical and 7 of the socio-economic environment as detailed in Table 7. The criteria used involved giving a score ranging from significantly negative (-2) through neutral = 0 to significantly positive (+2) as indicated in Tables 8-19. Each alternative was assessed for biophysical and socio-economic impacts as indicated in these Tables. Each impact was
also classified based on intensity, duration and weighted scores in the matrix. The scores were added and summarized as indicated in Table 7 by the whole study team. For the preferred alternative, mitigation measures were identified for negative impacts, and environmental management and monitoring plans for effective implementation formulated.

2.5: STAKEHOLDER IDENTIFICATION AND ANALYSIS

Stakeholders were identified on the basis of whether they will affect the implementation of the Industrial Park Master Plan or they will be affected by it. Identification of stakeholders was informed by a desk study, recommendations made by officials of Uasin Gishu County Government, the project proponent and expert judgment of the SEA team. The Stakeholder Forum was held on September 1, 2015 and the Public consultation held on 4th September 2015. The Key informant interviews were held between July and September 2015 and others in April 2015. Household surveys were administered from 1st to 4th September 2015. Focus Group Discussions were held with the Agriculture, Livestock and Forestry Platform Stakeholders in May 2016. Those identified are as indicated in Chapter six of this report.

2.6: HARMONIZATION OF FINDINGS AND REPORT WRITING

The SEA team synthesized and harmonized the study findings in a report-writing workshop. This was to ensure that key environmental and socio-economic aspects have been captured and documented clearly and logically.
CHAPTER THREE
PROPOSED INDUSTRIAL PARK MASTER PLAN

3.1: OVERVIEW

Industrial parks are among the most important features of progressive economic development and an effective vehicle for attracting investment, fostering technological transfer and innovation, and for creating jobs. With the potential to generate comparative and competitive advantages, industrial parks can attract innovative businesses, leading to both jobs increment and a larger tax base.

The industrial park’s key vision is to be a leading frontier in industrial estate design, setting standards in sustainability, social amenity and building efficiency. The specific objectives of the park include to:

— Integrate economic, social, technological, environmental and ecological performance in its design.
— Conserve natural resources by promoting flows within the park through material and by-product exchange through re-use, reducing and recycling.
— Serve as a focal point for supporting innovation (innovation hub) that will empower locals’ technical and technological capacity through practice, training or apprenticeship.
— Create room for job opportunities (for both gender, race and colour), nurturing and transfer of technology through incubation and local employments.
— Enhance research and technology transfer through cultivating start-up ideas, technological innovations and experimentation of the same.
— Facilitate cluster formation integrated model for collective benefit and augmenting competitiveness in the local and world market in order to achieve economic vitality.

3.2: GUIDING PRINCIPLES OF THE MASTER PLAN

The planning and design of the Eldoret ICDC industrial park has been hinged on an array of principles highlighted below:

a) **Sustainability**: - The principle of sustainable design has been actualized at various levels ranging from land use planning, building technology and infrastructure development.

b) **Ecological Quality**: - the Eldoret ICDC Industrial park has been conceived in a manner that conserves natural resources by promoting flows within the park through material and by-product exchange through re-use, reducing and recycling in order to minimize exploitation of virgin resources. Ecological quality has been manifested economically by providing opportunities for income generation from use and sale of wasted materials.
c) **Economic Vitality:** - the Park includes a community of businesses that seeks a collective benefit that is greater than the sum of the individual benefits each company would have realized if it optimized its individual interests. The park promotes both industrial and non-industrial/commercial developments.

d) **Social Equity:** - the design of the industrial park has observed a participatory approach towards arriving at consensus among all stakeholders (investors, institutions and potential labor source). Thus, the park creates room for job opportunities (for both gender, race and colour), nurturing and transfer of technology through incubation and local employments respectively.

e) **Technological Development:** - the Park institutes a system that shall engage the locals and relevant stakeholders in ways that will empower their technical and technological capacity through practice, training or apprenticeship. It is on this backdrop that the EEIP has incorporated an incubation center to aid develop local technical and technological capacity. The technologies applied in the park such as water, biomass and energy cascading are some of the first hand experiences the locals and others will gain knowledge from and apply in other contexts.

f) **Innovative Zoning:** - a sustainable industrial park is anticipated to accommodate a number of key functions of varying capacities in terms of turn over and spatial demands. The park is well balanced with respect to spatial distribution of plot sizes, land uses and functional areas.

### 3.3: THE MASTER PLAN

The industrial park occupies approximately 135 acres of land. The Master Plan for the park is designed to foster sustainable industrial development through an integrated approach. This approach has embraced the principles of eco-industrial parks that focuses on achieving a community of manufacturing and service businesses that are keen on enhanced economic and environmental performance through collaboration in managing environmental and resource issues, including energy, water, and materials.

Subsequently, the park promotes a system of planned materials and energy exchanges that seek to minimize energy and raw materials use, minimize waste, and build sustainable economic, ecological and social relationships. The master plan broadly provides rationale for land use activities within the site in addition to providing detailed infrastructure plans (roads, power distribution, sewerage, drainage, telecommunication, and utility installations – these are discussed in detail in subsequent sections). The spatial representation of the master plan is shown in Figure 1.
3.3.1: Land Use Plan

The Land Use Plan entails a description and spatial representation of the various land uses provided in the park. The organization of various land uses on the industrial park was informed by among others theoretical land use planning concepts, zoning regulations from Uasin Gishu County, case studies especially from India, and site suitability analysis. Conversely, some of the key land use organization concepts that guided the organization of various land uses within the industrial park include; compatibility, clustering, carrying capacity, conservation, co-location, and integration of land uses.

Arising from the needs assessment and land use organization concepts, five key land uses were identified and adopted in the development of the park. The specific land uses and the amount of land allocated for each is presented in Table 3 below.
### Table 3: Land Use Budget

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Proposed Activities</th>
<th>Amount Of Land Allocated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Industrial use</strong></td>
<td>- The predominant land use in the park is basically light industrial activities</td>
<td>62% 83.82</td>
</tr>
<tr>
<td></td>
<td>- Has been categorized into two - light heavy industries and basic light industries - based on the nature of industrial activities envisaged.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Light heavy industries are perceived to be of higher energy consumption, high turnover and likely to generate more toxic waste and byproducts compared to light industries</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Other functions include logistics and incubation center.</td>
<td></td>
</tr>
<tr>
<td><strong>2. Commercial</strong></td>
<td>- Will accommodate commercial developments such as ICDC Complex, commercial car park building, small-scale business complex among others</td>
<td>6.3% 8.55</td>
</tr>
<tr>
<td><strong>3. Road way-leave</strong></td>
<td>- Covers the total way-leave land (18m and 15m) allocated for road and other trunk infrastructure</td>
<td>19.2% 25.86</td>
</tr>
<tr>
<td><strong>4. Green/open space</strong></td>
<td>- Open spaces create room for recreation, relaxing of workers and promote ecological conservation and environmental ambience through green infrastructure and aesthetics</td>
<td>7.7% 10.40</td>
</tr>
<tr>
<td><strong>5. Utilities and Amenities</strong></td>
<td>- Are uses/facilities that provide everyday necessities for convenience of users - Include water reticulation systems, power reticulation, sewerage and waste treatment systems and ICT infrastructure</td>
<td>4.8% 6.37</td>
</tr>
</tbody>
</table>

**TOTAL** 100% 135.00

### 3.3.2: Land Use Disposition

The placement of the functional areas within the park was informed by the land use planning principles and suitability analysis that looked into issues such as adjacent land uses, slope and geology, wind paths among others. Based on compatibility
dynamics, similar functions were clustered with respect to services demands, amount of energy demands and servicing. As a result, the light heavy industries were co-located in the north-west section, light industries in the eastern block, the logistics centrally located. This applied to open spaces and incubation locations. The spatial representation of this disposition is indicated in the land use plan (Figure 2 below.)

![Industrial Park Land Use Plan](image)

**Figure 2: Industrial Park Land Use Plan**

3.3.3: Land Subdivision

The land subdivision for the park adheres to Uasin Gishu County government Land Use zoning guidelines and the development application subject to Physical Planning Act Cap 286 of 1996, section 33. The industrial park occupies a total of approximately 135 acres of land. The area is zoned for industrial use by the Uasin Gishu County Land Use guidelines and designated under Block 15/1757. Under this zoning, the minimum plot size allowable for such industrial use is one acre. Therefore, the subdivision scheme for the industrial park has adopted the minimum 1-acre guideline.
As a result, a total of 116 plots have been realized of which 73 are exactly one acre. The remaining 43 are larger in the range of 1.04 to 1.56 acres, mainly due to factors such as location (corner plots), accommodation of easements, wayleaves and the irregular site morphology.

For sustainability purposes, the subdivision scheme for the park conformed to minimum frontages of 50 metres for all industrial properties to ensure accessibility of all the functional areas (plots). Using a system of loops, the circulation strategy ensured that each plot is accessible without compromising their serviceability and cost-effectiveness. Spatial representation of the subdivision plan is presented in the figure 3 below:

**Figure 3: Land Subdivision Plan**

3.3.4: **Industrial Prototypes and Clusters**

The proposed industrial park is largely envisaged to be an agro-industrial park, which aims at increasing income and access to food. The proposed park accommodates five industrial prototypes. The proposed industries have been assessed for viability and categorized in target sectors as shown in table 4 below.
Table 4: Summary of Proposed Industries

<table>
<thead>
<tr>
<th>INDUSTRY</th>
<th>INDUSTRIAL ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Food processing Industries</strong></td>
<td>— Meat and meat products</td>
</tr>
<tr>
<td></td>
<td>— Dairy and dairy products</td>
</tr>
<tr>
<td></td>
<td>— Vegetable oils and fat</td>
</tr>
<tr>
<td></td>
<td>— Fruits and vegetables processing and packaging</td>
</tr>
<tr>
<td></td>
<td>— Grains and cereals milling and related products</td>
</tr>
<tr>
<td></td>
<td>— Bakery and wheat products</td>
</tr>
<tr>
<td></td>
<td>— Animal Feeds</td>
</tr>
<tr>
<td><strong>2. Agro-based industries</strong></td>
<td>— Fertilizer production</td>
</tr>
<tr>
<td></td>
<td>— Agro veterinary chemicals</td>
</tr>
<tr>
<td></td>
<td>— Farm equipment</td>
</tr>
<tr>
<td><strong>3. Textile Industries</strong></td>
<td>— Textile fabric and yarn production</td>
</tr>
<tr>
<td></td>
<td>— Garment manufacture</td>
</tr>
<tr>
<td></td>
<td>— Manufacture of accessories</td>
</tr>
<tr>
<td></td>
<td>— Embroidery</td>
</tr>
<tr>
<td></td>
<td>— Fabric Manipulation</td>
</tr>
<tr>
<td></td>
<td>— Washing</td>
</tr>
<tr>
<td></td>
<td>— Screen printing services</td>
</tr>
<tr>
<td><strong>4. Service and logistics</strong></td>
<td>— Cold rooms</td>
</tr>
<tr>
<td></td>
<td>— Go-downs/ warehouses</td>
</tr>
<tr>
<td></td>
<td>— Logistics and business outsourcing</td>
</tr>
<tr>
<td></td>
<td>— Production of packaging materials</td>
</tr>
<tr>
<td></td>
<td>— Waste recycling plant</td>
</tr>
<tr>
<td></td>
<td>— Steam plant and boilers</td>
</tr>
<tr>
<td><strong>5. Processed Leather industry</strong></td>
<td>— Shoe making and leather products</td>
</tr>
</tbody>
</table>

The above five main clusters have further been categorized into two main industrial typologies i.e. light heavy industries and light industries. The Light Heavy Industries comprises primary processors, secondary processors and tertiary processors based on their value chain systems e.g. processed leather industries, farm equipment manufacture, fertilizer manufacture, Agro-vet drugs/chemicals, Industrial equipment – (agro-machinery, farm equipment assembly) etc. The Light Industries cluster consists of two main industrial activities, namely food processing and textile industries such as sugar processing and packaging, bakery and wheat products, meat and meat products, pork and bacon products etc.

The Research and Incubation Cluster will accommodate institutions specialized in industrial research and development and training young industrial ventures. Some of the targeted entities include the Kenya Industrial Research Development Institute (KIRDI), Moi University, Eldoret Polytechnic, and KAM Research. The Commercial Cluster are provided to complement the industrial functions. Some of the commercial
provisions in the park include: restaurants and fast-food outlets, convenience stores, banks, travel agencies etc.

Plate 3: Typical Textile Industry

Plate 4: Proposed Typical Agro Industry
3.3.5: Transportation and Infrastructure

The proposed transportation system and level of accessibility will be a major influence on the basic function and form of the proposed park. There are three hierarchy of roads for the park, namely KURA-1 road within a 30m way-leave traversing the park as a north-south spine; primary industrial stand access (PISA) roads within a 20m way-leave, and secondary industrial stand access roads (SISA), within a 15m way-leave. All roadways within the Industrial Park are of two lanes (one in each direction).

The industrial park is strategically located with good access to key infrastructure like roads, power and sewer. Potable water and waste water systems have been designed for optimization and conservation of the available water resources. Electricity supply shall primarily be from the national grid with proposals for future alternative sources from solar and biomass. In the long run, it is proposed that bio-energy carriers waste is tapped for energy production i.e. electricity and heat for utilization within the industrial park.

Figure 5: Road Network Plan
CHAPTER FOUR
POLICY, LEGAL, REGULATORY AND INSTITUTIONAL FRAMEWORK

4.1: OVERVIEW

This chapter presents a detailed review of policy, legal, regulatory and institutional frameworks that have informed the preparation of this report. Specifically, the review integrates the international, national and sectoral policies and principles into the study and compliance with the existing policies and laws. The review further identifies indicators and legally acceptable thresholds and standards for environmental quality such as air, water, noise, radiation, solid and liquid waste and protection of sensitive ecosystems.

4.2: POLICY FRAMEWORK

4.2.1: International Conventions

a) Millenium Development Goals

Kenya is a signatory to the Millennium Development Goals (MDGs) Programme of the United Nations, whose goal number one was to halve the hunger incidence by the year 2015. The same Goal continues as Goal 2 in the Sustainable Development Goals of 2015. Goal number seven of the MDGs was to ensure sustainable management of the environment. Objective one of the EIIP master plan has addressed MDG goal number one of eradicating extreme poverty and hunger. This is mainly through creation of employment. The resource efficiency principles incorporated in the design of the master plan as elaborated in chapter three and ten of this report has addressed the MDG goal number seven. The EIIP Master Plan is therefore compliant to the MDGs.

b) Sustainable Development Goals

In October 2015, The United Nations adopted 17 Sustainable Development Goals aimed at transforming the world. Eleven of these goals have some bearing on the EIIP Master Plan. They include Goal number 1 aiming at reducing poverty, Goal 2, reducing hunger; Goal 3, good health and wellbeing; Goal 4, clean water and sanitation; Goal 7, affordable clean energy; Goal 8, decent work and economic growth; Goal 9, Industrial growth, innovation and infrastructure; Goal 11, sustainable cities and communities; Goal 12, responsible consumption and production; Goal 13, climate action; and Goal 15, life on land. As described in chapter three and ten of this report, the master plan has addressed each of these 11 Goals in its plan components and infrastructure.
c) **United Nations Framework Convention on Climate Change**

The primary purpose of the convention is to establish methods to minimize global warming and in particular emission of greenhouse gases. The United Nations Framework Convention on Climate Change was adopted on 9th May 1992 and came into force on 21st March 1994. Kenya ratified the Convention on 30th August 1994 thereby committing to join the international community in combating the problem of climate change. The National Environmental Management Authority is the agency acting as the national focal point for this protocol.

The objective of the Convention is; “Stabilization of the greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system” (source)

A general description of steps envisaged to implement the Convention and other relevant information to achieve the objectives include:

- Preparation and implementation of abatement plans on climate change.
- Integration of climate change consideration into the development of environmental, social and economic policies, that is, in development policies.
- Promoting the sustainable management of sinks and GHG reservoirs.
- Promoting research and cooperation in information exchange.
- Development of education, training and public awareness raising programs.
- Promoting and developing research and systematic observation.

These activities are related to seeking and processing of information, building long-term scenarios, identification and evaluation of abatement options and strategies, climate change vulnerability evaluation of the most likely scenarios, policy design for the implementation of abatement and/or adaptation activities, evaluating the social and economic impacts of activities that are to be implemented and integrating them into the global and sector objectives, evaluating the viability of the scenarios foreseen.

The execution of these obligations implies that industrial park implementation process requires the human, organizational, institutional and scientific resources for developing and implementing the tasks and functions that reduce emission of GHG. This SEA report has determined and put in place measures to minimize the emissions of GHGs through appropriate technologies like gaseous emissions neutralization and ample green cover to act as carbon sequestration mechanism.

d) **Vienna Convention for the Protection of the Ozone Layer**

Intergovernmental negotiations for an international agreement to phase out ozone depleting substances concluded in March 1985 with the adoption of the Vienna Convention for the Protection of the Ozone Layer. This Convention encourages
intergovernmental cooperation on research, systematic observation of the ozone layer, monitoring of CFC production, and the exchange of information.

The convention’s declaration demands a voluntary attempt at monitoring development processes, their resultant emissions and the impacts on the ozone layer for purposes of knowledge and information sharing in order to combat the same. The Master Plan proposes industrial development, and therefore the SEA report has determined and put in place measures to minimize the emissions that affect the ozone layer through technological monitoring of gaseous emissions and their toxicity levels for purposes of minimizing the same.

e) Convention on Biological Diversity

The purpose of this convention is to ensure the conservation and sustainable use of biodiversity. Kenya signed the convention on 5th June 1992 and ratified the same on 26th July 1992. The National Environment Management Authority (NEMA) is the national focal point to this Convention. The provisions of this convention have been integrated in many laws of Kenya such as Wetlands, Riverbanks, Lake Shore and Sea Shore Management Regulations, 2009 (Legal Notice No. 19)

The industrial park proposes the establishment of industrial investments that are agro-based whose operations have direct implications on the natural plant biodiversity through the utilization of raw materials and industrial processing. This SEA report and the proponent of the park have identified measures to improve biodiversity through measures such as conserving the riparian reserve, landscaping and use of bio-swales to prevent surface runoff and flooding.

f) Ramsar Convention on Wetlands

The Ramsar Convention on Wetlands is primarily concerned with the conservation and management of Wetlands. Parties to the convention are required to promote prudent use of wetlands within their territories and to take measures for the conservation of the same. One way to conserve the wetlands (as proposed under this convention) is establishing nature reserves whether they are included in the Ramsar list or not.

The wetlands include swamps, marshes, bogs, soaked shallow lakes, ox-bow lakes, river meanders and flood plains, as well as riverbanks, lakeshores where wetland plants grow. They also include marine and inter-tidal wetlands such as deltas, estuaries, mudflats, mangroves, salt marshes, sea grass beds, shallow coral reefs and creeks.

The park is expected to observe and adhere strictly to the Ramsar Convention’s principles of prudent use of wetlands especially in controlling developments along the riverine areas particularly because the park lies in close proximity to a river whose source is an underground spring that requires protection. The Master Plan and SEA proposes measures to conserve this wetland area that include greening of the riparian
reserve and the use of bio-swales to promote infiltration of surface run off back into the aquifer.

g) **Convention on the Elimination of all Forms of Discrimination against Women**

The Convention places explicit obligations on states to protect women and girls from sexual exploitation and abuse. The industrial park proposes to observe and adopt the above guidelines during its implementation. The realization of a non-discriminatory environment can be realized through preventive and mitigative measures by the SEA on matters of social concerns.

h) **Agenda 21**

The Agenda 21 entails a comprehensive plan of action to be undertaken globally, nationally and locally by organizations affiliated to the United Nations, governments, and other groups in every area in which human’s impacts on the environment. Kenya continues to implement Agenda 21 plan of action by incorporating its principles in national policies, plans, programmes and strategies. The provisions have also been incorporated in the Master Plan to promote sustainable development, which comprises of the three (3) underlying tenets of economic, social and ecology, which are well articulated in the SEA (specifically section on Environmental and Social Management Plan).

4.2.2 **National Policy Framework**

a) **Kenya Vision 2030**

As the country’s development blueprint covering the period 2008-2030, Vision 2030 aims to achieve a “globally competitive and prosperous country with a high quality of life by 2030” (GOK, 2007). Specifically, Vision 2030 aims at transforming Kenya into “a newly industrializing, middle income country providing a high quality of life to all its citizens by the year 2030” (Ibid). The Vision describes six priority key sectors in acting as key growth drivers in the journey to 2030; among these is the manufacturing sector. In this regard, the Vision states that, the country aims to become the provider of choice for basic manufactured goods in eastern and central Africa, by targeting "niche" products e.g. organic foods and beverages. This, according to the Vision will be achieved by strategically increasing the level of value addition in niche exports by additional processing of local agriculture products.

On the environment front, Kenya aims to be a nation living in a clean, secure and sustainable environment by 2030 (Kenya Vision 2030). Kenya will also enhance disaster preparedness in all disaster-prone areas and improve the capacity for adaptation to global climatic change. In addition, the country will also harmonize environment-related laws for better environmental planning and governance. Specific strategies will involve: promoting environmental conservation for better support to the economic
pillar flagship projects. The application of economic incentives; and the commissioning of public-private partnerships (PPPs) for improved efficiency in water and sanitation delivery.

The principles of the industrial work is aligned to the ideals of Vision 2030 as it meets objectives of the economic and environmental pillars through offering economic opportunities and protection of the environment. The positive impacts of the park on employment, income generation and sustained social and health of the people and the area is covered in Chapter Nine of this SEA report.

The park shall play a key role in increasing value in agriculture by providing a platform for the processing of agro-produce within the county and the region. Value addition of agricultural produce shall increase the farmers’ earnings and therefore enhance their livelihoods. Manufacturing for the East and Central African regional market shall be made possible through export production approach thus increasing the country’s foreign exchange earnings.

Moreover, Vision 2030 strategy puts forward proposals in with promotion of ICT, gender balance and catering for persons with disabilities. All these aspects have been observed in the EEIP through provisions for all the socio-economic groups and the people with disabilities both through access to economic activities and building designs.

b) Draft National Industrialization Policy, 2010

The Kenya National Industrialization Policy framework, draft 5, 2010 recognizes that Kenya is primarily an agricultural based economy with fairly skilled human resource base and strategically located to serve as a regional industrial hub. The policy acknowledges the industrial sector best-positioned as a potential growth driver as identified in the Vision 2030 because, among other reasons, the sector enjoys strong forward and backward linkages with other important economic sectors such as agriculture and services; and offers high prospects for employment creation especially in labor-intensive industries (GOK, 2010).

The policy further recognizes the need to promote sustainable industrial development that upholds environmental protection, management and efficient resource utilization. The overall objective of this policy is to sustain the growth of the industrial sector and make Kenya the most preferred location for industrial investment. The Eldoret Park inherently proposes promotion of key objectives of the industrialization policy, that is, to sustain the growth of the industrial sector. In regard to environmental sustainability, the policy recognizes the need to promote sustainable industrial development that upholds environmental protection, management and efficient resource utilization; a key principle of the Master Plan. Recognition and mitigation of possible negative impacts on the environment are contained in Chapter Nine of this SEA report.
c) **Draft National Environment Policy, 2013**

The draft National Environment Policy upholds the tenets of environment management and planning in Kenya by tracing the same to the Rio Earth Summit of 1992, which helped a great deal in raising the understanding of the link between environment and development (GOK, 2013). The policy recognizes the importance of the link between development and sustainable environment by stating the key principles, among others:

i) Promotion and support SMEs and other industries to adopt appropriate environmentally sound technologies through provision of appropriate incentives and disincentives,

ii) To develop and promote use of strategic environmental assessment in the industrial development plans, policies and programmes.

Overall, the government recognizes the need to integrate environmental concerns in all policy, planning and development processes. It states thus in the policy document, "Integration of environmental considerations in all national, county and relevant sectoral policies, planning and development processes is critical if this policy is to achieve its goal and objectives’ (GOK, 2013). This SEA report is geared towards showing how the proposed industrial park fulfills and complies with the provisions of the Environmental Policy. Chapter Nine of this reports details all the possible impacts of the implementation of the plan and shows how the negative impacts will be mitigated.

d) **National Environment Action Plan, 2009**

The National Environment Action Plan recognizes the environmental challenges facing industries, among others as; generation and management of solid, liquid and hazardous waste; gaseous emissions; adoption of cleaner production technologies and compliance with EIA/EA; waste and water regulations; importation of obsolete technologies; unregulated importation of toxic and hazardous chemicals; air and noise pollution; inappropriate technology in energy production; poor planning in respect to industrial and residential areas. The National Action Plan proposes, among others, the following interventions: enhance use of cleaner production systems, finalize and implement regulations on toxic and hazardous chemicals and finalize and implement regulations on noise pollution.

This SEA report clearly shows how the above propositions are tackled by the Master Plan according to the provisions for implementation of EMCA 1999 and the associated environmental regulations. Chapter Nine of this report details all the possible impacts of the implementation of the park activities and shows how the negative impacts will be mitigated.
e) Sessional Paper No. 3 of 2009 on National Land Policy

The National Land Policy was formulated to provide an overall framework and define the key measures required to address among others, the critical issues on land, land use planning, environmental degradation, conflicts and unplanned proliferation of informal urban settlements, outdated legal framework, institutional framework and information management. The policy further encourages a multi-sectoral approach to land use, provision of social, economic and other incentives and put in place an enabling environment for investment, agriculture, livestock development and the exploitation of natural resources. The main objective of the park is enhanced economic development but has incorporated environmental sustainability considerations in allocation of the 135 acres of land to the various industrial and commercial land uses. Specific and detailed impacts, mitigation and strategies to enhance acceptability and appropriateness of the park activities are contained in Chapter Eight, Nine and Ten of this report.

f) National Water Policy, 2012

The National Water Policy is informed by the gains made during the past decade on implementation of reforms in the water sector as anchored on the National Water Policy of 1999 (NWP 1999) also referred to as Sessional Paper No. 1 on National Policy on Water Resources Management and Development, the Water Act 2002, existing related policy documents, and the globally recognized Integrated Water Resources Management (IWRM) approach (GOK, 2012).

The policy aligns itself to the constitution in regard to creation of a system of democratic governance in which powers are devolved both vertically and horizontally in efforts to take measures to achieve the progressive realization of the cultural and socio-economic ‘rights to water’, an enabler of wealth creation and poverty alleviation. (GOK, 2012). Most importantly, the key principle of the policy is to ensure a comprehensive framework for promoting optimal, sustainable, and equitable development and use of water resources for livelihoods of Kenyans’ (GOK 2012). In regard to the park, provisions are incorporated to ensure protection of the affected water resources, supply and efficient utilization of water resources as well as the safe disposal of wastewater.

g) Sessional Paper No. 2 of 2009 on Forest Policy

The Forest Policy requires Local Authorities (County Governments) to establish and maintain arboreta, mini-forests or mini-recreational parks within their areas of jurisdiction and during construction of housing estates by the public and private investors. This could also be extended to Industrial Parks. Developers are also required to plant trees on both sides of road reserves. The Forest policy also aims to promote wood based industries to manufacture diverse finished products for local and export market. Trees absorb carbon-dioxide, pollutants particularly sulphur-dioxide, absorb noise, provide shade, cools the environment and improves aesthetics within the urban
environment. Promotion of wood based industries has backward linkages to the farms for supply of wood. This will lead to increased employment and incomes for farmers. The EIIP Master Plan has provided 10.4 acres of land (7.7% of the total) for green/open space. In addition, the plan has provided for all roads, pedestrian walkways and parking spaces in the park to be lined with trees. Unutilized spaces in individual plots will also be greened. This will significantly increase the proportion of trees in the park.

Wood based industries have been included in the list of possible industries therefore, the policy is sufficiently provided for.

h) Sessional Paper No. 2 of 2008 on Livestock Policy

Livestock farming, is the mainstay of most rural households. It contributes significantly to the livelihoods of the citizenry of this country. The sub-sector accounts for about 10% of the entire GDP and about 42% of the agricultural GDP. It also supplies the domestic requirements of meat, milk and dairy products, and other livestock products while accounting for about 30% of the total marketed agricultural products. The sub-sector earns the country substantial foreign exchange through export of live animals, hides and skins, dairy products, and some processed pork products. It also employs about 50 percent of the country’s agricultural sector labour-force. The sub-sector also contributes substantial earnings to households through sale of livestock and livestock products; and provides raw material for agro-industries. Of the total dairy cattle milk production, about 55% is marketed through traders, cooperatives, hotels and shops. An estimated 84% of the total milk production is sold in the raw form, while only 16% is processed.

Currently, Kenya’s livestock sub-sector is based on primary production. There is very little on-farm and off-farm processing of livestock produce, and this translates to low income for farmers and loss of employment opportunities. Value addition initiatives in the livestock sub-sector are mainly constrained by lack of supportive infrastructure such as roads, electricity, and water, in addition to investment disincentives arising from high taxes and un-conducive regulatory frameworks. The overall aim of the livestock policy is to facilitate enhanced and sustainable growth of the livestock sub-sector. It intends to guide development of the sub-sector to increase household incomes, assure food security and create employment through improved livestock farming, value addition of products and support of livestock-based industries, among others.

The EIIP Master Plan has identified the livestock products agro-processing as one of the key industries for the park. The livestock sector will therefore provide raw materials for the Industrial Park while the park will provide a market for the sector hence creating a strong synergy.

i) Energy Policy, 2012

The broad objective of the national energy policy is to ensure adequate, quality, cost effective, and affordable supply of energy to meet development needs while protecting and conserving the environment. The specific objectives are to:
— Provide sustainable quality energy services for development
— Utilize energy as a tool to accelerate economic empowerment for urban and rural development
— Improve access to affordable energy services
— Provide an enabling environment for the provision of energy services
— Enhance security of energy supply
— Promote development of indigenous energy resources, and
— Promote energy efficiency and conservation as well as prudent environmental, health and safety practices

The park has incorporated use of renewable energy, designed green buildings that will optimize use of solar energy, has included generation of energy from solid waste hence contributing to conservation of conventional energy forms.

j) Public Health Policy, 1994

The Kenya Health Policy Framework set out the policy agenda for the health sector up to the year 2010. The policy includes strengthening of the central policy role of the Ministry of Health (MOH), adoption of an explicit strategy to reduce the burden of disease, and definition of an essential cost-effective healthcare package. To operationalize the health policy framework, the paper on National Health Sector Strategic Plan (NHSSP, 1999-2004) was developed in 1994. The plan focused on the essential priority packages based on the burden of disease and the required support systems to deliver services. Major players in the health sector include the government represented by the Ministry of health and the local government, private sector, and non-governmental (NGOs).

The implementation of the devolved system of government has led to the active involvement of the lower levels of government albeit with major challenges. The role of the county governments includes implementation of the health policies, maintaining quality standards, and coordinating and controlling all county public health activities. Public health challenges in urban areas revolve around poor sanitation, unhygienic environment, and non-adherence to planning and building regulations. The park provides for enhanced physical environment within the park and its surroundings, including guidelines for management of solid and liquid waste, ensure that building standards are adhered to and enhance conservation of the stream adjacent to the park.


The overall goal of the strategy is to ensure clear improvement in the social and economic well-being of all Kenyans; thereby giving Kenyans a better deal in their lives, and in their struggle to build a modern and prosperous nation (GOK, 2006). This strategy paper has commanded a great deal of attention in recent years and essentially subsumes the Poverty Reduction Strategy Paper (PRSP). The key areas covered in the
strategy include, among others; reforms in trade and industry and safeguarding the environment and natural resources.

When fully operational, the park shall greatly contribute to the expansion of the industrial development by improving related infrastructure and services thereby contribute to increased productivity in the forestry, agricultural and livestock value chains. Moreover, park activities are expected to create a significant number of employment opportunities and thus increased incomes thereby fulfilling the ideals of the policy.

4.3: LEGAL FRAMEWORK

4.3.1: Constitution of Kenya, 2010

The Constitution is the supreme law of the land. It lays the foundation on which the wellbeing of Kenya is founded. The constitution’s provisions are specific to ensuring sustainable and productive management of land resources; transparent and cost effective administration of land; and sound conservation and protection of ecologically sensitive areas. Specifically, Chapter 2 Part 4, on the Bill of Rights, section 42 provides that every person has the right to a clean and healthy environment, which includes the right: (a) to have the environment protected for the benefit of present and future generations through legislative and other measures. Article 69 outlines specific provisions on the environment; subsections (d) encourage public participation in the management, protection and conservation of the environment, and g) provides for elimination of processes and activities that are likely to endanger the environment.

The Master Plan has made provisions to ensure a clean and healthy environment through the environmental and social management plan. Provisions for optimal utilization of natural resources particularly water and energy through promotion of efficient utilization and regular water and energy use audit are contained in the plan. The document further provides for the management of solid and liquid wastes, reduced pollution and management of the natural Cherunya stream.

4.3.2: Environment Management and Coordination Act, CAP 387 of 1999

Reference to this act is made together with other relevant regulations that form the environmental legal framework namely, the Environment (Impact Assessment and Audit) Regulations formulated in 2003. Based on these laws and regulations, relevant rules and a series of environmental criteria were developed to facilitate enforcement of the law.

Environmental Management and Coordination Act, 1999 describes the legal and institutional framework for environmental management. General principles of the act are that every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment. The entitlement to a clean and healthy environment includes the access by any person in Kenya to various public
elements or segments of the environment for recreational, educational, health, spiritual and cultural purposes.

There are a number of regulations that stem from EMCA which have significance to this SEA study. These are discussed below:

a) **Environmental (Impact Assessment and Audit) Regulations, 2003**

The Environmental (Impact Assessment and Audit) Regulations, state in Regulation 3 that “the Regulations shall apply to all policies, plans, programmes, projects and activities specified in Part IV, Part V and the Second Schedule of the Act”. (ER-EIA, 2003). Section 42 and 43 address Strategic Environment Assessments; section 42(1) requires lead agencies in consultation with NEMA to subject all policy, plans and programmes for implementation to a Strategic Environment Assessments while regulation 42 (3) commits the government and all lead agencies to incorporate principles of SEA in the development of sector or national policy.

b) **Air Quality Regulations, 2013 (Legal Notice No. 34)**

These regulations spell out levels of ambient air quality standards that should not to be exceeded. Part II prohibits an individual from causing immediate or subsequent air pollution. Section 6 states that “no person shall cause or allow emission of the priority air pollutants prescribed in the Second Schedule of the regulations to cause the ambient air quality limits prescribed in the First Schedule to be exceeded” (AQR, 2013).

c) **Waste Management Regulations, 2006 (Legal Notice 121)**

These regulations provide for the management of waste. Part II regulation 4 (1) provides that no person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated receptacle; regulation 4 (2) further states that a waste generator shall collect, segregate and dispose such waste in the manner provided for under these regulations and finally; and regulation 5 (1) provides for cleaner production methods. It states that a waste generator shall minimize the waste generated by adopting the following cleaner production methods:

i. Improvement of production process through:
   — Conserving raw materials and energy; Eliminating the use of toxic raw materials; and Reducing toxic emissions and wastes;  
   ii. Monitoring the product cycle from beginning to end by:
       — Identifying and eliminating potential negative impacts of the product;  
       — Enabling the recovery and re-use of the product where possible; and  
       — Incorporating environmental concerns in the design and disposal of a product.

This SEA report has incorporated the Environmental and Social Management Plan and Environmental Monitoring Plan to ensure that the waste management regulations are complied.
d) **Water Quality Regulations, 2006 (Legal Notice No. 120)**

This regulation has provisions for ensuring water quality standards by actors and players in the water sector. Regulation 8 provides for all operators and suppliers of treated water, containerized water and all water vendors to comply with the relevant quality standards in force Regulation 9 provides for water quality monitoring and states that the Authority in consultation with the relevant lead agency, shall maintain water quality monitoring for sources of domestic water at least twice every calendar year.

e) **Controlled Substances Regulations, 2007 (Legal Notice No.73)**

According to these regulations, producers and/or importers of controlled substances are required to include a material safety data sheet. Persons are prohibited from storing, distributing, transporting or otherwise handling a controlled substance unless the controlled substance is accompanied by a material safety data sheet. Manufacturers, exporters or importers of controlled substances must be licensed by NEMA. Further, any person wishing to dispose of a controlled substance must be authorized by NEMA. The licensee should ensure that the controlled substance is disposed of in an environmentally sound manner. These regulations also apply to any person transporting such controlled substances through Kenya. Such a person is required to obtain a Prior Informed Consent (PIC) permit from NEMA.

Persons handling controlled substances are required to apply for a permit from NEMA. Any licensee who imports or produces any controlled substances is required to ensure that all persons who receive or buy such substances sign a declaration form. Where an imported controlled substance does not meet set specifications, NEMA shall require the licensee to return the controlled substance to the country of origin at his/her cost or pay to NEMA the cost of disposing of the controlled substance. The EEIP Master Plan and this SEA report and specifically the Environmental and Social Management and Monitoring Plans have incorporated the handling of controlled substances to ensure safety of all the actors reduced harm and/or injury is caused to the people working in the sector and to the environment. (Chapter Nine)

f) **Wetlands, Riverbanks, Lake Shore and Sea Shore Management Regulations, 2009 (Legal Notice No. 19)**

Management of wetlands is guided by the following principles:

- Resources on the river banks, lake shores and the sea shore shall be utilized in a sustainable manner;
- Environmental impact assessment as required under the Act shall be mandatory for all major activities on river banks, lake shores and the seashore; and
- Special measures, including prevention of soil erosion, siltation and water pollution will be enforced.
— Section 9 clause 2(c) provides that a strategic environmental assessment be conducted for specific wetlands management plans.
— On use of wetlands, section 11 (1 and 2) details the activities permitted and environmentally sound to ensure sustainable management of the wetlands.

The Master Plan has factored prevention of soil erosion, siltation and pollution of water resources to ensure sound environmental health of Cherunya stream, a management plan for its conservation will be prepared. The plan has incorporated guides for landscaping and greening in efforts to reduce possible erosion into the stream resulting from the increased water runoff from the park. Secondly, adequate measures have been taken to ensure no liquid waste is discharged into the stream without proper care and treatment.

g) Noise and Excessive Vibration Pollution (Control) Regulations, 2009 (Legal Notice No. 25)

These rules provide for the noise regulations that apply to every factory, premises, place, process and operations to which the provisions of the Factories and Other Places of Work Act (Cap 514) apply. Section 1.4 of the legislation details the permissible levels of noise in a work place; section 5 and 6 elaborate on the recommended noise prevention programme as well as measurement and records to be undertaken by the contracted company during construction and operational phases of the project.

A great amount of noise and vibrations are expected in the activities proposed for implementation of the industrial park and these regulations will serve as guidelines to the investors. Specifically, the SEA has incorporated the Environmental and Social Management Plan that will ensure the tolerable Limits of Noise and Vibrations are not exceeded and that the recommendations in the regulations are adhered to.

4.3.3: County Government Act, No 17 of 2012

The County Government Act aims at giving effect to chapter 11 (Devolution) of the constitution and provides for the county government powers, functions and responsibilities in the delivery of services and for connected purposes. The act emphasizes the need for a consultative and participatory approach where the principles of planning and development facilitation in a county serve as a basis for engagement between the county government and the citizenry, other stakeholders and interest groups (Article 102 (i)). An important feature of SEA is that it is a participatory process whose hallmarks are public participation and stakeholder consultations to ensure that all their environmental and social concerns are incorporated. Therefore, individuals and institutions directly or indirectly affected by implementation of the EEIP Master Plan are entitled to express their interests and have them respectively taken into consideration in the decision-making process.
4.3.4: Urban Areas and Cities Act, CAP 275 of 2012

Article 22 of this act provides for Citizen Forum. Secondly, according to the 2nd Schedule, residents of a city, municipality/town may deliberate and make proposals to the relevant bodies or institutions on the provision of services or plan strategies for engaging the various levels and units of government on matters of concern to citizens.

4.3.5: Physical Planning Act, Cap 286 of 1996

The act’s main objectives are inter alia to provide for proper coordination between the different levels of government in the preparation and implementation of the various physical development plans. Part IV of the act specifically provides for the preparation of physical development plans for the selected area and selected purpose for the concerned administrative unit, while Part V, on “control of development” provides for powers of planning authorities in development permission including application and approval of development proposals. The act stipulates development application procedures and for approvals in regard to: (i) change of use: change in the use of land; (ii) extension of use, that is, adding other use to the land (20% of the total land); (iii) amalgamation: combination of the plot or use of land; and, (iv) sub-division that is, separating the use of the land.

The above are crucial tools in development control whose application may not be forthcoming in short term, that is, implementation of the provisions of the plan and park activities. However, the tools have been included in this report to enable the investors and other players of their importance in development and possible application in the long term, particularly change of user and extension of use. (Development control guidelines for developers are provided for in Chapter Nine)

4.3.6: National Land Commission Act, CAP 5D of 2012

This is an act of parliament that provides for the functions and powers of the National Land Commission, which among others gives effect to the Constitution, the objects and principles of devolved government in land management and administration, and for connected purposes.

In relation to the SEA study, this Act provides for:

a) the management and administration of land in accordance with the principles of set out in Article 60 of the Constitution and the national land policy,

b) a linkage between the National Land Commission, county governments and other institutions dealing with land and land related resources

Section 19 (1) provides that the commission shall, subject to the physical planning and survey requirements, process applications for allocation of land, change and extension of user, subdivision of public land and renewal of leases.
4.3.7: Energy Act, CAP 314 of 2006

The Energy Act was enacted to amend and consolidate the laws relating to energy, to provide for the establishment, powers and functions of the Energy Regulatory Commission (ERC) and the Rural Electrification Authority (REA), and for connected purposes.

Sections 46, 47, 48, 49, 50, 51, 52, 53 and 54 provide for procedures for acquisition (whether through willing surrender or compulsorily) of and the use of way leaves. Specifically, section 53(1) provides that for the purpose of the conveyance, transmission, or supply of electrical energy, a licensee may erect, fix, install or lay any poles, wires, electric supply lines, power or other apparatus in, upon, under, over or across any public streets, roads, railways, tramways, rivers, canals, harbors or government property, in the manner and on the conditions as provided in this Act.

Important to this SEA study is section 98, which provides for compliance with environmental, safety and health standards for any person engaged in petroleum business. Further, section 98(2) provides for cleaning up of polluted or damaged environment, in the event of a fire, explosion, oil spill, injury or fatality occurring in the course of operating a petroleum facility or transportation of petroleum, either by accident or through negligence, to the satisfaction of the commission and other relevant authorities. The Master Plan and this SEA study (see section Environmental Management and Social Management Plan) re-emphasize the provisions of this act during the pre- and post-implementation phases of the project. The possible negative and positive impacts of this project are detailed in the SEA report and presented in Chapter Eight, Nine and Ten.

4.3.8: The Forests Act 2005

The Forests Act is an Act of parliament to provide for the establishment, development and sustainable management including conservation and rational utilization of forest resources for the socio-economic development of the country. The Act provides for the creation of the Kenya Forest Service with the responsibility to: i. Provide forest extension services by assisting forest owners, farmers, and associations in the sustainable management of forests; ii. Promote the empowerment of associations and communities in the control and management of forests. iii. Manage forests on water catchment areas primarily for purposes of water and soil conservation, carbon sequestration, and other environmental services.

The EIIP Master Plan will immensely benefit directly and indirectly from the services of the Kenya Forest Service as provided for in the Forests Act. The direct benefits are from technical advice on the tree and shrub species to plant and how to manage them and indirectly from promotion of commercial forestry among the farming communities particularly for the supply of wood and other forest raw materials to the Industrial Park.
4.3.9 The Building Code of 1997

According to this code, prior to erection of buildings, an application, submission of plans and payments of fees are to be made to the municipal/county council. The Code states that prior to erection of buildings an application, submission of plans and payment of fees are to be made to the municipal/county council. It also contains requirements relating to certificates for occupation of premises. These are adoptive by-laws under the now repealed Local Government Act and are under revision.

Relevance to industrial park, the code’s provisions shall be adhered to thus;

— Establishing of standards for building as workspace is crucial for integration of these needs into the industrial park development agenda.

— Co-ordination between the various lead agencies, both government and county authorities is crucial to provision of direction to developers and investors of EIIP.

— Enforcement of these directives would also require sensitization and empowerment of the County Engineer’s Department.

In order to mitigate against the potential environmental impacts of the proposed developments in the park, such as noise, dust and vibrations, the SEA has provided for appropriate EMMP. These developments shall equally have social and economic implications whose impacts have to be determined by the SEA and measures to mitigate against the negative impact and promotion of the positive impacts put in place.

4.3.10: Water Act, Cap 372 of 2007

The act provides regulations for the management and development of water resources, water supply and sewerage development in all parts of the country with the objective of conserving, protecting and allocating such resources in order to meet the various needs while ensuring safe disposal of wastes.

Part II, section 18, of the act provides for national monitoring and information system on water resources while sub-section 3 allows the Water Resources Management Authority (WRMA) to demand from any person or institution, specified information, documents, samples or materials on water resources. Furthermore, the act vests the rights of all water to the state, and the power for the control of all bodies of water with the Minister, in consultation with the water catchments boards, it aims at among others: (i) provision of and conservation of water; and, (ii) apportionment and use of water resources.

The Master Plan has made provisions for conservation of the adjacent water source. This SEA report contains an Environmental and Social Management Plan to ensure efficient utilization of the water resource both within the industrial park and conservation of the nearby Cherunya stream.
4.3.11: Occupational Health and Safety Act (OSHA), 2007

This is an Act of Parliament, which provides for the safety, health and welfare of all workers and all persons lawfully present at workplaces. The act further provides for the establishment of the National Council for Occupational Safety and Health and for connected purposes. The act repealed the Factories and Other Places of Work Act. It applies to all workplaces where any person is at work, whether temporarily or permanently and therefore will apply to the project both during construction and operation phases.

The purpose of this Act is to:

— Secure the safety, health and welfare of persons at work; and
— Protect persons other than persons at work against safety and health arising out of, or in connection with the activities of persons at work.

The scope of OSHA has been expanded to cover all workplaces including offices, schools, academic institutions and plantations. It establishes codes of practices to be approved and issued by the Director, Directorate of Occupational Health and Safety Services (DOHSS) for practical guidance of the various provisions of the Act.

Other parameters within the act relevant to the project include:

— Duties of employers, owners or occupiers of workplace;
— Establishment of safety and health committees;
— Annual safety and health audit of workplaces;
— Safety and Health obligations for persons who may come to premises for work and are not employees of that particular workplace;
— Reporting of any accident, dangerous occurrence or occupational poisoning caused in the workplace to the area Occupational Health and Safety Office. These incidents should be entered in the General Register. In case of a fatal accident information to the area Safety and Health Office should be within 24 hrs. and a written notice to the same within 7 days;
— The duties of manufacturers, designers, importers and suppliers to ensure that all articles and substances for use at workplace are safe and will not cause injury to health and the environment;
— Prohibition of interference or misuse of any appliance, convenience or any other facility provided to secure Safety, Health and Welfare at work by any person (occupier, self-employed person or employed);
— The administration of the act is the responsibility of a Director and other appointed and gazetted officials (Occupational Health and Safety Officers);

The master plan and the SEA study has recommended the establishment of a department mandated with the development and enforcement of a health and safety policy framework to promote occupational health and safety as well as community health and safety mechanisms. This mandate should be accompanied with the requisite capacity building interventions, which may include specialized training for staff as well as targeted recruitment to enhance the existing expertise. On the same, Chapter Nine of the SEA report has identified the various potential negative impacts of the
development/construction and operational stages and has proposed possible mitigation measures.

4.4: INSTITUTIONAL FRAMEWORK

4.4.1: National Environment Management Authority (NEMA)

The authority is the key agency in charge of coordination of environment management activities, ensure compliance environmental guidelines and advise government on legislative and measures concerning environment management.

For purposes of the master plan and SEA study, the authority has to ensure compliance by the project proponent. This is done with a view to ensuring the proper management and rational utilization of environmental resources, on sustainable yield basis, for the improvement of the quality of human life in the project area. NEMA a key player in all environmental matters in the country, and is the approving authority of the SEA and EIA studies/reports prepared under this project.

4.4.2: National Environment Council

The National Environment Council (NEC) is established under Section 4(1) of the Environmental Management and Coordination Act no. 8 of 1999. The key functions of the Council, among others, include;

(a) Set national goals and objectives and determine policies and priorities for the protection of the environment;

(b) Promote cooperation among public departments, local authorities, private sector, non-governmental organizations and such other organizations engaged in environmental protection programmes

4.4.3: Ministry of Water and Irrigation

The ministry is responsible for the establishment, coordination and operationalization of the water service boards in Kenya. Thus, all the service boards through the relevant acts are expected to effectively and efficiently provide services related to water resources management and water projects’ development. The realization of the master plan proposals heavily depends on expansion of water services. The proposals in the plan are geared towards agro-processing industries; this implies that the investors will rely on sustained availability of raw materials. Therefore, provision of water for both irrigation and industrial use is pertinent and the Ministry of Water and Irrigation is a key player in this endeavor.

4.4.4: National Environmental Complaints Committee

The functions of the Complaints committee are to:
a) Investigate any allegations or complaints against any person or against the Authority in relation to condition of the environment in Kenya; or on its own motion, any suspected case of environmental degradation, and to make a report of its findings together with its recommendations thereon to the Council;
b) Prepare and submit to the Council, periodic reports of its activities, which report shall form part of the annual report on the state of the environment under section 9(3); and
c) Perform such other functions and exercise such powers as may be assigned to it by the Council.

4.4.5: County Environment Committee

Under the Environmental Management and Co-Ordination (Amendment) Act, 2015 No. 5 of 2015, County Environment Committee is constituted by the Governor in consultation with the relevant county organs. The role of the committee includes the proper management of the environment within the county and developing a county strategic environmental action plan every five years. For purposes of this plan and SEA study, apart from being a key stakeholder, the county government shall provide an oversight role on issue of the during all the stages of the project.

4.4.6: Eldoret Water and Sanitation Company (ELDOWAS)

The Eldoret Water and Sanitation Company Limited (ELDOWAS) is a corporate entity established under Cap 486 of the laws of Kenya. The company is fully owned by the county government of Uasin Gishu (the public agency/body that took over the functions and operations of Eldoret Municipal Council under whose mandate the company was formed). The company is in charge of water supply in Eldoret town and its environs and is therefore expected to be the main supplier of water to the industrial park. The company is mandated with the management of sewerage system and is therefore expected to be monitoring quality of effluents at the treatment plants to ensure compliance with the set standards before they are discharged into their trunk sewer.
5.1: OVERVIEW

Baseline conditions describe the state of the environment before the onset of the proposed development. This section provides the state of the existing environmental conditions such as current physical status of the site, topography, rainfall pattern, temperature range, water supply and quality, geology, vegetation type, cover and land uses for the proposed Industrial park site. This is broadly categorized into the Physical Environment, Biological Environment and Socio-Economic Environment.

5.2: PHYSICAL ENVIRONMENT

5.2.1: Topography

The project site is generally flat. The proposed project site slopes towards the western boundary where the stream is also located. The gradient of this slope is slight, approximated at 1:100. The western boundary noticeably slopes from the last 20 m toward the river running in a southeasterly direction.

Within approximately 100m from the river, the gradient becomes more appreciable, at approximately 1:15. The slope to the northeast of the site ranges between 0% and 2%; while to the west of the site the slope ranges from 11% to 24%.

The central parts of the site were found to have naturally growing grass giving potential for elaborate landscaping of the park. There was little vegetation cover on the western side of the road as it had been cleared for small-scale crop farming. Some trees and hedges were noted in the vicinity of two homesteads on the project side.

The geotechnical report of the project reveals the project area lies at an average altitude of 2100 m above mean sea level. The rock occurrence in the area is dominated by the tertiary volcanic rock formations. Recent sediment deposits and soils overlay the rock formation. The soils comprise of fairly drained, shallow to moderately deep loam soils and friable clayey soils.
5.2.2: Ground and Surface Water Characteristics

The site generally drains westwards into the valley at the bottom of the site. Drainage of storm water into the site is minimal except from eastern sides that are higher than the site. Points of ground water i.e. spring were noted at some points towards the lowest parts of the site. This part is also swampy. A small stream runs close to the western boundary of the site.

The site water table is generally shallow lying in the range of 10m to 25m. Rain fed saturated soil layers were, however encountered at about 1.5 metres along the western boundary. This can be attributed to saturation of the soils due to poor/moderate drainage of the underlying soils compared to the top layers after infiltration and low hydraulic gradient due to the adjacent river. The groundwater springs largely indicates that the water table is possibly high due to the fact the site has a stream and a minor wetland on its western side.

The results of water analysis indicate that levels of most of the parameters assessed are within the acceptable limit. However, Turbidity, pH and Faecal Coliforms are not within the limits. From the survey it was concluded that the water quality at the proposed project site is contaminated and needs filtration and disinfection before use. Conversely, another water quality survey will have to be carried out after land development.
5.2.3: Climate and Weather Patterns

Eldoret experiences a warm and temperate climate characterized by an average temperature range of 16.6°C in the warmest months of February and March. In the coldest months, it averages at 9°C. The town has significant rainfall throughout the year with an average annual precipitation of 1103 mm. The month of February is within the comfort zone except for a few days, which are cooler. Similarly, July is completely outside the comfort zone and therefore there is need for heating the interior of buildings when the temperatures fall below 20°C and radiation is below 200w/m². This has implications on energy demand. Eldoret is close to the Equator; as such the solar path
oscillates evenly to the North and South. It deviates to the North in June, it is overhead in March and September, and deviates to the South in December. The winds flow in the Northeast to southwest direction.

Figure 9: Views, Noise, Wind and Sun Path

5.2.4: Geology and soils

The project area lies at an average altitude of 2100 metres above mean sea level. The regional history described below covers the geological area south of Cherangani Hills. The rock occurrence in the area is dominated by the tertiary volcanic rock formations (Kenya Geological Maps). Recent sediment deposits and soils overlay the rock formation. The soils comprise of fairly drained, shallow to moderately deep loam soils and friable clayey soils. Loamy silts, clay loamy silts and varying ranges of gravel silts overlay the stratum. This soil can be very good for agricultural use and will be opportune for landscaping at the site.

However the alignment of the soil falls within S1 sub-grade class as classified by the Roads Design Manual Part III (Material and Pavement Design for New Roads). This soil class is structurally weak for pavement laying and will need capping or chemical treatment for pavement support. The foundation safe bearing capacity of the soil is 188kN/m² worked by Terzhaghi and Peck formula assuming a 2.5m deep square 3m footing and a safety factor of 4.

During the soil analysis the following parameters were checked; pH, Electrical Conductivity (EC), Lead (Pb), Zinc (Zn), Copper (Cu), Potassium (K), Sodium (Na), Calcium (Ca), Magnesium (Mg), Manganese (Mn) and Iron (Fe). The results of soil analysis indicate levels of all parameters assessed are within the limit.
The soil samples collected at the proposed industrial park site were subjected to radiation measurement. The results indicated that the soil radiation levels are within limit. It also indicated that the project site does not have radioactive source. The main soil pollution is mainly from previous usage of the land and not due to any construction. From the survey it was concluded that the soil heath condition at the proposed project site is satisfactory. Nevertheless, another survey would have to be carried out after land development. The soil analysis report is attached as part of volume two of the SEA report.

5.2.5: Noise Levels

The ambient noise levels at the proposed development site and its environ was between 27.0dB (A) and 51.1dB (A) which is within the NEMA Noise and Vibration limit set for commercial zones. The target noise level is set at 75dB (A) at construction sites. Currently, the noise emission is from wind, birds and animals at the site apart from traffic noise along the site access road.

Predictions of noise during development phase shows that the target noise levels shall be met and will not impact negatively on the environment and neighbours. The noise that will be generated during operation phase is not expected to impact negatively on the environment beyond 200m from the centre of the development after mitigation. The effect of the development on the acoustic environment of the site and surrounding environment shall need to be investigated further during the construction and operation phases and appropriate recommendations made.

5.2.6: Manmade Site Installations

There are utility lines traversing part of the site on the southern part that lead to waste of land due to the setbacks required. These utilities include the 11KV power line, the sewer line and the 30m wide road reserve that divides the site into two. The 11+9KV power line requires setbacks of up to 6metres on either side. The project seeks to consider application for rerouting of the power line, an idea that Kenya Power received well and assured the team of its practicability upon formal application. Application for rerouting of the power line should be done together with application for connection to power.

Sewer rerouting, according to the concerned agency, ELDOWAS, is only possible for a very small section of the line within the site. The rerouting of sewer is however
technically complicated due to issues of topography of the site. The planning team has to find innovative ways of integrating this into the land use plan.

5.2.7: Abutting Land Uses

To the north of the site lie government land accommodating KURA, NYS and private land and properties. The eastern side has residential and mixed uses with the southern having an informal settlement, Langas estate. Agricultural land exists to the western side.
5.2.8: Air Quality

From the measurement results, the air quality (dust concentration) emission and the noise levels at the site are low and within the accepted limit. Currently, the air emission at the proposed project sites is mainly dust and vegetation debris blown by wind.

The dust seen on tree leaves and on top of neighbouring buildings is not a risk to health as it is not inhalable. The results of the measurements indicate that there is no environmental air pollution or health risk to humans and the present air quality levels standards should be maintained as far as reasonably practically during construction phase.

The presence of Greenhouse gases such as Carbon monoxide (CO), Carbon Dioxide (CO\textsubscript{2}), Sulphur Dioxide, (SO\textsubscript{2}) and Volatile Organic Compounds (VOC) were found to be within the acceptable limits. Nonetheless, it was recommended that another survey should be done after construction phase to assess the operational emissions to the environment. The results of the air quality measurements are attached as part of volume two of the SEA study.
5.2.9: Biodiversity

The site is generally clear of any other forms of vegetation, except for grass, which covers the ground throughout the site. About four different grass species, three herbaceous plant species and two shrub species were observed on the site. The predominant grass type is Kikuyu grass.

The site is also a habitat for various invertebrates such as insects. There is no wildlife. The biodiversity of the site requires significant enhancement, especially tree and shrub planting. It is anticipated that this can attract mainly birds to the area and increase the fauna diversity.

Plate 11: Site Vegetation Cover

5.3: CURRENT SITE ACTIVITIES

There were a number of ongoing activities on site:

— There is a well on site being used by the NYS. This well belonged to the original owner of the land. It appeared to be shallow with not so clean water.

— In terms of physical developments, it was observed that the site is largely vacant save for a currently constructed security/gate office, temporary pit latrine, and one homestead.

— The site is currently being temporarily used as grazing field and pathway for community members. A portion of the land also had some crops but the team was informed that the owner of the crops had been instructed to uproot them.

— The site is currently being fenced with a view to protect it from grabbing. It was however noted that due to lack of clarity of the actual boundaries the sewer line encroached into the ICDC site.
5.4: **SOCIO-ECONOMIC ENVIRONMENT**

5.4.1: **Population and Demography**

The 2009 Kenya population and housing census estimated the population of the County to be 894,179. Population growth rate of the County is estimated at 3.8% compared to the national average of 2.4%. It is projected to increase to 1,201,853 in 2017 consisting of 598,507 males and 603,346 females. The population increase is attributed to be mainly from immigrants from neighbouring towns who provide cheap labour during the farming seasons. Development of the Industrial Park is likely to contribute to an even high population growth rate in three ways. The first one will involve people coming to seek for jobs in the industries, the second is entrepreneurs coming to set up their own businesses especially in the commercial and logistics clusters of the Industrial Park and the third will be in all the agricultural, livestock, fisheries and forestry sub-sectors for increased raw material production to supply the agro-processing industries. This will increase demand for social services and utilities.

5.4.2: **Poverty, Gender and Vulnerable Groups**

The 2013 County Development Profile reports that causes of poverty in the county include lack of market for farm produce, high cost of farm inputs and poor storage
facilities. Farmers also have limited access to good quality seeds, credit facilities and have poor delivery of extension services. This calls for a value chain approach in addressing raw material supply to industries.

Gender Inequality Index (GII) reflects gender-based disadvantage in three dimensions that include reproductive health, empowerment and the labour market. The index shows loss in potential of human development due to inequality between female and male achievements in these dimensions. It varies between 0 (when women and men fare equally and 1 when one gender fares very poorly in all measured dimensions.

The Uasin Gishu County reports indicate that those vulnerable to poverty in the county include persons with disabilities, the elderly, women (particularly female headed households), the landless, the youth, the unemployed, orphans and children in difficult circumstances. Improving equity in gender issues and reducing gender disparities will benefit all sectors of the economy and thus contribute to sustainable economic growth, and reduction of poverty and social injustices. This suggests that development plans/programmes/projects should have specific programmes/project components and facilities targeting these vulnerable groups in the County.

The high annual population growth rate of 3.35% has also contributed to increasing poverty as social facilities such as health, education, and transport have been overburdened. This is expected to worsen especially in Wareng Ward of Kapsaret Division where the proposed Agro-Industrial Park will be located.

5.4.3: Agriculture, Food Security and Poverty Levels

Agriculture is the main economic activity in Uasin Gishu County providing livelihood and food for over 80% of the rural population and employing over 57% of the labour force (16-64 years). The sector envisions a sustainable and equitable rural development with a mission of contributing to poverty reduction through promotion of food security, agro-industrial development, trade, water supply, rural employment and sustainable utilization of natural resources. This however, has not been forth coming as poverty, food security and un-employment are reported to be worsening. For example, several poverty assessment surveys carried out in the county show that the overall absolute poverty increased from 47.6 in 2003 to 49% in 2012.

In addition, although the County is ranked as a major food producer in the country, the food poverty incidence is still high. Rural food poverty was estimated at 37% in 1994 and increased to 43% in 1997. Urban food poverty on the other hand was estimated at 27% in 1994 and increased to 38% by 1997. This is a trend that the proposed agro-industrial park can contribute to reversing through direct and indirect measures.
5.4.4: **Agriculture Potential Levels**

--- *Crop Sub-Sector*

Compared to other counties, Uasin Gishu has a higher average household farm size of over three hectares for small scale and 50 hectares for large scale farming suggesting that there are enormous opportunities for raw material production by both small and large-scale farmers to support agro-industries. The main food and cash crops produced in the county/region are maize, wheat, beans and horticultural crops such as passion fruits, cut flowers and pyrethrum. In 2013, the total area under food crops was over 85,525 hectares. The area under cash crops was estimated at about 40,786 hectares and for commercial horticulture just about 62 hectares was recorded. Industries for both food and cash crops have the potential of obtaining raw materials from the farmers. Production of other crops particularly horticultural crops can also be expanded. Apparently, lack of market for farm produce is one of the main reasons why production is very low. The agro-industrial park can provide a market for most farm produce in the County.

--- *Livestock Sub-Sector*

The main livestock reared in the County are dairy and beef cattle, goats, sheep, rabbits, pigs, chicken (both exotic and indigenous), and bees. This suggests that these livestock can be produced commercially and processed for the local and external market. Fish farming is also practiced through aquaculture. Fish farming was aggressively promoted through the Economic Stimulus Programme (ESP). Over 330 fishponds were constructed under this programme. There are over 1000 fish ponds in the County and more fish is produced from the dams. Although the annual yield was reported to be low (1.92 tons), the programme demonstrated that there is a lot of potential in fish farming in the County. This can be exploited.

--- *Forestry Sub-Sector*

According to the County Profile (Republic of Kenya, 2013), in 2013, Uasin Gishu County was estimated to have a total of 29,802 hectares of gazetted forest. Out of this, 13,184 hectares (44%) was under plantation, while 16,618 hectares (56%) was indigenous forest cover. There are numerous private farm forests/woodlots in the county for commercial purposes. There are also Community Forest Associations in the county, which practice forestry as an income generating activity through nurturing and selling of tree seedlings. These are institutions that can mobilize farmers to grow trees for the market. There already exists a big market for forest products such as poles, timber and wood fuel in the county.

Development of the Industrial Park will widen the market further. This market opportunity need to be exploited for the good of the county. Bamboo, a forest crop grows well in the county and is being promoted because it is a significant carbon sink. Bamboo grows very fast and has many applications in rural industries like handicrafts;
furniture, utensils, houses and it can also be widely used in modern wood and paper industries.

There is enormous potential to invest in the forestry sub-sector in Uasin Gishu County especially if trees are grown and forests established for the market. Given that globally, forests and oceans are the key carbon sinks and that Uasin Gishu does not have large water bodies, the growing trees will act as carbon sinks for the county. They will contribute to cleaning the air for the population and this will in-turn contribute to their good health and well-being. In addition, the forests will provide both raw materials for the agro-industries, create rural jobs at the production level and urban jobs in the processing and trade components of the value chain. The wood and timber industries have also to be developed to create a market for the primary forest products. Overall, investment in farm and plantation forestry in the county will contribute to carbon sequestration, employment creation, income generation and production of raw materials for the furniture manufacturing industry of the Industrial Park and subsequently contribute to poverty reduction.

5.4.5: Industry and Manufacturing Sector

Uasin Gishu has no known important mineral or water resources. It is basically an agriculture dependent county and its industrial development will depend mainly on agricultural raw materials inputs. There are eight key manufacturing industries in the county. These include Rivatex, Ken Knit, Rai-Ply, Coca Cola Bottlers and Unga Group millers among others. Proximity to big commercial centres such as Kisumu, Kakamega, Bungoma, Nakuru and Kitale provides a wide market for industrial products. There is a huge unexploited industrial potential given the ready availability of raw materials, labour and strategic air, rail, and road transport infrastructure. The milk industry is a case in point where available industrial capacity is not sufficient to absorb all the milk produced in the county. In fact, the revised industrialization policy of 2010 indicates that the limited growth of the agricultural and livestock sub-sectors is as a result of there being no industries to process the agricultural produce. The Uasin Gishu County Integrated Development Plan further highlights that the increasing poverty in the county has a direct relationship with closure of some industries like the EATEC, Raymond Mills and Corn Products.

The UG-CIDP also highlighted that the cottage industry can be exploited gainfully for wealth and employment creation. This industry requires minimal set up costs and makes use of locally available raw materials. There are plenty of reeds in the county that can be used to make chairs, tables, ceilings, beds, mats, and baskets among others. There is also a wide scope for establishing a plant to process fruits and horticultural products, which are grown within the county and from the other neighboring counties. Potential also exists in product processing from livestock production as the county has ample stocks of cattle, sheep, goats, pigs and chicken. Livestock based agro-processing has potential to thrive. Implementation of the Industrial Park will greatly contribute to achieving the goals of the County Integrated Development Plan.
5.4.6: Infrastructure

The county is characterized by a good road network comprising 309.6 km of bitumen surface, 549 km of murram and 377.2 km of earth surface. There are eight railway stations in the county and a total length of 179 km of railway line. In addition, the county has an international airport and two airstrips. There is also an inland container depot in the county. This makes the county the region’s transport and service hub. Implementation of the Industrial Park will increase demand on the existing infrastructure and improve on utilization of the underutilized infrastructure such as the railway line and airport. This will play a significant role in the county’s economic growth and poverty reduction.

5.4.7: Housing

Considering the houses built in the county, 45.6% are made of mud or wood as the main walling material. This is followed by brick/block at 25.4%, stone at 12.3% and mud-cement 5.8%. The main roofing materials are corrugated iron sheets, accounting for 84.4% followed by grass at 7.7%. The county needs to come up with strategies to encourage more investments in the housing sub-sector to deal with the shortage of housing units in the county especially in Eldoret Municipality and other towns within the county. According to the National Housing Policy of 2004, of the required 150,000 additional housing units per year for urban households in the country, only 30,000-50,000 (20-30%) are supplied leaving a deficit of 80-70% unmet. This contributes to emergence of informal settlements. Investment in housing supply is therefore a desirable and priority investment for the country as whole and urban centres across the country, Eldoret Municipality being included. As discussed under population, housing is one of the social services whose demand will increase with the development of the Industrial Park. Given that the project site is already next to an informal settlement, there is need for ICDC in collaboration with the County Department in-charge of Housing to come up with a deliberate strategy for housing.

5.4.8: Labour Force

According to the county profile of 2013, Uasin Gishu County had a labor force of 549,613 in 2012, which accounts for 55.7% of the entire population. This translates to 44.3% of the population being dependants. Thirty seven percent (37%) of the county population is in wage employment. Up to 8.8% of the labor force living in the rural areas is in self-employment while for the urban areas it is 35.3%. In general, the level of unemployment and underemployment in the county is high. The 2012/2013 National Housing Survey estimated the national unemployment rate to be 8.1%, 9.9% for urban and 7.3% for the rural areas. This is as a result of preference for white-collar jobs as opposed to promotion of agribusiness given that the county has high agricultural potential and white-collar jobs are not sufficient to address the problem of unemployment.
Agriculture as an enterprise has also been plagued by numerous challenges including lack of enough certified seeds and fertilizers, leading to sub-optimal land productivity per unit area. Post-harvest management has also been a challenge, leading to losses or low profitability. Processing of farm produce as a post-harvest management strategy can contribute to increased profitability. The promotion of horticulture as opposed to the traditional cash crops can also help to address the problem of unemployment. The county plans to create an enabling environment for small scale and young entrepreneurs to thrive. In addition, it plans to establish industry/business incubators to encourage the youth to venture into business. Implementation of the Industrial Park will therefore contribute to attaining the goals of the County Development Plans.
CHAPTER SIX
STAKEHOLDERS AND PUBLIC ENGAGEMENT

6.1: OVERVIEW

Public participation and stakeholder engagement is considered a distinguished feature of Strategic Environmental Assessment (SEA). Various SEA literature have traditionally identified several benefits attached to it, from more open and transparent decision-making to greater acceptance of plans/programmes output by the affected population. This chapter describes the objectives, methods used and summary of results of the public and stakeholders’ consultation activities undertaken during the SEA study for the proposed industrial park development.

6.2: RATIONALE FOR STAKEHOLDER AND PUBLIC ENGAGEMENT

Public and Stakeholders consultations in this SEA was carried out in accordance to the legal framework spelt out in the CoK 2010 and EMCA 1999. Specifically, public and stakeholder engagement under this SEA study was carried out to among others:

a) Provide a more comprehensive understanding of the baseline environment and relevant key individual and community issues and values to be integrated into the preparation of the industrial park master plan;
b) Enhance transparency in decision-making, by providing information which allows early identification and mitigation of impacts;
c) Obtain information about potential environmental effects at an early stage of the SEA process; and
d) Facilitate understanding and appreciating of the proposed industrial park thus avoiding unnecessary controversy and delays during implementation.

6.3: STAKEHOLDER IDENTIFICATION AND ROLES

6.3.1: Stakeholder Identification

Key stakeholders consulted during the SEA study were identified in accordance with the areas/sectors that are affected directly or indirectly by the proposed industrial park development. Stakeholder analysis was done with a view to understand stakeholders positions, influence on other groups, and their interest in this particular master plan; provide an idea of the type of impacts of the master plan, highlight the divergent views on the proposed master plan, and potential power struggles among groups/individuals; and help identify potential strategies for negotiating with stakeholders with divergent opinions.

The criteria used to identify various stakeholders was based on the legal mandates of various institutions; assessment of the different interests of the stakeholders; stakeholder power rights and responsibilities; potential role in the industrial park
development and human and technical resources that can contribute to the success of the industrial park Master Plan implementation. Therefore, the stakeholders identified and consulted included the national Government Sectoral Development and Law Enforcement Agencies such as (ICDC, NEMA, Kenya National Chamber of Commerce, ELDOWAS, KURA, WRMA etc.), the Uasin Gishu County government, private companies and groups of affected individuals.

Other stakeholders that were consulted include: Educational Institutions such as Moi University Eldoret, Eldoret Polytechnic, Kenya Industrial Estates (KIE), women and youth Associations – see table 5.

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<th>CATEGORY</th>
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<td>Project Proponent</td>
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<td>— Ministry of Industrialization and Enterprise Development</td>
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<td>Government Sectoral Development and Law Enforcement Agencies</td>
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<td>— Eldoret Water and Sanitation Company Limited (ELDOWAS)</td>
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<td>Key Informant Interviews</td>
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6.3.2: Stakeholders’ Roles

Stakeholders’ Activities in SEA plays three fundamental, complementary and non-exclusive functions relative to the decision-making process. In a strategic approach some of these activities include; integration of environmental and sustainability
objectives and issues into planning and programming procedures; assessment of strategic options with respect to opportunities and risks and validation of SEA performance.

Stakeholders and the public consulted in this SEA participated in a number of activities which included assessment of strategic options relative to the opportunities and risks to the environment and to the sustainability of decisions of the proposed industrial park master plan. They were also involved in validation to authenticate if the issues raised during various forums were incorporated into the SEA as well as getting to know how SEA will contribute to greater efficiency in strategic processes and for better quality in the expected outcomes of the proposed master plan.

6.4: MATTTERS ARISING FROM STAKEHOLDER CONSULTATIONS

The issues identified through public and key stakeholders’ consultations broadly touched on environmental and socio-economic issues in the proposed industrial master plan. These were considered in order to provide a high level of protection of the environment and to contribute to the integration of environmental considerations in the preparation of the industrial park master plan. The concerns and suggestions from stakeholders are broadly categorized into public forum, stakeholder workshop, Key informant interviews and household survey.

6.4.1: Public Forum

On 3rd September 2015, the SEA team had a major public forum meeting for the design and documentation of the proposed industrial park at the ICDC project site block 15/1757, behind Rivatex. Over 1000 members of the public and stakeholders attended this forum. Other groups who attended the forum included the County Government administration officials; stakeholders from the industrial sector; NGOs and national government Institutions representatives; business associations; youth and women groups; religious leaders; neighboring residents from Langas, Pioneer, and Kipkaren; and the community association representatives among others- See appendix 7.

The issues raised by participants included:

a) Environmental Concerns

The public noted that it would be important for ICDC to ensure that the proposed industrial development does not adversely affect River Cherunya. They argued that other developments within the area have contributed to dumping of toxic waste such into the river into the river system. Thus residents who depend on the river continue to suffer from respiratory diseases but also from acid burns, rashes, aches, dizziness, and nausea.

As a mitigation measure, the residents emphasized the need for environmental protection such as planting indigenous tree species in the park and on the park boundary for windbreak and cleaning of air; effective installation and management of
proper solid and liquid waste water treatment and disposal where every industry to have its own treatment plant for inspection before discharging into the main sewer line. Moreover there should be provision of sufficient water supply to ensure good sanitary conditions in the park, controlling of flooding through ensuring proper storm water management in the park—if possible harvest all the water. Possible suggestion that were made also with regards to protection of the environment includes adoption of e-waste Management such as re-use and recycling of waste.

The residents also preferred more light industries that are less polluting as opposed to heavy industries. Among additional industries proposed include, Jua kali for metal fabrications, Jua kali show rooms, shoe making, hand bags, and leather foot balls while industries typologies rejected by the public included tannery, abattoirs, fertilizer production and agro-veterinary chemicals.

b) Socio-Economic Issues

The public was impressed by this project due to the fact that it will create more job opportunities to locals, youth and women. However from a socio-economic angle the public expressed their anxiety that as a consequence there would be increased population influx. As a result the public requested for increased investment in social amenities such as schools, health facilities, children play ground (park), football field, entertainment, social halls etc. To stir local economy, community cooperation and job creation during construction of the park, the project proponent was urged to use local materials for construction, ensure community participation as well as create projects that will generate income for the surrounding communities.

As a cooperate social responsibility gesture, the public urged ICDC to extend the sewer about 2-3 km into Langas Estate to capture wastewater emitted into Cherunya Stream, include a police post to improve on security, consider improving neighbourhood infrastructure such roads, water, and electricity, plan and for a recreation site and a youth sports centre to promote young talents as well as plan for proper housing in the neighborhood to avoid creation of slums. Lastly, the team was also urged to prevent illegal activities during and after construction. These include activities such as informal businesses in the park or on the road reserve.

c) Institutional Framework for Environmental Management

The public suggested that ICDC should have a fully equipped environmental unit with personnel and environmental labs to monitor environmental quality of the park and its surrounding areas. Moreover, ICDC should explore possibilities of proper waste management in partnership with ELDOWAS and other private company on a competitive basis since government institutions have proven from the past to be usually not effective.
6.4.2: Key Stakeholder Workshop

On 1st September 2015, the SEA team had a successful stakeholders’ workshop at Starbucks hotel in Eldoret. Over 60 stakeholders attended the 1 day workshop. The participants were from various groups including the County Government administration officials, stakeholders from the industrial sector mainly industrialists, NGOs and national government Institution representatives, business association, youth and women groups, Langas, Pioneer, Kipkaren resident association representatives, religious leaders, representatives from universities and other educational institutions in Eldoret among others. - See appendix 6.

During the stakeholder workshop a number of environmental and socio-economic concerns were raised with regards to the proposed industrial park development. The environmental issues raised included the protection of Cherunya stream from the industrial effluent pollution. This concern was tied to the tendencies various industries within the County industries which continue to discharged their waste effluent into water bodies. The stakeholders suggested to the team that, the park should prevent land and water pollution through efficient use of water resources and having clear strategies on how they will handle their waste, preferable the offsite treatment methods.

Another concern raised was on various industrial typologies proposed with a potential to cause heavy air pollution should be avoided. This was linked to the fact that air pollution from industries has negative impacts to the environment including spread of
respiratory diseases, formation of acid rain among others. To mitigate these negative effects, the stakeholders highly recommended planting of various trees species for carbon sequestrations.

On Socio economic matters the stakeholders argued that the proposed park would be a major source of employment. They suggested that the proposed industrial park should take into account among others; consideration of the local needs, priorities and concerns such as job opportunities, improvement of security, inclusive employment of various marginalized groups such as women, youth and persons with disability.

6.4.3: Key Informant Interviews

The project team had preliminary consultation meetings with an array of key stakeholders. These are discussed below:

a) Chief Officer, Uasin Gishu County, Ministry of Trade Industrialization, Cooperatives, Tourism and Wildlife

In his introductory remarks, the Chief Officer called upon ICDC to facilitate a faster implementation of the proposed industrial park project since the County was willing to support industrialization as a key sector driving its economy. In addition, he gave proposals concerning areas the proposed industrial park should address; noting that the proposed Industrial park should give priority/lean towards their policy direction particularly on trade and industrialization sector (food processing industry and textile industry as market driven).
With regards to SEA, the Chief Officer’s main concern was on the Cherunya stream, which passes close to the project site. He argued that stream should be captured strongly during the writing of the SEA report indicating the likely effects the proposed industrial park would have on the stream. Measures of safety and wayleave space were indicated to be of major concern especially on the power line traversing the site and the pipeline passing adjacent to the site; hence the proposed industrial park should take care of the activities closer to the pipeline that may trigger vibration leading to leakages or spill over. On utility services such as water and sewerage services, it was noted that ELDOWAS as the major service provider only has two supply lines hence the proposed industrial park should look into means of harvesting and conserving water.

b) Director Roads, Transport and Public Works Uasin Gishu County Government

The Roads officer highlighted the fact that the road connecting the proposed industrial park has been listed by KURA for construction and their department is ready and committed to facilitate this since the two (KURA and the County government) are working closely in financing road developments. To support his argument the officer cited the key teams and institutions that the ministry will work together with including but not limited to: KURA, Trade and Industrialization department, Roads and public works department and the department of lands and physical planning.

c) County Physical Planner, Uasin Gishu County Government

The County Physical Planner confirmed that the proposed industrial park site is zoned for mixed industrial development. The Physical Planner noted that Uasin Gishu County Physical planning zoning regulations allows for industrial development under block 2 zone, at a minimum plot size of 0.2ha, plot ratio and plot coverage of 75%. Other regulations for this zone includes an industrial building height of 1 story while for
commercial developments a maximum of 4 floors. The minimum setbacks, front, rear and side in metres are 6, 1.5 and 1.5 respectively.

According to the Physical planner, the approval process for the proposed industrial park would pass through the planning committee composed of among others the Physical planner, Land officer, Public health officer, Architect, Engineer and NEMA officer for comments. Thereafter it will be presented through the Chief Officer, Land and Physical Planning, to the County Executive Committee, chaired by the Governor before the final approval.

d) **Design Engineer, Kenya Power - Uasin Gishu County**

The engineer informed the team of their commitment to serve their customers to their satisfaction at friendly terms. He noted the adequacy of power supply to the proposed industrial park site noting that there is an electricity substation behind Rivatex that would be able to serve the park once it starts its operations. He therefore advised the team to apply for connection of electricity which will depend on the capacity/load requirements. The engineer also noted that there is the possibility of rerouting the electricity line traversing the site and aligning it with the site boundary only if this is requested during electricity connection application. Finally the officer also emphasized that there would be need to consider wayleave requirements and power backups/standby generators to supplement electricity from Kenya Power.

e) **Kenya National Chamber of Commerce and Industry, Executive Officer Uasin Gishu County.**

The Executive Officer on behalf of the Kenya National Chamber of Commerce Uasin Gishu branch introduced KNCCI as an organization coordinating trading activities between the government, businessmen and various organizations within Uasin Gishu County. It represents and looks at the interests of its members, who are the business community who register by paying a small registration fee as well as supporting industrial development such as advocacy towards the business community, lobbying investors, facilitating MOUs among others.

In relation to the proposed industrial park, the Officer assured ICDC on their cooperation and support towards achieving the set goals of the project. The Officer identified some of the roles the organization would play to include maintenance of a stable political and economic climate in which business can thrive, assisting ICDC to identify key industrialist investors within the county and nationally.

The chamber of commerce gave a number of considerations the proposed industrial park should take into account to ensure success of the project. These included consideration of the local needs, priorities and concerns: whereby the proposed industrial park should take care of ‘incubators’ or industrialists who are on the “starter” stage to enable them grow to maturity.

According to KNCCI ICDC should leverage the partnership opportunities within the county particularly within the North rift region, which has over nine counties. This
would aim at promoting technology innovation that will further generate employment and establish investors both the local and foreign.

f) Head of Technical Services, Eldoret Water and Sanitation Company Limited (ELDOWAS)

ELDOWAS is majorly concerned with water and sewer connection and reticulation in Eldoret town. The company draws water from Chebara dam in Elgeyo Marakwet that has a capacity of about 36 million liters per day against a demand of 45-50 million litres per day depending on the season. Demand is highest during the dry season. The Company has existing water supply infrastructure (250mm pipe) along the Eldoret-Kisumu road which could be connected to the proposed park, but due to the low volumes of water, the company may not be in a position to supply adequate water until the new supply line from Kipkaren dam is complete.

Plans are underway to build a supply line from the Kipkaren dam near Eldoret airport, an effort expected to be complete after two years. The company has two sewer treatment plants with one located near the County dumping site. It was noted that the recently constructed sewer on the ICDC site was constructed by the Ministry of Housing but currently under management by ELDOWAS.

The park will be connected to the sewer upon application to ELDOWAS and payment of fees and charges in accordance to the current tariff. The application has to be accompanied by approved plans as well as an occupation permit of the premises. On effluent regulation, the company has guidelines on levels of effluents allowable in the sewer system. In case the effluents exceed the requirement there is need for pre-treatment of the effluents to the permitted levels before releasing them into the system.

g) Eldoret Regional Officer, National Environment Management Authority (NEMA)

The Officer expressed his concern on the need for preparation of a SEA for the whole master plan and the individual EIA for each industrial development due to the diversity of the components of the industry. SEA should look at the carrying capacity of the site in relation to water, energy, effluent, and site location in relation to other enterprises, labour market and transport.

The Officer noted that the SEA report should outline the following in relation to waste; transportation and disposal of waste, possibilities of hazardous waste and how it will be handled for example by use of an incinerator. If not, what are the possibilities of partnerships with either the Moi Teaching and Referral Hospital or any other Institution that has the equipment to handle hazardous waste. The SEA team was also advised to consider exploring how all the categories of waste will be handled, overall loading of air from the fumes released from the industries and the possibilities of trappers or other mitigation measures, projection of noise pollution from both the industries and vehicles and possibilities of decommissioning, recycling or dismantling and decontamination to make waste safe.
According to the Officer, the SEA report, should adequately consider all impacts of the proposed development on transportation. For example, the Officer wondered if the project is envisaging the possibility of a railway line nearby for bulky goods and if not, what would be the overall contribution of the development to congestion and traffic on the existing roads. Thus it was suggested that parking and turning for heavy trucks and how these will be handled as well as projections for need of a separate road to handle the generated traffic to avoid direct feeding of traffic to the roads should be considered.

The SEA should outline if the metered water is sufficient, or if there will be need for a borehole or abstraction of the neighboring river to provide water required by the industrial park. The report should outline the environmental dangers of each source and what mitigation the project will come up with. He also highlighted the need to outline if there is envisaged housing and other support amenities such as playfields for the labour force by the project based on the following dimensions:

- **Associate development** - What are the likely development associated with the development of the ICDC Industrial Park such as Markets, housing, medical facilities, schools etc.
- **Ecological breathers** - The SEA should outline how the project will provide green parks, recreation facilities, fountains, and buffer zones for general ambience and contribution to the micro climate.
- **Corporate social responsibility** - Would include roads, hospitals and schools that are open use, street lighting, security, storm water management, playfields and any added advantage to the neighborhoods as a result of the industrial park establishment. Also any steps the park can take to reduce their carbon footprints are considered both good for the company and society as a whole and part of CSR.

With regards to consultation of stakeholders, the officer advised the team on the need for wide consultation of stakeholders as this will help reduce the time taken in the approval. Upon completion of the SEA, it was noted that ICDC should call stakeholders for a validation workshop and incorporate the inputs of the stakeholders into the report. This is a process of allowing the stakeholders to own the project.

Lastly, for environmental sustainability, the officer advised the team to spearhead the project towards best environmental practices, appropriate technology to enhance green economy/reduce carbon footprints, natural lighting and energy efficiency, water harvesting and recycling as well as use of renewable energy such as solar.

**h) Management Representatives, Water Resources Management Authority (WRMA)-Eldoret.**

According to the water officials present, the proximity of the proposed industrial park to a water body, calls for a Water Quality and Pollution Control Survey report to be
done by a consultant hydrologist registered under the Ministry of Water and Irrigation to determine the effects of the effluents to the water body.

It was noted that a hydro-geological survey could be carried out to determine the viability of a borehole on the site both in terms of salinity levels and volumes of water that a borehole in the area can yield. The area is made of different aquifers hence the need for a hydrogeological survey that would advise on viability of a borehole on the ICDC site. Nonetheless, it was argued that the volumes of water required by an industrial park might however be too high to be met by a borehole.

Although the team was informed that no regulations apply on the area on minimum distances between boreholes, it was clarified that permit must be sought from the water authority before sinking a borehole.

The officials were of opinion that ICDC should explore the option of abstraction of the river next to the site and also use of roof catchment to supply water to the industrial park. However, the SEA team was advised to conduct a hydrological assessment to determine if the river has enough water for such purposes and how best to carry out the abstraction.

i) Industrialists, Kenya Industrial Estates

The key industrial players in Uasin Gishu County are mainly from the textile, and agro based or food processing industries. From the discussion with the industrial players, it emerged that the main challenges facing industrial investments in the county were political interference from those in power who have vested interests on industrial development, poor management of industries (KIE experience), inefficiency in supply of raw materials and lack of empowerment and capacity building for the local investors.

The industrialists emphasized the need for a thorough stakeholder consultation mainly from the County government, area local authority where the proposed industrial park will be located including the MCA, sub county administrator, ward representative and the local elders such as the chiefs. Lastly the key industrial players in Uasin Gishu County called upon ICDC to consider the small-scale incubator groups (Jua kali) of industrialist as well as give priority on value addition mainly for industries for the textile and agro processing industries in the county.
6.3.4: Household Survey

Household survey mainly focused on getting primary data from neighboring households’ within the proposed industrial park with regards to social, economic and environmental effects the development- See appendix 5. This section outlines the findings of the household survey. It is broadly categorized into respondents' characteristics, socio-economic status and lastly environmental characteristics and impacts.

a) Respondents Characteristics

A total of 140 households from Langas (67), Pioneer (37) and Kipkaren (36) Estates were interviewed. About 58% of the respondents were male while 42% were of female. Majority (46%) of the respondent were between 29-39 years old, 26% between 19-29 years, 15% between 39-49 years, 9% between 49-59 years while only 4% were of over 59 years old. From the age characteristics above it’s a clear indication that the neighbourhood is mostly occupied by the middle aged-population.
Chart 1: Age Cohort of the Respondents

Source: Field Survey, 2015

As presented by the chart below, more than half of the residents have attained secondary education at 44% of the population, 16% have attained primary education, 37% have attained tertiary education (middle level college/university), while only 3% of the population interviewed had never attended school - see chart 2.

Chart 2: Education Level of the Respondents

Source: Field Survey, 2015
Further analysis shows that the residents who have attained tertiary education are the ones mainly employed at the formal sector while 16% of the respondents with only primary level of education are engaged in informal economic activities within the neighborhood. Thus, informal employment is most prevalent in the neighbourhood as noted by 64% of the respondents. About 31% of the respondents said that they are self-employed while 5% noted that they are formally employed – see chart 3. The respondents in formal employment are mainly civil servants at the County government or lecturers/teachers at nearby educational institutions. On the other hand, informal and self-employed economic activities are characterized by mixed farming (crop farming, livestock, and poultry rearing), and small retail kiosks vending fruits and vegetables.

**Chart 3: Employment status of the Respondents**

<table>
<thead>
<tr>
<th>Percent Distribution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>64%</td>
<td>Informal employment</td>
</tr>
<tr>
<td>31%</td>
<td>self-employed</td>
</tr>
<tr>
<td>5%</td>
<td>formally employed</td>
</tr>
</tbody>
</table>

*Source: Field Survey, 2015*

b) **Socio-economic Impact of Proposed Industrial Park**

Over 78% of the respondents describe their current living conditions as good and satisfactory while 22% of the population feel their current living status is poor. This has mainly been attributed by majority of the residents being low-income earners living in the nearby Langas informal settlement. Out of the 22% of the population who feel that their current living status is poor, 60% are low income earners in self-employment running small-scale enterprises like shop keeping, sale of groceries, farming, and barbershops while 40% are employed as casual labourers (*bodaboda* operators, construction and jua kali workers etc.) within the neighbourhood.

Majority of the respondents (89%) argued that the industrial park project would improve their living conditions. Some of the envisioned benefits from the industrial park development to include business opportunities for the local traders such as supply of raw materials and food for the workers, market for finished industrial products, real
estate development especially housing to cater for the park employees and those working within the park. They also noted that the park would create employment opportunities for both skilled and semi-skilled labourers. Furthermore, the Langas estate residents were more optimistic that the park will trigger expansion and addition of basic infrastructure such as road network, storm water drainage and sewerage reticulation system to the estate hence making it more habitable.

On the other hand, 11% of the respondents felt that the industrial park project would not improve their living conditions. They argued that they were not sure if they would secure employment/job opportunities during and after construction of the park. This was attributed mainly by vices such corruption during employment, contractors employing non-residents, political interference/vested interests and lack of priority on the local labour during such projects.

Social and Economic Impact of the Proposed Industrial Park.

Over 93% of the respondents are of the opinion that the proposed EEIP will address the major economic challenges of this area of high levels of unemployment and poverty while 7% feel that their economic challenges will still be there. Cross tabulation of the data indicates that to eradicate the above challenges and ensuring economic benefits to the locals, out of the above 93%, 55% of the respondents recommended that locals be given priority in employment opportunities, 27% are of view that local businesses be promoted by buying raw materials from the locals while 18% recommend equity and equality in allocation of employment opportunities.

With the introduction of the proposed industrial park, 90% of the respondents predict an increase in population while 10% are convinced there will be no population influx during and after the construction and operation phase of the industrial park. Prediction in the increase in population in the area was mainly attributed to job opportunities the park will attract.

However, residents fear that as far as the industrial park will bring positive impacts to their lives and environment, an increase in population would lead to human/vehicular congestion, increase in rent due to high demand for housing, proliferation of informal settlements at the periphery or within the park, and insecurity. Moreover the living standards would shoot up due to better remuneration.

c) Environmental Impacts of the proposed Industrial Park

Respondents mentioned land, air and water pollution as the major potential environmental impacts of the proposed development. Based on Chart 4 below, approximately 45% of the respondents mentioned air pollution as the major environmental challenge while 30% cited damage of landscape and biodiversity, 10% felt poor sanitation (liquid/solid waste management) would be a major environmental issue, 8% mentioned water pollution, 5% noise pollution and 2% soil erosion.
d) Mitigation of Negative Effects

In view of the potential impacts of the proposed industrial park, the respondents argued for mitigation of negative effects of the park activities. They noted that there should be sufficient safeguards to ensure environmental quality. Over 77% of the respondents felt that a well-planned industrial park integrated with greenery would improve air quality, health and well-being of the environment by reducing noise, recharging ground water hence preventing drying up of River Cherunya, preventing soil erosion, enabling flood attenuation through sustainable urban drainage systems, cooling and pollution-absorption functions of trees among others.

6.3.5: Prevalidation Workshop

On Thursday, 26th May 2016 the SEA team organized a 1-day Eldoret ICDC Industrial Park Strategic Environmental Assessment (SEA) Study prevalidation workshop for the Eldoret ICDC Industrial Park Master Plan On Block 15/1757, Eldoret Municipality at Sirikwa Hotel, Eldoret.

This forum was aimed at formally engaging various stakeholders from Uasin Gishu County to ascertain whether the environmental and socio-economic issues raised during our first Stakeholder workshop held on 1st September 2015, in relation to the Eldoret ICDC industrial park have been taken into consideration before final submission of the SEA Masterplan report to NEMA for approval.

Over 75 stakeholders attended the Strategic Environmental Assessment (SEA) study prevalidation workshop including officials from the Uasin Gishu county government and line Ministries (Trade, Industrialization, cooperatives, tourism & Wildlife Water, Energy, Environment & Natural Resources, Finance and Economic Planning), Local administration from Soy, Turbo, Moiben, Ainabkoi, Kapsaret, Kesses, Langas, Kapsare, Wareng Estate, Kipkaren, the county commissioner, official representatives from the ELDOWAS, NEMA, KAM, WRMA, KIRDI, KIE, KNCCI, Kenya Power, Youth and women groups resident associations among others - See appendix 8.
The main stakeholder main concerns touched on whether the Eldoret ICDC industrial park had provided for; various target groups such as the youth centres/facilities and the Jua kali sector, waste management, water & power supply strategies, security, fire and emergency responses, greenery and open spaces, river Cherunya conservation plan, corporate social responsibility, research and incubation to accommodate institutions specialized in industrial research and development and training young industrial ventures targeting entities such as the Kenya Industrial Research Development Institute (KIRDI), Moi University, Eldoret Polytechnic KAM among others.

From the plenary discussion it was indicated that all the above issues had been taken into consideration and various Park’s environmental and socio-economic negative effects had been provided with effective mitigative strategies under the environmental impacts and mitigation measures, environmental initiatives and strategies strategic environmental and social management plan (chapter 8,9 and 10 respectively) of the Draft SEA report.

Moreover, the master plan has also provided a monitoring and evaluation plans for the master plan and riparian (river Cherunya) reserve management plan as envisioned under the two fundamental construction phase and post-construction phase of the park. Monitoring and evaluation of this project essentially will be carried out at specific time intervals in order to keep track of the steps in the development process and also to monitor the public’s reaction and reception of the provided information.

Plate 8: Participants of the 1-day SEA study prevalidation workshop for the Eldoret ICDC Industrial Park Master Plan at Sirikwa Hotel, Eldoret.
CHAPTER SEVEN

ALTERNATIVE LAND USE OPTIONS TO THE INDUSTRIAL PARK

7.1: OVERVIEW

The Land use zoning for the Industrial park master plan was done after considering a number of suitability factors to meet the social, economic, environmental, cultural and even political aspirations of the respective planning jurisdictions. As a result, different land uses exist which range from residential, commercial, industrial, open spaces, transportation among others in a balanced manner that promotes sustainable development. The establishment of the proposed Eldoret ICDC Industrial Park (EIIP) conforms to this provision by actualizing the industrial development demands of the municipality besides meeting the flagship project proposals of the Kenya Vision 2030. Much as this development conforms to the zoning provisions of the land, there is need to widen the scope of potential alternative developments which may suffice particular needs other than the designated industrial use. Should there be justifications beyond reasonable doubt that an alternative project can be established on the land whose returns economically, environmentally and socially supersede those of industrial use, then a change of mind can be considered.

The SEA team identified six possible intervention options to which the land can be put to use. They include: The No Intervention Option (NIO), Agriculture Use Option (AUO), Commercial Development Option (CDO), Housing Development Option (HDO), Mixed Commercial and Housing Development Option and Eco-Industrial Park Option (EIPO). The likely environmental and socio-economic impacts of each option were assessed. The results are as reported descriptively and quantitatively as presented below:

7.2: THE NO INTERVENTION OPTION (NIO)

The proposed industrial park shall be on a 135-acre piece of land. Land is one of the finite natural resource on earth. Its optimal utilization is therefore one key factor to consider at all times. This option has the highest and most appealing environmentally and ecologically rewarding outputs. Nature shall thrive, both plant and animal on the site. Eventually, the site can end up creating a micro-climate in the urban set up, a peaceful park for the locals and promote carbon sequestration. However, if the value of the industrial land is compared to the no use option, this shall amount to massive wastage of valuable land. Based on the foregoing, the nil intervention option may not be the best use of the land.
7.3: AGRICULTURE USE OPTION

Kenya’s economy largely depends on the agricultural sector, which accounted for 24% of the GDP in 2003. About 75% of Kenyans owe their livelihood to agriculture. Other than agro-production, the sector boasts a comparatively wide range of manufacturing industries, with food processing being the largest single activity. About 66% of the manufacturing sector is agro based, owing to the country’s agricultural economy foundation. The agro-grain processing sub-sector is one of the leading and well-established industries and it includes major cereal foods such as maize, wheat, rice, sorghum, millet and barley among others.

Plate 9: Crop Agriculture Land use

Kenya being a food insecure country as it is evident by the perennial food shortages, it is important that both the national and county governments strategize on how to curb the situation. Eldoret has very conducive climatic conditions for agriculture besides being in an ecological zone suitable for maize production. It is based on this background that this project considered maize and beans production as a land use option for the 135 acres of land. On average, an acre of land can produce 45 bags of grain maize per acre if sufficient inputs are used. This translates to about 6,075 (90kg) bags of maize every harvest season valued at Ksh. 18,225 which is once in a year. Economically, this is not an expensive investment compared to any other land use like industrial. Ideally, it may cost about Kshs 30,000 per acre totaling to slightly above Kshs 4,050,000 worth of investment per season.

Source: Young Farmers’ Foundation, 2014

80
This output has the potential of contributing to the economy in a number of ways inter alia farmer earnings, transport sector, warehousing, preservation and the milling industries. Environmentally, this could be a sound way of utilizing the land for it does not have any ecological footprint for no paving is anticipated. No excavation of raw materials shall be done hence no serious negative impacts on the natural resources base. On the same note, besides the dust generated during land preparation and the little emissions by the land preparation and transporting vehicles during the harvest period, this practice has no known long-term negative impacts on the air quality.

However, if this land use option is compared to others like industrial and mixed use (commercial and residential), it will be noted that this is not the most optimal way to use the land. This land is zoned for industrial use and this translates to very high land values. As a result, much as this option has the potential to contribute to food security in a piecemeal way and has no huge negative environmental impacts, it is economically an unviable option for the land.

### 7.4: COMMERCIAL DEVELOPMENT OPTION (CDO)

This option will focus on developing the whole 135 acres of land for commercial purposes just like a satellite CBD to Eldoret Town. This option will optimize economic benefits in its entire decision making. Commercial development shall promote the economic development of the town by providing more space for doing business. One key factor to consider is the socio-economic impact of this option to both the locals and investors.

Currently, the CBD of Eldoret town is not fully utilized as it is evident by the presence of open and vacant land and low density commercial developments. As a result creating additional commercial development will lead to more underutilization of such land in the area and the bio-region. On the same note, the economic rate of return of commercial development is quite low when compared to that of industrial use. This is true if compared at different facets more so the value chain components of the same. Industrial functions have the ability to strongly support a number of economic entities ranging from agriculture, transportation, commercial, logistics, research and development. All these cannot be possible if the land is developed into a commercial center.
Housing has always been a basic human need. Developing countries, Kenya included, have encountered the perennial challenge of housing shortage, more so for the low and middle-income category of the population. Indeed, Eldoret has these challenges as well and if the option of a housing project is adopted, it will be handy in contributing to solving this problem. The housing shortage can be attributed to the high population influx and growth rate. The function of Eldoret town as the County headquarters has also attracted more people to the town. Given the limited land availability for urban development, 1-3 bedrooms high-rise housing units with associated social amenities will be preferred. Approximately 100 units per acre for 120 acres (12,000 units).

This option would thus call for the application of a change of user from the designated use of industrial to residential. When this option is compared with industrial use with respect to economic significance, a number of observations are apparent. For instance, housing development will have a limited impact on a number of development sectors as compared to industrial.

Whereas housing shall cater for shelter and social amenities in the area, this doesn’t impact significantly on the other facets of the value chain in development. Temporarily, housing shall promote the real estate industry, the building material sales, professionals (physical planners, architects, engineers, environmentalists etc.) only
from inception to occupancy. Other sectors likely to benefit are service providers like water, power and waste management. On the same note, housing stock can be boosted by densifying the old public housing and redeveloping Langas into a planned high rise residence. Environmentally, housing shall have very high stress on water demand which is already scarce in Eldoret municipality.

Industrial use on the other hand has a higher potential of impacting on the value chain aspects of development. For instance, whereas the option will promote the various professional, business and service provision elements of development, industrial use shall promote the entire range from agro-production, agroforestry, transport, manufacturing, logistics, professionals, research and development. This shall also promote production for export. This will earn foreign exchange in the short, medium and long term. The housing option cannot achieve this.

**Plate 11: Housing Development (Nyayo Estate)**


**7.6: MIXED COMMERCIAL AND HOUSING DEVELOPMENT OPTION**

An integrated use of the land to accommodate both commercial and residential is another possible option. This shall thus call for proportionate planning to cater for the two land use activities at the site. Two approaches are possible. One, since the land is already divided into two sections by the 30M KURA road, either side can be used for either of the functions above. On the other hand, an integrated mixed use can be arrived at by integrating the functions in the form of a mini town where the residential area has a form of a commercial district within. The impacts of the mixed development on the economic, social and environmental fronts shall remain as discussed above in the housing and commercial options.
Industrialization has been one of the major economic drivers since the industrial revolution era. As a result, less industrialized countries in the third world countries, Kenya included have struggled to thrive economically and competitively in the global trade. It is on this backdrop that Kenya established a number of industrial development flagship projects in the Kenya Vision 2030. Industrial use of the land is an approach to revitalizing the industrial sector that has been dwindling over time. In addition, industries focus on the public value rather than individual value. As a result, the common people stand to gain more. In addition, the investors and the country at large gains economically. The declining agricultural sector both nationally and in Uasin Gishu County has been mostly due to lack of market for the agricultural produce.

The industrial option has the potential to provide market for farm produce hence boost farmer confidence to increase production in a sustainable way. A number of industrial development options do exist to which the land can be put. For instance, the land can be used for a single major industrial investment like a mega agro-chemical industry, a mega textile or food processing industry. Much as these approaches are valid, a number of factors work against them such as investment diversification, raw material potential in the bioregion to support specialized mega industries and the economic security (both to the locals and investors). This suggests investment in a diversity of medium scale industries for the land.
7.8: QUANTITATIVE ANALYSIS OF THE ALTERNATIVE PLAN OPTIONS

To evaluate the alternatives, a scoring framework was developed as illustrated in Table 6 below. Using the criteria, professional judgment was then applied on each of the selected indicators. The rating of zero means the alternative plan in question has no -ve or +ve impact on the bio-physical or socio-economic environment. The rating of -ve 1 to - ve 2 reflects an overall negative impact on the bio-physical or socio-economic environment in growing intensity with -ve 1 representing minor negative impact while -ve 2 represents a significant negative impact. On the other hand, +ve 1 represents a minor positive impact while +ve 2 represents a significant positive impact on the bio-physical or socio-economic environment.

<table>
<thead>
<tr>
<th>Description</th>
<th>Rating</th>
<th>Rating</th>
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<td>Minor</td>
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<td>- +1</td>
</tr>
<tr>
<td>Significant</td>
<td>-2</td>
<td>+2</td>
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Using the matrix, scoring was done by the SEA Team through a round table discussion. The results are as presented in Table 7 below.

As indicated in Table 7 below, the qualitative and quantitative analysis show that in the first year (short run) of plan implementation, all the six options have an overall, negative impact on the bio-physical environment. However, when considering both the
bio-physical and socio-economic environment, the No Intervention Option (NIO) scored the least (-66) followed by the Agriculture Land Use Option (-16). The Industrial Park Option was leading with a score of 438 followed by the Mixed Commercial and Housing Development (421) as the second, Commercial Development as the third with a score of (382) and the Housing Development Option as the fourth with a score of 122. The Team therefore settled on the Industrial Park Land Use as the preferred land use for the 135 acres land.

Given the results of the analysis above, this master plan has opted for an Industrial Park with a number of light industries of varied characteristics in terms of produce, turn over and raw material demands. This employs a systems-approach involving an understanding of the quantities, as well as the physical and chemical characteristics, of materials and energy flowing in, within and out of the park, in addition to the regulatory, economic and managerial aspects of the park.

In order to achieve the highest level of benefits and sustainability, the study opted for an Eco-industrial park which is a community of manufacturing and service businesses seeking enhanced environmental and economic performance through collaboration in managing environmental and resource issues, including energy, water, and materials. This shall be an industrial system of planned materials and energy exchanges that seek to minimize energy and raw materials’ use, minimize waste generation, and build sustainable economic, ecological and social relationships. The proposed eco-industrial park is thus expected to integrate all the facets of a sustainably developed entity by ensuring that the economic, social and environmental factors are the guiding principles in the design, construction and management of the park.

The industrial park is expected to accommodate a range of industrial typologies mostly agro-based. These shall include the food processing industries, textile industries, agro-based industries and other logistical services. From this perspective, industry as a land use option for the park will most likely have a superior impact economically, socially and environmentally. Environmentally, the park shall employ some of the latest ecologically sensitive designs such as sustainable waste management (by applying the 3Rs), use of green energy and green infrastructure (parks/greenery, transportation conservation, solar power use) use of green architecture such as energy efficient buildings (day lighting, natural ventilations etc.), just to mention a few. Socio-economic significance shall cut across all the facets of the value chain from farmers, transport, logistics, manufacture, foreign exchange through exports, research and development, technology and entrepreneurship incubation and application.
Table 7: Evaluation Scores of Various Land Use Options

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<tr>
<th>INDICATORS</th>
<th>NIO</th>
<th>AUO</th>
<th>IPO</th>
<th>MCHD</th>
<th>CDO</th>
<th>HDO</th>
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<td>-1</td>
<td>-1</td>
<td>-1</td>
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<td>-14</td>
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<td>1</td>
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<td>-13</td>
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<td>-9</td>
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87
| Employment Creation Potential | 3   | 3   | 3   | 13  | 12  | 12  | 26  | 16  | 16  | 21  | 11  | 11  | 20  | 10  | 10  | 19  | 9   | 9   |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Human health                  | -2  | -2  | -2  | -6  | -6  | 11  | 21  | 21  | 10  | 23  | 23  | -10 | 22  | 22  | -10 | 22  | 22  |
| Social amenities              | -2  | -2  | -2  | 0   | 0   | 0   | 11  | 11  | 23  | 11  | 11  | 0   | 11  | 11  | -1  | 10  | 10  |
| Population increase           | 0   | 0   | 0   | 3   | 3   | 3   | 26  | 20  | 20  | 22  | 16  | 16  | 20  | 14  | 14  | 20  | 14  |
| Improved security             | -7  | -7  | -7  | 0   | 0   | 0   | 4   | 4   | 4   | 6   | 6   | 6   | 7   | 7   | 7   | 7   | 7   |
| Foreign direct investment potential | -4  | -4  | -4  | 0   | 0   | 0   | 20  | 20  | 20  | 17  | 17  | 17  | 17  | 17  | 17  | 16  | 16  |
| Increased value chain benefits | -2  | -2  | -2  | 3   | 3   | 3   | 17  | 17  | 17  | 14  | 14  | 14  | 14  | 14  | 14  | 13  | 13  |
| Sub-total Social Environment  | -14 | -14 | -14 | 13  | 12  | 12  | 104 | 109 | 109 | 113 | 98  | 98  | 68  | 95  | 95  | 64  | 91  |
| Total for both Bio-physical and social environment | -22 | -22 | -22 | -5  | -6  | -5  | 73  | 183 | 182 | 80  | 171 | 170 | 38  | 169 | 175 | 30  | 160 |
| OVERALL SCORES & RANKING      | -66 | -16 | 438 | 421 | 382 | 356 |
|                                | 6   | 5   | 1   | 2   | 3   | 4   |
Table 8: Weighted Potential Environmental Impacts of Implementing the Eldoret ICDC Industrial Park

<table>
<thead>
<tr>
<th>Plan Component</th>
<th>Biodiversity, Flora and Fauna</th>
<th>Land degradation</th>
<th>Water</th>
<th>Air</th>
<th>Climatic Factors (Temperature)</th>
<th>Landscape appearance</th>
<th>Increase in Concrete Surface</th>
<th>Noise and Vibrations</th>
<th>Conservation of green Spaces</th>
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<th>Completeness</th>
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| Plan                                  | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Grading of Drainage Channels          | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| Storm Water Drainage Plan             | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Solid Waste Management Plan           | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Power Distribution Plan               | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Telecommunication Infrastructure      | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gas and Steams                        | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fire Emergency                        | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Central Green Belt                    | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| Road Reserve and parking landscaping  | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 |
| 0                                     | -1| -1| -1| -1| -1| -1| -1| -1| -1| -1| -1| -1| -1| -1| -1| -1| -1| -1| -1| -1| -1|

90
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<th>Logistics operation</th>
<th>Incubation operation</th>
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Table 9: Weighted Potential Environmental Impacts of Implementing the Commercial Housing Option

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<th>Plan Components</th>
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<th>Land Degradation</th>
<th>Water</th>
<th>Air</th>
<th>Climatic Factors (Temperature)</th>
<th>Land Scape Appearance</th>
<th>Increase in Concrete Surface</th>
<th>Noise and Vibration</th>
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<th>Townscape</th>
<th>Complemen tarity</th>
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Table 10: Weighted Potential Environmental Impacts of Implementing the Commercial Option

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<th>Plan Components</th>
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<th>Land degradation</th>
<th>Water</th>
<th>Air</th>
<th>Climatic Factors (Temperature)</th>
<th>Land Scape appearance</th>
<th>Increase in Concrete Surface</th>
<th>Noise and Vibrations</th>
<th>Conservations of green Spaces</th>
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NEMA/SEA/5/2/044
|                        | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| Power Distribution Plan| - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Telecommunication Infrastructure| - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Gas and Steams| - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Fire Emergency| - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Central Green Belt| 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Road Reserve and parking landscaping| - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Commercial premises construction| - | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Commercial operation| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
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<th>Air</th>
<th>Climatic Factors (Temperature)</th>
<th>Land Scape appearance</th>
<th>Increase in Concrete Surface</th>
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Table 11: Potential Environmental Impacts of Implementing the Housing Only Option

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Table 12: Weighted Socio-Economic Impacts of Implementing the Eldoret ICDC Industrial Park

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<th>Human Health</th>
<th>Social amenities</th>
<th>Population</th>
<th>Improved security</th>
<th>Foreign Investment</th>
<th>Direct Benefits</th>
<th>Increased Value Chain Benefits</th>
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## Table 13: Weighted Socio-Economic Impacts of Implementing the Commercial-Housing Option

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<th>Plan Components</th>
<th>Employment</th>
<th>Human Health</th>
<th>Social Amenities</th>
<th>Population Increase</th>
<th>Improved Security</th>
<th>Foreign Investment</th>
<th>Direct Investment</th>
<th>Increased Value Chain Benefits</th>
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Table 16: Weighted Environmental Impacts of Implementing the Agriculture Land Use Option

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Table 17: Potential Socio-economic Impacts of Implementing the Agriculture Land Use Option

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Table 18: Weighted Environmental Impacts of the No Intervention Option

<table>
<thead>
<tr>
<th>Current Uses (Plan Components)</th>
<th>Biodiversity, Flora and Fauna</th>
<th>Land degradation (Soil)</th>
<th>Water Quality</th>
<th>Air Quality</th>
<th>Climatic Factors (Temperature)</th>
<th>Land Scape Appearance</th>
<th>Increase in Concrete surface</th>
<th>Noise and Vibration</th>
<th>Conservation of green spaces</th>
<th>Townscapary</th>
<th>Complementarity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S</td>
<td>M</td>
<td>L</td>
<td>S</td>
<td>M</td>
<td>L</td>
<td>S</td>
<td>M</td>
<td>L</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>Livestock grazing</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Encroachment for agriculture</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Encroachment for kiosks</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>Short-cut Road to Eldoret CBD</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Community playground</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Social meetings</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Solid waste disposal</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Squatter settlement</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Crime site</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total scores</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 19: Weighted Socio-economic Impacts of the No Intervention Option

<table>
<thead>
<tr>
<th>Current Uses</th>
<th>Employment Creation</th>
<th>Human Health</th>
<th>Social amenities</th>
<th>Population</th>
<th>Improved security</th>
<th>Foreign Investment</th>
<th>Direct Benefits</th>
<th>Increased Value Chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>S   M   L</td>
<td>S   M   L</td>
<td>S   M   L</td>
<td>S   M   L</td>
<td>S   M   L</td>
<td>S   M   L</td>
<td>S   M   L</td>
<td>S   M   L</td>
</tr>
<tr>
<td>Livestock grazing</td>
<td>1  1  1</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
</tr>
<tr>
<td>Encroachment for agriculture</td>
<td>1  1  1</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>-1  -1  -1</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
</tr>
<tr>
<td>Encroachment for kiosks</td>
<td>1  1  1</td>
<td>0  0  0</td>
<td>-2  -2  -2</td>
<td>2  2  2</td>
<td>-2  -2  -2</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
</tr>
<tr>
<td>Short-cut Road to Eldoret CBD</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
</tr>
<tr>
<td>Community play ground</td>
<td>0  0  0</td>
<td>1  1  1</td>
<td>1  1  1</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
</tr>
<tr>
<td>Social meetings</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
</tr>
<tr>
<td>Solid waste disposal</td>
<td>0  0  0</td>
<td>-1  -1  -1</td>
<td>-1  -1  -1</td>
<td>-1  -1  -1</td>
<td>0  0  0</td>
<td>-1  -1  -1</td>
<td>0  0  0</td>
<td>0  0  0</td>
</tr>
<tr>
<td>Squatter settlement</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>0  0  0</td>
<td>1  1  1</td>
<td>-2  -2  -2</td>
<td>-1  -1  -1</td>
<td>0  0  0</td>
<td>0  0  0</td>
</tr>
<tr>
<td><strong>Total scores</strong></td>
<td><strong>3  3  3</strong></td>
<td><strong>-2  -2  -2</strong></td>
<td><strong>-2  -2  -2</strong></td>
<td><strong>0  0  0</strong></td>
<td><strong>-7  -7  -7</strong></td>
<td><strong>-4  -4  -4</strong></td>
<td><strong>-2  -2  -2</strong></td>
<td><strong>-2  -2  -2</strong></td>
</tr>
</tbody>
</table>
CHAPTER EIGHT
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

8.1: APPROACH OF ANALYSIS

This chapter identifies, assesses and evaluates potential environmental and social impacts of implementing the EIIP Master Plan. Where possible, mitigation measures of the negative impacts and measures for enhancement of the positive impacts have been recommended. The impact assessment was carried out at two levels of proposals. The first being the infrastructure components of the master plan within the whole development site and the second being the land use clusters as summarized in the Table 20 below:

<table>
<thead>
<tr>
<th>Plan components</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Use Clusters</td>
<td>Industrial (Light and Light Heavy), Research and Incubation Cluster, Commercial Cluster, Service and Logistics Cluster</td>
</tr>
</tbody>
</table>

8.2: APPROACH OF ANALYSIS

Both qualitative and quantitative analysis of the identified impacts was undertaken. The analysis considered the nature of the impacts in terms of their probability of occurrence, spatial boundary, frequency, duration, intensity and reversibility using the criteria in Table 21 below.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial scale</td>
<td>Local</td>
</tr>
<tr>
<td>Duration</td>
<td>Short Term</td>
</tr>
<tr>
<td>Intensity</td>
<td>Low</td>
</tr>
<tr>
<td>Cumulative effects</td>
<td>None</td>
</tr>
<tr>
<td>Probability of occurrence</td>
<td>Improbable</td>
</tr>
<tr>
<td>Significance without mitigation</td>
<td>Low</td>
</tr>
<tr>
<td>Significance with mitigation</td>
<td>Low</td>
</tr>
</tbody>
</table>
8.3: IMPACTS IDENTIFICATION AND ANALYSIS

The study identified, predicted and evaluated impacts using standard methods of impact prediction and evaluation. A checklist of the Master Plan activities was made and scores assigned in an assessment matrix in order to make an objective assessment of how each planned activity would impact on the biophysical and social-economic environment parameters. The issues highlighted in the SEA principles and the public and stakeholders’ consultation results on their biophysical and socio-economic environment concerns were used as the parameters for impacts analysis. The scoring was done using professional expertise, brainstorming and consensus of the whole SEA study team. The pre-validation feedback of the public and stakeholders on the identified impacts and their magnitude was also sought and necessary adjustments made.

8.4: IMPACTS OF THE INDUSTRIAL PARK LAND USE CLUSTERS

Assessment of the bio-physical and socio-economic environment impacts of the different land use clusters can assist in refining the land budget for the different clusters. This means reconsidering whether more land should be allocated to the most beneficial cluster.

8.4.1: Positive impacts

Considering the bio-physical and socio-economic environment impacts of the four land use clusters, the commercial, logistics and incubation clusters have the least negative bio-physical environmental effects as indicated in Table 22 while the industrial (manufacturing) cluster has the highest negative effects. The negative impacts for the manufacturing cluster are mainly as a result of the high and continuous demand and use of water and generation of high volumes of waste water. In addition, air pollutants such as dust emissions are expected during construction and polluting gaseous emissions during the operation phases. The short-term negative impacts generated by the other clusters are offset by the positive impacts. In addition, with mitigation, the negative effects should be eliminated or reduced to acceptable levels. The net rating for socio-economic impacts is positive for all the clusters. This meets the desires of the stakeholders as expressed during the consultative meetings.

Table 22: Summary of the Bio-Physical and Socio-Economic Environment Impacts Analysis for the Four Land Use Clusters

<table>
<thead>
<tr>
<th>Land use cluster</th>
<th>Net Rating for Bio-Physical Environment</th>
<th>Net Rating for Socio-economic Environment</th>
<th>Overall Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial cluster</td>
<td>0</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Logistics cluster</td>
<td>0</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Incubation cluster</td>
<td>0</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Manufacturing cluster</td>
<td>-21</td>
<td>15</td>
<td>-6</td>
</tr>
</tbody>
</table>
As summarized in Table 23, and detailed in Table 25, the positive impacts under the bio-physical environment category includes complementarity with the surrounding environment, townscape, conservation of green spaces, landscape appearance and biological diversity.

Table 23: Summary of Impacts Analysis for Selected Environmental Parameters

<table>
<thead>
<tr>
<th>Parameter/Duration</th>
<th>S</th>
<th>M</th>
<th>L</th>
<th>Overall</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological diversity (Fauna and Flora)</td>
<td>-13</td>
<td>11</td>
<td>10</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Land degradation</td>
<td>-29</td>
<td>1</td>
<td>1</td>
<td>-27</td>
<td>11</td>
</tr>
<tr>
<td>Water quality</td>
<td>-6</td>
<td>2</td>
<td>2</td>
<td>-2</td>
<td>6</td>
</tr>
<tr>
<td>Air quality</td>
<td>-9</td>
<td>-1</td>
<td>-1</td>
<td>-11</td>
<td>8</td>
</tr>
<tr>
<td>Temperature increase and heat island effect</td>
<td>0</td>
<td>-2</td>
<td>-2</td>
<td>-4</td>
<td>7</td>
</tr>
<tr>
<td>Landscape appearance</td>
<td>-17</td>
<td>16</td>
<td>16</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>Increase in concrete surface</td>
<td>-7</td>
<td>-7</td>
<td>-7</td>
<td>-21</td>
<td>10</td>
</tr>
<tr>
<td>Noise and vibrations</td>
<td>-5</td>
<td>-5</td>
<td>-5</td>
<td>-15</td>
<td>9</td>
</tr>
<tr>
<td>Conservation of green spaces</td>
<td>11</td>
<td>15</td>
<td>15</td>
<td>41</td>
<td>3</td>
</tr>
<tr>
<td>Townscape</td>
<td>21</td>
<td>21</td>
<td>21</td>
<td>63</td>
<td>2</td>
</tr>
<tr>
<td>Complementarity with existing land uses</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>66</td>
<td>1</td>
</tr>
<tr>
<td>Sub-total Biophysical Environment</td>
<td>-31</td>
<td>74</td>
<td>73</td>
<td>116</td>
<td>-</td>
</tr>
</tbody>
</table>

| Socio-Economic Environment Impacts of Implementing the Industrial Park Option |
|-----------------|----|----|----|------|
| Employment Creation Potential | 26 | 16 | 16 | 58   | 3    |
| Human Health    | 11 | 21 | 21 | 53   | 4    |
| Social Amenities | 0  | 11 | 11 | 22   | 6    |
| Population Increase | 26 | 20 | 20 | 66   | 1    |
| Improved Security | 4  | 4  | 4  | 16   | 7    |
| Foreign Direct Investment Potential | 20 | 20 | 20 | 60   | 2    |
| Increased Value Chain Benefits | 17 | 17 | 17 | 51   | 5    |
| **Sub-total Socio-economic** | **104** | **109** | **109** | **322** | **-** |

Under the socio-economic category of impacts, all the assessed parameters reflect positive impacts. They include population increase/employment creation, high Direct Foreign Investment, increased value chain benefits, social amenities and improved security as summarized in Table 23, detailed in Table 26 and elaborated below.
a.) Population/employment creation

Unlike other industrial parks which may have isolated locations for different functions, implementation of the EIIP-Master Plan that has the industrial, commercial, logistics, innovations premise and green spaces at the same site will attract many people hence increase the population at the site and also provide for their different needs all in one location. This increases efficiency of operation for those who work in the park. The highest socio-economic impact of the industrial park option is population increase which, for this analysis, has been classified as positive because the increased population will provide both labour and market for the products produced in the different industries. Increased population in the area will also create demand for housing and other basic services. This will be beneficial for those investing in the housing sector and providing other goods and services.

The literature review and key informant interviews undertaken revealed that the agriculture sector in Uasin Gishu County is not performing well because of various reasons that include lack of market. In addition, there is unemployment rate of 46%. Investment in agro-based light heavy industries and light industries will generate many jobs within the industrial park and also along the value chain of the specific preferred enterprises. The industries will provide a market for agricultural produce from within the county and beyond. This will in turn stimulate increased production of commodities and create more jobs downstream particularly in the county and the western Kenya region as a whole. Some of the processed agricultural products will be exported hence generate foreign exchange for the country. In addition, the commercial cluster, services and logistics cluster and the innovations cluster will also generate jobs and training opportunities for many people. Short term benefits will be mainly from the construction phase of all the clusters. These activities will lead to an overall significant positive impact on the socio-economic category of the SEA in the short, medium and long term as indicated in Table 26.

b.) Landscape

The current landscape at the site is plain and very un-attractive. Construction of the planned developments together with the greening and grading of the land will make the site more interesting, appealing and aesthetically attractive resulting in a significant positive impact. This will apply to all the proposed four clusters as indicated on the EIIP Master Plan artistic visual impression on the title page.

c.) Bio-Diversity

The current bio-diversity status of the site is very low on both fauna and flora. The EIIP Master Plan has an elaborate greening and bio-diversity enhancing plan that will ensure deliberate increase in the indigenous and exotic plant species. After construction has been completed which is anticipated to happen mainly during the short term period, the greening and landscaping phase will greatly increase the species of mainly indigenous ornamental trees, shrubs, flowers and other herbaceous plants. Once grown
during the medium and long term periods, these are in turn expected to attract numerous species of birds, insects, and other invertebrates. Since it will not result in a forest like ecosystem, the overall change is classified as minor positive as indicated in Table 25.

8.4.2: **Negative Impacts**

Considering the parameters in the bio-physical environment category, land will be the most impacted negatively by all the four land use clusters. This is because construction will change the land surface permanently to concrete. This is followed by increased demand for water again by all the four land use clusters. The manufacturing cluster will however require more water than the other three clusters during the short, medium and long term time frames. Manufacturing will also affect the air quality from gaseous emissions during all the three time frames. As detailed in Table 25, the manufacturing cluster is expected to generate noise and excessive vibrations when compared to the other three clusters. The overall negative impacts in this category are land degradation, increase in concrete surface, noise and excessive vibrations, air quality, temperature increase and water quality as indicated in Table 23.

a) **Land (Soil)**

During the construction phase, there will be enormous soil movement, excavating mainly for construction of foundations for buildings. This will cause much disturbance to the top layer soil structure at the site. In addition, the heavy machines are likely to cause enormous compaction of the land. This interferes with the soil structure. However, once the construction phase is over, there will be little interference with the soil. This explains the classification of neutral impacts for all the five clusters during the medium and long-term period.

**Mitigation**

- Ensure only sites required for buildings are excavated
- Use the excavated soil within the park for landscaping so that the park does not suffer a net soil loss.
- The remaining un-excavated land should be managed in such a way that it can allow maximum rain water percolation so that the Cherunuya stream Plates 7 & 8 originating from the lowest point of the park will continue with minimum interference and also the ground water recharge will not be significantly affected.

b) **Water Quality and Quantity**

Currently, Eldoret town has a net scarcity of water. Development of the EIIP Master Plan will require huge volumes of water. This will add to the already existing water stress. During the short term period when construction is being undertaken, a lot of water will be used in the construction phase for all the clusters. Once operational, more water will be required particularly for use in
the industries. This will in-turn generate much waste water that may finally end up in the sewer, again adding strain on the waste water utility services. This is a process that will continue for as long as the industries are operational, suggesting a permanent water supply stress and a waste water management strain. The other four clusters (light industries, logistics, commercial and innovations components) will be using some water and also generating waste water but this will be in limited volumes. This explains the classification of the impacts as significant negative for the short, medium and long term for industries and minor negative for the other clusters as indicated in Table 25.

Mitigation

- Ensure efficient water utilization by all users in the park.
- Ensure rain water harvesting from all buildings by the plot owners within the Industrial Park.
- Ensure efficient management of the generated waste water particularly onsite treatment before releasing into the sewer system.
- Promote re-use of waste water especially for purposes like irrigation of plants and the green spaces within the park.

c) Air quality

Industries are known to generate air pollutants. During the construction phase of the industrial park, there will be generation of dust from the earth works. However, during the operation phase – medium to long term, there will be continuous generation of air pollutants particularly from the industrial clusters. Severity of the pollution is expected to increase as more industries become operational. The volume of emissions may stabilize once all the desired industries are constructed. This explains the classification of minor negative impacts during the short and medium term and significant negative impacts for the long-term operation phase.

Mitigation

- During construction phase water can be used to minimize the dust particles in the air.
- All the EMCA of 1999 recommendations and regulations for air quality control should be complied with by the industries and other park investors.
- Monitoring of air quality should be done on regular basis to ensure adherence to the standards.

d) Human Health

As a result of the industries using machines, there is likely to be noise and high vibrations from the machines in the industries. The traffic within the park and the nearby Kisumu road will also generate noise. These, if they exceed the recommended levels can be harmful to human health. In addition, diseases can also arise from air pollution and excessive exposure to electromagnetic
radiation. This is likely to come from any of the clusters depending on the type of activities undertaken.

Mitigation

— All the recommendations for sound and vibrations levels should be complied with by contractors and the industries.
— Monitoring should be done on regular basis to ensure adherence to the sound level standards.

e) Bio-diversity

During the construction phase, there will be complete clearing of the land for construction purposes. This means that the plant species on the ground will be removed. This will further affect the current bio-diversity level.

Mitigation

— There will be a deliberate increase in the number of plant species during landscaping and greening of the park
— When re-vegetating any of the cleared areas, indigenous plants will be considered first before exotic ones are taken up.

f) Climatic factors

As a result of constructing many buildings, and a large area of concrete surface, the urban heat island effect is likely to be experienced in the park. In addition, the wind flow will be affected because of the height of the same buildings. This is likely to increase the humidity and the temperature too.

Mitigation

— All possible spaces available for plants will be planted with trees, shrubs, flowers and other suitable vegetation to ensure that there is sufficient vegetation cover in the park.

Table 24: Scheme for Scoring and Weighting

<table>
<thead>
<tr>
<th>Score Key</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Effect</td>
<td>No</td>
<td>Score</td>
<td>Uncertain</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Where more than one symbol is presented in a box it indicates that the SEA has found more than one score for the category
- Where the scores are both positive and negative, the boxes are deliberately not colored.
- Where a box is colored but also contains a question mark, this indicates uncertainty over whether the effect could be a minor or significant effect although a professional judgment is expressed.

A conclusion of uncertainty arises where there is insufficient evidence for expert judgment to conclude an effect.

<table>
<thead>
<tr>
<th>S</th>
<th>Short Term (0-12 months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Medium ( &gt; 12 Months &lt; 5 Years)</td>
</tr>
<tr>
<td>L</td>
<td>Long - Term ( &gt; 5 years)</td>
</tr>
</tbody>
</table>
Table 25: Weighted Potential Environmental Impacts of Implementing the Eldoret ICDC Industrial Park

<table>
<thead>
<tr>
<th>Plan Components</th>
<th>Biodiversity, Flora and Fauna</th>
<th>Land degradation</th>
<th>Water</th>
<th>Air</th>
<th>Climatic Factors (Temperature)</th>
<th>Land Scape appearance</th>
<th>Increase in Concrete Surface</th>
<th>Noise and Vibration</th>
<th>Conservatio n of green Spaces</th>
<th>Townscape</th>
<th>Complementarity</th>
</tr>
</thead>
</table>

- Roads
- Parking plan
- Pedestrian circulation
- External street lighting
- Water Reticulation Network
- Waste Water Management Plan
- Site Grading
- Grading of roads
- Grading of Green Spaces
- Grading of Drainage Channels
<table>
<thead>
<tr>
<th>Project</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storm Water Drainage Plan</td>
<td>11</td>
</tr>
<tr>
<td>Solid Waste Management Plan</td>
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<td>Telecommunication Infrastructure</td>
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<td>Gas and Steam</td>
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<tr>
<td>Fire Emergency</td>
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</tr>
<tr>
<td>Central Green Belt</td>
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</tr>
<tr>
<td>Road Reserve and parking landscaping</td>
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</tr>
<tr>
<td>Manufacturing</td>
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<tr>
<td>Commercial operation</td>
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<td>Logistics operation</td>
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<td>Incubation operation</td>
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<tr>
<td><strong>Total Scores</strong></td>
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Table 26: Weighted Socio-Economic Impacts of Implementing the Eldoret ICDC Industrial Park

<table>
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<tr>
<th>Plan Components</th>
<th>Employment</th>
<th>Human Health</th>
<th>Social Amenities</th>
<th>Population Increase</th>
<th>Improved Security</th>
<th>Foreign Direct Investment</th>
<th>Increased Value Chain Benefits</th>
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<td><strong>Duration</strong></td>
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<td>S M L</td>
<td>S M L</td>
<td>S M L</td>
<td>S M L</td>
<td>S M L</td>
<td>S M L</td>
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<td>1 1 1</td>
<td>1 1 1</td>
<td>1 1 1</td>
<td>1 1 1</td>
</tr>
<tr>
<td>Parking Plan</td>
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<td>0 0 0</td>
<td>1 1 1</td>
<td>1 1 1</td>
<td>1 1 1</td>
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</tr>
<tr>
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<td>1 1 1</td>
</tr>
<tr>
<td>External Street Lighting</td>
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<td>0 2 2</td>
<td>1 1 1</td>
<td>2 2 2</td>
<td>0 0 0</td>
<td>0 0 0</td>
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<tr>
<td>Water Reticulation Network</td>
<td>1 0 0</td>
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<td>0 0 0</td>
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<td>1 1 1</td>
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<td>Waste Water Management Plan</td>
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</tr>
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</tr>
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<td>0</td>
<td>-1</td>
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<td>1</td>
<td>-1</td>
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<tr>
<td>Central Green Belt</td>
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</tr>
<tr>
<td>Road Reserve and parking landscaping</td>
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<td>0</td>
<td>-1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Manufacturing</td>
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<td>2</td>
<td>-2</td>
<td>-2</td>
<td>-2</td>
<td>0</td>
</tr>
<tr>
<td>Commercial operation</td>
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<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Logistics operation</td>
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<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>Incubation operation</td>
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<td>16</td>
<td>-12</td>
<td>20</td>
<td>20</td>
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</tr>
</tbody>
</table>
8.5: IMPACTS OF IMPLEMENTING THE INDUSTRIAL PARK INFRASTRUCTURE

The Industrial Park Master Plan has proposed to install a number of infrastructure like roads, power line, water supply and sewerage among others. These infrastructures have a number of effects socially, economically and environmentally. The SEA study has examined their impacts broadly presented as positive and negative effects as summarized in Table 27 below.

Table 27: Positive impacts of implementing the Industrial Park Infrastructure

<table>
<thead>
<tr>
<th>Infrastructure Type</th>
<th>Positive Impacts</th>
</tr>
</thead>
</table>
| Roads Network                           | • Increased storm water harvesting from the road surface during the medium and long term period.  
  • Improved landscape after road construction during the medium and long-term period.  
  • Improved road network to Eldoret CBD for the communities neighboring the Industrial Park.  
  • There will be job creation during the roads construction phase.                                                                                                                                                                                                                     |
| Parking Plan                            | • Increased surface storm water harvesting during the medium and long term period.  
  • Increased landscape beauty during the medium and long term period.  
  • Improved air quality due to the increased vegetative cover in the parking plan.  
  • There will be increased job creation during the construction phase in the short term.                                                                                                                                                                                                  |
| Pedestrian Circulation                  | • All the pedestrian routes will be lined by shade trees, ornamentals/flower beds and lawns of diverse plant species hence will improve the bio-diversity of the Industrial Park for the medium and long-term period.  
  • Provision of seat walls and benches along the routes will be beneficial for the health of the Industrial Park community – i.e. workers and visitors.  
  • The proposed attractive views by use of vegetation, landscape features such as water bodies, monuments and arts along the routes will enhance the aesthetic value of the Industrial Park for the medium and long-term period.  
  • Promotion of the walking culture by providing extensive pedestrian routes is good from the health point of view.  
  • During construction phase (short term) of the pedestrian routes, numerous jobs will be created.                                                                                                                                                                               |
| External Street Lighting                | • Improved street lighting will greatly improve security during the night. This will contribute to the safety hence health of those using the roads and the green spaces in the Industrial Park.                                                                                                                        |
| Water Reticulation Network              | • Water supply to an area that has not been having water will contribute to good health of the Industrial Park Population.  
  • Neighboring communities are likely to draw clean water from the Industrial Park.                                                                                                                                                                                                      |
| Waste Water Management Plan             | • Effective management of waste water generated in the Industrial Park will result in improved health for the park community.  
  • Improved waste water quality will enhance water supply for landscape irrigation for the medium and long term hence reduce demand for clean water.  
  • Recycling of the grey waste water during the medium and long-term period will result in reduced fresh water utilization hence increased water use efficiency.  
  • Job creation will be realized for those who will handle the waste water treatment at the individual plot level, stabilization ponds level and general maintenance of the waste water network.  
  • The gravity flowing sewer system will not use any energy hence will contribute to energy resource conservation in the medium and long-term period.                                                                                   |
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Grading Plan</td>
<td>This will result in a desirable and aesthetically attractive landscape for the whole park that will increase working comfort of the Industrial Park workers.</td>
</tr>
<tr>
<td>Grading of Roads</td>
<td>This will minimize loss of soil through erosion hence no gullies will form. Gullies can cause accidents to both humans, bicycles, motorcycles and vehicles. Grading will therefore minimize accidents and enhance good health. Grading will increase percolation of storm water and contribute to increased recharge of the underground water. This is desirable to maintain water flow to Cherunya stream.</td>
</tr>
<tr>
<td>Grading of Individual Plots</td>
<td>This will improve the aesthetic value of the individual plot landscape and contribute to increased comfort of the Industrial Park workers. Grading will also be used to create a desired slope for storm water flow within the plot to minimize presence of stagnant water in the plots that could easily become breeding grounds for mosquitoes and other disease carrying vectors.</td>
</tr>
<tr>
<td>Grading of Green Spaces</td>
<td>Grading of the green spaces for example for restaurants, toilets, sports pitches and pedestrian walkways is beneficial for the health of the Industrial Park users.</td>
</tr>
<tr>
<td>Grading of Drainage Channels</td>
<td>The bio-swales that will be used to collect and drain storm water in areas of gradient less than 2% will enhance percolation/infiltration of storm water hence recharging of the underground water.</td>
</tr>
<tr>
<td>Storm Water Drainage Plan</td>
<td>Roof catchment and re-use of rain-water at plot level will reduce the amount of surface run-off hence the management burden of storm water. Use of porous paving in the open spaces and bio-swales in places with suitable gradient (2%) will reduce surface run-off and promote percolation and recharge of ground water. Recycling of storm water through bio-swales, water detention ponds and infiltration strips will greatly improve the underground water recharge. Offsite storm water will be intercepted and re-directed using off-site cut off drains to the stream. This will enhance water availability for downstream water users and minimize the risk of flooding at the Industrial Park site.</td>
</tr>
<tr>
<td>Solid Waste Plan</td>
<td>In the long-term time frame, the planned energy generation from the bio-degradable solid waste will generate revenue, reduce consumption of the conventional energy forms, reduce on the need for land fill space and transportation of waste to landfills – this will lead to an overall saving on energy.</td>
</tr>
<tr>
<td>Power Distribution Plan</td>
<td>The underground network will ensure establishment of a safer and aesthetically more appealing distribution of the power. Additional power supply from solar and biomass (renewable energy) will conserve on conventional energy sources hence save on energy.</td>
</tr>
<tr>
<td>Telecommunication</td>
<td>The Optical Fiber Cable Technology that will be used for telecommunication provides high levels of bandwidth and is cheaper to set up compared to the traditional copper cable communication. This will enhance more and faster communication making the investments vibrant and economically beneficial.</td>
</tr>
<tr>
<td>Gas and Steams</td>
<td>Steam from the renewable biomass energy will contribute to conservation of energy from conventional sources giving a net energy saving and efficiency.</td>
</tr>
<tr>
<td>Central Green Belt</td>
<td>The central green belt will facilitate social interactions between the different groups and individuals in the park. It will act as the lungs of the Industrial Park providing fresh air, enhanced biodiversity as a result of the many species of plants planted in it and also beauty. The green belt will also greatly improve percolation of storm water for underground water recharge.</td>
</tr>
<tr>
<td>Road Reserve and Parking Landscaping</td>
<td>The road reserve will be lined with shade trees, shrubs, flowers and other green plants. This will make use of the roads attractive, because there will be shade all along. The vegetation will also sequester some of the gases generated hence contribute to cleaning the air. This is good for the health of all those working in the park environment.</td>
</tr>
</tbody>
</table>
Table 28: Negative impacts of implementing the Industrial Park Infrastructure and the mitigation measures

<table>
<thead>
<tr>
<th>INFRASTRUCTURE TYPE</th>
<th>NEGATIVE IMPACTS</th>
<th>MITIGATION MEASURES</th>
</tr>
</thead>
</table>
| Transport Infrastructure | • Vegetation will be cleared during construction of the transport infrastructure in the short term and this will reduce the bio-diversity in the industrial park  
• A lot of soil will be excavated to give way for roads, parking and footpaths. | • Once construction is over, during landscaping of the roads, footpaths, parking, and all the green spaces will be replanted with diverse indigenous plants. Some exotic species may also be included where the indigenous equivalent of a desired species is not available.  
• The excavated soil shall be used within the park in the landscaping to ensure that the park has no net soil loss. |
| Concrete | • Temperatures will be high as a result of the increased concrete road and parking surface. | • The landscaping will ensure as many trees, shrubs and other vegetation as possible are planted to mitigate for the high temperatures. |
| Water demand | • There will be increased water demand and use during the road construction phase in the short term. | • Ensure efficient utilization of water during all the phases. |
| Waste Water Management Plan | • The increased discharge of waste water into the sewer increases the waste water management load | • Ensure efficient utilization of the fresh water to minimize waste water generation.  
• Ensure recycling of waste water to minimize the use of fresh water for irrigation. |
| Solid Waste Plan | • The incineration plan will increase pollutants that will affect the air quality | • The enhanced vegetation cover will help in cleaning the air. |
| Fire Emergency | • Possibilities of fire accidents due to electrical faults, gas leaks and other sources | • Fire safety management strategies will be adopted.  
• Ensure compliance to Occupational Safety and Health Act of 2007 at all times  
• Ensure clearly labeled fire assembly points for every plot to minimize confusion in case of a fire outbreak. |
CHAPTER NINE
ENVIRONMENTAL INITIATIVES AND STRATEGIES

9.1: OVERVIEW
The proposed industrial park development is envisaged to have potential impacts on the project site and the bioregion. Key anticipated impacts are environmental in nature, which call for adequate, and effective/appropriate mitigation measures if sustainable industrial activities are to be achieved in the long run. Thus, this section details out the strategic environmental initiatives and strategies adopted by the master plan. Generally, the proposed industrial park master plan has employed various environmental conservation measures guided by the legal regulatory frameworks and its six overarching principles.

9.2: MASTER PLAN ENVIRONMENTAL STRATEGIES
9.2.1: Dynamics in Land Use
The location of the park in question is in a zone designated purely for industrial use. This presents a challenge of sustainability in developments and functions since no particular land use can thrive as an island. Based on land use integration, the park has adopted a mixed-use approach as opposed to exclusive zoning. The land disposition applied provides for other compatible land uses meant to complement the industrial function. This promotes a system that is balanced and self-sustaining in terms of operations and service provision. The model provides for non-industrial activities ranging from the research and incubation, commercial functions, by-product and waste management.

Through industrial clustering, the land use plan has co-located industries that have similar functional needs and characteristics like service demand, energy and water consumption, traffic type, level and type of pollution among others. This approach is quite convenient in the management of environmental impacts for it promotes pollution containment as opposed to pollution dispersal.

The land use structure has considered sustainability of the environment by majorly looking at the issue of land carrying capacity. This is in consideration that industrial developments tend to have higher potential for ecological destruction whether through overexploitation of raw materials or exceeding the ability of the land to support the industrialization activities proposed. The land distribution on the park does not compromise the ability of the land to support the activities now and in the future.

Moreover, the green belt concept adopted as the overriding theme of the park is geared towards environmental health of the park. The land use plan has promoted, to a higher degree, landscaping that employs green infrastructure towards conservation. Concepts like bio-swales, permeable paving, green buffers,
xeriscaping among others are all aimed at promoting conservation and protection of the underground water systems.

9.2.2: Transport and Parking Strategy
For safety and environmental concerns, the park’s transport system has provided a separate motorized transport and non-motorized transport lanes. Safe, clearly marked and convenient pedestrian walkways and cycle lanes have been provided between buildings, at building entrances and within parking areas. All pedestrian walkways have also been well defined by responsive landscaping such as decorative pavement, low walls, and low-level lighting.

The circulation system of the park is designed to reduce conflicts between vehicular and pedestrian traffic, to provide adequate maneuvering and stacking areas, and makes consideration for emergency vehicle access and security gating systems. To minimize on traffic nuisance effects such as noise and vibration, heavy commercial vehicles will access the park through the northern entrance and exit the park through the same. In particular, the residential properties on the eastern side of the park will be protected from such excessive noise and vibrations from industrial traffic given that the road is not in close proximity to the residential estates.

The parking model proposed for the industrial park is a hybrid of on-site, centralized and on-street parking. Centralized parking will be centrally located such that indiscriminate parking will not occur on internal roads or on roads adjacent to the development. The centralized parking has been provided on each block to avoid parking sprawling on among other pavements. The industrial prototypes provide a minimum of three on-site parking lots per plot. Moreover, there shall be flexibility of the delivery yards located within the industrial plots where periodic delivery allows the yards to be converted into parking spaces after delivery.

On-street parking will be along the 30m KURA -1 access road cutting across the site and the other roads by which the site is bound. Heavy commercial vehicles shall not be catered for under this category of parking. These parking spaces shall be subject to the standards adopted by the County Government and shall be regulated by the same. This means that these parking spaces will not be under the control of the industrial park management and fees may be levied accordingly on the users by the County Government of Uasin Gishu. These parking spaces will help ease the parking demand expected in the park.

A minimum of 1.5 m pedestrian trail parallels the length of all the internal roadway circulation system from both sides. Other pedestrian linkages are provided to all other spaces that are restricted to motorized traffic. The plan proposes a direct pedestrian linkage to Kisumu Road through the western edge. All pedestrian walkways are accessible, safe, visually attractive, and well defined by responsive landscaping such as decorative pavement, low walls, and low-level lighting.
Pedestrian access points between parking areas, and activity centers will be clearly marked to provide safe access and designed with aesthetics in mind. Lighting is also to be provided to facilitate pedestrian movement.

Plate 13: Transport Infrastructure

9.2.3: Circulation Management Strategy
An efficient logistical system reduces load clearance time and costs of production. The main mode of transport within the Industrial park will be road based. Given the varied types of traffic anticipated within the project area, a central transport surveillance office has been proposed. The main objective of the office shall be to monitor the efficiency of transportation within the park and develop sustainable management measures. This will ensure efficient transportation, time and vehicle operation cost reductions that will increase profitability for the transporters. This will preferably be placed at the main entrance, which is situated on the northern boundary of the Park. This will ensure that all logistics can be controlled before they can enter the site.

All roadways proposed within the industrial park are two lanes (one in each direction). The circulation system is designed to reduce conflicts between vehicular and pedestrian traffic, to provide adequate maneuvering and stacking areas, and makes consideration for emergency vehicle access and security gating systems. Sufficient lane width is required for heavy commercial vehicles, so that they are separated from opposing traffic on two-lane roads. The total heavy vehicle width including mirrors is nearly 3.0 metres. After allowing for the effects of pavement cross fall, leaning or swaying of the truck body and potentially untrue tracking of trailer trains, a design envelope of up to 3.5 metres wide was adopted as the minimum lane width on two-lane, two-way roads.
The projected types of traffic likely to access the site include: passenger vehicles; delivery/collection vehicles – both heavy and light commercial vehicles; service vehicles; taxis; emergency vehicles; pedestrians; and heavy commercial industrial traffic. These include trucks that will be making deliveries or picking up products from restaurants, manufacturing facilities, warehouses, office buildings, and even commercial entities within the park. Heavy commercial vehicles will access the park through the northern entrance and exit the park through the same. This is a planning effort to mitigate nuisance effects (e.g. noise and vibration) associated with such traffic. In particular, the residential properties on the eastern side of the park will be protected from such excessive noise and vibrations from industrial traffic given that the road is not in close proximity to the residential estates. A typical illustration of circulation of the heavy traffic is as shown in Figure 14.

Light vehicles that are non-industrial will enter and exit the park via both entrances but will be highly encouraged to use the southern entry/exit. Traffic using the southern entry/exit will transition from the Eldoret-Kisumu Road to join the Industrial park through the KURA -1 access road at the southern part of the park. The control of traffic on this road will also help minimize traffic related impacts in the residential neighborhood where it passes. Traffic signs shall be erected to discourage truck-related traffic within this road.

Figure 14: Circulation of Heavy Commercial Vehicle
9.2.4: Water Management Strategy

Water provision in Eldoret and its environs is under the jurisdiction of the Eldoret Water and Sanitation Company (ELDOWAS) and Lake Victoria North Water Service Board. Water and specifically quality water is paramount to the operation of the Industrial Park. Three water sources; rain, borehole (groundwater) and public piped ELDOWAS water supply have been considered as the potential sources of water for the Industrial Park.

Water supply is normally designed for the ultimate demand. However, following the proposal for phasing of the implementation, the design has also been examined using the initial (5 years) and the future (10 years) demand projections. Emergency firefighting facility demands have not been considered for the demand but have been provided in the supply system capacity design.

Based on the proposed project phasing, the initial phase form about 1.9% of ELDOWAS capacity of 36,000 m³/day supply. This demand will add to the 10,000 m³/day deficit currently experienced by ELDOWAS. A combination of rainwater, boreholes and public piped water from ELDOWAS has therefore been considered for possible water sources for the Park. The completion of the proposed Kapseret water treatment plant will increase the ELDOWAS capacity by about 10,000 m³/day.
The initial and future phases can be serviced by a combination of public pipe water and underground water. Detailed investigation on viability of underground water would ascertain the quantity and quality. In addition, investigations on direct abstraction from surface sources within the project catchment area forms the most sustainable alternative water source for the forecasted ultimate water demand. Allowance has been made for later integration with the surface water reticulation line. Provision for an on-site portable water treatment plant is allowed for at the proposed pressure tank location to an average of 0.5-acre space.

9.2.5: Wastewater Management Strategy

Industrial operations will lead to the generation of industrial wastewater. It is a requirement by ELDOWAS that the park treats its wastewater before discharging into the municipal sewer line. As a result, waste treatment plant has been allocated about 2.5 Acres of land on the lots indicated on the land use plan.

Due to water scarcity in Eldoret, measures to design the industrial park to reuse and recycle water supplies in a cascading fashion became very significant. The type of wastewater in the park will fall into three categories; gray water, black water, and industrial wastewater. Using this classification, opportunities for water reuse were identified and the water flows could be mapped. It is assumed that the park will need to draw some water from the reservoir or tap; however, this will be kept to a minimum through site design and water cascading.

The park is envisaged to have three wastewater types that will include grey water, black water and industrial wastewater. Grey water shall undergo recycling at the plot level. The grey water networks are limited within each plot based on the industrial prototype. The probable uses for the treated gray water include; landscape irrigation, toilet flushing, and selective equipment/vehicle cleaning among others. The neutralized wastewater shall then be channeled to the Central Effluent treatment plant for further treatment before discharge into the ELDOWAS main lines located along the southern boundary (see figure 34). The industrial wastewater and backwater shall be treated to conform to the EMCA (Water Quality) Regulations 2006 (Schedule 13 on Standards for Effluent Discharge into Public Sewers) and any other standards prescribed by ELDOWAS.

The method selected for wastewater treatment at the Central Effluent Treatment Plant is the use of simple, low cost, low maintenance and efficient Waste Stabilization Ponds (WSP). Inlets of the ponds will discharge well below the liquid level so as to minimize short-circuiting. The outlet will provide a scum guard and the outfall at the end will discharge into a simple notch flow measuring. The pond shall be fenced by a masonry wall with an operation office provided at the outlet end with the following facilities: - offices, equipped laboratory, car park, wash basin and toilets, storage space for clothing and equipment
Though the wastewater will eventually be discharged into public sewer system, the waste stabilization ponds have been designed to meet the following standards: BOD5 at 20°C = 50 mg/l; Suspended solids = 30 mg/l; Coliform = 1,000 per 100 ml as per WHO standards for BOD5 and Coliform count.

The waste stabilization ponds comprise of two parallel systems of a facultative pond and maturation ponds in series. This will allow for project phasing of construction and continued operations during maintenance. All ponds will be lined to prevent seepage into the nearby ground and surface water system.

a. **Pre-treatment (Screens):** - Pre-treatment of the influent will be at the inlet works and will comprise of removal of suspended waste and grit. The system will comprise screening bars and a rapid settling chamber.

b. **Anaerobic pond:** - Though the use of anaerobic ponds reduces the overall WSP overall area, compromise was made for slightly larger area and elimination of odour associated with anaerobic ponds.

c. **Facultative Pond:** - The ponds are designed for 1.5 m depth to avoid anaerobic conditions throughout. The ponds will have a total sewage detention time of 10 days to allow bio-digestion of the influent BOD by about 70%. The facultative ponds cover an area of 6,000 m².

d. **Maturation Pond:** - The maturation ponds are 1.5 m deep with combined detention time of 7 days for each series of 3 ponds.

### 9.2.6: Storm Water Management Strategy

A number of interventions shall be applied to storm water management; they are intended to reduce the amount of surface run-off. The interventions are: roof catchment and re-use of rain water at plot level, use of porous paving in the open spaces to reduce surface runoff and promote percolation, use of bio-swales in places with suitable gradient; bio-swales slow the rates of flow of storm water, promoting percolation in the process, use of retention ponds to promote percolation and recharging of the underground water table, creating green roofs which slow surface run off, consequently improving the chances of percolation and evaporation of storm water. These are highlighted below:

- The guidelines adopted include: Surface run-off coefficient (C): 0.90 paved and 0.50 grassed; Average annual rainfall: 1000mm; Rainfall intensity (I): 74mm/hr; Return period for culverts: 10 years.

- Recycling of storm water has been considered in two fronts. The first option proposes ground infiltration through bio-swells along the road KURA1.
— Storm water from the rest of the site will be channeled to water detention systems (detention ponds, infiltration strips and proposed water features) at the centre of western green belt.

— Sand and oil filters will be installed at the storm water sources within parking areas and areas associated with oil spillage.

— Roof catchment and re-use of rainwater at plot level.

— Use of porous paving in the open spaces to reduce surface runoff and promote percolation,

— Use of bio-swales in places with suitable gradient; bio-swales slow the rates of flow of storm water, promoting percolation in the process,

— Use of retention ponds to promote percolation and recharging of the underground water table,

— Creating green roofs which slow surface run off, consequently improving the chances of percolation and evaporation of storm water.

9.2.7: Solid Waste Management Strategy

The park has adopted a dual solid waste management system involving management initiatives from both individual industries and centrally under the stewardship of ICDC park administrator. Each individual industry shall be fully responsible for managing its waste in line with the Environmental Management and Coordination (Solid Waste Management) Regulations 2006. The waste management approaches adopted are as described below:

— At the industry level, trash enclosures shall be used for initial solid waste storage. The trash enclosures will play the role of handling waste as it is generated by temporarily storing before it reaches a critical mass for disposal.

— At the plot level, waste sorting, reduction, reusing and recycling shall occur. Once waste that can be reused and recycled has been eliminated, the rest is either incinerated or taken to the municipal landfill.

— Not all the waste generated will be reusable or recyclable. The park shall incinerate all inorganic waste that could neither be reused nor recycled. One incinerator will be provided and managed by ICDC.

— In the long run, it is proposed that an industrial biogas plant be developed that shall integrate both organic waste management and wastewater management. This approach is not only economical on land demand but
also promotes cogeneration of clean energy, organic solid waste management, wastewater management, and does not pollute the environment as compared to typical waste management approaches like transfer stations and landfills.

9.2.8: Air pollution

Industrial processes shall inevitably have a negative impact on air quality of both the immediate environment and the bioregions. As a result, there is need for deliberate measures to mitigate the potential sideeffects of these activities. Several strategies are applicable in preventing and mitigating potential air pollution that include but not limited to:

— Effective enforcement of Legal Framework for air quality Management in Kenya as provided for in EMCA 1999.

— Ensure Air Quality Policy compliance by the relative subjects such as industrialists, motorists and the general public.

— Conduct periodic air quality audits in order to determine trends in order to contain pollution dispersal and potential impacts.

— Advocacy for cleaner production measures and the use of green energy where possible.

— Use of vegetation to improve air quality. This strategy forms the major green belt theme that informed the planning of the park. The green belt provided in addition to the proposed riparian management plan shall play a great role in promoting air quality. This is applicable by direct removal of pollutants through absorbing gaseous pollutants through the leaf surface (SO₂, NO₂) and intercepting particulate matter on leaves (PM10); reducing air temperatures through shading and evapo-transpiration, and thereby lowering ozone levels (O₃). Indirectly, by reducing air-conditioning use and related energy consumption in buildings (through shading of buildings, air temperature reduction and wind modification) leading to lower air pollutant emissions from power plants (known as ‘avoided emissions’).

9.2.9: Biodiversity Strategy

A belt of green open space cuts across the industrial park. The green space is divided into the upper and lower segments by the KURA road that cuts across the site. The upper segment (to the east of the KURA road) has been designed for passive recreation while the lower segment (west of the KURA road) has been designed to take a naturalistic character, planted with indigenous tree species to create an arboretum/ botanical garden – see figure 16 below:
Apart from safeguarding environmental (biodiversity) quality, greenery and open spaces provided within the park are meant to enhance recreational needs of local dwellers, promote physical and mental health benefits through provision of jogging trails and bicycle trails, ameliorating local climate, improving air quality and promoting social cohesion and interaction.

A number of amenities which promote effective use of the open spaces and green belt have also been provided, these include paved pedestrian walkways, seats, waste bins, drinking fountains, landscape lighting, shade structures, storm water drains, bicycle racks and support facilities such as public toilets, changing rooms, snack/canteens, restaurants and stores/maintenance offices. The lower open space (the arboretum) has been designed for low intensive recreational activities such as nature trails, jogging trails and bicycle trails.

**Figure 16: Greenery and Open Space Plan**

9.2.10: Energy Conservation

Industries are one of the largest consumers of energy. The park shall rely on a number of energy sources ranging from electricity, steam and solar. Besides the
reliance on electricity, and for future sustainability of power supply for the Park, additional sources of power from solar and biomass have been proposed. These include:

a) Clean energy sources

— Solar energy: solar energy shall be harnessed by incorporating solar infrastructure within the roofs of all the industries. The roof area available for installation of solar panels is approximately 135,000 m² where there is potential for generation of about 10 MW.

— Additional power can be generated from biomass with the clear implication that considerable energy needs can be supplemented from these renewable sources.

b) Passive design approach

The objective of passive solar design is to optimize passive solar gain and cooling that will improve overall building performance through energy efficient design. Therefore, all developments within the park shall optimize the application of the following passive solar design principles: building orientation, shading, natural lighting, cross-flow ventilation and energy efficient lighting. This is achievable through:

— Building orientation: The orientation of buildings on the plot takes advantage of solar reception hence enabling natural lighting, ventilation, heating and cooling.

— Sun shading devices: the design prevents internal heating from direct sunlight thus minimizing the need for cooling. Street-facing facades, shall be prominently glazed and appropriately shaded from solar heat gain using external shading devices (overhangs, directional louvers and shutters). Sun shading devices have been provided for all openings exposed to solar heat gain.

— Natural lighting: this shall reduce energy use by relying on natural light through design. To achieve a suitable level of natural lighting of interior spaces, all openings shall be strategically placed. High-level (clerestory) operable windows and vent openings shall be provided within the industrial building typologies to ensure cross ventilation and day lighting. Natural daylight provides less heat gain than most types of artificial light for equivalent lighting levels. Skylights and Clerestory windows enable natural daylight to permeate the building without loss of privacy or usable floor space. Skylights admit daylight and distribute it evenly thereby saving energy and improving visual comfort levels.
— Cross ventilation: Cross ventilation shall be achieved through Orientation of openings and provision of side setbacks that allow cross ventilation through secondary facades.

— Energy efficient lighting: Involves the installation of high efficacy fittings and occupancy control systems designed to shift utility demand at off-peak hours.

9.2.11: Fire Emergency

Fire safety management strategies such as providing suitable means of detecting and warning against fire, adequate means of escape provision, means to restrict the passage of fire within the building, means for the building to maintain structural integrity for a pre-determined period in the event of fire, fire brigade access to exterior of building and fire brigade access to the interior of the building (firefighting shafts) have been considered and integrated in the master plan. Essentially, provisions in the Occupational Safety and Health Act of 2007 shall at all times be complied with.

For example, break out spaces which are mainly the open spaces, green corridors within the park are centralized, interconnected and multifunctional in nature thus enhancing safety of the park during emergencies by acting as fire assembly points. Visual linkage has been enhanced to direct pedestrians to open space facilities/fire assembly points. Signs and notices, where necessary have been provided to help people identify escape routes, find firefighting equipment and emergency fire telephones. Notices at the building level shall be mandatory mainly to give instructions to occupants/users on how to use any fire safety equipment; the actions to be taken in the event of fire; and help for the fire and rescue service (e.g. location of fire assembly points, sprinkler valves or electrical cut-off switches).

Moreover, all owners of any buildings within the park must have a procedure in place (evacuation procedure) for the safe, prompt, and efficient evacuation of the building’s occupants in the event of a fire emergency requiring evacuation. This entail ensuring clear routes of travel to the place or places of safety for the building; the fire alarm signals used or available for use by the occupants; and any firefighting equipment available for use by the occupants.

External fire hydrants (FH) for the three main clusters in the park have been designed with fire reserve water tanks of 200 Cubic metres (15 No.) have been provided for the entire site. The FH will be owned, installed and maintained by ICDC who will fit them to their water mains to provide the water supply needed. Hydrant coloring will also be necessary depending on class: Class A hydrants (1000–1499 gpm), green, Class B hydrants (500–999 gpm), orange, and Class C hydrants (0–499 gpm), red. This will aid arriving firefighters in determining how
much water is available and whether to call for additional resources, or find another hydrant.

9.2.12: Riparian Reserve Management

A riparian zone or riparian reserve is the interface between land and a river or stream. According to the Land Act Cap 280 of 2012 a “riparian reserve” means the land adjacent to the ocean, lake, sea, rivers, dams and watercourses. The Cherunya stream runs along the western boundary of the proposed industrial park. The intervention made can be grouped into two main broad categories as discussed herein, these are the management interventions (see table 7) and the design interventions. The following design interventions have made in conceptualizing the riparian reserve as recreation space that is also meant to serve as an environmental safeguard:

a) Activity nodes are created at intervals along the river to attract users into the riparian reserve park for activities such as picnics, hiking, jogging, cycling and bird watching
b) The nodes will be designed to enhance aesthetics through use of appropriate plant and other landscape elements
c) The circulation paths through the park will be designed to take the park users through a series of spaces with different characters to enrich the experience in the park
d) The recreational spaces within the industrial park shall be linked with the river Cherunya riparian reserve to create a large network of interconnected green spaces

Table 29: Management guidelines and regulations

<table>
<thead>
<tr>
<th>Activity</th>
<th>Regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Access</td>
<td>• The riparian reserve will be accessible by all members of the public to utilize between 8.00am and 6.00pm daily</td>
</tr>
<tr>
<td></td>
<td>• Management may close the reserve to the public for maintenance or other reason they deem necessary</td>
</tr>
<tr>
<td></td>
<td>• Motor vehicles will not be permitted within the riparian reserve except for emergency cases only</td>
</tr>
<tr>
<td></td>
<td>• Pedestrian, wheel chairs and cycling are the permissible forms of movement within the riparian reserve</td>
</tr>
<tr>
<td>b) Recreation</td>
<td>• The park may be utilized for passive recreation activities such as picnics, hiking, bird watching, and strolling</td>
</tr>
<tr>
<td></td>
<td>• Recreational activities that utilize the natural setting of the reserve/park such as jogging, cycling shall be allowed within the park</td>
</tr>
<tr>
<td></td>
<td>• Active sports and other activities that will require clearing of vegetation will not be permissible within the park</td>
</tr>
<tr>
<td>c) Development</td>
<td>• Development of permanent structures shall not be permitted within the riparian reserve.</td>
</tr>
<tr>
<td></td>
<td>• Shelters and any other structures necessary within the riparian reserve shall be made of natural degradable materials</td>
</tr>
<tr>
<td>d) Planting</td>
<td>• The reserve shall be planted with indigenous plant species to create an arboretum along the riparian reserve</td>
</tr>
<tr>
<td></td>
<td>• Exotic vegetation species should be avoided,</td>
</tr>
<tr>
<td></td>
<td>• Invasive vegetation species should be avoided</td>
</tr>
<tr>
<td>e) Storm water</td>
<td>• The storm water from the surrounding areas shall be relayed to the stream through bio-swales and natural channels</td>
</tr>
</tbody>
</table>
The riparian reserve shall be planted with ground covers to reduce and filter storm water before it gets into the river channel, reduce erosion and sedimentation in the channel.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>f) Economic activity</td>
<td>Economic activities such as hawking, shops are not permissible within the riparian reserve</td>
</tr>
<tr>
<td>g) Education</td>
<td>Groups or individuals can access the reserve for educational purposes so along as they obtain permission from the management</td>
</tr>
<tr>
<td>h) Human safety and comfort</td>
<td>Comfort and convenience facilities such as washrooms, seats, drinking fountains and shelters shall be provided within the riparian reserve. Development of the reserve into a park will be based on CPTED principles to promote security and safety</td>
</tr>
</tbody>
</table>

Figure 17: River Cherunya Riparian Reserve’s Spatial Design Concept
9.2.13: Population Influx
The proposed industrial park shall influence the influx of labor force into the region and the park itself during working hours. It is thus expected that the population will have both environmental and social impacts both on the park and the immediate environment.

In order to address their needs, certain facilities have been provided. A number of amenities which promote effective use of the open spaces are provided in the upper open space, these include paved pedestrian walkways, seats, waste bins, drinking fountains, landscape lighting, shade structures, storm water drains, bicycle racks and support facilities such as public toilets, changing rooms, snack/canteens, restaurants and stores/maintenance offices. The lower open space (the arboretum) has been designed for low intensive recreational activities such as nature trails, jogging trails and bicycle trails. Nodes are created at intervals along the trails. Seats, waste receptacles, drinking fountains and signage are some of the landscape elements provided along the trails.

Proper measures have been put in place to tackle the possible solid waste to be generated by the people in the park. Those working in industries shall be served by the plot level waste management system whereas those in other spaces are well supplied with dustbins in the park, near sitting benches and along the streets. The provision of sanitary facilities will help improve sanitation in the park.

In order to ensure good public health, the food selling points and kiosks shall be of high hygiene standards, workers have to be of good health with appropriate medical certification and training in food handling.

9.2.13: Development Control Guidelines
The guidelines adopted for regulating land use and development in the industrial park conform to the Kenya Constitution 2010, the National Land Policy (Sessional Paper No. 3 of 2009), the Physical Planning Act Cap 286 and Environment Management and Coordination Act of 1999. They also conform to zoning guidelines applicable in Uasin Gishu County. Innovative guidelines are proposed for emerging industry clusters such as steam and boiler plants; waste recycling plant and recreational parks.

These guidelines are intended to promote compatibility of land uses, guidance of building design, aesthetics and more importantly order and character of physical development. Nevertheless, they allow individuality of building character, while maintaining a sense of overall harmony throughout the project and its adjacent developments.

In addition, the guidelines also define how buildings complement each other through coordination of footprint size, placement, materials, colors, building mass, height, and spatial articulation. It is important to note that due to the project's proximity to residential areas, special attention is given at all times to pollution control.
control and building sound attenuation. Essentially, these development control guidelines reflect the vision and spatial objective of the Master Plan; thus all developments shall be expected to comply with them. In order to promote harmonious development, use and enhancing of property values within the park, there shall be need to enforce the development control measures which will form part of the lease agreement. The specific guidelines are presented in subsequent sections. The detailed development control guidelines are attached as appendix 5.

9.3: SUMMARY

Based on land use integration, the park has adopted a mixed-use approach as opposed to exclusive zoning meant to compliment the industrial function. This has promoted a system of well-balanced and self-sustaining park in terms of operations and service provision thus aiming to be a leading frontier in industrial estate design, setting standards in sustainability, social amenity and building efficiency.

The park has employed design concepts meant to promote ecological sustainability. This has been attained through design of green commercial and industrial buildings, which are energy efficient buildings, flexible and adaptable to multiple uses. Efforts to minimize waste generation and disposal through effective management of the same has been achieved through the 3Rs waste management strategies. Efficient and effective waste management has been established through setting out of proper development control policy and institutional frameworks for waste management and Environmental Management Plans. These are well articulated under chapter 10.

Energy efficiency on the other hand has been enunciated within the park through exploration in utilization of multiple energy alternatives that are eco-friendly/clean and affordable such as solar, biogas, biomass etc. Energy cascading as key principle in sustainability of the park has been realized through a well-balanced energy transfer network with respect to clustering of compatible functions and use of value chain system to enable cohesive and harmonious operations.

The Eldoret ICDC Industrial Park layout and in the long run its operation has been developed with an overall goal to achieve ecological quality and ecosystem integrity. Various industrial prototype buildings and infrastructure designs are aimed at conserving the natural and economic resources; reducing production, material and energy, improving operating efficiency, quality, workers health as well as creating opportunities for income generation from use and sale of waste materials.

Socio-economically, the park is envisaged to create new job opportunities (for both gender/race/tribe/groups) through local utilization and management of natural resources and establishment of business opportunities among different industrial clusters. Moreover, one of the key objectives of the park is nurturing start-up ideas, technological innovations and experimentation of the same. Thus, an incubation
zone has been proposed which will accommodate institutions specialized in industrial research and development and training young industrial ventures.

Landscaping and green infrastructure has been generously provided within the park mainly for improving environmental quality as well as boosting the image of the park. Orienting development of various industrial clusters towards green space is geared to capture value and integrate natural and the built form. Landscaped green areas, tree planting and amenity strips along streets, major transport corridors and walkways have been provided to soften the man-made environment. Trees and vegetation main role is to act as carbon sinks subject to Kyoto Protocol, targeting absorbing \( \text{CO}_2 \) emission from the heavy industries and motorized vehicles. Lastly, establishing a network of green corridors promotes eco-friendly modes of transport such as walking and cycling.

In conclusion, the Eldoret ICDC Industrial Park has observed socio-economic and environment-friendly concepts/ principles by hosting a community of manufacturing and service businesses seeking to enhance environmental and economic performance through collaboration in managing environmental and resource issues, including energy, water and materials. Consequently, it has integrated all the facets of a sustainably developed entity by ensuring that the economic, social and environmental factors are its guiding principles in the design, construction and management.
CHAPTER TEN

STRATEGIC ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

10.1: OVERVIEW

A Strategic Environmental and Social Management Plan is prepared to show how site specific concerns and mitigation measures are addressed through planning/design, construction and operation phases of a project/plan. It provides a link between the impacts of project activities and the mitigation measures put in place to minimize these impacts and enhance the positive impacts.

In this SEA report, most of the proposed plan interventions are at broader level and this SESMP is only envisaged to provide strategic guidelines for the subsequent project specific SESMPs based on detailed component designs, construction and operation plans. These will be formulated from project and site specific environmental and social impact assessments which will be undertaken before implementation of the various specific project commences. This SESMP prescribes and directs the management of all environmental aspects of the EIIP Master Plan including the physical, natural and social impacts, associated with and arising from planning, construction, and operation of the proposed components of the Master plan.

10.2: STRATEGIC OBJECTIVES

The specific objectives of this Strategic Environmental and Social Management Plan are to:

a) Provide guidelines for appropriate management of environmental issues resulting from all activities associated with implementation of all the EIIP Master Plan components that include the: industrial, commercial, logistics and incubation clusters, their associated infrastructure and also individual investors.

b) Highlight the environmental concerns of the stakeholders and appropriate protection measures.

c) Provide detailed standards and specifications for the management and mitigation of activities that have the potential to impact negatively on the physical and social environment.

d) Provide guidelines to project implementers regarding procedures for protecting the environment and minimizing negative environmental effects, thereby supporting the Master Plan’s goal of promoting sustainable development.

The various conditions of implementing the Strategic Environmental and Social Management Plan include among others:
a) All investors will adhere to the recommendations of this SESMP.
b) All investors will ensure sound environmental management by minimizing negative environmental impacts in all the activities they undertake.
c) SESMP shall be expanded and may be modified where there is need to customize to specific project/development conditions.
d) SESMP recognizes the law attached to environmental aspects and it will be implemented accordingly.

10.3: INSTITUTIONAL ROLES AND RESPONSIBILITY

For effective implementation of the SESMP, it is necessary to identify the relevant institutions, agencies, authorities or persons and their respective roles in the process. Thus, the following identified entities ought to be involved in the implementation of the SESMP throughout the project cycle or as deemed fit.

For environmental sustainability of the park, there is need for close and committed monitoring of all the activities. The study therefore proposes that ICDC establishes an Environmental Management Unit (EMU) to take responsibility of overseeing the implementation activities. Such a unit can be run by a team of three officers consisting of an Environmental Manager and two assistants. Their main responsibilities will be to understand the environmental requirements of the park, ensure full implementation of the recommended actions, monitor the performance of the environment, ensure compliance by all agencies, generate and keep records of the trends and write reports. The unit personnel will be expected to understand all the environmental laws and by-laws relevant to implementation of the SESMP and all the equipment required to monitor environmental parameters using the appropriate indicators.

Secondly, the unit will be expected to liaise with the departments responsible for environmental matters at the Uasin Gishu County Office, national government agencies and the implementing agencies to ensure effective implementation of the SESMP. Key implementing agencies include Kenya Power, Communication Authority of Kenya, WRMA, ELDOWAS, Kenya Pipeline Corporation and Kenya Urban Roads Authority.

The National Environment Management Authority (NEMA) is the key institution of the government overseeing implementation of environmental policy and laws in Kenya. The authority will take responsibility for general supervision and coordination of all environmental matters. In addition to reviewing environmental reports on the progress of EIIP Master Plan, the authority’s inspectors may visit any of the projects, during implementation, make reports and suggest improvements to ensure compliance to the recommended quality standards. The cost of implementing and maintaining environmental quality of the park and its surrounding is estimated at Ksh. 10 million per year. A way of generating the funds from the park investors should be explored to ensure sustainability. The
in institutional arrangement for implementing the EIIP master plan is summarized in
Table 30 below:

**Table 30: Institutional Arrangements of Implementing Environmental Components of the Master Plan**

<table>
<thead>
<tr>
<th>INSTITUTIONS</th>
<th>KEY RESPONSIBILITIES</th>
</tr>
</thead>
</table>
| **ICDC** | - ICDC to participate in the entire SEMP process as part of the owner.  
- EMU to oversee implementation of the EIIP Master Plan as conducted by contractors/investors from construction, reviewing and verifying the implementation of the ESMP of the Park |
| **Uasin Gishu County Government** | - Provide oversight and advisory services during the implementation by volunteering information if need be. |
| **National Government** | |
| Ministry of Industrialization and Enterprise Development | - Policy direction on industries and trade  
- Provide funding  
- Facilitate in coordination of trade and associated matters |
| Ministry of Agriculture, Livestock and Fisheries Development | |
| Ministry of Environment and Natural Resources | - Training and mobilization of farmers for raw materials production  
- Farm level value addition  
- Forestry Policy Advice |
| Ministry of Lands, Housing and Urban Development | - Land and land tenure issues  
- Approval of land use plans for industries  
- Approval or architectural drawings |
| **Implementing Agencies** | |
| Kenya Urban Roads Authority | - Overseeing construction of the roads, foot paths, storm water drainage in the Industrial Park. |
| Eldoret Water and Sanitation Co. Ltd. (ELDOWAS) | - Supply of clean water to the Park  
- Providing sewer services to the Park  
- Regular monitoring of sewer quality at the park before draining into the public sewer.  
- Potential company for solid waste collection. |
| Kenya Forest Service | - Training and mobilizing farmers to produce tree and bamboo seedlings, plant trees and bamboo for supply of forestry based raw materials to the industries.  
- Building capacity of the Community Forest Associations to coordinate tree growing activities in the county for raw material supply. |
| Kerio Valley Water Service Board | Efficient and sustainable water supply management |
| Kenya Power | Supply of electricity |
| Kenya Railway Corporation | Possible extension of railway line to the park |
| Rift Valley Railway Corporation | Provision of railway line services for goods, people etc. |
| National Construction Authority | Monitoring construction works for quality control |
| Water Resources Management Authority | - Monitoring of water abstraction rates.  
- Monitoring of water quality - pollution of water sources – rivers and boreholes. |
| National Environment Management Authority | - Review Environmental Impact Assessment (EIA) reports for the different investors/projects.  
- Review environmental audit (EA) reports.  
- Approve EIA and EA reports.  
- Deal with cases of non-compliance. |
| Eldoret University  
Moi University  
Eldoret Polytechnic  
Other Academic Institutions | - Facilitate capacity building of young entrepreneurs.  
- Facilitate incubation of innovations. |
| Kenya Industrial Research and Development Institute (KIRDI) | Facilitating technology development and transfer. |
| Kenya Bureau of Standards | Monitor product standards |
| Kenya Institute of Intellectual Property (KIPI) | Patenting of innovations. |
| Kenya Association of Manufacturers (KAM) | - Energy use audits to monitor energy efficiency.  
- Water use audits to monitor water efficiency.  
- Ensure welfare of the Industrialists. |
| Kenya Power | Supply electricity and provide maintenance services. |
| Investors | - Construct and invest according to the laid down development and environmental guidelines and regulations.  
- Comply with county, national and international quality standards. |
<table>
<thead>
<tr>
<th>Activity/program</th>
<th>Possible Impacts</th>
<th>Mitigation Measures</th>
<th>Institutional Responsibility</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of roads, pedestrian walkways and parking</td>
<td>Loss of vegetation cover</td>
<td>• Clear only what must be cleared and replant with 70% indigenous and 30% exotic.</td>
<td>All implementing agencies</td>
<td>Phase 1</td>
</tr>
<tr>
<td></td>
<td>Disturbance of soil</td>
<td>• Vegetate all embankments to avoid soil erosion. • Replant with 70% indigenous and 30% exotic.</td>
<td>All implementing agencies</td>
<td>Phase 1</td>
</tr>
<tr>
<td></td>
<td>Compaction of soil due to use of heavy machines</td>
<td>• Open up compacted sites before landscaping and greening to improve on the soil structure</td>
<td>All implementing agencies</td>
<td>Phase 1</td>
</tr>
<tr>
<td></td>
<td>Air pollution (Dust)</td>
<td>• Use water to minimize dust particles in the air.</td>
<td>All implementing agencies</td>
<td>Phase 1</td>
</tr>
<tr>
<td></td>
<td>Generation of construction based solid waste</td>
<td>• Re-use excavated soil for landscaping along the pedestrian walkways, road reserve and parking areas. • Replant with 70% indigenous and 30% exotic.</td>
<td>All implementing agencies</td>
<td>Phase 1</td>
</tr>
<tr>
<td>Installation of power cables, street lighting</td>
<td>Loss of existing vegetation and disturbance of soil as a result of digging trenches</td>
<td>• Limit the vegetative areas to be cleared to a minimum. • Preserve the soil to be used in landscaping.</td>
<td>Kenya Power and ICDC – EMU</td>
<td>Phase 1</td>
</tr>
<tr>
<td>Installation of ducts for communication network</td>
<td>-Loss of existing vegetation due to clearance and -Disturbance of soil as a result of digging of trenches.</td>
<td>• Limit the vegetative areas to be cleared to a minimum. • Preserve the soil to be used in landscaping.</td>
<td>Communication Authority of Kenya (CAK) ICDC-EMU</td>
<td>Phase 1</td>
</tr>
<tr>
<td>Grading of site, roads, drainage channels, and green spaces.</td>
<td>-Loss of vegetation cover due to clearance -Degradation of the top soil due to mix with construction materials</td>
<td>• Limit the vegetative areas to be cleared to a minimum. • Preserve the soil to be used in landscaping. • Extra caution taken when carrying out clearing • Replant with 70% indigenous and 30% exotic.</td>
<td>All implementing agencies ICDC-EMU</td>
<td>Phase 1 &amp; 2</td>
</tr>
<tr>
<td>Construction of storm water drainage channel</td>
<td>-Loss of vegetation cover due to clearance -Disturbance of soil as a result of digging of trenches for the drainage channel.</td>
<td>• Limit the vegetative areas to be cleared to a minimum. • Preserve the soil to be used in landscaping. • Replant with 70% indigenous and 30% exotic.</td>
<td>ICDC-EMU KURA ELDOWAS</td>
<td>Phase 1</td>
</tr>
<tr>
<td>Construction of buildings in the park</td>
<td>Loss of vegetation cover</td>
<td>• Clear only the area that must be cleared.</td>
<td>ICDC-EMU All developers</td>
<td>Phase 2</td>
</tr>
<tr>
<td></td>
<td>Disturbance of soil</td>
<td>a) Vegetate all embankments to avoid soil erosion.</td>
<td>ICDC-EMU All developers</td>
<td>Phase 2</td>
</tr>
<tr>
<td>Environmental Impact</td>
<td>Mitigation Measures</td>
<td>Responsible Party</td>
<td>Phase</td>
<td></td>
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<tr>
<td>----------------------</td>
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<td></td>
</tr>
<tr>
<td>Compaction of the soil</td>
<td>Use increased organic manure for fertilizing the soil to improve on the structure.</td>
<td>ICDC-EMU All developers</td>
<td>Phase 2</td>
<td></td>
</tr>
<tr>
<td>Increased air pollution (Dust)</td>
<td>Use dust screen and water to reduce the intensity of dust particles in the air.</td>
<td>ICDC-EMU All developers</td>
<td>Phase 2</td>
<td></td>
</tr>
<tr>
<td>Increased generation of solid waste</td>
<td>Implement the solid waste management plan as described in chapter 3 of this report (reduce, re-use, recycle and incinerate). Proper disposal of unwanted waste</td>
<td>ICDC-EMU Appointed Solid Waste Management Company</td>
<td>All Phases</td>
<td></td>
</tr>
<tr>
<td>High demand of water for construction and operation</td>
<td>Ensure efficient utilization of water.</td>
<td>All developers ICDC-EMU</td>
<td>All phases</td>
<td></td>
</tr>
<tr>
<td>High quantities of waste water generated.</td>
<td>Use water efficiently to minimize generation of high quantities of waste water. Ensure the waste water is treated to recommended quality before being discharged into the communal and finally public sewer. Implement recycling of grey water to minimize the quantity discharged into the sewer.</td>
<td>All developers ELDOWAS ICDC-EMU</td>
<td>Phase 2</td>
<td></td>
</tr>
<tr>
<td>Increased temperatures – heat island - as a result of the increase in the built up area.</td>
<td>Increase vegetation cover and diversity of plants in all possible locations. Plant with 70% indigenous and 30% exotic in all the available spaces. Plant as many shade trees as is practically possible.</td>
<td>ICDC-EMU All implementing agencies</td>
<td>Phase 2</td>
<td></td>
</tr>
<tr>
<td>Operation of industries</td>
<td>Increase the vegetation cover to increase the carbon sink function of the plants. Implement recommended mitigation measures from the baseline study.</td>
<td>ICDC-EMU All implementing agencies</td>
<td>Phase 2</td>
<td></td>
</tr>
<tr>
<td>Increased noise pollution from industrial operations</td>
<td>Follow recommendations in the noise and excessive vibrations regulations based on the baseline mitigation measures.</td>
<td>ICDC-EMU All implementing agencies</td>
<td>Phase 2</td>
<td></td>
</tr>
<tr>
<td>Impacts of Decommissioning</td>
<td>Decommissioning of the industrial park</td>
<td>Solid waste generation</td>
<td>Construction debris/excavated material should be disposed at sites approved by Uasin Gishu county government and in accordance with waste management regulations of 2006. Provide adequate sanitary convenience/ pit latrines in a clean state to construction workers.</td>
<td>ICDC, Contractor</td>
</tr>
</tbody>
</table>
| Noise pollution                                      | -Noise hazard signs should be displayed where necessary  
|                                                   | -Service and use equipment/machinery in accordance with manufacturer’s recommendations. | ICDC, Contractor | Phase 3 |
| Air pollution                                      | Carry out routine maintenance of vehicles & other machinery to ensure minimized emission of nitrogen and Sulphur oxides from vehicle and machinery exhaust systems. 
|                                                   | Provide appropriate dust screens to reduce dust exposure  
|                                                   | Provide dust masks to workers in extreme dust 
|                                                   | Avoid spillage of loose soil to the road where it will be disturbed and blown away by traffic | ICDC, Contractor | Phase 3 |
| Occupational hazard                               | -Compliance of regulation and guidance of occupational health and safety  
|                                                   | -Safety measures (personal protective equipment) 
|                                                   | -Minimize soil disturbance and sprinkle water regularly to reduce dust.  
|                                                   | -Provide First Aid Kit. 
|                                                   | Train workers on safe practices | ICDC, Contractor | Phase 3 |
10.4: OPERATION AND MAINTENANCE MANUAL /GUIDELINES

All landscapes need some level of maintenance; otherwise they will become derelict and fall part.

10.4.1: Objectives

The general objectives of landscape maintenance practices include:

- To keep the landscape clean
- Maintain attractive, safe and user-friendly landscape
- Use sustainable, environment friendly and safe methods maintenance
- To protect and enhance the natural character of the landscape
- To minimize loss through wastage of natural resources such as water and energy.

10.4.2: Staffing

The riparian reserve will require a number of resident staff members as follows:

a) Park manager

The park requires one resident park manager. The park manager’s responsibilities will be:

- Overseeing the day to day running of the park
- Co-coordinating activities such as events in the park, funding for park programmes, rehabilitation
- Human resource management of park staff

b) Grounds men

Two grounds men will be required in the park. The grounds men’s responsibilities will be as follows.

- Carry out daily cleaning tasks in the park
- Keeping the plants in the park in check through practices such as mowing, pruning, watering and fertilization of the plants

c) Security officers/ Park patrol

Two security officers will be stationed in the reserve. Their responsibility will be to:

- Guard the entry point exercising control into the park where necessary
- They will serve as park patrol, enforcing order during the hours of use
- They will keep watch over the park during the night and when the park is not in use to ensure that vandalism, theft or crime does not take place in the park
10.4.3: Maintenance Regimes

The maintenance practices carried out in a park can be broken down into those that are undertaken on daily, weekly, monthly, yearly basis and those that are done occasionally.

Daily:
- Picking up trash and debris, perform normal grounds maintenance tasks
- Emptying of trash from the waste bins.
- Survey entire site for recent unsafe conditions.

Weekly:
- Repair or replace signage.
- Clean on site roadways and parking lots.

Monthly:
- Inspect paving for cracks or potholes, structures and furniture for defects, repair immediately or barricade as appropriate
- Schedule repair of remaining defects.

Annually:
- Repair and fill asphalt cracks.
- Stripe parking lots, paint directional signs, fire lanes, and crosswalks.
- Change or replant as necessary
- Complete overhaul of landscaping projects to enhance overall appearance.

10.4.4: Maintenance Practices

a) Vegetation

Maintenance of vegetation involves at least four basic aspects, namely watering, fertilization, pruning and pest control. The following are general practices for plant maintenance:

**Irrigation**
- Plant indigenous plant species to minimize need for irrigation

**Pruning**
- Pruning should be carried out during the dormant growing season
- The sawn off material should be used as mulch on site or compost on site wherever possible.

**Fertilization**
- Use of inorganic fertilizers is discouraged. Instead, use of organic fertilizer whenever necessary

**Pest control**
- All plant material should be checked for pests or diseases before planting
- Integrated pest and diseases control method, which is a more sustainable approach to pest and disease control should be used.
- Use indigenous plant species, they are more resistant to pest and diseases
Cleaning
- Waste bins should be emptied on a daily basis
- Remove trash from planting beds on a weekly basis to keep a clean, attractive appearance

b) Trees and shrubs
   Choice
   - The park should have a prescribed plant palette. Plants to be used in the park should always be selected from the palette
   Installation
   - All plants should be installed according to details provided by the supervising professional
   - Plants should be checked for pests and diseases before being installed
   Pruning
   - Trees should be pruned at least once a year during the dormant season to maintain the natural shape of the tree
   - Branches that hang too low obstructing sightlines or interfere with functions should be pruned as soon as possible
   - Damaged/diseased growth should be removed during pruning
   Fertilization
   - Use of inorganic fertilizer should be discouraged
   Replacement
   - All vegetation material should be replaced as soon as it is removed

c) Lawn
   Irrigation
   - Water more frequently during the dry season and less frequently during the wet season
   - Water to 12-inch depth (below root zone). A total of 1 inch of water is necessary weekly during the dry hot weather
   - Irrigate lawns longer and less frequently as opposed to shorter, more frequent irrigation regimes
   Fertilization
   - Use of inorganic fertilizers should be utilized

d) Circulation paths
- All footpaths within the riparian reserve should be finished using permeable material
- The surfaces should be cleaned on a weekly basis
- Signage should be provided to direct the users of the park along
- When paths are barricaded, alternate routes MUST be provided for pedestrians to use.
e) **Furniture (Seats, waste bins, drinking fountains)**
   - Benches and other forms of seats should be checked for foreign material such as gum, graffiti. Such should be cleaned off as soon as they are noted.
   - Benches and seats and other furniture should be monitored for safety issues such as structural failure, sharp edges at least on a monthly basis.
   - Whenever the safety of an item is in question, it should be removed or barricaded immediately.

f) **Drinking fountains**
   - The drinking fountain space should be cleaned at least once daily.
   - The drinking fountains should be checked for leaks and excessive flows at least once a week. During the checks, it should be ensured that the water pressure is appropriate.
   - Mechanical parts of drinking fountains such as faucets and valves should be checked during weekly checks.
   - In case of malfunction the fountains should be shut off at the water source until repair has taken place.
   - Drinking fountains should be repaired within a day of determination of a problem.

g) **Storm water drains**
   - Surface run off as opposed to channeled storm water drainage is to be utilized within the riparian reserve.
   - Vegetation cover should be used to slow down and filter the surface runoff flowing into the river channel.
CHAPTER ELEVEN

MONITORING AND EVALUATION PLANS FOR THE MASTER PLAN AND RIPARIAN RESERVE MANAGEMENT PLAN

11.1: OVERVIEW

This chapter presents the approach towards monitoring and evaluation of the implementation process of both the EIIP and the Riparian Reserve Management Plan.

11.2: IMPLEMENTATION, MONITORING AND EVALUATION

Implementation of the planning and design provisions outlined in this industrial master plan has been envisioned under two fundamental phases – construction phase and post-construction phase. It is also important to note that there are some implementation processes that will commence before mainly touching on statutory approval logistics.

Construction Phase will involve construction works including trunk infrastructure, ICDC administration complex and individual industries by various investors. ICDC being the developer, will undertake construction of capital works which include; roads, storm water drainage system, water reticulation system, sewerage system, central effluent treatment plant, power sub-station, electrical supply system, ICT, landscaping of the green belt among others. These works will take approximately 3 years.

For ease of execution, construction of the capital works will be done in 2 phases aligned to the two main blocks constituting the industrial park. The first phase of construction will mainly cover works within the North Eastern bloc. On the other hand, the second phase will mainly involve construction of; ICDC complex, gas/steam supply system and the remaining 40% capital works which all fall on the North West and Southwest side. Upon completion of the capital works by ICDC, the park will now be ready for individual developers to commence construction of their industries.

At the post-construction phase, ICDC shall designate an Industrial Park Administrator to take responsibility of management. The total amount of finances required to develop the master plan has been arrived at through estimation of the various components of the infrastructure broadly categorized under; core trunk Infrastructure, ICDC Complex, and Industrial infrastructure. The feasibility study report carried out for the Industrial Park in the year 2014 by Ernst and Young outlines in detail the various options available to the client for financing the project.
Monitoring is a never-ending process that continues throughout the life of a project. Monitoring and evaluation of this project will be carried out at specific time intervals in order to keep track of the steps in the development process and also to monitor the public’s reaction and reception of the provided information. During the construction phase, the project manager will carry out periodic monitoring and evaluation based on the scope of works. After handover to ICDC, the Park Administrator will take over the role of continuous monitoring and evaluation to ensure that the standards of development as proposed in the master plan are adhered to.
### Table 32: Potential Environmental Monitoring Indicators

<table>
<thead>
<tr>
<th>SEA PARAMETER</th>
<th>MONITORING MEASURE</th>
<th>SOURCES OF INFORMATION</th>
<th>FREQUENCY OF MONITORING</th>
<th>RESPONSIBLE INSTITUTION</th>
</tr>
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<tr>
<td></td>
<td></td>
<td>Construction Phase</td>
<td>Operational Phase</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Biodiversity, Flora and Fauna</td>
<td>Number of plant species Number of bird species visiting site Number of Invertebrate species</td>
<td>Local studies, ICDC-EMU Department of Wildlife</td>
<td>Annually Annually</td>
<td>ICDC-EMU Department of Wildlife</td>
</tr>
<tr>
<td>Soil/land</td>
<td>Soil erosion incidences</td>
<td>ICDC-EMU, County Ministry of Agriculture</td>
<td>Continuous Continuous</td>
<td>ICDC-EMU County Ministry of Agriculture</td>
</tr>
<tr>
<td>Water</td>
<td>Water resource availability Per capita water consumption (efficiency) Water quality compliance Biological Oxygen Demand BOD5 at 20° C = 50 mg/l; Total Suspended Solids = 30 mg/l; Coliform =1,000 per 100 ml as per WHO standards for BOD5 and Coliform Count.</td>
<td>ICDC-EMU, ELDOWAS, WRMA NEMA</td>
<td>Daily Quarterly</td>
<td>ICDC-EMU ELDOWAS WRMA NEMA</td>
</tr>
<tr>
<td>Air</td>
<td>Air Quality Levels</td>
<td>ICDC-EMU NEMA</td>
<td>Daily Monthly</td>
<td>ICDC-EMU NEMA</td>
</tr>
<tr>
<td>Noise and Vibrations Pollution</td>
<td>Noise levels</td>
<td>ICDC-EMU</td>
<td>Daily</td>
<td>ICDC-EMU</td>
</tr>
</tbody>
</table>
| **Climatic factors** | • Greenhouse gas levels  
  • Flooding incidences  
  • Temperature changes | • ICDC  
  • NEMA  
  • CGUG | • Monthly  
  • Seasonal  
  • Daily | • Weekly | • ICDC/NEMA  
  • CGUG |
|---------------------|-----------------------------------------------------------------|--------------|-------------|----------|
| **Landscape**       | • Change in area as a result of aesthetic quality  
  • % of persons satisfied with local area aesthetics | • ICDC-EMU/ADMIN | • Monthly  
  • Annually | | ICDC-EMU/ADMIN |

**SOCIO-ECONOMICS**

<table>
<thead>
<tr>
<th><strong>Employment levels</strong></th>
<th>• No. of persons employed</th>
<th>• Individual institutions</th>
<th>• Annually</th>
<th>ICDC-EMU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crime levels</strong></td>
<td>• Crime incidences</td>
<td>• Nearest Police Station</td>
<td>• Monthly</td>
<td>ICDC-EMU</td>
</tr>
<tr>
<td><strong>Gender equity in employment</strong></td>
<td>• Ratio of men to women in employment</td>
<td>• Individual Institutions</td>
<td>• Annually</td>
<td>ICDC-EMU</td>
</tr>
<tr>
<td><strong>People with disability</strong></td>
<td>• No. of persons with disability engaged in park activities</td>
<td>• ICDC - Records</td>
<td>• Annually</td>
<td>ICDC-EMU</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>• Human traffic</td>
<td>• ICDC/Security Office</td>
<td>• Monthly</td>
<td>ICDC-EMU</td>
</tr>
</tbody>
</table>
| **Human Health**      | • Long term illnesses of Industrial Park Community  
  • Rate of use of recreation facilities. | • Health Facilities  
  • Nearest Police Office | • Monthly | ICDC-EMU |
CHAPTER TWELVE
CONCLUSION AND RECOMMENDATIONS

12.1 Overview

The broad objective of the SEA was to systematically integrate environmental considerations into the Master Plan and support decision making processes. The specific objectives were to: i. incorporate environmental sustainability measures in the design phase of the master plan, ii. provide guidelines for sustainable management of environmental aspects of the industrial park, iii. provide guidelines for incorporation of environmental issues in the sub-projects of the master plan, iv. provide environmental quality benchmarks for monitoring future environmental quality of the park, and v. recommend institutional arrangements for sustainable management of environmental aspects of the industrial park.

12.2 Conclusion

The study concludes the following:

a) Incorporation of environmental sustainability measures in the design phase of the master plan has been provided for in the land budget where by 7.7% (10.4 acres) of the land has been allocated for green/open space. In addition to this, all the roads, pedestrian walk ways, parking spaces will be lined with trees, shrubs and ornamental plants that have multiple functions of absorbing pollutants such as SO$_2$ and CO$_2$ as they release oxygen in the air. The effective land coverage for the green space will therefore exceed 10%. The trees, shrubs and other plants will also improve the aesthetics of the Industrial Park. Exploitation of natural lighting, ventilation, rain and storm water has been incorporated in the building and infrastructure designs.

b) Guidelines for sustainable management of environmental aspects of the industrial park includes ensuring efficient utilization of energy, water and material resources. Energy, water and material resources use will be monitored closely during the construction and operation phases through energy and water efficiency audits to ensure their efficient utilization. All the infrastructure to be installed have been carefully designed to ensure that there is sufficient percolation of water to the underground aquifers. In addition, a management plan has been formulated for Cherunya riparian reserve to ensure minimum negative impacts on the river and no squatter settlements along the reserve.

c) Guidelines for incorporation of environmental issues in the sub-projects of the Master Plan includes ensuring that individual sub-projects of the Industrial Park undertake an
environmental impact assessment which shall generate detailed information on how environmental matters for the individual projects should be handled. Each sub-project will be expected to formulate an environmental policy to guide management of environmental issues during the operation phase. In addition to this the Industrial Park managers will ensure that the sub-projects follow the laid down rules in the development control plan of every aspect of building construction and infrastructure development as detailed in the Master Plan.

d) The environmental quality bench marks for monitoring future environmental quality of the Industrial Park showed the following:

i. **Biophysical-Environment**

**Bio-diversity:** Biodiversity of the site is very low with only about nine plant species identified. No large wild animals were found on the site. Domestic animals such as goats, sheep, donkeys and cows are occasionally brought to the site for grazing. The plant and animal diversity is expected to change significantly during the operation phase of the park.

**Geology:** The alignment of the soil falls within S1 sub-grade class as classified by the Roads Design Manual Part III (Material and Pavement Design for New Roads). This soil is structurally weak for pavement laying and require capping or chemical treatment for pavement support. The foundation bearing capacity of the soil was 188kN/M² assuming a 2.5m deep square 3m footing and safety factor of 4.

**Soils:** There were visible signs of surface land degradation especially through erosion. The soil health such as PH, Electrical Conductivity (EC), Lead (Pb), Zinc (Zn), Copper (Cu), and Pottasium (K), Sodium (Na), Calcium (Ca), Magnisium (Mg), Manganese (Mn) and Iron (Fe) were all within acceptable limits.

**Water:** The water table was found to be shallow between 10-25 metres. There is a well at the site whose water quality was found to be poor exceeding the recommended acceptable limits. The water is used by NYS.

**Wetlands:** There is a minor wetland on the lower end of the western side with a spring originating at the same site. The spring develops into river Cherunya.

**Air quality:** Emissions at the site were mainly dust and vegetation debris. Greenhouse gas emissions such as Carbon monoxide, Carbon dioxide, Sulphur dioxide and Volatile Organic Compounds were all found to be within limit. Overall, the air quality was within limit. However, a baseline operational assessment should also be done.
Noise levels: The noise levels range of 27.0dB(A) and 51.1dB(A) was found to be within limits for commercial zones. The target for construction sites in 75dB (A). Noise generated during operation phase is not expected to impact negatively on the environment beyond 200m after mitigation. The effect of the development on the acoustic environment should be investigated further during construction and operation phases to additional baseline data.

Landscape: Landscape and townscape appearance was very poor.

Concrete surface: There was no concrete surface at the site but this is expected to increase enormously as construction of both buildings and infrastructure commences.

Temperature: Average temperature was 16.6 °C in the warmest months of February and March. In the coldest months of June-July, it averages 9 °C.

Compatibility with the surrounding land uses: To the North is KURA, NYS and Private Properties mainly residential houses. The eastern side has residential and mixed uses, southern side has informal settlement (Langas Estate), while the western side is agricultural land planted with maize and beans. EIIP is compatible with the surrounding land uses.

ii. Socio-Economic Environment

Employment: The baseline unemployment and underemployment level of the County is high estimated at 46% The county absolute poverty level for 2012 was 49%. Urban food poverty was 38% in 1997, while rural food poverty for the county was 43% in 1997. Female headed households had higher poverty levels. Agricultural performance is low due to mainly lack of value addition and organized markets for agricultural produce. There were complaints of gender discrimination during hiring of employees with preference being given to men.

Human health: Currently there is no human health issues at the site since it is not yet occupied.

Social amenities: The site is used for social meetings and as a playground by different people, particularly youth groups. There is no educational or health facility within the site.

Population: In 2009, the Uasin Gishu County population was 894,179 and is projected to increase to 1,201,853 in 2017 with a growth rate of 3.8% compared to the national average of 2.4%. The population is expected to grow significantly from people coming in to seek jobs, entrepreneurs coming in to set up their own businesses and from
immigrant labor for increased agricultural, livestock and forestry production to supply raw materials to industries.

**Security:** There is no police post nearby. Mugging, rape and murder cases have been reported to occur at the site, but records were not available. There are no street lights hence the site is in complete darkness at night.

**Foreign Direct Investment:** There is no current FDI at the site but many investors are expected to come and invest especially after the infrastructure is installed.

**Value Chain Benefits:** There is no data for value chain benefits but it is expected to increase significantly through the backward and forward linkages that will be created by the Industrial Park.

e) Institutional arrangements for sustainable management of environmental aspects of the industrial park

Environmental issues tend to be ignored in many development projects even when planned for and targets are set. To ensure that what this SEA has proposed is implemented, the study proposes creation of an environmental unit by ICDC. It should be housed at the ICDC Complex within the Industrial Park. The Unit which will work very closely with the County Environmental Committee and NEMA should have a minimum of three qualified fulltime employees to run it. This will consist of an Environmental Manager and two assistants. Their work will include ensuring that all investors have environmental policies and targets for their individual sub-projects and also ensure implementation of all the recommended mitigation measures. This will be done in collaboration with all the relevant line agencies/sectors.

f) Anticipated positive and negative impacts

**Positive impacts:** The anticipated bio-physical impacts of implementing the EIIP Master Plan are: increased bio-diversity, conservation of green/open spaces, improved landscape, townscape appearance and the parks complementarity with the surrounding land uses during the operation phase. The positive socio-economic impacts include increased employment, social amenities, population, improved security, Foreign Direct Investment, and increased value chain benefits from backward and forward value chain linkages.

**Negative Impacts:** The negative bio-physical impacts include: Decrease in biodiversity during the construction phase, land degradation and increased water use in the construction phase and waste water generation in the operation phase. Others are landscape appearance during construction and increase in concrete surface during the operation phase. The negative socio-economic impacts are mainly on human health
from dust pollution during construction and gaseous pollutants during the operation phase.

**g) Sustainability Principle**

The principle of sustainable design has been actualized at various levels ranging from land use planning, building technology and infrastructure development. Such as promoting flows within the park through material and by-product exchange through, reducing, re-use and recycling in order to minimize exploitation of natural resources. Additionally, the industrial park shall employ some of the latest ecologically sensitive designs such as sustainable waste management (by applying the 3Rs), use of green energy and green infrastructure such as parks/greenery, transportation conservation, solar power use, use of green architecture such as energy efficient buildings with day lighting and natural ventilations.

**12.3 Recommendations**

For the EIIP Master Plan to achieve its intended strategic objectives and the proposed environmental strategies, the following are recommended.

a) The proposed Environmental and Social Management Plan should be implemented effectively ensuring that all the recommended mitigation measures are implemented.

b) ICDC should establish an Environmental Management, Coordination and Monitoring Unit to oversee all the environmental aspects of the park.

c) The Cherunya River management plan should be implemented effectively.

d) The formulated Development Control guidelines for construction and infrastructure development should be followed by all investors.

The SEA study has observed that there are both positive and negative environmental and social-economic impacts from implementation of the EEIP Master Plan. However, overall, the positive impacts outweigh the negative. The positive impacts include creation of many jobs, and growing of the county economy by stimulating vibrancy in the agricultural, livestock and forestry sectors. The negative impacts on the other hand are mainly disturbance of the soil during the construction phase, air pollution from industries, increased waste generation and increased demand on utility services. However, all these have been mitigated hence the negative effects have been minimized through the SESMP and the environmental monitoring plan.
Views from consultations were incorporated in the master plan continuously, helped to shape objectives of the master plan and issues to be studied in detail. They also formed part of the recommendations. These were recorded in minutes taken during public consultations and are also reported in the scoping report.

There is a deliberate effort to integrate economic, social, technological, environmental and ecological performance in the design of the park. The principle of sustainable design has been actualized at various levels ranging from land use planning, building technology and infrastructure development. Such as promoting flows within the park through material and by-product exchange through re-use, reducing and recycling in order to minimize exploitation of natural resources. Additionally, the industrial park shall employ some of the latest ecologically sensitive designs such as sustainable waste management (by applying the 3Rs), use of green energy and green infrastructure (parks/greenery, transportation conservation, solar power use) use of green architecture such as energy efficient buildings (day lighting and natural ventilations).
BIBLIOGRAPHY

APPENDICES
Key Informant Interview Guide

Industrial and Commercial Development Corporation (hereafter referred to as ICDC), a state-owned parastatal proposes the establishment of an industrial park within Eldoret Municipality, Uasin Gishu County on plot no 15/1757.

As a stakeholder this guide seeks your views on key land use options, environmental and socioeconomic impacts of the proposed Industrial Park.

<table>
<thead>
<tr>
<th>Name of Stakeholder</th>
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<tbody>
<tr>
<td>Title</td>
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<tr>
<td>Gender (M/F)</td>
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<tr>
<td>Age (Years)</td>
</tr>
<tr>
<td>Institution/Organization</td>
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<tr>
<td>Telephone No. (s)</td>
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<tr>
<td>E-mail address</td>
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1.0 INDUSTRY TYPOLOGIES (OPTIONS)

Proposed:

**FOOD PROCESSING INDUSTRIES:**

a. Bakery and wheat products
b. Meat and meat products
c. Dairy and dairy products
d. Vegetable oils and fat
e. Fruits and vegetable processing and packaging
f. Grains and cereals milling and related products
g. Animal feeds

Additional industry options from key informants and other stakeholders

**AGRO-BASED INDUSTRIES**

a. Fertilizer production
b. Agro-veterinary chemicals
c. Farm equipment

**AGRO-BASED INDUSTRIES**
<table>
<thead>
<tr>
<th>TEXTILE INDUSTRIES</th>
<th>TEXTILE INDUSTRIES</th>
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</thead>
<tbody>
<tr>
<td>a. Textile, fabric and yarn production</td>
<td></td>
</tr>
<tr>
<td>b. Garment manufacture</td>
<td></td>
</tr>
<tr>
<td>c. Manufacture of accessories</td>
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<tr>
<td>d. Embroidery</td>
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<tr>
<td>e. Fabric manipulation</td>
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<tr>
<td>f. Washing</td>
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<tr>
<td>g. Screen printing</td>
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<thead>
<tr>
<th>SERVICE AND LOGISTICS</th>
<th>SERVICE AND LOGISTICS</th>
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<tbody>
<tr>
<td>a. Cold rooms</td>
<td></td>
</tr>
<tr>
<td>b. Go-downs/warehouse</td>
<td></td>
</tr>
<tr>
<td>c. Logistics and business outsourcing</td>
<td></td>
</tr>
<tr>
<td>d. Production and packaging materials</td>
<td></td>
</tr>
<tr>
<td>e. Waste recycling plant</td>
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<tr>
<th>LEATHER INDUSTRY</th>
<th>LEATHER INDUSTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Shoe making and other leather products</td>
<td></td>
</tr>
</tbody>
</table>

| OTHERS | |
|--------| |

| 2.0 STRATEGIC ENVIRONMENTAL ASSESSMENT | |
|--------------------------------------| |
| a. What environmental issues would you like to be considered in the planning of the Eldoret Industrial park | |
b. What social economic issues would you like to be considered in the planning of the Eldoret Industrial Park

### 3.0 ENVIRONMENTAL IMPACT ASSESSMENT

1. What are the potential environmental impacts of the proposed Eldoret Industrial Park

   a. Positive Impacts

   b. Negative Impacts

2. What are the potential socio-economic impacts of the proposed Eldoret Industrial Park

   a. Positive

   b. Negative
Strategic Environmental Assessment (SEA) for the Master Plan for the Proposed Eldoret Industrial Park:

Household Interview Questionnaire

Questionnaire No. ........................................ Date..............................................

Enumerator Name.................................................................

Enumerator Tel. Number............................................................

Enumerator E-mail........................................................................

Section One: Respondents Characteristics

1.1 Respondent Name :( Optional): ........................................................

1.2 Respondents Telephone No............................................................

1.3 Gender: Male: [ ] .......................... Female: [ ]

1.4 Age Category (Years): a. 19 < 29 [ ] .......................... b. 29 < 39 [ ] .......................... c. 39 < 49 [ ]

.......................................................... d. 49 < 59 [ ] .......................... e. Over 59 [ ]

Section Two: Socio Economic Characteristics and Impacts

2.1 What activity do you depend on for your livelihood?

2.2 What is your highest level of education completed?

2.3 In general, how would you describe your current living conditions?
   a. Poor         b. Satisfactory   c. Good         d. Very Good

2.4 Do you anticipate that this project will improve your living conditions?
   a. Yes         b. No

If yes, please state how?

2.5 How do you think the population of the area will change with the development of the Eldoret Industrial Park?
   a. Increase   b. Decrease   c. Both

Explain your answer in 2.5 above.

2.6 How will the population change in 2.5 impact the area?
2.7 In your opinion what are the three major economic challenges of this area that the Eldoret Industrial Park will address?

a. 

b. 

c. 

2.8 What do you think needs to be done to ensure that the proposed Eldoret Industrial Park produces high economic benefits to the neighboring communities?

a. 

Section Three: Environmental Characteristics and Impacts

3.1 What are the common environmental challenges in this project area?

3.2 Do you know of any specific environmental feature in the project area that needs to be considered during the construction phase and the operation phase of the project?

If yes, please mention them:

a. Construction phase:

b. Operation phase:

3.3 In your opinion do you think the construction and operation phase of this project will interfere with the environmental attributes of the surrounding area?

a. [Yes] b. [No]
If yes to 3.3, please state how:

a. Construction phase  
b. Operation phase  

3.4 Do you think the surrounding farm lands will be affected?  

a. [Yes]  
b. [No]  

If so, please state how  

3.5 What do you suggest should be done at the planning stage to increase positive environmental impacts?  

3.6 What do you suggest should be done at the planning stage to minimize negative environmental impacts?  

4.0 Section Four - Additional comments  

If you have any additional comments please list them here:  

Name:……………………………………………………  

Signature:………………………………………………  

Date:……………………………………………………
INDUSTRIAL & COMMERCIAL DEVELOPMENT CORPORATION (ICDC)

DESIGN AND DOCUMENTATION OF THE PROPOSED ELDORET INDUSTRIAL PARK ON BLOCK 15/1757, ELDORET MUNICIPALITY

ELDORET ICDC INDUSTRIAL PARK MASTER PLAN

Development Control Guidelines Manual

1.0: DEVELOPMENT CONTROL GUIDELINES

The guidelines adopted for regulating land use and development in the industrial park conform to the Kenya Constitution 2010, the National Land Policy (Sessional Paper No. 3 of 2009), and the Physical...
Planning Act Cap 286. They also conform to zoning guidelines applicable in Uasin Gishu County. Innovative guidelines are proposed for emerging industry clusters such as steam and boiler plants; waste recycling plant and recreational parks.

These guidelines are intended to promote compatibility of land uses, guidance of building design, aesthetics and more importantly order and character of physical development. Nevertheless, they allow individuality of building character, while maintaining a sense of overall harmony throughout the project and its adjacent developments. In addition, the guidelines also define how buildings complement each other through coordination of footprint size, placement, materials, colors, building mass, height, and spatial articulation.

It is important to note that due to the project’s proximity to residential areas, special attention is given at all times to pollution control and building sound attenuation. Essentially, these development control guidelines reflect the vision and spatial objective of the Master Plan; thus all developments shall be expected to comply with them. In order to promote harmonious development, use and enhancing of property values within the park, there shall be need to enforce the development control measures which will form part of the lease agreement. The specific guidelines are presented in subsequent sections.

1.1.1: Land Use

The land uses allowable within the park shall be those outlined in the Master Plan – industrial, commercial, recreational park, green/opens space infrastructure, and utilities and amenities. For purposes of incompatibility, social nuisance and space demands, the following uses are prohibited from the industrial park: the tannery and animal slaughtering, fertilizer production and commercial land uses such as: adult entertainment facility, casino and commercial entertainment facility, outdoor commercial recreational facility, night clubs, religious assembly, warehouse sales, spectator sports facility and fleet management. In addition to the guidelines in this Master Plan, individual developers within the park shall be expected to conform to all policy and legal provisions guiding approval of developments in Uasin Gishu County jurisdiction.

1.1.2 Plot Densities

The allowable plot density shall include and conform to the following:

- Plot coverage of 75%
- Plot ratio: commercial-300%, and industrial-75%.
- Front setback: 9M for all plots except ICDC Complex that will have 10.5M
- Side setbacks: 4.5M
- Rear setbacks: 6M
- Building heights: Industrial prototypes: 1 floor and a mezzanine with the commercial being 4 floors

1.1.3 Easements

The plots abutting the park’s perimeter wall shall be subject to an easement of 1.5m from the plot boundary for purposes of development of a green buffer along the perimeter. On the same morality, lots front service roads shall be subject to easements not exceeding 1.5 metres for purposes of infrastructure reticulation should such a need arise.

1.1.4 Water harvesting
Each industry shall provide for on-site water harvesting facilities with minimum capacity of 10000 litres. This water shall be utilized for non-potable purposes.

1.1.5 On-plot waste management

Each plot shall have at least one trash enclosure with design specifications as prescribed under the waste management strategy for plot level solid waste management – refer to section 4. There shall also be provision for plot level grey water recycling and pretreatment of industrial waste prior to discharge into the main sewer. Generally, industrial trash enclosures shall observe some generic requirements as indicated below:

- Each industry shall be expected to have at least two trash enclosures. The maximum number will depend on waste volumes generated.
- Trash/recycle enclosures should be located to allow for convenient access.
- Enclosures should not be blocked with parking spaces or interfere with on-site circulation.
- Trash/recycle enclosures shall be constructed with masonry walls and the enclosure gate shall be metal with heavy-duty hardware. The use of chain link is not permissible for such fencing. Finishes and colors for enclosures shall be compatible with that of surrounding buildings.
- Trash/recycle enclosures shall include provisions for concrete stress pads to reduce pavement damage from disposal trucks.
- The height of trash/recycle enclosures shall be at least 6 feet and should be adequate to conceal its contents.

1.1.5 Plot Boundaries that need Retaining Walls

Based on the site location of the industry relative to slope and geology, plots on the western stretch of the park and those near areas of cut and fill shall be developed with retaining walls in their foundation details.

1.1.6: Way-leave Reserves

All developments within the park shall adhere to the proposed 3-tier structure of way-leave reserves of 30m, 20m and 15m. This will enable easy movement of people and heavy trucks, storm water drainage, conveyance of industrial effluents, laying out of sub-systems like water mains, electrical cables, and gas mains but also for curb parking, where necessary.

1.1.7: Parking

Parking shall only take place in designated parking zones; parking is prohibited on the roadway or by the side of another parked vehicle (double parking), on crosswalks, on sidewalks, in front of driveways, along curbs painted yellow or where "no parking" signs are posted, within intersections or in such a way that the vehicle obstructs or creates hazardous conditions for other vehicles.

1.1.8: Building Form and Character

Building designs within the park shall provide visual interest to the street through active building façades - predominantly glazed and with visible access points or openings. These are creative solutions that engage and respect the streetscape. Glazing shall enable day lighting of customer service areas and also provide surveillance of the street. Building entries should be clearly visible from the street and provide intuitive way finding for visitors and present a positive corporate image. Canopies and solar shading devices which play an important role in the character of a facade shall be utilized and thoughtfully integrated into the
facade as required on the street-level elevations. Further, the use of repetitive design elements on the buildings is also encouraged to create rhythm and re-enforce the cohesion of related cluster of buildings. Figure 8 illustrates how the use of various building heights shall create an appealing character.

Varied building Heights Create Architectural Character and Harmony

1.1.9: Building Materials

Building materials used shall be structurally sound, durable, harmonious with the landscape, be of high quality and aesthetic.

These materials include concrete and concrete blocks, glass, brick, natural stone and timber. The selective use of mirrored glass shall be allowed to create geometric masses.

Essentially, building materials and finishes shall take into consideration the following factors: Suitability to the location and exposure to view from the street and adjacent open areas, thermal insulation properties, reflectivity, maintenance, durability and life cycle expectation, embodied energies of fabrication, assembly, transport, and re-use, Textural aesthetic quality and visual interest.

Specifically, the following regulations shall apply on building materials:

a. Foundations

The foundation of any building shall be designed to safely transmit all the loads from such building to the ground.

The foundations of every building shall be:

— So designed and constructed as to sustain the combined dead load of the building and imposed vertical and lateral loads and to transmit these loads to the ground in such a manner that the pressure on the ground shall not cause such settlement as may impair the stability of the building, or of adjoining works or structures; and

— Taken down to such a depth or be so designed and constructed as to safeguard the building against damage by swelling, shrinking or erosion of the subsoil.

— To structural engineers detail with a minimum depth of 1.2m.

b. Concrete works / Structural works

Ensure that all samples of aggregates, cements and reinforced concrete are transported for testing in due time. Samples for Finishes to concrete should be presented and approved before commencement of the
work and should be prepared according to the specifications provided by the Architect. Ensure appropriate use of reinforcement bars and formwork as specified in the specifications.

c. **Floors**

Floors of all buildings shall be strong enough to safely support their own weight and any other load they are likely to be subjected to.

Floor covering materials include: Stone covering, ceramic tiles; Cement smoothing, Asphalt, brick and concrete.

- The floor of any laundry, kitchen, shower-room, bathroom or room containing a WC pan or urinal shall be water-resistant.
- Any suspended timber floor in a building shall be provided with adequate under-floor ventilation.
- All floors should be fire resistant
- Where any concrete floor slab is supported on ground or filling, such floor shall be so constructed that any moisture present in such ground or filling is prevented from penetrating such concrete floor slab.

d. **Walls and Accent Features:**

Materials to be used include: Pre-cast concrete finished with coloured pigments, exposed aggregate, sand blasted finish, Metal panels and/or columns (aluminum or steel), Light color brick, Rock and Silver-gray colored tile and attached artwork, textured paint and/or render, Alucobond Framed panel cladding.

- Pack and transport for testing each type of brick, block or stone to be used in the work.
- Any wall shall be capable of safely sustaining any loads to which it is likely to be subjected and in the case of any structural wall such wall shall be capable of safely transferring such loads to the foundations supporting such wall.
- Masonry units, mortar and any other materials used in the erection of walling shall comply with the requirements for compressive strength as specified in the building code.
- Every external wall of a domestic, public or warehouse class building, including any parapet wall thereto, shall adequately resist the penetration of rain.

e. **Doors**

Doors to Emergency exits, electrical transformer rooms, plant rooms, refuse storage chambers and doors leading to similar types of utility rooms or chambers may open outwards over such a street if such doors when fully opened do not cause an obstruction to any person or vehicle using the street.

- Inspection doors shall have a minimum height of 1.4m and a minimum width of 600mm.
- Emergency doors shall have a minimum height of 1.8m and a minimum width of 500mm. In addition the emergency doors shall:- be located in a position readily accessible to rescuers; and bear on its outside face a notice in English and in Kiswahili in letters and characters not less than 25mm high:
- Any pane of glass installed in any door shall, where not made of safety glass, be not more than 1m² in area and shall have a nominal thickness of not less than 6mm; and where more than 1m², safety glass is required.

f. **Windows:**
Involve the use of energy-efficient glass, lightly reflective glass, Green tinted solar glass, Tinted bronze, blue, or green glass, Clerestory windows and Glass blocks.

- Every building within the park shall be provided with approved means of ventilation and shall have a sufficient number of windows suitably positioned for direct communication with the external air.
- Every habitable room shall have a window or windows opening directly into the external air, which shall have for the purpose of daylight, a total area exclusive of frames, equal to at least one-tenth of the floor area of such room.

g. Roofs

Involve the use of Light colored metal tile that reflects the high tech architectural style of the industrial Park and Slate roofing. Industrial typology roofs consist of a Series of pitched roofs one slope of which is steeper than the other. (Saw tooth roof). The roof of any building shall be so constructed such that it:

- Resist any forces to which it is likely to be subjected;
- Be durable and waterproof;
- Not allow the accumulation of any rainwater upon its surface; and
- Where a nominally flat roof of boarded or concrete construction is used it shall be provided with an impervious surface and laid to a fall of not less than 1 in 50.
- The material of the roof covering is determined by the angle of slope of the roof.

h. Boundary walls

The development of all plots within the industrial park shall include the provision of boundary walls, screen walls, fences or other means of enclosure of approved materials, construction and design.

- These Boundary walls shall be of such a height as prescribed by Uasin Gishu county that recommends a height of 2.4m
- All boundary walls and fences shall be constructed of sound approved building materials and shall be erected with sufficient supports securely fixed to ensure the stability of the structure.
- All walls and fences shall be erected in a vertical plane or as designed and approved, and fences shall be suitably finished with an approved preservative. See the boundary way details below:

Master Plan Boundary Wall Details- Wall with Signage Details

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1.1.10: Passive Design

The objective of passive solar design is to optimize passive solar gain and cooling that will improve overall building performance through energy efficient design. Therefore, all developments within the
park shall optimize the application of the following passive solar design principles: building orientation, shading, natural lighting, cross-flow ventilation and energy efficient lighting.

a. **Building orientation**: The orientation of buildings on the plot takes advantage of solar reception hence enabling natural lighting, ventilation, heating and cooling.

b. **Sun shading devices**: Street-facing facades, shall be prominently glazed and appropriately shaded from solar heat gain using external shading devices (overhangs, directional louvers and shutters). Sun shading devices have been provided for all openings exposed to solar heat gain.

c. **Natural lighting**: To achieve a suitable level of natural lighting of interior spaces, all openings shall be strategically placed. High-level (clerestory) operable windows and vent openings shall be provided within the industrial building typologies to ensure cross ventilation and day lighting. Natural daylight provides less heat gain than most types of artificial light for equivalent lighting levels. Skylights and Clerestory windows enable natural daylight to permeate the building without loss of privacy or usable floor space. Skylights admit daylight and distribute it evenly thereby saving energy and improving visual comfort levels.

d. **Cross ventilation**: Cross ventilation shall be achieved through Orientation of openings and provision of side setbacks that allow cross ventilation through secondary facades.

e. **Energy efficient lighting**: Involves the installation of high efficacy fittings and occupancy control systems designed to shift utility demand at off-peak hours.

**1.1.1: Building Site Planning**

The placement, orientation, and massing of the buildings within the park shall be in a manner to create visual interest, ensures efficient and optimum use of the development parcels, create aesthetically interesting and functional exterior spaces such as plazas, courtyards and pedestrian walkways, maximizes views to the open spaces, maximizes visibility from highways, and local arterials and enables the clustering of service and loading areas. All customer service areas and employee amenities shall be consolidated within the front building zone, and the operational area within the rear-building zone. Other site planning guidelines are discussed below.

**Building setbacks and layout**: The following setbacks have been adopted for the industrial building typologies: front setback of 10.5m, side setback of 4.5m and rear setback of 6m. The building setbacks have been established giving consideration to the following: Good streetscape outcomes, Adjoining properties and buildings, solar aspect, adequate natural lighting and breeze paths, Development form and Crime Prevention through Environmental Design (CPTED) principles.

**Loading, Service and Delivery Areas**: Loading, service and delivery areas for the industrial developments shall front the public street. These activities shall be screened from the showroom through extension of the building wall and recession of the loading and off-loading zone. Such a spatial arrangement maximizes site efficiency and minimizes the adverse visual impact of the service areas. However, all other service areas (treatment plants, generator rooms, transformer rooms, etc.) shall be accommodated on-site and screened from public view.

**1.1.12: Building Heights and Skylines**

Designing structures and building complexes with a variety of heights creates visual interest and minimizes monotony along the street frontage. Building heights shall conform to Uasin Gishu County physical planning regulations, which provide that commercial buildings should be four levels while industrial buildings, 1 floor and a mezzanine.

**1.1.13: Building Massing and Scale (Facade and Details)**
The design of the building façades and details shall convey a hierarchy of order, and create visual interest through the interplay of light, shadow, color and material texture. Building entrances shall be defined through the use of building recesses and projections. Building mass and fenestration design shall be in proper proportion and scale with the site, adjacent streets and developments. Window panels, reveals, recesses, projections and moldings shall be utilized to articulate the exterior wall surface - figure 9 illustrating successful examples of utilization of window panels, reveals, recesses, projections and decorative structures to segment and articulate exterior wall surface and 10 illustrating use of fenestrations, recesses and projections to articulate wall surface.

1.1.14: Building Colors

Colors incorporated in the developments shall be harmonious and complementary of each other and to adjacent buildings in general. Accent colors shall be used only to accentuate interest at focal areas and entries and to break monotony and minimize massive façade.

1.1.15: Roofs, Penthouses and Mechanical Equipment Screens

Buildings' roof designs shall be flat or pitched at 15% to reflect the contemporary character of the industrial park and visually integrated into the overall building form. The Rooftops contribute to the visual continuity of the industrial Park. Suitable solar panels and appropriately designed roof gardens shall be provided. Mechanical equipment and penthouses shall be properly screened using screens integrated with the building façade.

1.1.16: Crime Prevention

Building designs and landscape treatments within the industrial park shall be designed to address crime prevention through the following environmental design principles: Maximum passive surveillance of street and public areas, visible parking areas, limited and controlled building entries and exits, clear demarcation of public and private spaces, building setbacks, side service areas open to the street and predominantly glazed street facades to provide visual connectivity to the public zones.

1.1.17: Way-finding and Signage

Way finding refers to the orderly structuring of information and graphics hence enabling people to comfortably and successfully navigate a particular built environment. A successful way-finding program should be intuitive and self-navigable. Effective way finding is primarily achieved through the effective use
of signage, informational displays and kiosks, building and site layout, and other architectural indicators such as light, color, and materials. Way finding also includes audible communication, tactile elements, and provisions for other persons with disabilities. Functionally, way-finding means reaching a destination within an acceptable amount of time and energy. Finally, way finding encourages accessibility and public safety, focusing on all modes of transportation, by foot, bicycle and automobile, reducing accidents and liability.

The way finding model is based upon many criteria, such as the arrangement of buildings and facilities, the use / purpose of the facilities, spatial layout and environment, the appearance, the location and number. Signs shall be incorporated into the architectural character of the park and compatible with the architectural design of the building with which they are associated. Their design, size and appearance shall be consistent throughout the Park. They shall also be located in a manner that maintains the safety and efficiency of vehicular and pedestrian circulation within the Park. The number of signs permitted within the park shall be limited to reduce the impact of “visual clutter.”

Hierarchy of Signs systems shall be designed to lead the user from arterial access road and collector the Primary Industrial Stand Access (PISA), to feeder the Secondary Industrial Stand Access roads (SISA) to drop-off and parking areas, and then to major building entry points. This hierarchy shall include the following types of signs:

- **Primary Entry Signs** – Main identification signs within signature entry nodes identifying major entries to the industrial park
- **Secondary Entry Signs** – Located at secondary entrances to the industrial Park.
- **Building Identification Signs at Street Frontage** - Building identification at entries to primary development areas from primary and secondary roadways.
- **Building Identification Signs On-Site** – Secondary building name identification at the entrance to a private drive serving only that building or at the drop-off area of the building.
- **Directional Signs** – Limited to the identification of functions and/or services. May contain directional arrows or information such as handicapped parking, visitor parking, loading and off-loading areas.
- **Building Wall Signs** – Used to identify building tenants in each development parcel. More appropriate for multi-tenant and assembly and manufacturing areas. Buildings located in the Project Area or within Research Park land uses are not allowed to have wall signs.
- **Industrial Park and Building Directories** – Includes maps and listings of all buildings within the Eldoret Industrial Park in special directories and building directories located inside multi-tenant buildings.
- **Pedestrian and Bicycle Pathways** – Includes signs along pedestrian and bicycle pathways which provide direction to common destinations.

Generally, numerous types of signage and way finding techniques shall be utilized in the industrial park. These include: architecture and landscape architecture features, static signage, variable message signs, informational kiosks and displays and the internet. Way finding and signage system shall be articulated by two categories of signs: Identification Signs and Way finding Signs (Vehicular & Pedestrian). Identification signs shall include site identification signs, zone/district identification signs, building identification signs and parking identification signs while pedestrian signs shall be used to direct pedestrian traffic to specific destinations within the industrial park, including: sites, facilities and parking. These are discussed in detail below.

a. **Agro Industrial Park Identification (A1-A2)**

Site Identification signs serve to identify a “stand alone” area that encompasses multiple buildings within a site. It is located perpendicular to major roadways. Site identification signs include primary and
secondary park entry sign markers. Primary park entry sign markers (A1) are located at the main entrances to the park (12m long X 0.8m deep X 3.2m high) while secondary park entry sign markers (A2) are located at the secondary entrances to the park (6m long X 0.5m deep X 2.2m high).

Figure 18: Primary park entry sign markers (A1)

b. Clusters Identification (B1-B2)

Shall either be wall free standing (B1-1m high) or wall mounted (B2-mounted at least 1m from ground level). Identifies the clusters. Located at the boundaries of Clusters, roadside and pedestrian paths.

c. Building Identification (C1-C5)

Building Identification signs shall be used to identify individual buildings and structures within the park. They shall provide information on the building number / code and official name. They may be wall mounted (C1-C4) or free standing (C5-1.35m high). The size of the sign is intended to be consistent
with the height and location of the building, with the tallest
signs being C1, for multi-story buildings, and C4, for the
smallest buildings in the park. Building Identification signs
shall be located in close proximity to the associated building,
perpendicular to the Primary Industrial Stand Access (PISA
and the Secondary Industrial Stand Access roads (SISA)
roadways as well as pedestrian pathways within the park.

d. Parking Identification (D1)

Parking Identification signs (D1-2.4m high) are intended specifically for the identification of surface lots
and parking structures. They provide information on the type of vehicle / car park area (e.g. Private,
Public, Loading Zone, etc.) These signs are located at the primary vehicular entrance of a parking area,
using multiple signs where appropriate. Larger parking identification signs are used along major
roadways, and the smaller signs along minor roadways, and are positioned perpendicular to the roadway.
e. **Vehicular map/directory (E1)**

This is a Major directory sign (map and building list)-2.7m high. It is located at the main vehicular entrances to the park and major public spaces.

![Vehicular Map/Directory (E1)](image)

f. **Vehicular Directional Signs (E2, E3, E4)**

Vehicular directional signs shall serve to direct traffic within the the park and identify land use zones/districts. These signs shall be located perpendicular to the roadway, in areas outside land use zones/districts, at roadides and at major intersections between 2 or more main roads. Primary Vehicular Directional signs (E2-3.85m high) shall be located along the Primary Industrial Stand Access (PISA), where the viewing distance of the sign is more than 50m while secondary Vehicular Directional signs (E3-3.85m high) shall be used on the Secondary Industrial Stand Access roads (SISA) where the viewing distance of the sign is less than 50m. Secondary Vehicular Directional signs shall be used where it is necessary to direct vehicular traffic to multiple building entrances, specific parking and loading areas, within the site. These signs shall not to be used in lieu of Pedestrian Directional signs.
g. **Directional Signs (F1, F2, F3)**

Pedestrian directional signs shall be used to direct pedestrian traffic within the park, or a site, and shall be located at strategic locations where pedestrian paths cross, at major intersection points in-between clusters and within districts/zones or where multiple destinations are located. These signs shall be located adjacent to or within walkways, and shall be mounted to existing pole structures. Blades show directions to other clusters as well as major/main facilities within the clusters shall be located. In some cases, new poles shall be required where there are no existing poles. They may be free standing or wall mounted.
h. Kiosks/Orientation Maps (F4-2.4m high)

Orientation kiosks shall provide a visual map of the industrial park, oriented based on view, and serve to provide context and location of specific zones, buildings and service amenities. They shall be located at major/minor intersection points within a cluster, adjacent to bus stops along roadways and walkways. As the name suggests they can be mounted onto kiosks/ walls/ bus stops or be free standing. E1, F1 and F3 can also be variations of this signage.

Kiosks/orientation maps (F4)

i. Building Directory (F5-2.7m high)

Directories shall serve to identify occupants/tenants within a building. These signs shall be located adjacent to the primary entrance of a building and are intended to be visible from pedestrian walkways. Directories shall not be used for identification from vehicular roadways, although they may be seen from a roadway. Directories shall not be used in lieu of Building Identification Signs, but shall provide additional information for pedestrians.
1.1.18: Landscaping Guidelines

a. Pedestrian walkways: Pedestrian walkways in the industrial park shall be designed to create an experience of landscape exploration for their users; this shall be achieved by making routes as scenic as possible and providing nodes and opportunities for resting along the pedestrian routes. They will conform to the following development control guidelines.

- Create opportunities for shaded seating along the way by providing seat walls, benches, lawns, berms and shade trees along the routes
- Interesting views shall be created along pedestrian walkways by use of vegetation, landscape features such as water bodies and monuments and art.
- Pedestrian walkways in public areas shall have a minimum width 2400mm to allow for smooth flow of pedestrian traffic and accommodate persons with disabilities
- Ramps as opposed to steps will be used in public spaces with abrupt change in gradient. The ramps shall have a maximum slope of 1:12
- Landscape amenities (waste receptacles, bicycle racks, lighting, shade structures) and Safe entry and exit points with high level of visibility for passive surveillance shall be provided
- Signage should be provided to indicate directions and distances to specific destinations.

b. Furniture: Basic landscape furniture shall form part of the components of the green infrastructure of the park. These basic landscape furniture include: seats, waste bins, lighting, shade structures, bicycle racks – see table 4.

Landscape Furniture

<table>
<thead>
<tr>
<th>Landscape furniture</th>
<th>Description</th>
<th>Guidelines</th>
</tr>
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</table>
| Seats               | Shall be provided in form of benches and seat walls | • All landscape seating (benches and seat walls) in the Eldoret Eco-Industrial park shall be provided in concrete form
|                     |             | • Landscape seating will be provided at intervals along the roadside green corridors, in open spaces and in the setbacks of individual plots |
c. **Fences, hedges and boundaries:** In addition to the primary functions of security, fences, hedges, and walls shall be used to give industries the desired character. Where feasible, they shall be used to convey public art. The specific guidelines for the fences and hedges are:

- Internally, 2.4m high walls part solid wall and part grill shall be used for separation of individual industries.
- Climbers and creepers shall be planted to soften the visual impact of the partition walls between industries.
- Where hedges are used to direct traffic, they shall be laced at the centre with barbed wire to increase their efficiency.

Waste bins  | Waste receptacles contribute to the overall cleanliness of public open spaces | The colours for landscape seating shall be limited to green, grey or brown colours

**Lighting**  | Nighttime lighting shall be provided in the park with the primary objectives of promoting nighttime functioning of space, security and also for aesthetics. | The distribution of waste bins in various part of the park should be based on intensity of use spaces. High activity areas should be supplied with more waste bins than low activity areas. Distribution of waste bins shall higher along pedestrian walkways, next to shops and close to locations of clusters of seats. Along streets and pedestrian routes, distribution of waste bins shall not exceed a distance 100m apart.

- A consistent theme for the lighting fixtures shall be maintained across all open spaces (central recreational park, streetscapes and individual lots).
- During design of outdoor lighting, daytime appearance of the lighting fixtures shall also be considered.
- Lighting fixtures shall be fully shielded or utilize use horizontal lamps to control light pollution by limiting spread of light into areas where the light is not required.
- Solar lighting shall be utilized for outdoor lighting in the entire

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**Public art:** The main form of art in the open spaces of the park shall be sculptures, monuments and wall murals. But whenever possible, art shall be incorporated into other elements of the landscape such as pavements, walls, fences and vegetation. Landscape furniture also presents a good opportunity for incorporation of public art in the landscape. Public art shall conform to the following guidelines:
Landscape art shall be located in visually explicit locations in the landscape, where it can be easily noticed and appreciated.

Art forms used in the landscape shall be designed to be as durable and vandalism proof as possible.

Priority shall be given to art forms that require minimal maintenance.

e. **Vegetation:** Vegetation shall be utilized in Industrial park to provide shade, modify the micro-climate, improve the air quality in the park though reduction of pollution, define spaces, direct traffic and enhance the visual aesthetics of the park. Planting of vegetation in the park shall conform to the following guidelines;

- Indigenous vegetation species shall be planted in the park. Exotic species may only be used for functions where native equivalents are not available.
- Planting in all the public areas of the industrial park (central open space, road reserve, power way leave, and parking) shall be coordinated and managed by the park management.
- Planting within individual spaces in the park shall conform to the overall planting design theme to maintain a coherent/consistent image.
- A planting palette below specifies the type of plants species allowable in the park.

### PLANTING PALETTE

**Trees**

<table>
<thead>
<tr>
<th>NO.</th>
<th>Scientific name</th>
<th>Common name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Spathodea nilotica</em></td>
<td>Nandi flame</td>
<td>Colourful deciduous tree native to the Kenyan highlands. Makes a good shade tree</td>
</tr>
<tr>
<td>2.</td>
<td><em>Calodendrum capense</em></td>
<td>Cape chest nut</td>
<td>Colourful indigenous shade tree</td>
</tr>
<tr>
<td>3.</td>
<td><em>Ficus elastica</em></td>
<td>Rubber plant</td>
<td>A large evergreen tree with air purification abilities and good shade throughout the year. Has invasive roots hence should be planted in open spaces away from structures</td>
</tr>
<tr>
<td>4.</td>
<td><em>Ficus benjamina</em></td>
<td>Weeping fig</td>
<td>A large ornamental tree that has a good shade air purifying properties too. Has invasive roots, should be planted away from structures</td>
</tr>
<tr>
<td>5.</td>
<td><em>Casuarina equisetifolia</em></td>
<td>Whistling pine</td>
<td>Good for filtering dust, particulate and noise due to fibrous foliage. Plant along buffer zones, and boundaries to filter both noise and particulate pollution from industries</td>
</tr>
<tr>
<td></td>
<td><strong>Scientific Name</strong></td>
<td><strong>Common Name</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>---</td>
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<td>----------------</td>
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</tr>
<tr>
<td>6.</td>
<td><em>Chamaedora seifrizii</em></td>
<td>Bamboo palm</td>
<td>A small palm tree that possesses air purifying properties</td>
</tr>
<tr>
<td>7.</td>
<td><em>Croton megalocarpus</em></td>
<td>Croton</td>
<td>A shade tree that is well adapted to highland climate. The spreading canopy makes it ideal for areas such as parking lots</td>
</tr>
<tr>
<td>8.</td>
<td><em>Schefflera arboricola</em></td>
<td>Dwarf umbrella tree</td>
<td>A good accent plant. Can also be grown in pots in interiors due to high air purification properties.</td>
</tr>
<tr>
<td>9.</td>
<td><em>Moringa oleifera</em></td>
<td>Croton</td>
<td>A deciduous tree of high medicinal value. The seeds aid in purifying standing water by promoting sedimentation and removing harmful bacteria and viruses. Plant along ponds and swales</td>
</tr>
<tr>
<td>10.</td>
<td><em>Jacaranda mimosifolia</em></td>
<td>Jacaranda</td>
<td>A large deciduous shade tree. Colourful ornamental when in full bloom</td>
</tr>
<tr>
<td>11.</td>
<td><em>Filiciun decipiens</em></td>
<td>Thika palm</td>
<td>An evergreen drought resistant tree, plant for shade</td>
</tr>
<tr>
<td>12.</td>
<td><em>Bambusa vulgaris</em></td>
<td>Bamboo</td>
<td>A good plant for stabilizing slopes that are prone to erosion</td>
</tr>
<tr>
<td>13.</td>
<td><em>Terminalia spinosa</em></td>
<td>Umbrella tree</td>
<td>Provides shade without killing lawns beneath it. Good shade tree for areas with grass lawn</td>
</tr>
<tr>
<td>14.</td>
<td><em>Dracena steudneri</em></td>
<td>Dracena</td>
<td>A multi-stemmed tree that makes a good accent plant</td>
</tr>
<tr>
<td>15.</td>
<td><em>Cupressus sempervirens</em></td>
<td>Italian cypress</td>
<td>Has a columnar form, makes a good plant for planting in rows especially where one desires to direct views. Good filter for noise and dust. Best planted along buffer zones to filter out noise and dust</td>
</tr>
<tr>
<td>16.</td>
<td><em>Cereus peruvianus</em></td>
<td>Giant cactus</td>
<td>Has a sculptural form making it a good accent plant</td>
</tr>
<tr>
<td>17.</td>
<td><em>Markhamia lutea</em></td>
<td>Markhamia</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td><em>Senna spectabilis</em></td>
<td></td>
<td>Has showy flowers which make it a spectacular ornamental tree. Its spreading canopy makes it suited for areas where shade is crucial like parking lots</td>
</tr>
</tbody>
</table>
### Shrubs

<table>
<thead>
<tr>
<th>NO.</th>
<th>Scientific name</th>
<th>Common name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Aglaonema modestum</em></td>
<td>Chinese evergreen</td>
<td>These plants are known to remove most of the volatile organic compound (VOCs) and chemical pollutants such as formaldehyde, benzene and carbon dioxide found in the environment. The plants (mostly shrubs and bedding plants) can be grown either in planting beds or containers in both indoor and outdoor areas.</td>
</tr>
<tr>
<td>2.</td>
<td><em>Anthurium andreanum</em></td>
<td>Anthurium</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td><em>Dendranthena grandiflora</em></td>
<td>Chrysanthemums</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td><em>Dffenbachia spp.</em></td>
<td>Dumb canes</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td><em>Draceana Marginata</em></td>
<td>Red edge draceana</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td><em>Gerbera jamesonii</em></td>
<td>Gerbera daisies</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td><em>Philodendron bipinnatifidum</em></td>
<td>Elephant’s ear</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td><em>Sansevieria trifasciata</em></td>
<td>Sanke plant/Mother inlaw’s tongue</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td><em>Spathiphyllum spp.</em></td>
<td>Peace lilies</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td><em>Bougainvillea spp.</em></td>
<td>Bougainvillea</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td><em>Opuntia ficus indica</em></td>
<td>Cactus</td>
<td></td>
</tr>
<tr>
<td>NO.</td>
<td>Scientific name</td>
<td>Common name</td>
<td>Use</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------</td>
<td>------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>13.</td>
<td>Monstera deliciosa</td>
<td>Split leaf philodendron</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Chlorophytum comosum</td>
<td>Spider plant</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Nephrolepis exaltata</td>
<td>Ferns</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Asparagus densiflorus</td>
<td>Foxtail fern</td>
<td>Best grown in pots/planters</td>
</tr>
<tr>
<td>17.</td>
<td>Euphorbia pulcherrima</td>
<td>poisenntia</td>
<td>Does well as both a small tree/shrub outdoors as well as a potted plan indoors</td>
</tr>
<tr>
<td>18.</td>
<td>Podophyllum syngonium</td>
<td>Arrow head plant</td>
<td>A colorful bedding plant</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Best grown in containers, or small planters</td>
</tr>
<tr>
<td>19.</td>
<td>Typha latifolia</td>
<td>cattail</td>
<td>Suitable plants for ponds and swales</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Apart from enhancing visual aesthetics of ponds, these plants play a role in purifying the water, and in flood and erosion control</td>
</tr>
<tr>
<td>21.</td>
<td>Colocasia esculenta</td>
<td>Taro</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Nymphae spp.</td>
<td>Water lilies</td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Pennisetum alopecoides</td>
<td>Fountain grass</td>
<td>Ornamental grasses are available in a variety of colours, texture and growth forms</td>
</tr>
<tr>
<td></td>
<td>(and other ornamental grasses)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ground Covers & Creepers**

<table>
<thead>
<tr>
<th>NO.</th>
<th>Scientific name</th>
<th>Common name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Hedera helix</td>
<td>English ivy</td>
<td>Plant on walls as creeper to soften visual impact of hard surfaces</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Has air purifying properties</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Can be planted both indoors and outdoors</td>
</tr>
<tr>
<td></td>
<td>Common Name</td>
<td>Scientific Name</td>
<td>Plant Type</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------</td>
<td>---------------------------</td>
<td>------------</td>
</tr>
</tbody>
</table>
| 2 | Money plant                 | *Scindapsus aureus*       | A trailing plant with air purifying properties  
Best if planted in pots, containers or planters and allowed to trail |
| 3 | Trailing lantana            | *Lantana montevidensis*   | A colourful ornamental trailing plant that can also be used as a ground cover  
Can be planted in containers as well as planting beds |
| 4 | Fire cracker plant          | *Russelia equisetiformis*  | A colorful ornamental with an arching form that creates an over spilling effect  
Best planted in on raised containers / ground due to the spilling form |
| 5 | Bougainvillea               | *Bougainvillea spp.*      | Can be grown either as a small tree, a shrub a ground cover or a trailer  
Drought resistant and performs well in a wide range of climatic conditions |
| 6 | Cat's tail plant            | *Acalypha hispaniola*     | Colourful ground cover |
| 7 | Jelly bean plant            | *Sedum rubrotinctum*      | Colourful ground cover |
| 8 | Lavender cotton / grey santolina | *Santolina chamaecyparisus* | Hardy ground cover |
| 9 | Calico plant                | *Alternathera ficoidea*    | A hardy ground cover available in a variety of colours |
| 10| Kikuyu grass and Bermuda grass (Lawn grass) | *Penisetum clandestinum Cynodon dactylon* | Drought resistant varieties that can withstand high pedestrian traffic levels  
Plant in open green spaces as lawn |