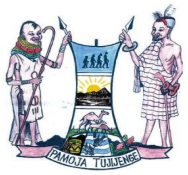
TURKANA COUNTY GOVERNMENT

Ministry of Lands, Physical Planning, Housing and Urban Areas Management

INTEGRATED STRATEGIC URBAN DEVELOPMENT PLAN FOR LODWAR TOWN 2011-2030



INTEGRATED STRATEGIC URBAN DEVELOPMENT PLAN FOR LODWAR TOWN 2011 – 2030

REPORT

FOR
THE PERMANENT SECRETARY
MINISTRY OF LOCAL
GOVERNMENT

ON BEHALF OF
MUNICIPAL COUNCIL OF LODWAR
P.O. BOX 30004-00100
NAIROBI

BY
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NOVEMBER, 2013

FOREWARD

Urbanization is the process by which large numbers of people become permanently concentrated in relatively small areas, forming cities, just like the case of Lodwar Town. In such concentrations, people have needs that must be satisfied - they need housing; jobs; education; opportunities for recreation; transport; and basic services like water, electricity, clean air and health care. That notwithstanding, while for instance houses must be built for the population, they cannot be provided in a swamp; or an area that is unsuitable for housing development because of its terrain, vulnerability to natural or other disasters, or inability to physically support the building; or in an area that endangers the health and safety of the occupants or other members of the public.

As aforementioned, Lodwar Town needed to be provided with both a technical and spatial framework to accommodate all its needs. This would only be achieved through Land Use planning, which refers to the process by which land is allocated between competing and sometimes conflicting uses in order to secure the rational and orderly development of land in an environmentally sound manner to ensure the creation of sustainable human settlements. In so doing, the Integrated Strategic Urban Development Plan for Lodwar (2011 -2030) culminated into two twin functions of Development/Land use Planning and Development Control.

This Integrated Strategic Urban Development Plan for Lodwar (2011 -2030) is a long term plan for Lodwar Town. It is going to be the software for delivering its urban development. It is going to provide a structured framework for coordinating and integrating sectoral plans and activities, and support the systematic implementation of urban development programmes. In addition, it is going to provide a platform for mobilization for public participation in urban development, while also seeking to optimize resource allocation and utilization. The plan intends to promote individual initiatives while safeguarding public interest. Above all it is going to be an instrument for initiating, guiding, monitoring and appraising urban development activities.

I take this opportunity to commend the good work exhibited in the development of this plan. I am confident that for the next twenty or so years, management of Lodwar Town will have in its possession, a document of repute that will help it in guiding all spatially-related developments without any hitches of conflict.

His Excellency Josephat Koli Nanok

Governor, Turkana County

PREFACE

The Constitution of Kenya (2010) ushered the Country into a new dispensation with two levels of governments. The advent of devolution made spatial planning a devolved function to the County Government. Thus planning at the County level is a requirement under the constitution of Kenya and subsidiary legislation such as the County Government act (2012), Urban Areas and Cities Act (2011) – where the preparation of Lodwar Integrated Strategic Urban Development Plan (ISUDP) draws its legal mandate.

Being the first Integrated Strategic Urban Development Plan for Lodwar town, that was prepared through stakeholders' inclusive and participatory process, I believe it will help us provide a spatial framework that will guide, order, coordinate development activities on our space within the precinct of the Planning area. It is my hope that the Plan will be used by all as a working planning tool for development control and creation of harmony among different land use in the fast growing Lodwar as a County headquarters and commercial hub.

I wish to thank all stakeholders that were involved in the spatial plan preparation process and it is my hope that they will fully support the plan implementation.

H. E. Peter Ekai Lokoel

Deputy Governor,

Turkana County

ACKNOWLEDGEMENT

This Integrated Strategic Urban Development Plan is a product of long, intensive and participatory consultative process of stakeholders drawn from key sectors captured by the plan and the planning area community members.

The Turkana County Ministry of Lands, Physical Planning, Housing and Urban Areas Management do acknowledge and registers appreciation to all those who relentlessly gave their time, technical spatial insights and local social – dimension context of planning area. In particular, we acknowledge the planning team under International Project Planning and Management Consultants, the Turkana County Inter-ministerial Technical Committee on review of Lodwar Town Integrated Development Plan consisting of Chief Officers drawn from Turkana County Ministry of Transport, Roads & Infrastructure, Finance & Planning, Energy, Environment & Natural Resources, Pastoral Economy & Fisheries, County Assembly Committee on Finance & Planning , without forgetting technical staff from the County Ministry of Lands, Physical Planning and Urban Areas Management.

Finally, the Ministry acknowledges all development oriented agencies, institutions, individuals, Physical Planning and Engineering consultancy firm's representatives who immensely contributed and participated in the preparation process of Lodwar Integrated Strategic Urban Development Plan.

Mr. Mark Ewesit Ewoi,

Chief Officer, Ministry of Lands, Physical Planning, Housing and Urban Areas Management

PLAN APPROVAL

This plan has been prepared, publicized and circulated as per the requirements of the new Constitution of Kenya 2010, Urban Areas and Cities Act 2011, Physical Planning Act (Cap 286) of the laws of Kenya. This Plan has fulfilled the statutory requirements and is hereby approved

CERTIFIED

Sign .....Date 22/12/2015

Hon. Patrick Ekuwa Imana, Chairman, Finance, Planning and Trade Committee

Sign .....Date 22/12/2015

Mr. Mark Evesit Ewui, Chief Officer, Ministry of Lands, Physical Planning, Housing and Urban Areas Management

Sign .....Date 22/12/2015

Hon. June Ajele, CEC Member - Lands, Physical Planning, Housing and Urban Areas Management

APPROVED

Sign .....Date 22/12/2015

H.E. Josephat Koli Nanok, Governor, Turkana County

Approved Development Plan No: 023/PP/01/2015

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EXECUTIVE SUMMARY

The Integrated Strategic Urban Development Plan for Lodwar (2011 -2030) is a long term plan for the Lodwar town recommending a spatial framework to guide and control development for a period of 20 years. The planning area for Lodwar-ISUDP (2011-2030) covers 70 km^2 of the total size of the existing town. This plan has been prepared pursuant to the new Constitution of Kenya 2010, Urban Areas and Cities Act 2011, Physical Planning Act (Cap 286) ï section 24, 25, 26, 27 and 28 and the second schedule, Physical Planners Registration Act (no. 3 of 1996).

Lodwar town is located in Turkana County in the far North of the former Rift Valley Province along Kitale ï Lokichogio ï Juba (southern Sudan) route. Lodwar town served as the administrative headquarters of the former Turkana District. Currently it is the headquarters of the Turkana County Government. It was founded in 1919 as an army base of colonial Government and in 1993 Lodwar was elevated to an Urban Council and thereafter it became a municipality in 1997. As of the 2009 census Lodwar Municipality has a population of 58,218 and a projected population of 100,485 people by 2030. It mainly functions as an administrative, transport, communication and commercial centre.

Lodwar town lies in a plain that has some hills and inselbergs in an arid and semiarid environment with scattered shrubs. It has an altitude that ranges from 500 to 1,000 metres above sea level. The area experiences high temperatures throughout the year between 20^0 and 38^0 centigrade and receives rainfall that ranges between 200mm and 500mm annually, mainly in the months of April to August. The area consists mainly of seasonal rivers.

The main environmental concerns facing Lodwar include the encroachment of the riparian, encroachment of riverine forest, dust storms, the odd location of the airstrip, ponding and flooding, foul odour due to open defecation, and flooding of Kawalathe River.

Turkana county is predominantly inhabited by the Turkana community who live a predominantly pastoralist way of life. It is mainly composed of semi-permanent settlements, and few nucleated urban settlements. There are 11,437 households in Lodwar town and a household size of 5.1 persons**.**

Lodwar town is largely trust land, and currently it does not have strict zoning guidelines.

The existing educational institutions in Lodwar include 23 primary schools, 6 secondary schools and one university most of which have insufficient facilities are overcrowded and understaffed. Lodwar municipality suffers from inadequate public health care facilities, inadequate housing, an inadequate transport system, and a shortage of public recreational facilities. All utility services apart from water supply are inadequate or lacking.

Currently the Lodwar townôs capacities to analyze, formulate, and review policies and strategies relevant to its operations are limited due to insufficient staffing and lack of professional personnel.

The primary economic activities practiced in Lodwar Municipality include agriculture, livestock keeping, fish trading and mining.

To collect the needed input from the Lodwar people the consultant carried out stakeholder workshops, consultant-client forums and intra-consultant sessions. As a result of resident and stakeholder participation and an in-depth study of the area this comprehensive proposal for Lodwar town has been formed.

The ñGreen City in Sunny Lodwarò is expected to grow to be a competitive, inclusive, regional industrial, commercial and service city that provides quality and sustainable infrastructure, effective and efficient governance systems, optimum utilization of land resources and environment, and affordable decent housing and Social facilities and Services.

The growth of the City can be organized into 4 development zones namely across the bridge of Kawalathe, towards the upper grounds between the rivers, across the Turkwel River towards Kitale and, main Central Business District of Lodwar. Each of the zones should be planned on a mixed land use basis. Linking of the zones of the town with well integrated road system comprising motorized and non-motorized transport infrastructure is necessary. There should be clearly defined riparian areas reserved along the rivers for their protection and ensure constant water supply for the town by naturally recharging the water boreholes. The town cannot be served by one sewerage system but a number of them for each of the different growth areas. The hills present an opportunity for tree planting around them to enhance the beauty of Lodwar town and utilization as recreation parks.

Here presented in this report are four alternative growth models which include the Concentrated Model, the Dispersed Model, the Relocation Model and the Preferred Model, each with its advantages and disadvantages. Also included are proposals for the education, healthcare, housing, transport, utilities, economic, financial and investment management, environment, institutional framework and human resource sectors in terms of strategies and land requirements. There is also a proposal of how this ISUDP should be implemented.

List of Acronyms

ACC	-	Audit Committee of the council
BPO	-	Business Process off shoring
CBOs	-	Community Based Organizations
CCT	-	County Council of Turkana
CDDC	-	Community Development Departments of the Council
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
FBOs	-	Faith-Based Organizations
GDP	-	Gross Domestic Product
ISUDP	-	Integrated Strategic Urban Development Plan
KAM	-	Kenya Association of Manufacturers
KARA	-	Kenya Alliance of Residential Associations
KeNHA	-	Kenya National Highways Authority
KEPSA	-	Kenya Private Sector Alliance
KeRRA	-	Kenya Rural Roads Authority
KLGRP	-	Kenya Local Government Reform Program
KMP	-	Kenya Municipal Programme
KNBS	-	Kenya National Bureau of Statistics
KPLC	-	Kenya Power and Lighting Company
KRB	-	Kenya Roads Board
KRC	-	Kenya Railways Corporation
KURA	-	Kenya Urban Roads Authority
LAIFMOS	-	Local Authority Integrated Financial Operational and Management System
LASDAP	-	Local Authority Services Delivery Action Planning
LATF	-	Local Authorities Transfer Fund
LOWASCO	-	Lodwar Water and Sanitation Company
LOWRUA	-	Lodwar Water Resources User Association

LPDP	-	Local Physical Development Plan
MDGs	-	Millennium Development Goals
MoLG	-	Ministry of Local Government
MoWI	-	Ministry of Environment, Water and Natural Resources
MVOA	-	Matatu Vehicle Owners Association
NEMA	-	National Environmental Management Authority
NGOs	-	Non-Governmental Organizations
ODPM	-	Office of The Deputy Prime Minister
PPP	-	Public Private Partnerships
PTA	-	Parent-Teacher Associations
RAs	-	Resident Associations
REP	-	Revenue Enhancement Plan
RMLF	-	Roads Maintenance Levy Fund
RVWSB	-	Rift Valley Water Service Board
SBP	-	Single Business Permit
SPA	-	Service Provision Agreement
TOR	-	Terms of Reference
UDD	-	Urban Development Department
UfW	-	Unaccounted for Water
UMCDP	-	Urban Management Capacity Development Plan
WRMA	-	Water Resources Management Authority
WRMARO	-	Water Resources Management Authority Regional Office
WSP	-	Water Services Provider
WSRB	-	Water Services Regulatory Board
WSTF	-	Water Services Trust Fund

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PART ONE: INTRODUCTION

1.1 Background to Lodwar Municipality

Lodwar town is located in Turkana County in the far North of the former Rift valley province along Kitale ï Lokichogio ï Juba (southern Sudan) route. It lies approximately 696 kilometers and 520 kilometers North West of Nairobi and Nakuru respectively and only 70km from Lokichogio town. The town is located within the former larger Turkana District that borders internationally with Sudan in the North-West, Uganda in the west and Ethiopia in the north east. There is West Pokot to the South, Marsabit to the East and Samburu to the South East.

Historically, the town which was founded in 1919 as an army base of colonial Government also served as the administrative headquarters of the former Turkana District. In 1939 it became an administrative center for the British Colonial government to facilitate the administration of the vast remote north western Kenya region. In 1993 Lodwar was elevated to an Urban Council and thereafter to its current municipality status in 1997.

The town has seen drastic growth and expansion and now covers 706 sq km. Before the devolved system of governance, the town was composed of six civic wards namely Borabuyong, Kawalathe, Napuu, Kenyatta, Kanamkemer and Natotol, supporting a population of 58,218 according to the last census out of the Turkana Countyôs total population of 855,399 according to the 2009 national census data. This population comprises of 45,368 in the core urban area, 2,948 in the peri-urban area and 9,902 in the rural parts of the then municipality.

Lodwar town mainly functions as a commercial center serving other small centers in the Northern parts of the rift valley. Commercial activities include retail and whole sale shops and hotels. It is also the headquarters of Turkana County, one of the largest counties in the country.

In terms of geography, as part of the Great Rift Valley, Lodwar town lies in a plain punctuated with hills and inselbergs in an arid and semiarid environment with scattered shrubs. The area experiences high temperatures throughout the year between 20 and 38 centigrade and receives minimal rainfall, 200mm and 500mm annually, mainly in the months of April to August. In terms of drainage the area consists mainly of seasonal laggers except River Turkwel which drains into Lake Turkana. The Lake which provides fish and recreation is also fed by River Omo from Ethiopia currently causing concern in the human Rights fraternity due to the large dam being constructed on the Ethiopian side feared to eventually impact negatively upon the lake and the livelihoods of the inhabitants. *(See detailed analysis in - the Planning Area in Context and Situational Analysis sections of this report).*

1.2 Terms of Reference (ToR)

Preparation of the Integrated Sustainable Urban Development Plan (ISUDP) for Lodwar town was financed by The Government of Kenya, through The Office of The Deputy Prime Minister (ODPM), Ministry of Local Government (MoLG), Urban Development Department (UDD). It

was among the seven towns that benefited from this endeavor in the country including Mariakani Town Council, Busia Municipal Council, Meru Municipal Council, Kisii Municipal Council, Maralal Town Council, Bomet Town Council and Lodwar Municipal Council.

Pursuant to Physical Planning Act (1996), Section 24(2) ï Third Schedule, the development of ISUDP included; interpreting regional physical development policies in terms appropriate to the local areas; articulating the aims of the Government and Local Authority for the areas together with strategies, policies and general proposals which are intended to achieve those aims; providing a framework for detailed development policies and proposals for subsequent short-term plans for the area; indicating action area for immediate development or re-development; and providing a coordinated basis upon which various implementing agencies can develop their individual programmes of work for which they have executive responsibility, for example, housing, transportation, water supply, electricity supply, sewerage development, etc.;

International Project Planning and Management (IPPM) was contracted to pursue this assignment. As a prerequisite, Digital Topographical Mapping was first to be carried out so as to provide reliable digital maps, particularly for the planning purposes, and also to be used for infrastructure design and maintenance programs and to subsequently develop an ISUDP for Lodwar. In cognizance of Section 24(4) and the Second Schedule of the PPA (1996) the consulting team recognised that objectives of ISUDP for Lodwar town would include the following:-

i. To enhance and promote integrated development of socio-economic development activities in Lodwar;

ii. To provide and develop sustainable human environmental and resource system;

iii. To allocate sufficient space for all land-uses to ensure efficient operation and comfort of users and accommodate future growth. Ensure compactness of urban form and design of transport and communication network to enhance interaction while minimizing loss of open land, agricultural land, forest, wildlife (land and riverside), water catchment areas, etc.;

iv. To avoid juxtaposition of incongruous uses and bringing together spatially harmonious uses, or those whose combination will enhance special benefits;

v. To preserve and protect existing good features and fragile eco-system. This may often require removal of unsatisfactory features;

vi. To create a specific town character by different uses of topography and other natural features and by specific groupings of uses and densities;

vii. To provide a policy framework for socio-economic investments, economic use of space, infrastructure services and community facilities;

viii. To provide a framework of plan implementation, organization and administration structure requirement, and resources needed to implement the Plan.

The targets of this endeavor therefore were; to enhance and promote integrated development for socio-economic investment, to enhance economic use of space, infrastructure and services and community and community facilities; to help the respective Local Authorities to have reliable digital maps for the planning of their towns and for use in the infrastructure design and maintenance programmes; to provide a framework for investments and orderly development of towns and; to develop a framework for plan implementation

1.3 DELIVERABLES

In the strategic planning life cycle of this project Lodwar ISUDP (2011 ï 2030), this report formed part of level three deliverables; refer to *PART FOUR: OUTPUTS IN PERSPECTIVE (AS PER THE WORK PLAN)* in the inception report.

The report presents

- an overview of ISUDP programme at the MoLG in brief,
- the planning area in context,
- diagnostic evaluation of the various sectors including the physical characteristics, population and social profile, economic growth and development, financial and investment management, environmental issues, housing, transportation and utilities services ï water, sanitation, solid waste and storm water drainage.
- The sectoral proposals
- Project prioritization and implementation framework
- Zonal policy framework

1.4 METHODOLOGY

1.4.1 Sectoral Approach

The consulting team endeavored through a sectoral approach to arrive at this plan report. The methods used are described below.

Population and Social Background

Population characteristics of the area including total number, growth rate, density, age structure and projections were analyzed. Population and demand for community facilities, health education, recreation, employment and incomes, etc with a view to establishing current and future shortfalls to the year 2030 were related.

Local Economics

Economic activities (formal and informal) and their distribution, the employment and incomes generated by these economic activities, incidence of unemployment, and problems and constraints to growth (expansion and diversification) of economic activities were identified. The general landscape of land values and the land tenure system of Lodwar town was also analysed.

Finance and Investment

The financial policies and operations of the Lodwar Municipality to establish a basis for implementation of strategic investments that will eventually be recommended in this and other development plans for the town were analyzed. Major sources of the townôs revenue were identified; different purposes to which the town applies its revenue were also analyzed.

Environment

A baseline environmental survey was conducted so as to establish problems, bottlenecks and prevailing situation. The study also identified environmentally sensitive areas (wetlands, rivers/streams, and recreational parks)

Housing

An assessment of the housing situation, to identify housing problems and development constraints was undertaken.

Transportation

In the transport sector, the geo-spatial layout of Lodwar town is an assessment of the traffic generated and future traffic from the study area taking into consideration. Further, the effect of the planning proposals that will arise from this study, trip distribution and alternative modes of transport available within the study area were also assessed.

Water and Sanitation

The existing situation for water supply, sanitation, (sewerage disposal, storm drains and solid waste disposal) was reviewed and the current shortfalls and future demands for water supply, sewerage and solid waste management assessed.

Institutional Structures & Human Resource

The study focused on highlighting the capacity of the human resources involved in the implementation of the development plan and the institutional framework in which the implementation will take place. This necessitated the identification of institutions and human resource problems and opportunities that exist in Lodwar town.

1.4.2 Consultative Forums

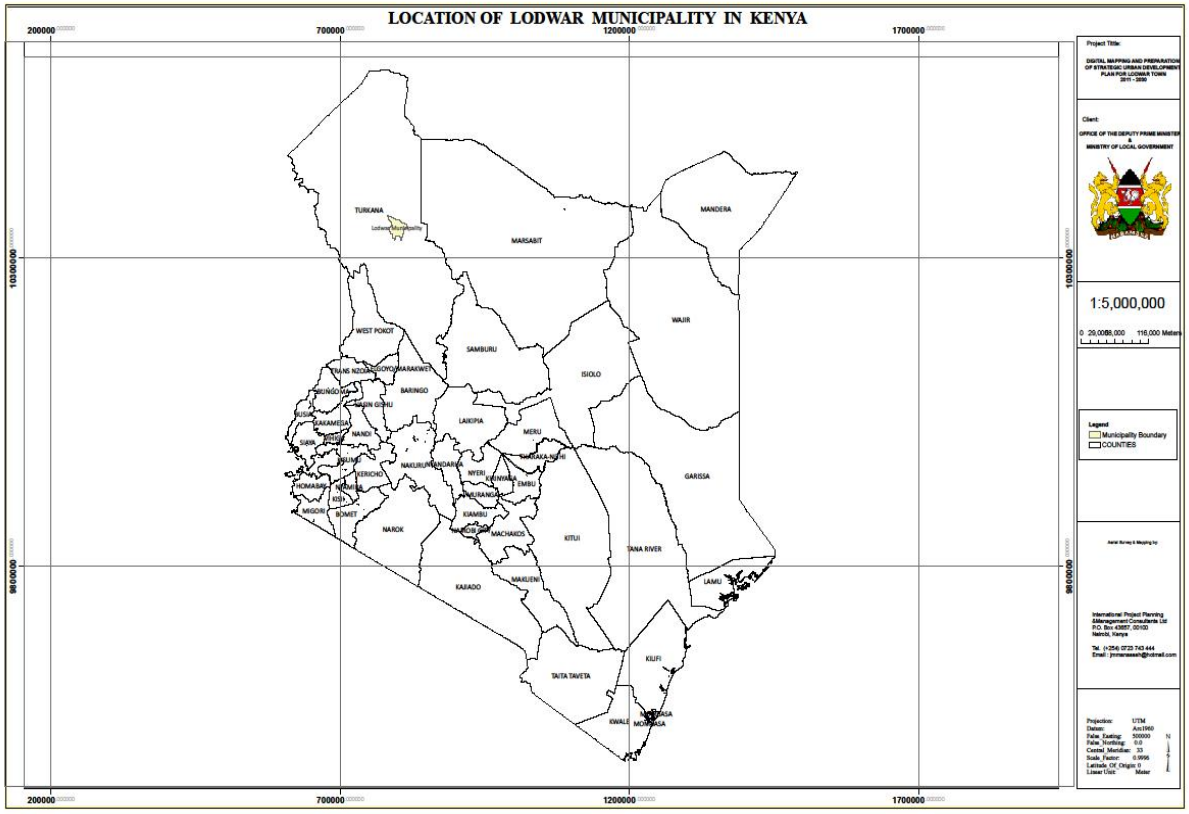
Stakeholder consultations through workshops as well as consultant-client forums and Intra-consultant sessions were an integral part of the planning process.

PART TWO: THE PLANNING AREA IN CONTEXT

2.1 National Context

Lodwar is located approximately 696 kilometers and 520 kilometers North West of Nairobi and Nakuru respectively and about 250km from the town of Lokichogio. The town is located within the former larger Turkana District that bordered internationally with South Sudan to the North-West, Uganda to the west and Ethiopia to the North-East, West Pokot to the South, Marsabit to the East and Samburu to the South East (Figure 2.1.1)

Figure 2.1.1: Map of Kenya Showing Position of Lodwar Municipality



2.2 Regional Context

In the current devolved governance, Lodwar town is situated in Turkana County in the North of the Rift Valley Province.

Turkana County forms part of the Arid and Semi Arid Lands (ASAL) of Kenya and the northern-most section of the Great Rift Valley system in Kenya. The county is situated in the North-Western part of Kenya to the west of Lake Turkana. The county borders Ethiopia to the North-East, Sudan to the North-West, and Uganda to the West. Within Kenya Turkana county also

borders the counties of Baringo and West Pokot to the South, Samburu to the South-East and Marsabit to the East as indicated in the Map below. The county is situated between Longitudes 34° 0ô and 36° 40ô East and between Latitudes 10° 30ô North and 5° 30ô North of the Equator.

Administratively the County comprises of Seven (7) Divisions, six (6) sub-counties, fifty-six (56) Locations and one hundred and fifty-six (156) Sub-Locations. The county area is served politically by six parliamentary constituencies.

Lodwar Town which is the largest town in the county, functions as the administrative, political and commercial centre of the Turkana County. In the former regimes it served as a District and County Council Headquarters for many years. It is currently the Headquarters of the new Turkana County under the devolved government system.

Lodwar Town also forms the regional transport and communication and commercial centre for the Turkana county area. It is connected by road to Kitale Town to the South, to the Republic of Sudan via Lokichogio and to Lokitaung to the north and Kalokol centre on Lake Turkana to the east. Lodwar is also linked by road to Baringo County to the South, and Maralal municipality in Samburu County. According to Kenyaôs Vision 2030, it is recommended that Lodwar be connected by Road and Rail transport corridor to the new Port to be built at Lamu to link with South Sudan. This is expected to open up trading and development prospects that will spur considerable investment and economic growth in Lodwar town and its county region as a whole. It will also help link Turkana County and Lodwar Town to the rest of Kenya and open up prospects for the economic and functional growth and expansion of the town in the wider international setting. (Figure 2.1.1a and 2.1.1b)

Figure 2.1.2a: Lodwar Municipality in Regional Context

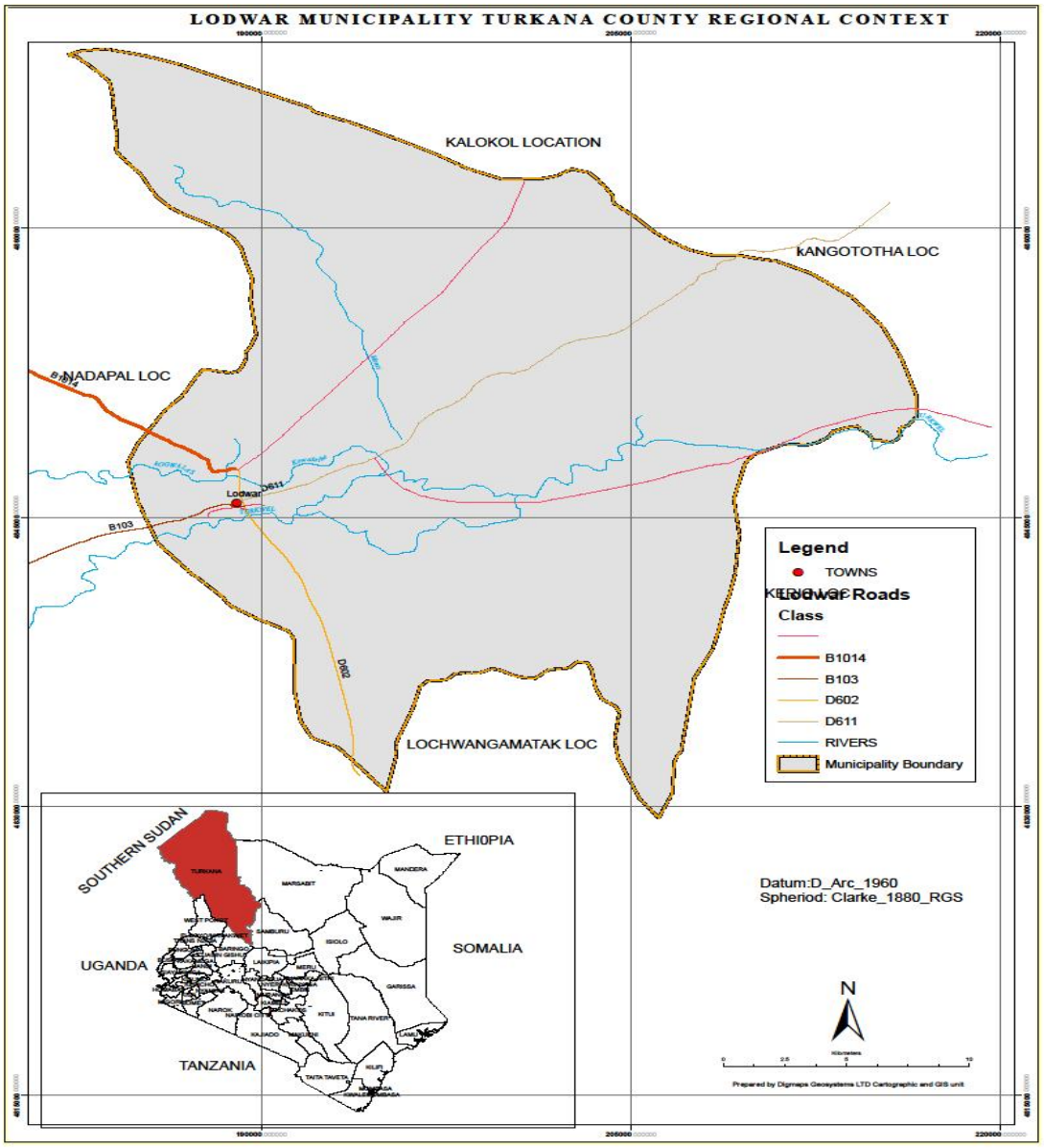
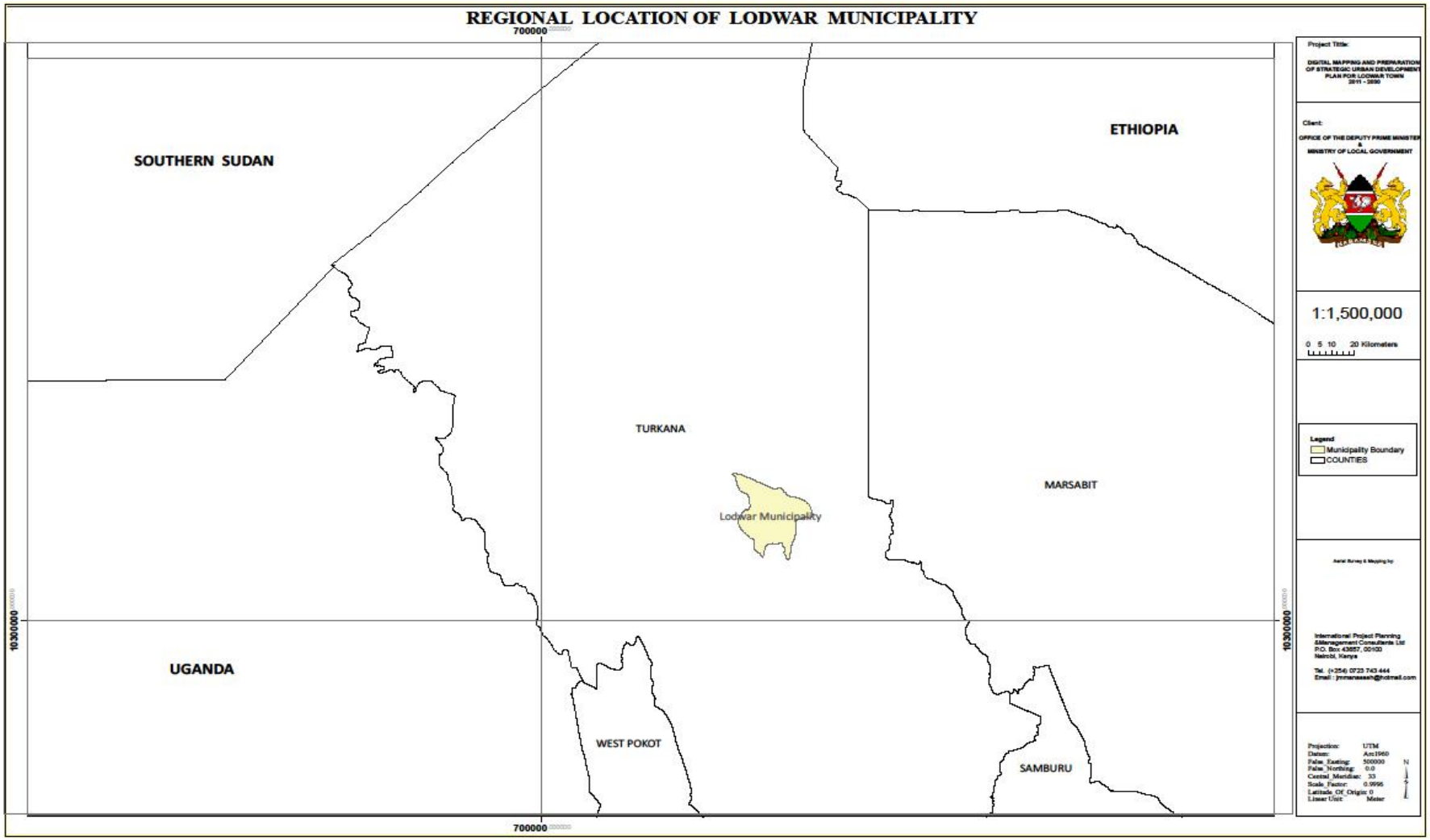


Figure 2.1.2b: Lodwar Municipality in Regional Context



PART THREE: SECTORAL SITUATIONAL ANALYSIS

3.1 Physiographic Characteristics

3.1.1 Physiographic and Natural Conditions

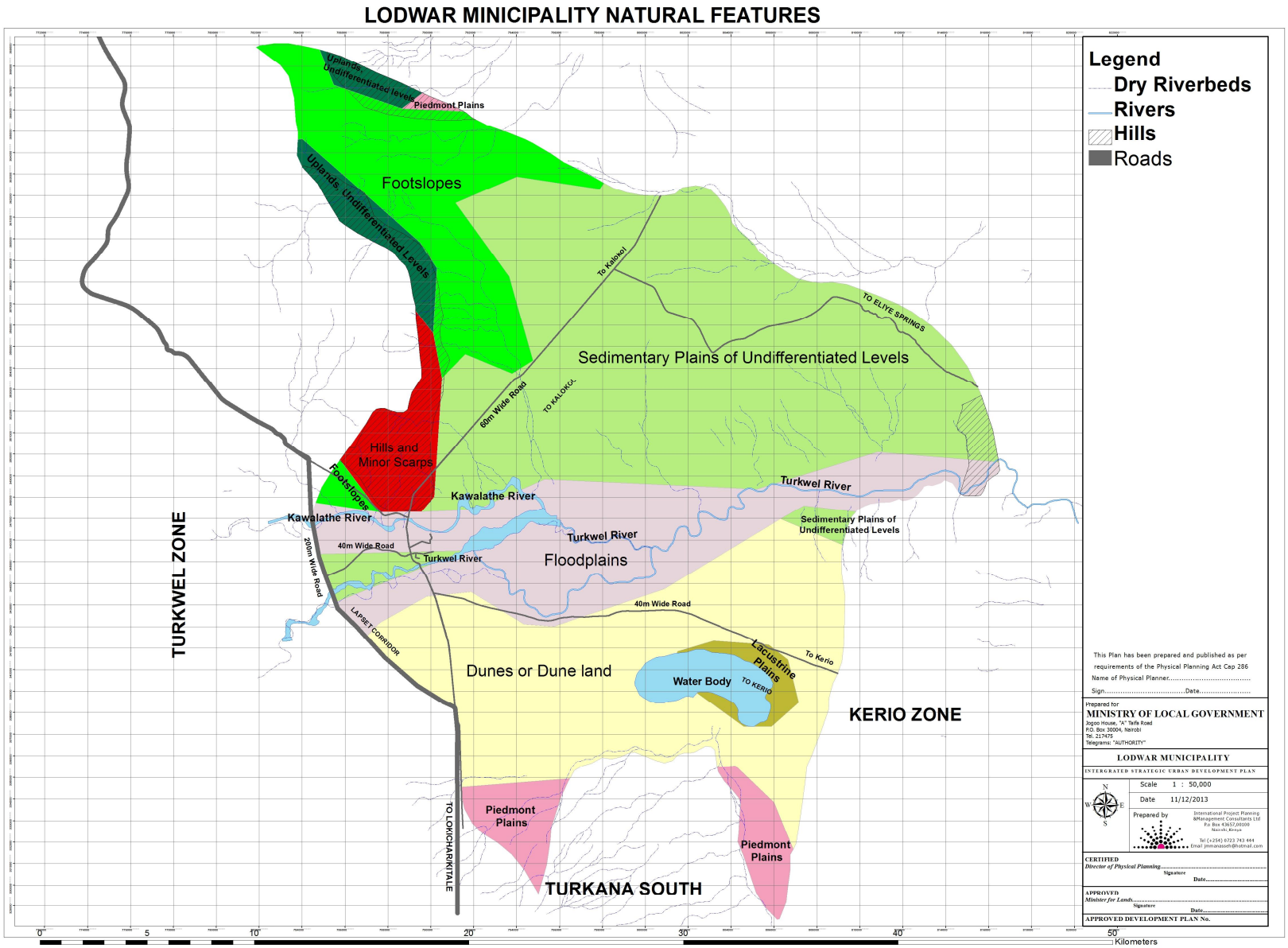
The Physiographic characteristics of the Turkana county include the low lying open plains, mountain ranges, Lake Turkana and the river drainage systems. The main Mountain ranges include Loima, Lorengippi, Lokwamoru, Lorionotoma, Loriu, Suguta, Lilale, Songot, Mogilla and Kailongkol. The altitude of the mountains varies between 1,500 and 1,800 metres above sea level in the east reaching the peak at Loima, which forms undulating hills for a stretch of some 65 square kilometers. The mountain ranges are normally green, covered with dense bushes and high woody cover because of their high elevation. The mountain ranges therefore support important economic activities such as honey production, livestock grazing especially during the dry season. They also form important water catchment sources, and produce gum Arabica harvesting, small crop farming and wood production.

The open lying plains consist of the central Plains, Kalapata plains and the lotikipi plains. The plains form part of approximately 1800mm per annum. These plains are dominated by dwarf shrub and grassland which provide forage for livestock during and shortly after the rainy season. This forage however dries up rapidly at the onset of the dry season.

3.1.2 Drainage

The main rivers draining the county area include Rivers Kerio, Turkwel, Tarah and Suguta respectively. Most of these rivers are seasonal. Rivers Kerio and Turkwel are permanent and the most important with the potential of producing large quantities of food for the region if properly utilized and managed. The two rivers have their sources in the Western Rift Valley Highland system consisting of the northern extension of Mau range, and the Turgen Hills which form the main source of the Kerio River and the Mount Elgon Volcanic Mountain range and the Cherengôani hills range which form the main source of the Turkwe River. The Kerio River is used for Hydro Power generation. Rivers Omo, Turkwel, and Kerio all drain into Lake Turkana which is one of the major Lakes of the Kenyan Rift Valley. The Lake, which is situated on the eastern part of the County, has three important islands. It is therefore an important tourist attraction endowed with a variety of birds, crocodiles, hippos and other aquatic life. Fishing is also an important economic production activity based on Lake Turkana with potential for income generation and employment creation including prospects of industrialization. (Figure 3.1.1)

Figure 3.1.1: Natural Features around Lodwar Municipality



3.1.3 Climate Characteristics

Turkana County is essentially arid and semi-Arid and characterized by warm and hot climatic conditions. The daily temperature ranges between 24^{o}c and 38^{o}c with a mean of 30^{o}c. The rainfall pattern and distribution is erratic and unreliable both with time and space. There are two rainfall seasons. The long rains usually occur between April and July and the short rains between October and November. The rainfall ranges between 120mm and 500mm. The driest periods are January, February and September. The rainfall is distributed on the East-West gradient with more rainfall in the Western parts and other areas of higher elevation. The rain falls in brief violent storms resulting in flash floods. The surface runoff and potential evaporation rates are extremely high.

Due to the low rainfall and high temperatures, there is a lot of evaporation resulting into the deposition of salt in the soil and copping on the surface. As a result, only about 30 percent of Turkana Countyôs soil can be rated as moderately suitable for agricultural production. These moderately fertile soils are found at the Central plains of Lorengippi, the upper Loima, the Lowlands drainage rivers, along the Lakeshore at Todonyang plains, the Lower Kolokol and the Lower Turkwel and Kerio Rivers and a portion of the Loriu Plateau.

3.1.4 Human Settlement Patterns

The total population of Turkana County is 855,399 people according to the 2009 national census. The population density in the county area varies from 29 persons per Km^2 in Kakuma Division to 1 person per Km^2 in Kibish Division according to the District Development Plan 2002-2008.

Permanently and Semi-permanently settled areas in the county are found along the Turkwel and the Kerio rivers where irrigated farming is practiced. Along these areas are also found the main urban and market centres with the necessary social service infrastructure like schools and health facilities which support human settlement and human life.

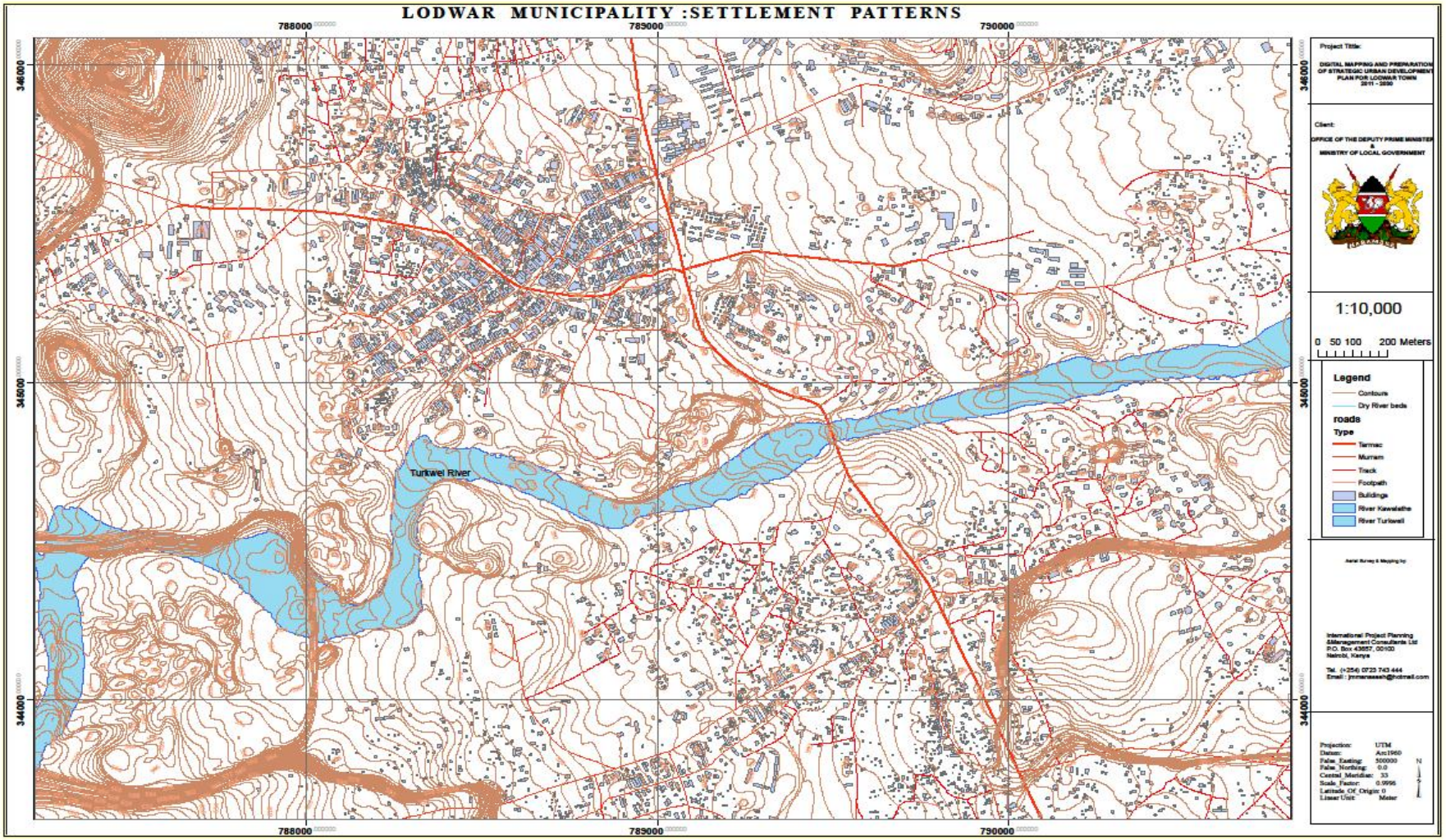
Turkana county is predominantly inhabited by the Turkana community who live a predominantly pastoralist way of life centred on livestock keeping. Owing to the harsh semi-arid and arid conditions of the region, the Turkana move in search of pasture and water supply for their livestock. This leads to the prevalence of semi-permanent settlements in the county outside the few nucleated urban settlements where most of the permanent settlements are found.

Lodwar town, with a population of 58,000 people according to the 2009 census, is the largest and most developed urban centre in the county located along the Turkwel River and functions as the main administrative and commercial capital of Turkana County. Other growing Towns and market centres of importance in Turkana County include Lokitaung, Kangatet, Lokori, Kakuma, Lokichoggio, Lorugumu, Kaputir, Kalokol, Lokichar among others. All these however, function at lower hierarchical levels and serve more localized hinterlands compared to Lodwar Town.

None of these other centres seems to provide a major competition in functional and development dominance to Lodwar.

It is noted, however, that owing to the long drawn political struggle in South Sudan for self ï governance, the inflow of refugees into this region of Kenya led to the emergence of Lokichoggio and Kakuma as important centres of refugee settlements. These centres, especially, Lokichoggio attracted lots of donor funds for the resettlement of Refugees making it attract more development activities and investments to threaten the position of Lodwar. Since the end of the Sudan war and the return of refugees to Sudan, Lokichoggioôs growth and development importance has rapidly declined. In the wake of these changes, focus for development and settlement is now on Lodwar Town once again. Lodwar therefore remains the dominant centre of development in the county. (Figure 3.1.2)

Figure 3.1.2: Settlement Patterns around Lodwar Municipality



3.1.4 Physical Site Conditions

Lodwar town is located at the point where Kawalathe River pours into the Tukwel River. The main town commercial centre is in fact located on the low-rivers. River Turkwel is a permanent river originating from the Cherengani Hills to the South and the slopes of Mt. Elgon to the far South West of the town including the Karapokot Hills and the Ruch Prasir Plateau. The Kawalathe River is a seasonal Lagger originating mainly from the Murua Ngithingerr hills, the Pelekech Range and the Ruth Prasir plateau to the west of the town.

These two rivers flood frequently and cover the main town area. During such period the town is rendered nonfunctional including the residential, besides, over the years this has led to the constant deposit of alluvial clay soils in these lower parts of the town which have made the area unreliable, unstable and unsuitable for urban development. During floods, settlements are destroyed and people are displaced and all functions are affected. During the stakeholdersô workshop, there was a unanimous demand for the possible relocation of the town to safer areas on the higher areas of the town.

Altitude

The altitude of the town area ranges from 500 ï to ï 1,000 metres above sea level. The Landscape generally slopes towards Lake Turkana from between 500 ï to ï 200 metres above sea level.

Geology

The Turkana County area forms part of the lower northern extension of the Great Rift Valley system of central Kenya. Turkana covers part of the western wall of the Rift Valley system represented by a series of North/South running fault systems and a number of isolated hills, hill ranges and volcanic plateau XL and plains dominating this North-Western section of Kenya with Lake Turkana as the northern most of the Rift Valley Lakes in Kenya.

The immediate areas surrounding Lodwar Town is therefore composed of a wide variety of geological characteristics as outlined below:-

1) The Quarternary Sediments

   These seem to form the widespread rock systems around Lodwar Town but spread more widely to the South, West and north-western and Eastern plains around the town. Those consist of sediments of Pleistocene age. In this part of the Rift Valle, they consist of thick deposits of Lacustrine and Fluviatile sediments among which diatomite beds are common.

2) Tertiary Volcanics

These occur in a limited concentration covering the area immediately north of the existing town. These are rock systems of the middle and upper Tertiary age.

3) Tertiary Sediments.

This forms a very narrow stretch of sedimentary deposits consisting mainly of shallow-water Lacustrine and fluviatile deposits with thin limestones. They lie in between the dominant quaternary sediments to the north-west of the town of Lodwar. This narrow strip of deposits extends in the north-south pattern from the road to kalokol in the east of the town.

Soils

Main Soil Types in Lodwar

1) Alluvium and recent locustrine deposits.

These consist of old river sediments as well as those now being added to the flood plain and lake deposits of geologically recent origin, without developed morphology other than a more humic surface horizon. These are mainly found along the drainage valleys of River Turkwel and its main tributaries of Kawalathe which drain much of the main town area of Lodwar which is prone to seasonal flooding effects hence additional alluvial deposits.

2) Brown Calcarious Loamy Sands and Sand dunes or desert soils.

These are reddish-brown wind-sorted horizon, it overlies brown calcareous compacted loamy sand. These are found within old flood plain of the lower Turkwell river drainage basin and its closely associated tributaries such as Kawalathe River extending immediately outside the Alluvium deposits described above.

3) Shallow Stony Soils with rock outcrops.

These consist of variously developed soils which have been subjected to geological and recent accelerated erosion and have lost their original characteristics. These are found immediately outside the Brown calcareous loamy sands described above both to the East West. They occur either as solid zones of these shallow stormy soils or in mixtures with either Lava boulders or steep slopes and escarpments.

4) Lava boulders

This is a dominant feature of the land surface covered by lava boulders ranging from continuous boulder cover with small pockets of dark soil to a shallow soil made up of boulders in a matrix of dark brown to orange-brown clay loam.

This seems to be the dominant land surface in the area north of Lodwar town stretching especially from the northern banks of the river Kawalathe and along the road to Lokichoggio across the Kawalathe Bridge.

Vegetation

1) Wooded grassland.

This consists of grassland with scattered or grouped trees, the trees are always conspicuous but have a canopy cover of less than 20 per cent. This seems to form a narrow stretch along the Turkwel river valley within the main town extending eastwards towards Lake Turkana.

2) Dwarf Shrub-grassland

This consists of land sparsely covered by grass and dwarf shrubs not exceeding one metre in height. It occurs sometimes with widely scattered larger shrubs or stunted trees. This is a form of bushed grassland which has been isolated for individual mention because it is representative of a distinct plant formation of arid regions occurring in northern Kenya. Portions of this vegetation are found on either side of the Turkwel River covering parts of the main town of Lodwar.

3) Bushed Grassland

This is grassland with scattered or grouped shrubs. The shrubs are always conspicuous but having a canopy cover of less than 20%. This covers a limited area of the town to its South East towards Lake Turkana. A similar portion of this vegetation is also found farther to the north and west of the main town centre.

4) Bushed Grassland and Barren Land.

This represents areas with a mixture of land naturally devoid of vascular plants and areas with bushed grassland vegetation types. This covers portions of the main town area extending towards the east and North East of the town. A portion of this zonal characteristic are found further South East of the town.

5) Bushed Grassland and Wooded Grassland

This forms major portions covering Southern and northern areas around the main town of Lodwar. They consist of a mixture of both the bushed grassland vegetation types and the wooded grassland types of vegetation.

6) Barren Land

In sections of the town of Lodwar there are patches of barren land which is not covered by any distinct form of vegetation.

3.1.5 Land Tenure

The entire town is largely trust land. This implies that there is no individual ownership of land and so the local leaders continually abuse the trust land by alienating the land arbitrarily to any use. There is therefore lack of an effective basis for control of land use and allocation of land for development purposes. This significantly limits the process of urban physical development, economic investment in development in the town and the revenue base for the municipality.

3.1.6 Ecological Potential

Two broad ecological zones can be identified within and around the town of Lodwar.

1) Rangeland of Low Potential.

This zone covers much of the municipal area to the south, west east and south eastern parts of dwarf shrub grassland or very dry forms of bushed grassland with acacia reficiens sub-species of Misera, often confined to water courses and depressions with barren land between perennial grasses such as chrysopogon aucheri are localized with predominantly annual grassland. Productivity is confined largely to unreliable seasonal flushes and only nomadic grazing systems are possible. The population of both domestic and wild stock is restricted severely by the harsh environment.

2) Land Locally suited for Agriculture.

This zone occurs on the outer side of the above zone. It consists of Land that is locally suited for agriculture. The zone is dominated by woody vegetation of the commiphora, acacia and allied genera, mostly of shrubby habit. Perennial grasses such as cenchrus cillaris and chloris voxburghiana tend to dominate, but succumb readily to harsh management. More than 4 hactares is required per stock unit. Wildlife is therefore important, particularly where dry thorn-bushland predominates. Burning requires great caution but can be highly effective in bush control.

3.2 Population Characteristics and Social Profile

This section focuses on the population characteristics of Lodwar town, the planning area. It examines the population size and distribution; its age and sex structures; and the size and composition of households.

3.2.1 Population Size and Distribution

The planning area occupies the Central Division of the Central Turkana District in Turkana County. Based on the 1999 Population and Housing Census Lodwar municipality recorded a total population of 35 919 persons (Kenya National Bureau of Statistics, 2000). By 2009 the areaôs population had risen to 58 290 out of the Lodwar Countyôs total population of 855 399 (Kenya National Bureau of Statistics, 2010a). This represents an increase of 62.3 percent over a 10 year period. Of the total 58, 290 persons, 77.9 percent (45 408) is found in the core urban area, 5 percent (2 914) in the peri-urban area and 17.1 percent (9 968) in the rural parts of the municipality. Table 3.2.1 presents the distribution of the population in the planning area by sex and the administrative units.

Table 3.2.1: Lodwar's Population by Sex and Administrative Unit, 2009

Administrative Units[1]	Sex		Total	Density
	Males	Females		
Lodwar Township:				
LodwarTownship	7 201	6 865	14 066	50
Nakwamekwi	4 965	5 320	10 285	420
Napetet	5 524	5 631	11 155	46
Sub-total	**17 690**	**17 816**	**35 506**	**65**
Kanamkemer:				
Kanamkemer	6 764	7 639	14 403	175
Nawoitorong	4 077	4 304	8 381	41
Sub-total	**10 841**	**11 943**	**22 784**	**79**
Overall total	**28 531**	**29 759**	**58 290**	**70**

Source: Kenya National Bureau of Statistics (2010a): 2009 Kenya *Population and Housing Census,* Volume I A

The density varied by sub-location with Nakwamekwi in Lodwar Township Location having the highest standing at 420 persons per square kilometer, the overall density stood at 70 persons per square kilometer.

[1] The administrative units used here are the location and sub-location

Sex and Age Structure of Population

The 2009 Population and Housing Census showed that of the 58 290 persons resident in the planning area, 28 531 were males while 29 759 were females. The sex ratio from these figures is 95.9 males for every 100 females. This is lower than the national ratio of 98.8 males for every 100 females.

For lack of data specific to the planning area, to capture the age structure of its population the age structure of the population of Turkana Central constituency within which Lodwar Municipality falls was relied on. As evident from Table 3.2.2, Central Turkana Constituency has a predominantly youthful population. Those aged below 35 years comprise 81.7 percent of the total population; a proportion that combines the 47.5 percent who are aged 0-14 years, 12.9 percent who are aged 15 -19 years, and 21.3 percent who are aged 20 ï 34 years. Those in the working age group (15 -60 years) constitute 48.9 percent while the retirees (61 and above years) make up 3.6% of the population (Kenya National Bureau of Statistics, 2010b).

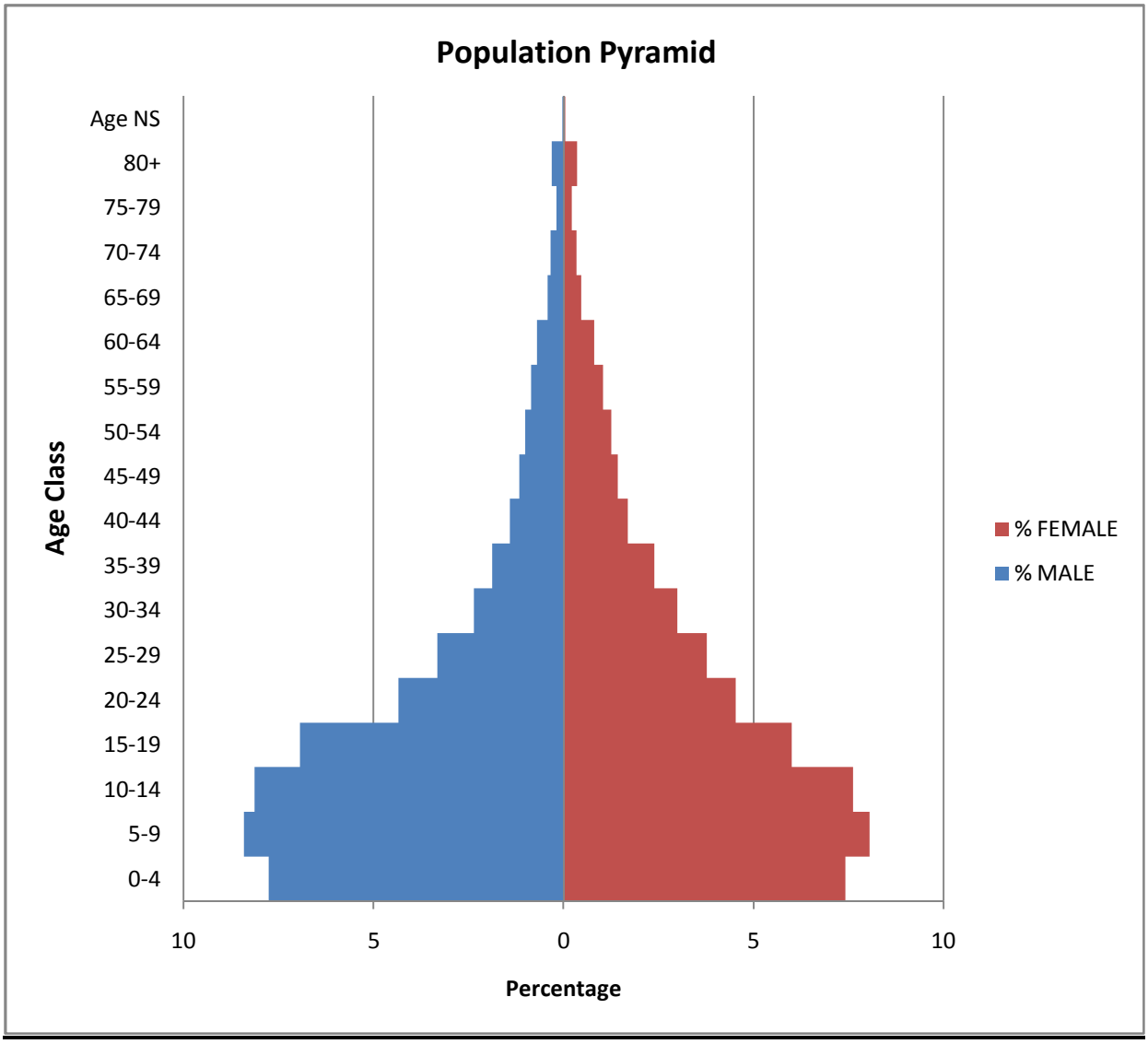
Based on the age structure of the population, the area has a high dependency ratio (number of people in the dependent age groups 0-14 and 61+) of 104 persons for every 100 persons in the working age groups. Figure 3.2.1 provides the age pyramid of the population. This high dependency ratio for Turkana Central constituency has serious economic implications. It suggests that those who are working must hold good jobs that will sustain the dependent population. It can also be concluded that the high dependency ratio is a major contributor to the high poverty rate in the area; the rate for Turkana County as a whole stands in excess of 80 percent.

Table 3.2.2: Distribution of Turkana Central Constituency's Population by Age Group, 2009

	Number			
Age Group	**Male**	**Females**	**Total**	**Percentage**
0 - 4 years	19 775	18 864	38 639	15.2
5 - 9 years	21 425	20 500	41 925	16.5
10 - 14 years	20 726	19 382	40 108	15.8
15 - 19 years	17 667	15 261	32 928	12.9
20 - 24 years	11 096	11 530	22 626	8.9
25 - 29 years	8 460	9 565	18 025	7.1
30 - 34 years	6 018	7 620	13 638	5.3
35 -39 years	4 785	6 053	10 838	4.2
40 - 44y ears	3 609	4 269	7 878	3.1
45 ï 49 years	2 981	3 605	6 586	2.6
50 -54 years	2 597	3 188	5 785	2.3
55 -60	2 941	3 436	6 377	2.5
61 + years	4 362	4 706	9 068	3.6
Age NS	95	88	183	0.0
Total	**126 537**	**128 067**	**254 606**	**100.0**
Ratios				
Dependency	**104**			
Sex Ratio	**98.8**			

Source: Source: Kenya National Bureau of Statistics (2010b): 2009 Kenya *Population and Housing Census,* Volume I B

Figure 3.2.1: Population Pyramid for Turkana Central Constituency, 2009



Household Size

A critical variable in planning is the number of households. The household is a consumer of important resources and facilities such as land, water, energy and housing. The household size, on the other hand, has implications for living conditions and the wellbeing of a population.

Table 4 presents the distribution of households in Lodwar Municipality by administrative unit (Division and Location) for 2009. Based on Table 3.2.3, 7,072 households (representing 61.8 percent) were in Lodwar Township Location whereas the remainder 4 365 (38.2 percent) were spread across Kanamkemer Location. Household sizes ranged from 4.8 to 5.2 persons, meaning that no major variations were observed across sub-locations.

The average household size stood at 5.1 persons for the municipality as a whole. This is higher than the national average of 4.4 persons.

Table 3.2.3: Number and Sizes of Households in Lodwar Municipality, 2009

Administrative Units	Population	Total Households	Household Size	Percentage
Lodwar Township:				
LodwarTownship	14 066	2 906	4.8	25.4
Nakwamekwi	10 285	1 985	5.2	17.4
Napetet	11 155	2 181	5.1	19.0
Sub-total	**35 506**	**7 072**	**5.0**	**61.8**
Kanamkemer:				
Kanamkemer	14 403	2 758	5.2	24.1
Nawoitorong	8 381	1 607	5.2	14.0
Sub-total	**22 784**	**4 365**	**5.2**	**38.2**
Overall total	**58 290**	**11 437**	**5.1**	**100.00**

Source: Kenya National Bureau of Statistics (2010a): 2009 *Population and Housing Census, Volume I A*

Population Projections

The future growth of Lodwar township will be determined mainly by in- (and out-) migration of persons coupled with natural population increase. To capture future demographic changes in light of the present situation and underlying demographic processes, demographic projections were for the periods 2010 to 2020 and 2021 to 2030. For the period 2010-2020 the projections utilized annual growth rates calculated from the 1999 and 2009 census data. These varied across locations from 2.20 % for Lodwar town location to 7.65 % for Kanamkemer location; the average growth rate was 5.15 %. For the period 2021- 2030 the projections utilized annual growth rates ranging from 2.75% for Lodwar town location to 9.64 % for Kanamkemer location; the average growth rate was 6.50 %. Table 3.2.4 presents the results of the projections.

Table 3.2.4: Population Projections for Lodwar Municipality, 2010 - 2030

Year	Location					Total
	Lodwar Town	Nakwamekwi	Napetet	Kanamkemer	Naiwotorong	
1999	11 338	6 381	5 883	6 894	5 423	**35 919**
2009	14 066	10285	11 155	14 403	8 381	**58 290**
2010	14 373	10 509	11 398	14 717	8 564	**59 561**
2011	14 686	10738	11 647	15 038	8 750	**60 859**
2012	15 006	10 972	11 900	15 365	8 941	**62 184**
2013	15 333	11 211	12 160	15 700	9 136	**63 540**
2014	15 667	11 456	12 425	16 042	9 335	**64 925**
2015	16 009	11 705	12 696	16 392	9 538	**66 340**
2016	16 357	11 960	12 972	16 749	9 746	**67 784**
2017	16 714	12 221	13 225	17 114	9 959	**69 233**
2018	17 078	12 487	13 544	17 487	10 176	**70 772**
2019	17 450	12 760	13 839	17 868	10 398	**72 315**
2020	17 831	13 038	14 141	18 258	10 624	**73 892**
2021	18 321	13 842	15 319	20 018	11 220	**78 720**
2022	18 825	14 222	15 740	20 569	11 529	**80 885**
2023	19 342	14 613	16 173	21 134	11 846	**83 108**
2024	19 874	15 015	16 618	21 715	12 171	**85 393**
2025	20 421	15 428	17 074	22 313	12 506	**87 742**
2026	20 982	15 852	17 544	22 926	12 850	**90 154**
2027	21 559	16 288	18 026	23 556	13 203	**92 632**
2028	22 152	16 736	18 522	24 204	13 566	**95 180**
2029	22 761	17 196	19 031	24 870	13 939	**97 797**
2030	23 387	17 669	19 554	25 553	14 322	**100 485**

The projections are guided by the two assumptions. First, that Lodwar municipality lies on an important growth corridor – **the LAPSSET** and will therefore continue to experience rising population growth. Second, that with devolution, the municipality will experience major developments in infrastructural, economic and social facilities and services that will attract increased in-migration. It is on this factor that the projected average growth rate of 6.50 % for 2021-2030 is anchored.

As evident from Table 3.2.4, the population of the planning area will reach 66 340 persons by 2015, rising to 73 892 persons by 2020.

The figures are projected to increase to 87 742 persons by 2025, reaching 100 485 persons by 2030, the end of the plan period. As indicated earlier, it is expected that population growth rates will continue to vary by location.

Major Population Related Challenges

A closer look at the population of Lodwar municipality reveals that its structure and composition poses a number of challenges. First, the population is predominantly young. This can be deduced from the age structure of Turkana central constituency in which Lodwar municipality is located. Of the total population for 2009, those aged 40 years and below comprised 85.9 percent. These included 47.5 percent who were aged 0 - 14 years and 38.4 percent who were aged 15 - 40 years. Only 8.4 percent of the population was aged 50+ years. The youthful population has implications for educational facilities as well as for the creation of jobs.

A second challenge posed by the population of Lodwar municipality is the high dependency ratio of 104 persons for every 100 working persons in the working age. As indicated earlier, the high dependency ratio suggests that those who are working must hold good jobs that will facilitate them to feed the dependent population. In addition, the high dependency ratio is likely to be a major contributor to the high poverty rate in the area.

3.2.2 The Social Sector

This section profiles the status of social facilities and services in the planning area. It focuses on educational facilities, healthcare services, places of worship, police services, post offices, and social (community) halls, with an emphasis on their distribution across the planning area.

Education Facilities

This section describes the current status of educational services and facilities - kindergartens, pre-schools/ nursery schools, primary schools, secondary schools, tertiary education, and vocational and technical training - in the planning area. The 2009 Population and Housing Census report (Kenya National Bureau of Statistics, 2010c:22), is emphatic that ôEducation is a key pillar for human development towards the realization of Vision 2030 as it imparts knowledge and skills to individuals necessary for nation buildingò.

The existing categories of educational institutions in Lodwar include 23 primary schools (4 private and 19 public), and 6 secondary schools. Each of the schools has 20 acres of land. The municipality is also the home to a polytechnic, and one university campus, Mount Kenya University which has been allocated 100 acres of land. Most of the schools d not have basic built facilities. Of the secondary schools for example, only 2 have laboratories and only 3 have boarding facilities. However, all educational facilities have sufficient water and playgrounds. Most schools do not have enough teachers and the enrolments for most of the schools have over 40 students per class while the catchment of the institutions is from all over the country.

Challenges facing the Educational Sector

The umbrella challenge facing the educational sector in Lodwar municipality is *inadequate public education facilities (Schools, colleges, etc).* This problem manifests itself through overcrowding in schools; long distances between schools; understaffing of schools; poor learning environment/facilities; high rate of school dropouts due to early marriages, poverty, etc.; poor academic performance; and increase in the number of street children.

Based on consultations held with stakeholders, the solution to the problem of inadequate public educational facilities lies in the construction of more education facilities, employment of more teachers to attain the recommended teacher/student ratio, and improvements in the school feeding programme.

The stakeholders pointed to a number of opportunities that could be harnessed to solve the problem. These included the availability of land on which to build more educational institutions, opportunity for expansion of existing institutions, willingness of children to attend school, and goodwill from development partners. Some of the actors who can be involved in solving the problem of inadequate educational facilities include the Kenya government, the Lodwar municipality, development partners, residents and NGOs.

Health Facilities

Challenges Facing the Healthcare Sector

Like the educational sector, the healthcare sector in Lodwar municipality suffers from inadequate public health care facilities. This is evident through overcrowding in hospitals, referral of patients to private healthcare facilities, low doctor patient ratio, high death rate, and low hygiene standards (at home, in hospital etc)

Those who participated in stakeholder consultations opined that the problem of inadequate public health care facilities can be addressed through building of more public healthcare facilities, improvement of the existing healthcare facilities, and employment of more doctors so as to attain the recommended doctor: patient ratio. The participants felt that this was possible because there existed a variety of enabling opportunities, especially the existing hospital and goodwill from stakeholders and development partners. Some of the actors (financiers) who can be involved in solving the problem of inadequate healthcare facilities include the Kenya government, the Lodwar municipality, development partners, residents, and NGOs.

Recreational Public Facilities

There are over 6 playgrounds in Lodwar municipality. However, despite the high demand, the municipality does not have any plans for more recreational facilities. The existing recreational facilities are used mostly for relaxing and games; most of them charge KES 30.00 for membership per month.

Challenges Facing Recreation Sector

The dominant challenge is one of lack of public recreational facilities. This problem manifests itself in forms such as idleness within the town, high levels of drunkenness, and early pregnancies. The problem can be tackled by establishing public recreational facilities in schools, building a sports stadium, establishing a public library, and by encouraging formation of sporting clubs (football, netball, athletics, etc).

Opportunities that could be harnessed to solve the problem of lack of public recreational facilities in Lodwar municipality include availability of land on which to develop public recreational facilities, youth who are talented in sports, and the goodwill of stakeholders. The development of such facilities could involve actors such as the GoK, MCL, development partners, residents, and NGOs, who could mainly constitute sources of funding.

3.3 Economic Growth & Development

3.3.1 Sector Background

Economic systems of spatial localities of different scales or hierarchies are key to the survival of mankind in various ways in a civilized community. It provides the mechanisms or means to individuals and groups through which people earn a living, and enhance their future economic security besides functional interaction at various scale levels. The functional interaction based on the flow of economic activities is either within spatial localities or between spatial localities. To industries and business groups, profits, growth and employment are highly appreciated while for institutions like the Lodwar Town Administration, improved incomes for its citizens, a vibrant expanding economic base is required for the Municipality to be able to get the required revenue for sustaining urban functions and creating an enabling environment for urban economic expansion.

The interaction of the economic system based on price mechanism creates an opportunity for the public finance function to be exercised with the aim of ensuring the triple objectives of efficiency, distribution, and stabilization besides coordination of urban economic activities. This focuses on the generation of revenues and expenditure based on either ability to pay or benefit principle. At a regional scale the interaction between the region and the urban through deliberate spatial planning with a focus on enhancing economic welfare to ensure that urban economies play a significant role in the development of the region by creating an environment for clustering of business and industrial activities. The availability of a well planned functional interaction between the urban and region in the County lays the foundation of economic growth and development that is local based in which the local communities participate.

Economic influences play a role in determining the configuration of land use activities in spatial localities. This section highlights the role of economic factors in the organization of land use activities, the provision of livelihoods both for residents and others beyond in addition to supporting the urban institutional function. This is done by flagging out the relevant policy areas of vision 2030, the macroeconomic policy framework of the Country, the regional resource base or economic base, the economic activities in municipality, employment and growth potential, challenges and implications.

Vision 2030

The development policy framework of the Kenya Government is expounded in Vision 2030 covering the period 2008-2030. Its main aim is to make Kenya a newly industrializing middle income Country providing high quality life for its citizens by the year 2030 hinged on three pillars. These are the economic, social and political.

The economic pillar aims at achieving through economic growth and development programme an average annual Gross Domestic Product (GDP) growth rate of 10% over the next 25 years.

The social pillar seeks to build a just and cohesive society with social equity in a clean and secure environment, while the political pillar aims at realizing a democratic political system founded on issue based politics that respect the rule of law, and protects the rights and freedoms of every individual in the Kenyan society A close scrutiny of the development problem in the Country actually requires an integrated strategy combining the pillars to achieve the realization of the vision.

The main emphasis however is on the economic pillar which is set to be achieved through key sectoral areas that have been identified. These are tourism, increasing value addition in agriculture, wholesale and retail trade sector, manufacturing for regional market, Business Process off shoring (BPO) and financial services. Various projects for each sector have been identified, goals, strategies and targets to realize its contribution to output and employment. This forms the basis of government action at all levels. However, the stated good intentions of the vision lack a clear link to the problem, spatial and resource base to enable the achievement of the vision.

3.3.2 County Resource Base

The County has a diverse resource base ranging from the vastness at 70,000Km2 to distinct physiographic factors with great mineral potential and strategic location. The three distinct physiographic features are Lotikipi plains in the North, Kalokol/Turkwel Kerio lowlands along the Western shores of Lake Turkana and Suguta Basin in the South East. It experiences sunny dry climatic conditions with an average annual rainfall of 300-400mm to 150mm in the arid central regions. Only 29.5% has some agricultural potential augmented with water provision through irrigation. The county has two permanent rivers flowing into Lake Turkana besides seasonal rivers. There are possibilities of mineral potential such as gemstone, and Gold mining at Makutano, building stone and ballast for building and construction of roads, in addition to the ongoing oil exploration.

The above presents roughly the County resource base situation which can be utilized to spur the growth of central places of which Lodwar Municipality is part. Agriculture is practiced by irrigation along Turkwell and Kerio rivers, where maize, sorghum, bananas, green grams and cotton are grown. This agricultural potential is shown in table 3.3.1.

Table 3.3.1: Acreage, Production and Value in Kshs

Crop	Hectare	Tones	Value in Kshs
Sorghum	511	726	25,408,000
Maize	149	372	9,000,000
Citrus	5	10	6,000
Mangoes	6	10	60,000
Kales	27	547	2,572,800
Cowpeas	20	6	184,000
Green Grams	18	6	210,000
Cotton	11	18	14,400
Bananas	2	1	-
Date Palm	6	.212	8,500
Total			

Source: District Agricultural Office

Agricultural potential of the County can be harnessed both for consumption and agro-based value addition through irrigation farming along the permanent rivers borrowing from the example of river Nile in Egypt. Using irrigation will help to overcome the environmental hazards of harsh climate, erratic rainfall conditions and recurrent drought.

Livestock

Nomadic pastoralism is the dominant form of land use within the largest part of the County (about 54,000Km^2) and is bound to remain in the foreseeable future. The characteristic of nomadic pastoralism is mobility through which they respond to environmental conditions. Mobility at three levels are local concentrations and dispersals in response to local environmental variations in water and fodder, second large scale seasonal migration or movements from lowlands to highlands and finally large scale movements in response to persistent drought or raiding incidence and sometimes out of the Country migration. Livestock kept include cattle, sheep, goats, camels, and donkeys. The livestock sub sector experiences drought, inadequate water and fodder, livestock diseases, livestock attacks and cultural practices of nomadism i.e. livestock seen as a form of wealth not to be freely sold.

Some efforts through government and development partners have been made to help step up livestock production, namely the establishment of livestock holding grounds and cattle crushes.

Table 3.3.2: Livestock Holding Grounds

Holding Grounds	Establishment	Maintenance	Capacity	Animals Per Week	Remarks
Lomelo-Lokori	EEC	EEC	6,000	2,000	Low
Lolongot-Katilu	EEC	MLD	6,000	3,000	Medium

Source: Turkana District Development Plan 1988-1993; From Livestock Development Office

Table 3.3.3: Distribution of Cattle Crushes

Division	1987	1988	1989	1990	1991	1992
Central	1	1	1	1	1	1
Turkwell	10	10	10	10	10	10
Katilu	7	7	7	7	7	7
Lokori	10	10	10	10	10	10
Lokitaung	7	7	7	7	7	7
Kakuma	6	6	6	6	6	6
Kibish	3	3	3	3	3	3
Lokichiogio	2	2	2	2	2	2

Source: Turkana District Development Plan 1988-1993; From Livestock Development Office

Livestock production trends are illustrated in table 3.3.4 below. It can be observed that livestock production has been on the decline due to poor rainfall, inadequate water and fodder. Tropical livestock unit has been calibrated mainly in terms of its average milk, blood and meat yield through comparison with human population. It enables the assessment of the adequacy of livestock resources in sustaining a pastoral livelihood.

Table 3.3.4: Livestock Production Trend

Type	1982	1984	1987	1988	1990	1992
Cattle	159,968	148,490	221,090	298,550	505,650	222,820
Shoats	1,102,360	1,397,433	1,856,140	2,166,916	3,166,492	1,557,992
Donkeys	7,9920	59,652	62,200	44, 154	59,470	29,994
Camels	95,187	91,021	101,848	81,054	141,384	82,316
Total	1,437,437	1,696,596	2,241,278	2,590,674	3,872,996	1,919,122
T.L.U.	**373,252**	**379,907**	**482,994**	**529,061**	**837,508**	**425,398**

District Development Plan 1997-2001: From TDPCU Lodwar 1993

Livestock either is slaughtered and sold within the County or slaughtered and sold outside the County. The figure of livestock and value either slaughtered or sold within or outside are indicated in the tables 3.3.5 and 3.3.6. From livestock a variety of products can be derived such as meat/beef, bones, milk, hides and skins and cow dung either for manure or biogas.

Milk from camels and goats goes at a premium and has medicinal value to patients in hospitals. Besides local consumption, the figures also illustrate that some is exported to other regions, but this tends to be affected by drought.

Table 3.3.5 Livestock Figures Slaughtered & Sold Within & Outside the County

	Within the County					Outside the County				
Animal	**1991**	**1992**	**1993**	**1994**	**1995**	**1991**	**1992**	**1993**	**1994**	**1995**
Cattle	282	1,616	783	1,426	319	2,660	1,784	705	370	259
Goats	33,926	39,894	24,532	39,237	32,313	10,108	4,629	529	422	6,904
Sheep	2,124	2,258	744	2,934	1,712	5,054	2,315	264	211	763
Camels	198	388	128	103	78	-	--	-	-	-

Source: District Livestock Production Office-1996

Table 3.3.6 Value of Livestock Slaughtered & Sold Within & Outside the County

	Within the County					Outside the County				
Animal	**1991**	**1992**	**1993**	**1994**	**1995**	**1991**	**1992**	**1993**	**1994**	**1995**
Cattle	317,250	1,717,875	1,277,268	2,961,000	1,953,875	2,264,000	5,780,000	2,284,136	1,198.766	839,136
Goats	6,1066,780	10,771,380	640,285	51,008,100	29,727,960	10,108,000	4,629,000	529,000	422,000	6,904,000
Sheep	371,700	618,975	188,790	2,934,000	1,506,560	5,054,000	2,315,000	264,000	211,000	763,000
Camels	346,500	1,081,500	324,800	1,545,000	672,750	-	-	-	-	-
Total	**7,142,130**	**14,126,550**	**2,431,143**	**58,448,100**	**32,861,145**	**17,426,000**	**10,636,500**	**3,077,136**	**1,831,766**	**8,506,136**

Source: District Livestock Production Office-1996

Skins from camels and donkeys are not sold but utilized in construction. The implication of the availability of hides and skin for the economy of the Municipality is the provision of avenue for leather turning and meat processing industries.

Fishing

Estimates show the lake has a possible sustainable fish yield of about 20,000 tons per annum. Fishing has in the past been undertaken through cooperatives, but hitherto they have collapsed. The decline in Fishing is due to the drying of Furfgersons Gulf, the departure of NORAD in the 1990s besides the collapse of fishing cooperatives owing to mismanagement and poor equipment and methods of handling fish. Current fish production trends do not even reach one tone per annum leave a lone the capacity indicated above. The implication is that the lake is underutilized as far as fishing is concerned. This indicates opportunities exist for fish production to meet the local consumption and for export. (Figure 3.3.7)

Table 3.3.7 Fish Production trend between 1988 and 1992.

Year	No of Fishermen	Total Production in Kgs 000	Value in Kshs 000	Local Consumption in Kgs 000	Value in Kshs	External Sales in Kgs 000	Value in kshs 000
1988	3,582	3,635	5,868	1,897	4,390	1,738	1,479
1989	1,300	884	1,801	408	876	476	929
1990	-	678	1,520	283	633	395	887
1991	-	899	2,355	270	865	629	1,490
1992	1,500	955	3,169	287	1,579	668	1,590

Source: Kenya Marine Fisheries Institute & Fisheries Department Lodwar, 1993

Tourism

The County and by extension Lodwar is remote and excluded from the main tourist circuit of the Country though tourist attraction features are available. These are the lake beaches comprising central Park in Lake Turkana, a major breeding area for crocodiles and bird species, lake islands, South Turkana National reserve, Turkana culture and Kenyatta house at Lodwar. Plans are underway by the Leakey family to construct a huge museum in Lodwar Municipality which will add to the tourist attraction. Few tourist facilities are available and more needs to be done to create awareness of the tourism potential through appropriate marketing based on the lake.

Mining

Currently, prospecting for oil is underway strongly premised on the fact that the region lies in the same oil belt that extends from Southern Sudan. Other known mineral opportunities are rock quarrying for ballast, gemstones and gold mining 70Km from the Municipality at Makutano.

Commercial sector

This sector has a major link between the consumers and the manufacturers through wholesale and retail trade. It is further linked to space in form of employment areas either of commerce, service or industry. Commercial activities are mostly found in commercial centres within the County with Lodwar Municipality having the largest share of commercial activities and supplying to others within the County. Commerce is inadequately developed due to a variety of factors such as non existence of agro-based industries as a result of meager agricultural output, limited financial resources in the hands of small scale traders, inadequate financial institutions and difficult lending conditions, underdeveloped infrastructure which hinders diversification of commercial activities and expansion of markets, lack of entrepreneurial acumen which accounts for scarcity of innovative and imaginative business outlook and finally low income people as most of their wealth is in form of cattle and not money.

Table 3.3.8 Business Trades licensed 1987-1992

Year	Wholesale	Catering	Motor Repair	Retail Shop	Miscellaneous Services	Manufacturing	Total Business Premises
1987	29	38	3	598	9	2	629
1988	38	46	4	690	9	3	790
1990	31	39	7	681	10	1	768
1991	24	42	4	809	9	4	892
1992	17	50	7	925	12	2	1015
	17	32	5	508	9	1	527

District Trade Office Lodwar 1993

Businesses undertaken are basketry, hair salon, welding, woodwork, posho milling, bicycle repair, tailoring, watch repair, food selling, bike repair, scratch cards, retail mobile phone shops, kerosene retail outlets and charcoal. Supplies are got from as far as Kitale and Nairobi particularly for beer, leading to increased prices, delays and lack of product variety due to long distances and the poor state of the road. A fluctuation in business activity is occasioned by harsh climatic and adverse economic conditions.

3.3.3 Economy of the Lodwar Municipality

Economic activities within the Municipality range from primary, secondary and tertiary. The primary economic activities practiced are agriculture, livestock keeping, fish trading and mining. The primary economic activities will however in the long term be phased out due to the expansion of the town, particularly livestock and agriculture. In addition the economic activities and wealth of the Municipality is manifested in two forms, namely, flow of daily activities and capital wealth in form of investments in buildings and infrastructure. Its economic prospects due to the strategic placement relies heavily on the regional resource base of the County as illustrated above.

Dry Land Agriculture

Agriculture though vital for the supply of food and raw materials for agro-based industries, is not done scientifically to the maximum potential of both the larger County and the areas within the municipality. The output of agriculture is illustrated in Table1.0, but most of it is consumed locally leaving no surplus for industrial development. The welfare of the Municipality lies in having access to enough food supplies and also extra agricultural output for industrialization. It also has the potential of backward linkage to enable the supplies of inputs to the sector hence a strong industry and commercial base.

Issues currently affecting the sector within the MCL are; conflict from various players in the utilization of the farming area close to the river, the farming community has less capacity to undertake farming for commercial benefit and finally the practice of agriculture is not well planned with clear goals and objectives. The above has led to inadequate produce from farms hence less food available to the urban population, and environmental degradation.

Within the county, output is only used locally, limiting the potential contribution of agriculture to the industrial development of the town and the county through backward and forward linkage.

This can only be realized in the context of a serious agricultural programme modeled along that of the Nile Valley on rivers Turkwell and Kerio subject to the assessment of the water flow regimes by water experts. Land is already available in plenty and is fertile.

Livestock

At the moment the County has a comparative advantage in livestock production relative to crop farming under the current circumstances. Tables 1.1 to 1.6 depict both the efforts and the output situation of the County in the past. There are a variety of products from livestock such as; milk, beef/meat, butter, cheese, horns, bones, and hides and skins. The county exports livestock and some of the above products. This is a basis for value addition through setting up of abattoirs and leather turning industries within the Municipality.

The sector experiences some problems such as frequent drought, livestock diseases, lack of markets, poor transport system, lack of early warning systems, cultural values of the people rotating around livestock as the only form of wealth acceptable to them. These constraints have manifestations such as loss of livestock, frequent bans on livestock products and movement (quarantine) and low prices of livestock. Problems in the livestock sector generally affect the residents of Turkana County since this is the backbone of their livelihoods.

Opportunities are available particularly land and investment in fodder production, water provision, and veterinary services. This can be modeled along the Botswana system of livestock production.

Mining

Minerals currently available within the vicinity of the MCL are gold, gypsum, precious stones and building materials. Prospecting for oil is ongoing and there are high prospects that oil can be found in Turkana County. This is due to the diverse geological structure and its positioning within the extended southern Sudan oil belt.

This sector does not contribute greatly to the economy of the MCL due to; inadequate geological surveys, local communities not involved in mining activities, concessions granted to external agencies and insecurity within the County.

Investment in localized public infrastructure and services, promotion of benefit sharing in mining activities and participation of the public through cooperatives or government ownership of stake in the sector can enhance the contribution of the sector to the local economy.

Capital Investments

Capital economic wealth arising from demand of various services spring from land prices which are always high in urban areas than rural. Plot sizes are 50 by 100 ft and cost about Kshs.300, 000 in the town centre and about Kshs. 70-200,000 away from town. The distribution of plots in the town and rates paid on the plots per month is indicated in the table 3.3.9 below. Plots are either commercial or residential.

Table 3.3.9 Distribution of Plots and Rates Paid

Area or Location	No of Plots	Type	Rate in Kshs Monthly	Annually in Kshs
Lodwar Market	318	Residential	800	3,052,800
Lodwar Town	801	Commercial	1,000	9,612,000
Nakwamekwi	226	Residential	800	2,169,600
Kanamkemer	680	Residential	800	6,480,000
Natotat-Akwamar	131	Residential	800	1,257,600
Total				**22,572,000**

Source: Lodwar Rates Register 2011

Building investments include residential both for middle and low income population, commercial buildings, and office buildings. Infrastructure investments relate to the main tarmac road from Kitale passing the town to Sudan, roads within the town that have no tarmac, electricity, airstrip, and the town water system. This form of asset value of capital investment of the town is expected to grow due to increasing urbanization and modernization of the trunk infrastructure particularly the road and railway link from Lamu to Juba through Lodwar. The capital investments mentioned above would create a better environment for attraction of business and industry in the locality.

Commercial

The spatial configuration of commercial activities is within the town centre but showing tendencies of gravitating towards Kitale side along the highway. Commercial activities found are; basketry, hair salon, welding, woodwork, posho milling, bicycle repair, tailoring, watch repair, food selling, bike repair, scratch cards, retail mobile phone shops, kerosene retail outlets and charcoal. Transport services operated as an economic activity by motor cycles and taxis owners. This provides some employment on a small scale, but is linked to the retail shop and motor cycle repairs.

The commercial sector is affected by the bad road infrastructure which is in poor condition, weak customer base, inadequate desired products, high energy costs, lack of collateral, inadequate local capacity due to traditional customs, less attraction by professionals, inadequate and costly ICT services, lack of public transport and high prices of commodities due to long distances from where the products are sourced.

As a result of the above, the following is evident within the Municipality, unemployment, scarcity of products, low investments in commercial activities, and low participation of the local community in business.

The strategic placement of the Municipality on the Trans African Highway, and within the County and through improvement of localized public infrastructure and services can greatly enhance commercial investments in the town. It also stands out as a regional commercial service and industrial centre for the County and Southern Sudan.

Industry and Tourism

Tourist attraction features and sites have been referred to earlier and are available. In addition, industrial potential exists based on livestock and improved agriculture as already suggested and local initiatives of basket making by women.

The above sector has been hampered by lack of localized public infrastructure and services, poor linkage to the regional resource base, lack of marketing of the tourist potential, negative publicity particularly the security of the county due to cattle rustling and lack of tourist facilities and services.

This constrains have led to the manifestations such as unemployment, poverty, proliferation of informal activities, small number of visitors and low revenue base for the municipality.

In conclusion, the region has resources which have not been tapped appropriately in a planned logical sequence for the benefit of the people both in central places and dispersed settlements. Economic fortunes of central places of which Lodwar is part lie in their close linkage to their regional resource systems. The resource areas are livestock, agriculture, fishing and mining. The livestock and agriculture have require to be carefully assessed in line with the water resource systems to provide opportunities for the mentioned economic activities to provide the Municipality with the required economic means particularly food and raw materials for industry or value addition in line with Vision 2030. To attain the above there are implications of infrastructure investments at various scale levels.

3.4 Financial and Investment Management

3.4.1 Staff Compliment

Currently the Lodwar Municipality has an approved staff complement of 37 with 33 in post and only four vacant.

The approved positions are distributed 10 to the Clerkôs Department, 18 to the Treasurerôs, 8 to the Workôs and only one the Community Development Departments of the Municipality.

Table 3.4.1 below outlines the strength of the councilôs staff in terms of numbers, salary grades and spread by departments in which they are deployed.

Table 3.4.1: Turkana County GovernmentStaff Compliment

Cadre of staff	Salary Scale	Position title	No. Approved	No. In-post	No. vacant	Clerk's Dept.	Treasurer's Dept.	Work's Dept.	Community Dev. Dept.
Salary scales 1-8 Professional	3	Town Clerk	1	-	1	1	-	-	-
Management Staff	4	Town Treasurer	1	-	1	-	1	-	-
Salary scales 9-15	7	Senior Accountant	1	1	-	-	1	-	-
Supervisory / Technical	9	Admin. Officer 1	1	-	1	1	-	-	-
Support Cadre	9	Accountant	1	-	1	-	1	-	-
	10	Internal Auditor 3	1	1	-	-	1	-	-
	10	ICT Officer	1	1	-	-	1	-	-
	10	Market Master	1	1	-	-	1	-	-
Semi-skilled technical	10	Works Officer	1	1	-	-	-	1	-
support staff Scales 10-13	10	Social Dev. Officer	1	1	-	-	-	-	**1**
	11	Senior Clerical Officers	1	1	-	1	-	-	-
	13	Revenue Clerk	1	1	-	-	1	-	-
Salary scales 14-18 Unskilled Support Staff	14-18	Clerical Officers, Secretary, Cleaner, Messenger, Market attendant	25	25	-	7	11	7	-
TOTALS			**37**	**33**	**4**	**10**	**18**	**8**	**1**

Of the approved three senior-most managerial positions only one position of Senior Accountant is filled leaving the two crucial positions of Town Clerk and Town Treasurer vacant. The municiplaityôs capacities to analyse, formulate, and review policies and strategies relevant to its operations are thus limited.

With the key positions of Town Clerk and Town treasurer vacant and without provisions for recruitment of engineering, legal, public health and physical and environmental planning experts, the municiplaity lacks professional competencies to identify and prioritize the services needs of the residents and also to develop and implement policies, strategies and plans to conclusively address those needs. In these areas the municiplaity relies on the advice of the line ministries whose appropriately qualified staff is, unfortunately, not in Lodwar town but in far off stations like the Lands Registrar at Kitale, the Urban Roads Engineer at Eldoret, and the State Counsel at Nakuru.

The established number of staff positions at supervisory and technical support levels is also too few to effectively attend to the services need of residents of a town the size of Lodwar. There is only one Social Development Officer to coordinate all the social development issues and one Works Officer to design, develop and manage public services infrastructure for a population exceeding 58,000.

3.4.2 Gender Balance

Gender representation on the municiplaity and among staff is as follows:

Table 3.4.2: Gender balance among Councillors and existing staff

	Male	Female	Total to total	% Female
Councillors	7	2	9	22%
Staff (In-post)	22	12	34	35%

The Lodwar Municipality, with 9 members, should include at least 3 female councillors to comply with the prescribed requirement that at least 30% of elective positions in a public institution be occupied by the minority gender.

The Municipality is an equal opportunity employer in terms of gender. This policy is far from being fulfilled when its female employees number only 35% of its existing staff.

3.4.3 Internal Controls and Internal Audit

The position of Internal Auditor is inappropriately placed in the Treasurersô Department. This means the Internal Auditor is directly answerable to the Treasurer and the Town Clerk both of whose activities he is supposed to check and report on. Furthermore the Internal Auditor is deployed to perform routine accounting operations such as bookkeeping, checking payment vouchers before payment or checking receipts before banking which conflicts with his oversight role.

The council should be re-organised to create an Audit Committee of the council (ACC) which will supervise the internal audit oversight function.

The Government should continue tying LATF grant disbursement conditional to attainment of desired performance criteria to keep the council encouraged to practice and sustain good financial discipline.

Timely production of realistic budgets and accurate financial reports will depend on the level of qualification of municipality staff and maintenance of up to date accounting and other transactions records.

To improve efficiency of its financial reporting the municiplaity should install computer programmes that capture and record all financial and other transactions to provide a ready and sufficient basis for information and data required for preparation of financial and other reports in compliance with the law or for improved managerial decision making.

The realization of the above objectives will depend on the quality and competence of the municiplaity staff. It is expected that the Lodwar Municipality will move with speed:

i. Immediately proceed with speed to fill the vacant positions of Town Clerk, Town Treasurer, Internal Auditor and Works Officer

ii. In the short-term establish the positions of Municipal Lawyer, Town Engineer, Physical Planner, Public Health Officer, Surveyor, Committee Clerk, Enforcement Officer, Revenue Officer and Market Master.

iii. In the long-term establish self monitoring human resource management and development systems that guarantee maintenance of staff at levels and with competencies appropriate to its operations

3.4.4 Public Private Partnership

Public private partnership in municipal services provision and problem solving is a recent idea in the town and is still a subject for further consideration by the council and interested private sector parties especially in connection with the provision of user charge services such as conservancy, markets, bus-park and slaughter house which can also be run effectively for the benefit of the general public by the council in partnership with the private sector. The council is aware and considering possibilities of contracting out the provision of such services (especially nursery schools) although necessary feasibility studies are yet to be done. Provision of Pre-primary school education mainly by Religious Organisations, NGOs and parents-teachers associations is a good example of private sector participation in the provision of public services in the town. Provision of exhauster services in Lodwar Town is a purely public affair of two public institutions, Lodwar Water Services Company (Lowasco) and Turkana County Council (CCT).

Two public toilets constructed in 2010 are not yet in use because the council has no capacity to manage them. These are indeed ripe candidates for sub-contracting to be managed by the private sector.

3.4.5 Principal Sources of Revenue

The Lodwar Municipality provides a variety of services to its residents. For the council to be able to do this satisfactorily, it requires funds to:

- finance the purchase or development of capital assets it uses while responding to service needs of its residents.
- pay for repairs required to maintain the productive capacities of its capital assets to ensure sustainability of quality services provision, and;
- pay for day-to-day operations, e.g. salaries and allowances, borrowing charges, transport and travelling, etc.

The council's main sources of revenue include government grants, land rents, Single Business Permit (SBP), market fees, user charges (fees and charges) and a variety of CESSes and royalties levied on movement of agricultural and mineral produce from or through the municipality area.

Table 3.4.3 below outlines annual amounts of the councilsô major sources of revenue over the financial years 2003/04 to 2008/09:

Table 3.4.3: Turkana County Government- Actual Income and expenditure trends 2003/04-2008/09

Revenue	2003/04 Kshs. Million	2004/05 Kshs. Million	2005/06 Kshs. Million	2006/07 Kshs. Million	2007/08 Kshs. Million	2008/09 Kshs. Million	2008/09 % of Total
Government Grants							
LATF grant	8.06	8.55	10.51	15.42	15.37	18.85	66%
RMLF grant	-	1.72	0.53	1.72	2.04	1.61	6%
Sub-total	**8.06**	**10.27**	**11.05**	**17.13**	**17.41**	**20.46**	**72%**
Local Revenues							
Contribution in lieu of rates	-	-	-	-	-	-	0%
Single Business Permit (SBP)	0.10	0.99	0.79	1.55	1.91	4.25	15%
Plot allotment fees and rents	0.16	0.76	1.03	1.05	1.21	1.75	6%
Market fees	0.76	0.49	0.47	0.38	0.49	1.06	4%
Others	1.13	0.59	1.54	1.16	1.32	0.90	3%
Sub-total	**2.15**	**2.83**	**3.82**	**4.15**	**4.93**	**7.96**	**28%**
Total Revenues	**10.21**	**13.10**	**14.87**	**21.28**	**22.33**	**28.42**	**100%**

i. On the average total annual revenue has been increasing.

ii. In 2008/09 the Lodwar Municipality received from the Government, a general purpose Local Authorities Transfer Fund (LATF) grant for spending on any approved matter in the local authority and a specific purpose Roads Maintenance Levy Fund (RMLF) grant for maintenance of roads within the Town. The LATF grant is accounted for 66% of total revenue while the RMLF grant accounted for 6%. Total Government grants revenue was 72% of total revenues.

iii. In 2008/09 yields from the councilôs own sources of revenue amounted to only 28% of its total revenue. Principal own sources of revenue are Single Business Permit (SBP), Plot rents and Market fees

3.4.6 Principal Classes of Expenditure

Expenditure of the council is classified as follows:-

- Personnel Costs comprise salaries, wages, allowances and other employment or service benefits paid to Councillors and staff.

- Operational costs comprise expenditure on activities that contribute directly to the councilôs performance of its statutory mandate, namely satisfying the public services needs of its residents. Personnel costs of staff posted at the market, slaughter-house, stadium, cemetery, conservancy, roads and works sections are taken as operational for the purposes of analyses in this report.

- Maintenance (or repair) costs comprise expenditure incurred to sustain the condition and productive capacity of capital assets which the council owns and uses for the purposes, and in the course of providing services required by its residents. This category of expenditure ensures sustained level and quality of services rendered.

- Capital expenditure includes the cost of developing or buying new capital assets to replace those that are worn out or to expand the services productive capacity.

- Debt Resolution is the value of payments made by the council towards reduction of its indebtedness to suppliers on account of outstanding bills for goods and services received.

Table 3.4.4: Turkana County Government- Actual Income and expenditure trends 2003/04-2008/09

Expenditure	2003/04 Kshs. Million	2004/05 Kshs. Million	2005/06 Kshs. Million	2006/07 Kshs. Million	2007/08 Kshs. Million	2008/09 Kshs. Million	2008/09 % of Revenue
Civic	1.07	2.43	1.46	3.98	3.80	3.48	12%
Personnel costs	3.74	3.80	1.41	5.98	5.48	10.51	37%
Operations costs	1.79	2.12	1.57	3.68	4.36	1.87	7%
Maintenance costs	0.16	0.12	0.07	0.16	0.74	0.69	2%
Total recurrent expenditure	**6.76**	**8.47**	**4.51**	**13.79**	**14.37**	**16.56**	**58%**
Capital payments							
Develop / acquire new assets	1.40	2.63	3.94	5.26	7.86	3.86	14%
Debt resolution	-	-	9.32	12.78	1.69	4.95	17%
Total Expenditure	**8.16**	**11.1**	**17.77**	**31.83**	**23.92**	**25.37**	**89%**
Revenue Surplus (deficit)	**2.05**	**2.00**	**(2.90)**	**(10.55)**	**(1.59)**	**(4.09)**	**11%**
Total Revenues	**10.21**	**13.10**	**14.87**	**21.28**	**22.33.1**	**21.28.1**	**100%**

Over the period 2003/04 to 2008/09 (Table 3.4.4 below) the councilôs total expenditure was generally less than revenue generated to finance it. The council is more inclined to incurring revenue deficits than surpluses. In year 2008/09 with allocation of only 7% of its total revenue to services provision (operations) this council can hardly claim public services delivery as justification for its existence.

Inadequacy of revenue funds to finance all planned activities has occasioned rationing which directs most of the available resources to the most pressing and inevitable expenditure item namely councillorôs and staff emoluments (49% of revenue). Very little is spared for services provision (7%), for maintenance (2%) of capital assets, for investment (14%) in new capital assets and for reduction of outstanding liabilities (17%).

Allocation of negligible amounts for acquisition and maintenance (repairs) of the councilsô revenue generating facilities and assets such as markets, slaughter slabs, and bus parks explains the councilôs inability to provide services to the expectations of the residents and also the permanent run-down condition of those facilities and absence of revenue from them.

A condition attached to disbursement of LATF grant requires the council to use part of the current yearôs grant for purchase of new capital assets and towards reduction of debts owing in order to qualify for continued disbursement of the grants in subsequent years. Spending about Kshs. 3.86Million on capital assets acquisition and Kshs. 4.95Million on debt resolution in 2008/09 demonstrates the councilôs effort to comply with this condition.

3.4.7 Resource Envelope for funding LASDAP Projects and Investments

The Local Authority Services Delivery Action Planning (LASDAP) process is a local level three year rolling consultative planning process whereby the council mobilizes its residents to participate in annual meetings.

In the meetings they identify and prioritize the activities and projects that need to be undertaken to resolve their local services needs and also contribute to realization of some overriding national policy considerations such as poverty reduction and the needs of special interest groups.

The proceeds of the RMLF grant are applied on repair and opening up of access roads within the town. This expenditure started in year 2004/05 when the council started receiving the RMLF grant and the amounts spent annually since then more or less correspond to value of grants received. Qualifying roads are identified and prioritised through the LASDAP process.

The LATF grant received plus revenue from own local sources net of expenditure on debt resolution, civic allowances, staff costs and on maintenance determines the councilôs ôResource Envelopeò or revenue available to finance programmed Local Authority Services Delivery Action Plan (LASDAP) activities. Table 3.4.5 summarizes LASDAP projects financed by the Resource Envelopes over the period 2001/02 to 2008/09

Table 3.4.5: Implemented LASDSP Capital Projects

	2001/02 Kshs. Million	2002/03 Kshs. Million	2003/04 Kshs. Million	2004/05 Kshs. Million	2005/06 Kshs. Million	2006/07 Kshs. Million	2007/08 Kshs. Million	2008/09 Kshs. Million
Valuation roll	-	-	-	-	-	-	1.50	-
Cemetery fencing	-	-	-	0.26	-	-	1.08	-
Consultancy	-	-	0.74	-	-	-	-	-
Computers	-	-	0.04	-	-	-	0.32	-
Schools / classes	5.60	0.45	-	-	0.60	-	-	0.30
Slaughter slabs	3.00	0.39	-	-	-	-	-	-
Bus Park	0.26	-	-	-	-	-	-	-
Joint Loan Board	-	-	-	-	0.25	-	-	-
Motor vehicle	-	-	-	-	-	2.64	-	-
Bursary fund	-	-	0.63	0.93	2.03	1.27	-	-
Roads maintenance	-	-	-	1.05	1.06	0.74	1.01	1.04
Offices construction	-	-	-	-	-	-	3.66	1.00
Public Toilet Constr.	-	0.25	-	-	-	-	-	0.70
Dispensary	-	-	-	-	-	0.60	-	0.52
Others	0.20	0.11	-	0.39	-	-	0.30	0.30
Total	**9.06**	**1.20**	**1.40**	**2.63**	**3.94**	**5.26**	**7.86**	**3.86**

The council has not been able and may not be in the near future to meaningfully invest in equipment and other capital assets for use in provision of services needed by the public. The only long-term assets which the council owns are the Town Hall, the Mayoral car, a few office computers and the recently constructed and yet to be used modern market and two pit latrines. Its capital asset base is grossly insufficient to enable it generate and sustain a meaningful level of public services on which the council can earn revenue.

3.4.8 Single Business Permit (SBP)

Under Section 148(a) of the Local Government Act the council is permitted to levy fees on licenses and permits it issues in respect of businesses, trades and occupations whose conduct, location and operation it is allowed by the law to control. The reason for giving a license or a permit is to control and not to raise revenue. The license fee should therefore not be unreasonably more than what the council spends to exercise that control. Businesses licensing is the second most important source of revenue for the council after central government grants. In 2008/08 about 15% of the Councilôs total revenue was derived from Small Business Permits (SBPs).

The council has a schedule of licenses which was last revised and approved by the Minister in 2010. A listing of licenses and permits issued is maintained for each year. The list shows businesses that have paid for their licenses and is therefore not a good base for enforcing collection of license fees from those that operate illegally and for establishment of what is due to council. Evasion of license payments is also rampant.

3.4.9 Plots Allotment and Rent Revenue

All land within the Municipality is Trust Land held by the Council on behalf of the local community. The council surveys and allocates portions of the land to individuals and corporate institutions for residential, commercial or industrial development. Most of the plots allocated measure 50 feet by 100 feet for development of shops or residential premises. Large plots of varying sizes and different uses have also been allocated for development as schools, hospitals, prayer houses, Universities, etc. The Town Clerk is of the view that more than half of the 706 square Kilometres of land in the town has already been surveyed and allocated in this manner. Plots ownership is not formally registered and lease documents issued.

Applications for plots must be accompanied with contributions of Kshs. 1000 each towards defraying part of related processing costs and for each quarter acre land allocated the council charges a once and for all allotment fee of Kshs. 15,000.

The council has not developed a valuation roll for any property or class of properties in its area. It cannot therefore levy property taxation as provided under the Rating Act, (Cap.267) and the Valuation for Rating Act, (Cap 266). It however maintains registers of a few (not all) plots for the purpose of assessing and collecting plot rents due on them annually. By December 2011 the number and rental income value of plots allocated in town were as follows (As per councilôs market plots registers):-

Table 3.4.6: Lodwar Town Annual Plot Rents Revenue Potential

Trading / Market centre	Number of commercial plots	Number of residential plots	Annual rent/plot Kshs	Annual plots rent Kshs
Lodwar Town - commercial	807	-	1,000	807.000
Lodwar Town - residential	-	318	800	254,400
Nakwamakwi	-	226	800	180,800
Kanamkemer	-	680	800	544,000
Natatol-Narapetet	-	131	800	104,800
Total	**807**	**1,355**	**-**	**1,891,000**

Plot allotment fees and rents are the third most important source of revenue for Lodwar Town after government grants and Single Business Permit (SBP). In 2008/09 about 6% of the Councilôs total revenue was derived from land based charges which include plot application fees, plot allotment fees, annual plot rents, approval of plot transfer fees, location of beacons fees, plot sub-division fees and approval of building plans fees.

Problems associated with collection of land based revenues include the following:-

a) Plot owners are unwilling to pay rents; most of them consider themselves too poor to be subjected to any form of taxation. (At stakeholders meetings some councilors and council officials appeared sympathetic to this view).

b) The council is unwilling to rigorously enforce collection of plot rents arrears.

c) The council does not have suitably qualified staff to follow-up collection of arrears of plot rents through courts.

d) Plot registers are incomplete-do not include all plots allocated to individuals and businesses in the town.

3.4.10 Market Fees and other User Charges

Section 148(b) of the Local Government Act, empowers the council to levy in respect of each service it provides, a user charge to raise revenue to cover the cost of providing the service (presumably with a reasonable surplus remaining to finance activities such as maintenance and capital replacement costs as are necessary to sustain provision of the service).

The users of Turkana County Governmentservices and facilities are expected to bear the full cost of the services or facilities they use through payment of a user charges categorized as:-

- Enclosed Market fees (handcraft market

- Slaughterhouse fees
- Solid waste collection and disposal fees
- Sceptic exhauster services
- Motor vehicle / Motor bike parking fees
- Informal open air market
- Hawking along the roads and in public places in the town
- CESS on transportation of livestock, hides and skins and quarry stones and sand.
- Livestock market and slaughter slabs fees
- Motor vehicle parking fees
- Livestock market and slaughter slabs fees

3.4.11 Enclosed Markets

There is only one enclosed handicrafts market in the Town. The Handicraft Market was built by a donor to provide space for collection, storage and marketing carpets and other items of handicraft produced by women groups in the Town. The council is not involved in the management of this market and has exempted it from payment of any form of municipal dues.

The council has just completed construction of a modern fresh produce market comprising of stalls, restaurants, butcheries, shops, and open space for general trading of dry produce. This market is yet to be commissioned for use.

Adjacent to the councilsô new market, the Government of Kenya through the Economic Stimulus Programme is constructing another large Kshs.10Million worth Fresh Produce Market which will be donated to the council upon completion.

Lodwar municipality has no experience and capacity to manage market operations. It has no enforcement unit to ensure compliance with relevant by-laws and to maintain security and acceptable behaviour at such public places. The existing personnel complement comprising a Markets Master and nine Market Attendants has no experience and competence to handle stalls rental business and to interpret and enforce market by-law. Management of the combined operations potential of the two markets under construction is a challenge for which the council must start preparing.

3.4.12 Open Air Markets

The council has not set aside land for use as an open air market in the Town. Informal open air markets have developed and operate daily, mostly in the evenings the area around the handicraft market and on road reserves in areas with high concentration of people as the cases of California, Kanamkemer, Nawaitorong and Nakumekwi. Some residents with shops or residential plots next to busy roads also display and sell their wares from temporary sheds built on their frontages. All such market areas are not served with water and pit latrines (a public pit latrine near the handicraft market has not been commissioned for use two years after it was built by the council).

The town is also home of many hawkers, mostly the youth, who carry loads of their wares and roam the town to find customers. Hawkers pay Kshs. 1,000 for a license for a yearôs operations.

3.4.13 Level of Market Charges

The council charges Shs. 300/= per month for each of the stalls in the enclosed municipal market shed.

Charges for retail-business in any of the open air markets range from Shs.5/= to Shs. 50/= per day per specified type and quantity of goods. Wholesalers are charge between Shs. 100/= to Shs. 500/= per day depending on the quantity of merchandise. The charges are not standardised and the collectors have the discretion to set fees payable on the produce displayed at the market for sale.

To keep up with inflation the council is expected to revise its schedule of user charges regularly by incorporating marginal and manageable adjustments as opposed to occasional material increases which often ignite public resistance.

Market fees collection problems

Collection markets revenue is constrained by:-

i. Evasion of users and some councillors who feel that even business people in Lodwar town are too poor to pay for use of public trading spaces.

ii. With only two security guards and both posted at Town Hall on half a day shift basis, the council lacks enforcement officers with skills and knowledge to interpret and enforce council by-laws.

iii. The market attendants are overworked, have a very low morale and too few to control markets activity transacted everywhere and at any time.

iv. The Market Attendant deployed at the livestock market work up to 11.00 am when the market continues to late afternoon.

v. The council does not keep a detailed and separate record for each user charge income and related expenditure and is therefore unable to assess the performance and viability of each of its user charge services.

vi. Market fees levied are generally low and cannot guarantee related cost recovery.

3.4.14 Parking Fees and CESS on transportation of produce

Transport operators pay an annual Kshs. 15,000 Single Business Permit (SBP) fee for doing business in the town and in addition charged every time they drive or park in the town. Parking charges are as follows:-

- Buses and mini-buses Kshs. 100 per day
- Lorries Kshs. 2,500 per annum
- Taxies Kshs. 700 per annum
- Motor cycle (Bodaboda) Kshs. 400 per month

The councilôs Omnibuses and Passenger Vehicles by-law requires operators of PSVs of such vehicles to drop and pick passengers at the councilôs bus park. Taxis may operate at strategic positions along roads and streets in the Town and may also use the bus park.

The existing bus park is small and rarely used by bus operators. Most operators avoid using the bus park because it is insecure and also because most operators prefer to pick and drop passengers by road sides as opposed to wasting time while waiting for them at the bus-park. The number of PSVs which ply the Town daily is small. Residents rely more on taxies and motor-cycles than on buses and matatus for movement in the town.

Many long-distance haulage trucks park overnight in the town but contribute nothing towards maintenance of the roads they use. Equally lacking are parking facilities for taxis and boda-boda in town.

The council has no staff to manage the bus park. Market attendants posted at the Handicraft market and at Kanamkemer cess collection point also collect parking fees from Lorries, buses and mini-buses entering the town. CESS charged by the council for transportation of controlled commodities, e.g. hides and skins, building stones and sand, livestock and marketable agricultural fresh produce into or out of the town is also collected at these points.

Major problems encountered in collection of parking fees and transportation CESSes include:-

(a) Lack of enforcement Personnel

(b) Lack of supervision

(c) There are no designated parking places for buses, matatus, Bodabodas and the long distant travelling trucks.

3.4.15 Budgeting and Budgetary control

The council has adopted the Local Authorities Budget Guidelines and complies with the recommended LASDAP formats and procedures. It has also complied with a condition that it prepares and submits a revenue enhancement plan (REP) outlining the measures it plans to implement to increase its gross revenue in the ensuing financial year to qualify for continued LATF grant disbursements.

The budgeting process involves determination and matching of expected revenues with estimated expenditure to give an indication of whether planned operations will yield a revenue surplus or a net expenditure (revenue deficit).

Each section prepares a budget request that is submitted to the Town Treasurer who:-

a) Facilitates internal review and negotiations in consultation with the Town Clerk, the Council and the wishes of residents gathered through the Local Authority Services Delivery Action Planning (LASDAP) process, and

b) Consolidates departmental/sectional budgets into one council-wide budget.

A comparison of the councilôs budgets with corresponding operating results in the fiscal periods 2007/08 and 2008/09 reveals that revenue estimates are reasonably realistic but expenditure estimates grossly understate actual expenditure levels. This is because the council spends on unbudgeted activities or beyond approved limits thereby causing relatively large negative variances as shown in Table 3.4.7 below:-

Table 3.4.7: Lodwar Municipal Council: 2008 /09 Budget - Actual Variance Analysis

Revenue	2008/09 Kshs. Million Budget	2008/09 Kshs. Million Actual	Average Annual Actual / Budget Variance	Variance as % of Budget %
LATF grant	18.85	18.85	(-)	(0%)
RMLF grant	8.08	1.61	(6,47)	(80%)
Sub-total	**26.93**	**20.46**	**(6.47)**	**-**
Local Revenues				
CILOR	-	-	-	-
SBPs	1.37	4.25	2.88	210%
Plot rents	0.66	1.75	1.09	165%
Market fees	0.37	1.06	0.69	187%
Others	1.84	0.90	(0.94)	(51%)
Sub-total	**4.25**	**7.96**	**3.71**	**-**
Total Revenues	**31.17**	**28.42**	**2.75**	**-**
Expenditure				
Civic	3.45	3.48	(0.03)	(1%)
Personnel costs	9.97	10.51	(0.54)	(6%)
Operations costs	2.26	1.87	0.39	17%
Maintenance costs	0.61	0.69	(0.08)	(13%)
Recurrent exp.	**16.28**	**16.56**	**-**	**-**
Surplus / (deficit)	**14.89**	**11.86**	**-**	**-**
Capital payments				
Acquisition of assets	12.90	3.86	9.04	70%
Debt resolution	3.73	4.95	(1.22)	(33%)
Net surplus / (deficit)	**(1.74)**	**3.05**	**-**	**-**

There seem to be a significant level of uncertainty in estimating the amount of RMLF grant due even in the very near future.

Collections from local revenue sources amount to about 50% of budgeted yields. This is so not because local revenue estimates are unrealistic but because the council is not enthusiastic to pursue their collection as government grants are sufficient for performance of the critical commitments in its budgets.

A requirement that the council uses part of LATF fund on debt resolution and for purchase or development of capital assets is being complied with, even when there is little or no budget provision and has the potential to progressively increase the net worth of the council.

3.4.16 Financial Records, Reports and Computerization

Turkana County Governmenthas a comprehensive set of financial rules and regulations whose primary intention is to ensure accountability and proper use of the public funds entrusted with it. It maintains:

a) A record of all its financial transactions including receipts and payments

b) Vote control books to direct use of available resource to budgeted purposes only

c) Cash flow statement and schedules of creditors and of debtors annually as supporting schedules to budgets, Revenue Enhancement Plans and to annual financial statements.

These records provide information and data that is useful for preparation and presentation statutory financial reports and for evaluating the councilôs ability to finance its activities, ability to meet its liabilities and other financial commitments and its performance in terms of service costs, efficiency and accomplishment and accountability to the public.

The council has consistently complied with the condition that it must prepare and publish its annual financial reports of the preceding year to qualify for allocation of LATF Grant in the ensuing year. For this reason the council has had all its annual abstracts of accounts prepared and audited within statutory deadlines. However the quality of the reports has been wanting as they have always attracted a qualified audit opinion for lack of credible valuations for its assets and liabilities. The council needs to:

a) verify the nature, size, location and use and valuations of all its assets

b) develop a fixed assets register, and

c) confirm or reconcile the amounts of all its long and short term liabilities

The council has not yet fully computerized its operations. It is currently installing the Local Authority Integrated Financial Operational and Management System (LAIFOMS), accounting software being developed by the Kenya Local Government Reform Programme (KLGRP) to address the unique accounting and other information needs of local authorities in Kenya. The council should ensure implementation of all accounting modules of the programme.

3.4.17 Performance Contracts

The LATF performance measures have included a requirement for the council to prepare and submit a Revenue Enhancement Plan (REP) outlining measures to be taken to increase its gross revenue in the ensuing financial year. Ideally, the targeted enhanced revenue yield should be based on the approved budgets but there was no evidence of efforts to harmonise the contents of the two documents.

Performance targets for Councils and senior council officers are rarely based on or harmonised with the approved budgets, which form the basis of all council operations yet Councillors and council officers seem to be more focused on attaining targets set in performance contracts than those in the budgets.

3.4.18 Summary of Key Areas of Concern

1) The Councilôs capacities to analyse, formulate, and review policies and strategies relevant to its operations are thus limited. Positions of Town Clerk and Town treasurer are vacant and there are no provisions for recruitment of engineering, legal, public health and physical and environmental planning competencies. Most of the professionally qualified staff of Government line ministries detailed with availing necessary technical assistance to the council is stationed out of Lodwar.

2) The established number of staff positions at supervisory and technical support levels is also too few to effectively service the residents of Lodwar.

3) The proportion of two female councillors on the council of nine falls short of the minimum 30% constitutional allocation for minority gender representation.

4) The Councilôs equal opportunity employer policy is far from being fulfilled as its female employees are only 35% of existing staff.

5) Public private partnership in municipal services provision is a recent innovation and subject for further consideration by the council and interested private sector parties

6) Central Government grants accounts for about 72% of the councilôs total revenues with the councilôs own sources raising the remaining 28%.

7) The council is more inclined to incurring annual revenue deficits as its total expenditure is generally less than total revenue generated to finance it.

8) About 50% of the councilôs annual revenue is used on financing personnel costs leaving a very small portion to finance services provision, maintenance of capital assets and investment in new capital assets.

9) The councilôs capital asset base is grossly insufficient to enable it generate and sustain a meaningful level of public services on which the council can earn revenue.

10) The revenue generating potential of the livestock market and the slaughter-slabs has never attracted serious consideration.

11) Lack of a database of individuals and businesses subject to Single Business Permit (SBP) makes enforcement and monitoring of licenses revenue collection difficult. Licenses fees payment evasion is also rampant.

12) The council has not developed a valuation roll and cannot therefore levy rates and does not maintain a complete register of owners of all plots in the town.

13) Most plot owners consider themselves to poor to be subject to any form of local taxation and the council seems to agree as it does not rigorously enforce collection of plot rents arrears.

14) The council does not have suitably qualified staff to follow-up collection of plot rent arrears through courts.

15) Evasion of users and some councillors who feel that even business people in Lodwar town are too poor to pay for use of public trading spaces.

16) With only two security guards and both posted at Town Hall on half a day shift basis, the council lacks enforcement officers with skills and knowledge to interpret and enforce council by-laws. The market attendants are overworked, have a very low morale and too few to control markets activity transacted everywhere and at any time. For example the Market Attendant deployed at the livestock market work up to 11.00 am when the market continues to late afternoon.

17) The council does not keep a detailed and separate record for each user charge income and related expenditure and is therefore unable to assess the performance and viability of each of its user charge services. Market fees levied are generally low and cannot guarantee related cost recovery.

18) There are no designated parking places for buses, matatus, Bodabodas and the long distant travelling trucks which park in the town overnight.

19) Performance targets for Councils and senior council officers are rarely based on or harmonised with the approved budgets, which form the basis of all council operations yet Councillors and council officers seem to be more focused on attaining targets set in performance contracts than those in the budgets.

3.5 Environment

3.5.1 Background

Despite the townôs growth and expansion, a number of environmental challenges are evident in Lodwar. With an increase in population, and the future importance Lodwar will play as a principle route between Kenya and Southern Sudan, the need to address environmental problems, and put in place measures to prevent future problems, cannot be over-emphasized. Moreover Lodwar is in a very unique and enviable geographical position in that it is located between two large rivers. At the time of this field visit (November 2011), the rainy season had ended approximately two or three weeks prior, but the two rivers, namely the Turkwel and the Kawalathe, both still experienced high volumes of water.

The main environmental problems are:

- Encroachment of the Riparian
- Encroachment of riverine forest
- Dust storms
- Location of airstrip
- Ponding and flooding
- Foul odour due to open defeacation
- Flooding of Kawalathe River

3.5.2 Encroachment of the Riparian

Several sections of both rivers have been seriously encroached. The absence of a full-time NEMA office in Lodwar (the closest is in Kitale) could partly explain the low level of environmental awareness, and no enforcement.

Enshrined in Kenyan Legislation, are laws to protect the land which is immediately adjacent to all wetlands. This includes rivers, such as the Turkwel and Kawalathe Rivers.

Figure 3.5.1: Turkwell River – cultivation within the riparian zone

3.5.3 Encroachment and destruction of riverine forests

There are few trees within the study area. The forest cover is approximately 400 Ha in Turkana County *(Epodo, John – Kenya Forestry Service)*. Some of the common trees include Acacia Tortillas, Acacia Nilotica, Cordia Sinensis, Eucalyptus and Zysphus Mauritania. Most vegetation is concentrated along the rivers, e.g. the Doum Palm. Some trees also exist along the main roads. Trees within the town are highly valued by town residents who due to extreme high temperatures have come to appreciate the shade offered mostly by large Neem trees. During hot afternoons nearly all cars in Lodwar are parked in shades of trees.

The existing riverine forests are however endangered by uncontrolled development towards inside the forested area. Local Water Resources Users Association lack enforcement laws to protect the encroachment into the riverine forest. The community is employing stop gap measures through organized groups where individuals are responsible for the survival of a certain number of trees along the river. Villagers are now answerable to their village should someone fell a tree without the knowledge or authority of the Kenya Forestry Service.

Figure 3.5.2: Encroachment and destruction of riverine forest

3.5.4 Dust Storms

Lodwar experiences high temperatures ranging from 35℃ to 50℃. Precipitation is also limited. For this reason only hardy and drought-resistant vegetation exists. This means there are large areas of bare sand. Dust storms are common; as a result the town is very dusty.

Figure 3.5.3: Typical streets in Lodwar – source of dust

3.5.5 Location of air-strip

The air-strip is located in the middle of the town. This result in noise pollution and risk associated with take-off and landing of aero planes.

3.5.6 Ponding and flooding

Lodwar town has no storm water drainage system. Storm water collects along the town streets and stagnates. Prolonged stagnation of storm water creates localized foul odours. Efforts have been made by the authorities to pump out the stagnated to mitigate on the health risks posed by the ponding. It is important that effective storm water drainage system is developed for the town to discharge storm water flows into the appropriate outfalls.

Figure 3.5.4: Ponding due to lack of drainage on main town streets.

3.5.7 Foul odour due to crude ways of managing night waste

Lack of adequate onsite sanitation facilities such as public toilets in the town has led to crude ways of managing night waste. Lodwar town has only two public toilets. The town, as a result, has many open areas that have a foul odour due to open defecation.

3.5.8 Invasive species – Prosopis Juliflora (Mathenge)

Though at first glance it is aesthetically pleasing (because it is so green), this invasive species which was first introduced to Kenya in Baringo has spread to the extent that it is now a nuisance. With its characteristic small, bright green leaves, and large, strong thorns, *prosopis* has now invaded even Lake Turkana and now destroys even fishermensônets. Numerous workshops have been held to teach local people methods of utilization and management of *prosopis.* Some of these include using it for poles, and charcoal. It has been found that the calorific value of *prosopis* is high and it does not produce sparks.

Figure 3.5.5: Prosopis Juliflora (Mathenge), the green plants

Prosopis Juliflora (Mathenge), the green plants, in the middle distance. It now grows everywhere and is out of control

3.5.9 Kawalathe River

Kawalathe River, notorious for laggers in the rainy seasons, has claimed many lives of those who use the narrow drift and also those live close to the seasonal river. The narrow drift is dangerous to the motorized and non-motorized traffic using the draft for movement purposes. This is an environmental and human problem which requires immediate and long lasting mitigation measures.

Figure 3.5.6: Kawalathe River – the narrow drift and the destructive lagger

3.5.10 Energy

Lodwar town is currently supplied by electricity from an isolated grid through a thermal power station located within the town. The power station is run by Kenya Power on behalf of Ministry of Energy. The fuel is imported through port of Mombasa and transported by road to Lodwar.

Considering the source of fuel and the delivery costs, the cost of generating electricity in Lodwar town is considerably high and it exceeds the normal tariff of retail consumer prices. As a social responsibility to its citizens, the Government of Kenya subsidizes the cost of this generation.

The power generation and supply currently in Lodwar is therefore not a commercially viable venture but a social responsibility initiative of the Government.

3.6 Housing

3.6.1 Background

The term ôhousingô is not synonymous with a ôhouseô. A ôhouseô is a single structure while ôhousingô refers to the house with all the supports, i.e., infrastructure and other social amenities and facilities. The main consumer of urban land is residential use, typically accounting for about 60% of the total. Well planned and decent housing for the resident population is key to the socio-economic development of any urban area.

3.6.2 The Planning Policy

The planning of Lodwar town is limited to a very small area which was carried out in 1983 by the Department of Physical Planning. This plan however, was not fully implemented and as of now it is out dated considering that the population of Lodwar increased tremendously since then and there are more socio-economic activities on the increase that require properly planned land.

This calls for a comprehensive planning policy that will be used to guide the growth of urban centres.

The current policy in Kenya which governs planning is made up of a number of acts including:

a) The Physical Planners Registration Act of 1996
b) The Local Government Act Cap 265
c) The Government Land Act Cap 280
d) The Land Control Act Cap 302
e) The Registered Land Act Cap 300
f) The Trust Land Act Cap 288
g) Registration of Titles Act Cap 281
h) The Land Titles Act Cap 282
i) The Official Secrets Act Cap 187
j) The Antiquities and Monuments Act Cap 215
k) The Public Roads and Roads Access Act Cap 399
l) The Street Adoption Act Cap 406
m) Public Health Act Cap 242
n) Water Act No. 8 of 2002
o) Environmental Management and Coordination Act (EMCA) No. 8 of 1999

The Physical Planning Act of 1996 of the Laws of Kenya, Cap 286, Sec 29, part V, Development Control is a preserve of the county government. Development Control ensures that development applications comply with policy guidelines, planning regulations, standards, approved physical development plans and the local authority by-laws among other statutes that guide urban development with the objectives of ensuring growth of a healthy economy and a safe and secure built environment among others.

3.6.3 Zoning Regulations

This is the separation of land uses in order to avoid mixed development that can course harm to human life. It is the physical division of urban community into districts or zones for the purpose of regulating the use of land and buildings, height and bulk buildings, plot coverage and density population. The main purpose of zoning is therefore to direct and regulate development or redevelopment of a town in appropriate directions and ensure proper uses of land and buildings with a view to creating a healthy, efficient and stimulating living environment. Lodwar

Municipality currently does not have strict zones which development can follow. Instead there is haphazard mixed use development.

3.6.4 Development Issues

The greater MCL covers an area of 700sq.km and the study area is 68 sq.km. The population of MCL according to 2009 census is 58,000 people. However, in the last 10 years MCL has experienced high population growth rate and development more than ever before. A rapid scan indicates that development has by far outpaced forward planning intervention measures. The developments have mainly been driven by the demand for housing, commercial and office developments.

3.6.5 Housing

There is a shortage of housing for all income groups in Lodwar. The Municipality has not developed any housing. The town is heavily depended on privately developed housing which caters mainly for the low to middle income groups. The county council of Lodwar manages a few residential houses which were left by NORAD, an NGO that moved out in late 1990s. These houses are mainly occupied by some of the government officers working in Lodwar. Housing in Lodwar is sparsely populated since there are no planned residential land use areas. The private sector plays a major role in the provision of housing in MCL. The quality of housing provided varies from very poor structures built out of temporary materials (mud and wattle, thatch, cow dung finish) to good quality permanent materials (concrete products-blocks, tiles, etc; Iron sheets, steel products etc). In between lies the semi-permanent structures built of a mixture of temporary and permanent materials.

A survey conducted on the housing situation in Lodwar town came up with findings on various parameters which are summarized in the sub-headings below.

Dream for Town with regard to Housing

A dream for the town by the residents in relation to housing elucidated many responses with varying opinions as shown in Table 3.6.1. Out of the 19 aspects of concern by residents in relation to housing, six of them stand out as key to achieve their dream. These aspects include building of permanent houses, town plan for residential houses, provision of affordable houses, modern housing units like flats, maisonettes etc; the need for government intervention in the provision of housing for the low-income people, among others. The first six aspects identified account for 83.6 percent weighting. These are aspects that will form the basis on which planning of housing will be articulated around. The rest of the other 13 aspects bring on board issues though with low weighting but very critical because they are more of a detail.

Table 3.6.1 Aspects of concern Identified by Residents with regard to housing

No.	Identified Aspects of Concern	Frequency	Valid Percent
1	Building of permanent houses	84	15.8
2	Town plan for residential houses	127	24.0
3	Affordable houses for all	80	15.1
4	Modern housing units-flats, maisonettes etc	82	15.5
5	Government to build decent but cheap houses for the poor	31	5.8
6	More real estates	39	7.4
7	Resettlement of IDPs	8	1.5
8	Government to sell its unused land to the public	3	.6
9	Affordable building/ mortgage loans	6	1.1
10	Proper surveying of plots	5	.9
11	Reduce building construction cost	12	2.3
12	Free housing for the IDPs and the vulnerable	14	2.6
13	Relocation of residential houses from town to villages	1	.2
14	Open up peri-urban villages for residential	4	.8
15	No shanties in town	1	.2
16	Relocation of people living near the airstrip	1	.2
17	Free land for investors	2	.4
18	More land for housing expansion	22	4.2
19	More government houses for government officials	8	1.5
	Total	**530**	**100.0**

Housing Typologies

The field survey identified the types of housing that were occupied by the residents.

The predominant house typology is the single rooms. Majority of the residents (60.6%) occupied single rooms, followed by 16 percent of the residents living in bungalows (table 3.6.2) the rest live in manyatta, huts and a combination of rooms (two, three and four). This scenario shows a limitation in the choice of housing typologies available to the residents of Lodwar.

Table 3.6.2 Type of house occupied

No.	Typology	Frequency	Valid Percent
1	Bungalow	94	16.3
2	Single rooms	350	60.6
3	Manyata	51	8.8
4	Huts	61	10.6
5	Double rooms	17	2.9
6	Three rooms	4	.7

7	Four rooms	1	.2
	Total	**578**	**100.0**

This scenario shows a mismatch between what peopleôs aspirations and wishes are and what is on the ground as presented in table 3.6.1. The residents talked of wishing to live in modern houses including apartments and maisonettes in addition to bungalows. The current housing typology is single floor units.

The Size of the Dwelling

The respondents were asked to state the number of rooms the house they were living in has. The majority (79.6%) of respondents were living in one room unit.

Table 3.6.3 Rooms occupied by Household

Rooms	Frequency	Valid Percent
1	463	79.6
2	50	8.6
3	57	9.8
4	12	2.1
Total	582	100.0

Adequacy of Present Housing

Respondents were asked whether their current housing was adequate for their household needs. 42.6 percent were satisfied with the size of their house while 57.4 percent found the size of the housing unit inadequate to their housing needs.

Table 3.6.4 Adequacy of Current Housing Unit

		Frequency	Valid Percent
Valid	Yes	234	42.6
	No	315	57.4
	Total	549	100.0

Ideal Size of Housing Unit

As a follow up of the adequacy issue, respondents were asked to state the number of rooms they needed for their household to live comfortably. The responses varied from one room to 12.

However it was noted that over 80 percent of the respondents would be satisfied with 3 to 6 room housing unit. The implications are that the current housing units are inadequate in size as shown in Table 3.6.4.

Table 3.6.5 Ideal Number of Rooms

No. of Rooms		Frequency	Valid Percent
Valid	0	1	.3
	1	4	1.2
	2	21	6.3
	3	80	24.1
	4	105	31.6
	5	53	16.0
	6	43	13.0
	7	11	3.3
	8	6	1.8
	9	1	.3
	10	3	.9
	11	1	.3
	12	3	.9
	Total	332	100.0

Ownership of the Dwelling

It was found out that 50.2 percent of the respondents lived in their own houses while 46.4 percent rented their housing. Thus a high percentage of the residents live in their own houses and yet the housing typologies as indicated in Table 3.6.2 is basically single storey (bungalow type) houses.

It is expected that owner occupied houses would vary in typology, space configuration, materials, finishes, etc. which is not the case in Lodwar.

Table 3.6.6 House Ownership

		Frequency	Valid Percent
Valid	Owner Occupied	290	50.2
	Employer	8	1.4
	Rental	268	46.4
	Squatter	9	1.6
	Lives with relative	3	.5
	Total	578	100.0

Mode of Delivery for Owner Occupied Houses.

The main delivery method of owner occupied housing was through construction by the owners which accounted for 72.3 percent. Only 11.6 percent bought the houses they were living in while 15.8 percent got their houses through inheritance. It is worth noting that houses were bought from individuals and not a property developer. This aspect of lack of realtors in Lodwar was highlighted by the respondents in Table 3.6.1 number six. The government agencies have not created an enabling environment for development of housing for sale.

Table 3.6.7 Owner Occupied Housing Delivery Mode

		Frequency	Valid Percent
Valid	Purchased	35	11.6
	Constructed	219	72.3
	Inherited	48	15.8
	Donation	1	.3
	Total	303	100.0

Provision of Rental Housing

In terms of rental housing, 89.9 percent is provided by individual developers. There is very little involvement of government agencies including MCL in the provision of rental housing. Thus the private sector (individuals) plays a major role in housing provision within its limitations.

Table 3.6.8 Provision of Rental Housing

		Frequency	Valid Percent
Valid	Government	5	1.9
	Local Authority	14	5.4
	Parastatal	2	.8
	Private company	4	1.6
	Individual	231	89.9
	Church	1	.4
	Total	257	100.0

Elemental Construction Materials of the House

The materials used on the houses were classified as permanent (concrete and burnt clay products and systems; Timber, Iron and steel products), semi-permanent (Tin roof, mud and wattle plastered wall, screeded murram/hardcore floor) and temporary (old tin, polythene, thatch roof

cover, mud and wattle/off cuts/old tin walling and murram floor). Table 3.6.9 shows that 51.4 percent of the structures fall within the permanent category and the rest are semi-permanent and temporary structures. One of the reasons why almost half of the structures are not permanent was highlighted as the high cost of building materials. Whereas in Lodwar, there is potential of building stone and sand, the cost of other building materials (iron sheets, cement, steel, etc) is very high because of transport cost.

Table 3.6.9 Elemental Analysis of Building Materials

	Roof	Wall	Floor	Overall
Permanent	59.7	47.5	47.1	51.4
Semi-permanent	20.9	34.3	25.1	26.8
Temporary	19.4	18.2	27.8	21.8
Total	100.0	100.0	100.0	100.0

SUMMARY

The field survey has brought out issues that were mentioned by the community during the stakeholderôs forum. The problem of shortage of decent housing has been corroborated by the survey work. In addition, issues like government non intervention in the provision of housing has led to poor housing conditions in Lodwar. These issues will form the basis upon which a policy framework will be developed to address the issue of housing in Lodwar.

3.7 Transportation

3.7.1 Sector Background

1 Introduction

The findings in this sector were derived from the transportation situational analysis of the planning area and the overall Municipality area. The data and information used in the situational analysis were obtained from both primary and secondary sources as well as from stakeholders and focussed group discussions. Data were also derived from transect survey and household/work place questionnaire surveys.

The Government of Kenya (GOK) recognizes the transport sector as a facilitator of rapid economic growth, reconstruction, poverty eradication and wealth creation for the country. An efficient transport system is a pre-requisite for the rapid economic development of the country and for improving the quality of life of the people. This makes transportation development strategy for Lodwar town and the municipal area critical given the socio-economic challenges facing this historically and regionally important town and the region at large. The transport demand in the municipal area as well as into and out of it is high given its regional and commercial importance, especially as it relates to the neigbouring countries such as South Sudan, Uganda and Ethiopia. Lodwar is an important commercial centre for the region with high level of security and this makes it a potential single important commercial and economic hub for the region if an efficient transport system and infrastructure within it and linkages to the hinterland and to other regions were well designed and developed.

The present transport supply in Lodwar is inadequate to meet the current and increase in travel demand, both within the Municipality and into and out of it, especially due to poorly planned and under-developed infrastructure. The development of road facilities and other transportation infrastructure together with traffic management measures are required. In order to solve the transport problems of the Municipality, a comprehensive urban plan should also cover a transport development strategy covering the areas of road network improvement, public transport and traffic management and other modes of transport that could improve the socio-economic development of the area.

2 Institutional Framework of the Transport Sector in Lodwar Municipality

The Lodwar town is an urban area in the County of Turkana in the Republic of Kenya. Under the Urban Area and Cities Act, Lodwar is an urban area mandated to discharge transport services as per the County Government Act.

The institutional and legal framework for the transport sector as a whole is currently not unified under a national transport authority or urban transport authority. The sector is governed by

numerous statutes that fall under two broad categories, namely statutes affecting all sectors of the economy and sector-specific legislation. Institutionally also, different sub-systems and sectors of the transport system fall under different authorities, Government ministries, departments and parastatals. The legal framework is currently not adequately able to facilitate the effective operations of the various entities they govern and to enhance harmony in the transport sector. Several transport parastatals operating under their specific statutes and are also subject to the State Corporations Act. They therefore experience lack of managerial autonomy and depend on decision-making by their respective Ministries and are burdened with bureaucracy. The institutional framework for the transport sector is fragmented in nature; therefore, the responsibilities of the institutions that govern the sector sometimes overlap with conflicts resulting in the process. However, the Roads Act is under review and after its completion, there will be a clear management and implementing agencies for the different classes of roads.

Currently, the responsibility for roads infrastructure, which constitutes the greatest component of the urban transport system, is vested in the Ministry of Transport and Infrastructure. With the enactment of the Kenya Roads Act 2007, three new Road Agencies have been established namely: the Kenya National Highways Authority (KeNHA) responsible for Class A, B and C roads; Kenya Rural Roads Authority (KeRRA) responsible for Class D, E and other roads and Kenya Urban Roads Authority (KURA) responsible for urban roads. The Kenya Roads Board (KRB) was established by an Act of Parliament in 1999 with the mandate of, among others, managing the road maintenance levy fund and other funds for road maintenance. It is now responsible for financing the maintenance of roads and undertaking technical audits.

In Lodwar, KURA and KeNHA, on behalf of the Ministry of Transport and Infrastructure therefore plays very important role in planning, provision, maintenance and repairs of road transport infrastructure. At policy level, the Ministry of transport and infrastructure is responsible for whole transport sector constituting all modes of travel, four major ones for passengers and bulk freight being rail, road, maritime and air. The County Government play key role in the sector, especially in urban transport planning and infrastructure provision and transportation services management.

The rail transport system is governed by the Kenya Railways Corporation (KRC). However, the mode is yet to be developed along the corridor and through the region in which Lodwar Town is located. It is anticipated that this will be done as part of Lamu Port development, whose feasibility study and design is already complete. This rail transport facility, expected to connect key urban areas of Kenya to South Sudan and Ethiopia, will play significant role in the movement of people and goods to and out of the Lodwar urban area.

Article 185(2), 186(1) and 187(2) and the Fourth Schedule of the constitution describes the distributions of functions between the National Government and the County Government. Fourth Schedule Part 1 Section 18 provides that National Government is in charge of Trunk Roads

while Part 2 Section 5 provides that the County Government will be in charge of all County Roads and Public Road Transport. This schedule tries to bring a more unified transport system at the County level that facilitate more coordinated planning and implementation of urban transport programs and projects and an integrated management of urban transport systems.

Figure 3.7.1 (a) shows the current institutional framework for the transport system in Kenya,

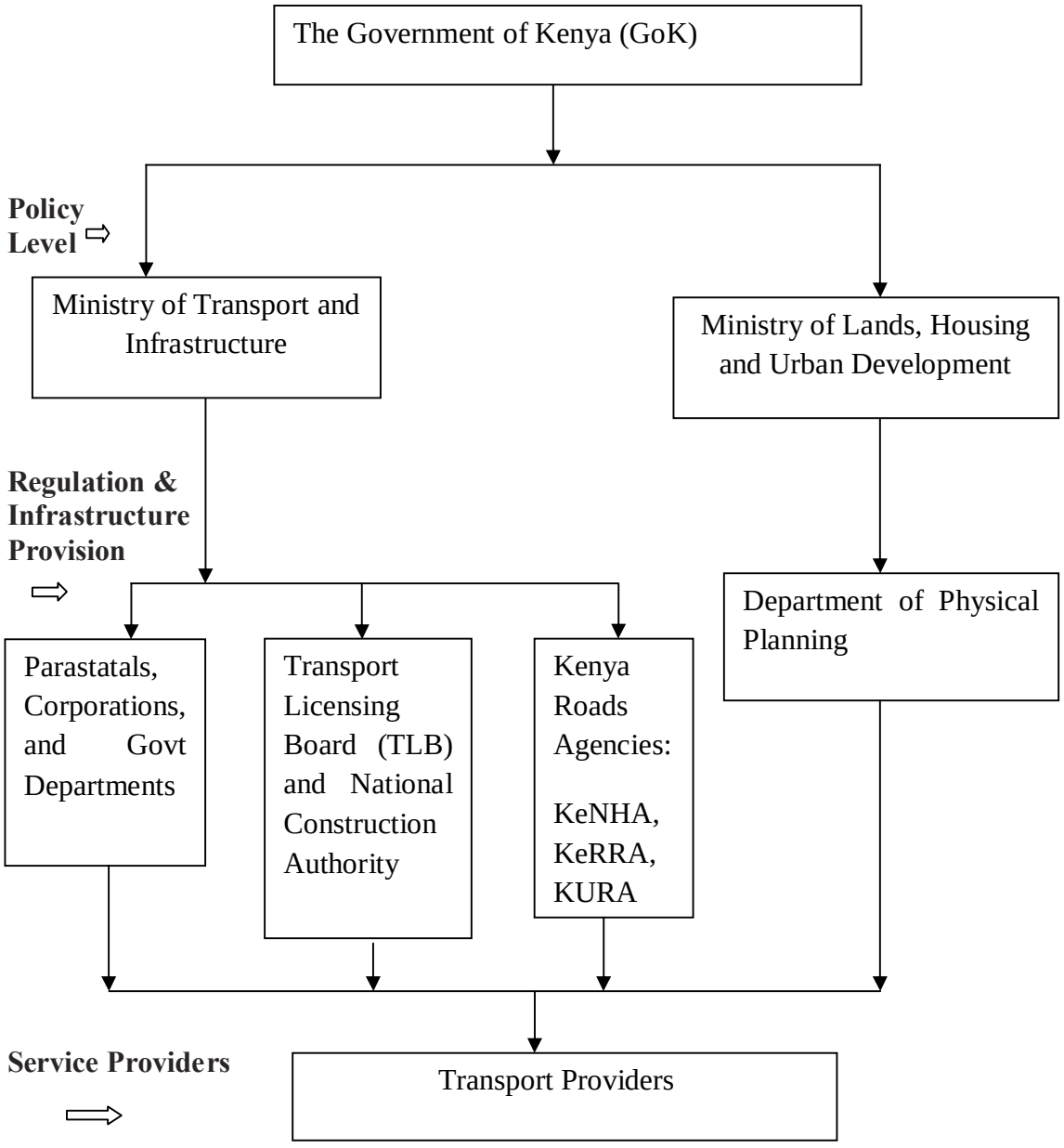
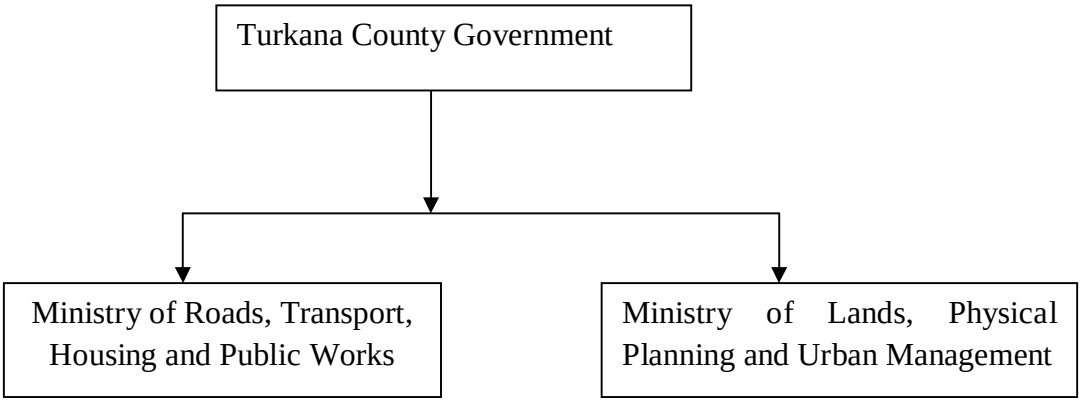


Figure 3.7.1 (b) shows the current institutional framework for the transport system in the County,



3.7.2 Transportation Infrastructure and Facilities

The roads and road network

The transportation infrastructure and facilities in Lodwar Urban area are both unplanned and under-developed. The roads are dilapidated and in deplorable conditions; the network is characterised by poor road conditions. Apart from the Class A1 road to Lokichogio, the entire road network in the town is not tarmacked (bitumen pavement surfacing) and is in a poor state. High frequency of potholes runs throughout the town roads. However, the County Government of Turkana has put efforts to upgrade the road network to bitumen standard.

Due to poor network connectivity, inadequate road network and poor conditions of the roads, there is inaccessibility of some areas and zones within the Municipality and of neighbouring centres. Many roads are poorly designed and potholed with poor drainage system. There is need for the expansion of the network in a well planned pattern/structure.

The roads lack bridges. Even Class A1 (international) road does not have a bridge; the roads in this area, including the class A1 road, are at best only served by drifts. There is an urgent need of construction of bridges along Class A1 road and other roads that are currently only served with drifts.

Other road transport facilities

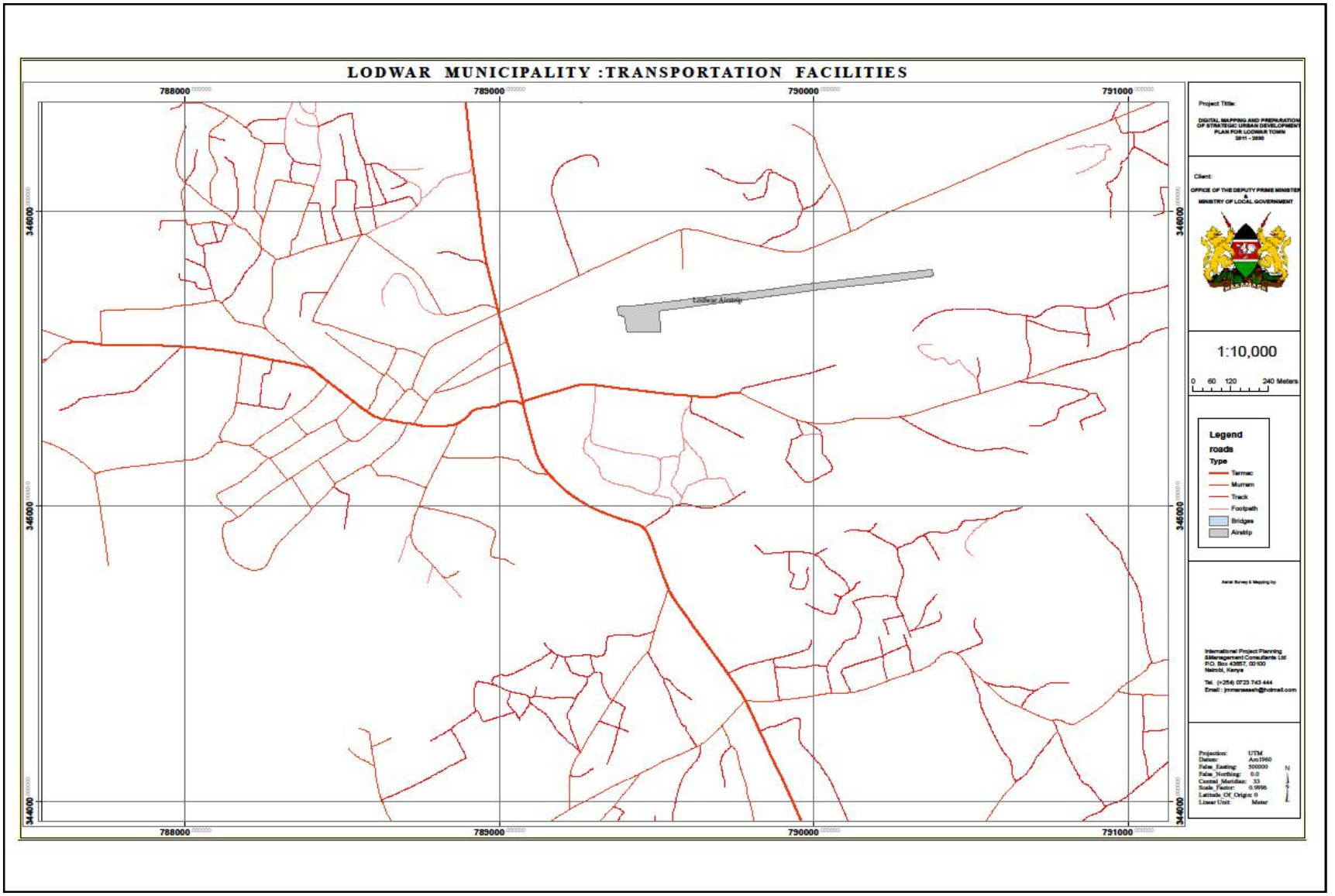
Lodwar Municipality is characterized by lack of transport facilities such as bus parks, and loading and unloading points within the municipality; there are no street lights even at the only airstrip which is located close to the Central Business District (CBD) and the built up area.

The parking, alighting and boarding points for vehicles in the municipality are crude and haphazard. There are only unplanned and unsuitably located undesignated/makeshift bus stops

that result into congestion and obstruction of traffic. The congestion witnessed along the streets is largely due to the crude and haphazard parking of vehicles, and not due to high volumes of traffic.

No road signs are erected within the Municipality. Therefore accidents, especially among new road users, are prevalent. These may result from taking of wrong turns, entries and exits. There is need to erect and secure new roads signs with favorable and durable materials that are less prone to theft and destruction.

Figure 3.7.2: Transport Network in Lodwar



Deterioration of roads

The roads within the Municipality and within the region are prone to fast deterioration in condition and state. The construction materials in this region (composed of mainly volcanic soils) weather out and erode much faster, especially when the roads are unpaved. The poor drainage system characterizing the area speeds this deterioration to be even faster. The other causes also include poor workmanship and overloading by goods vehicles. This calls for

- Development of efficient weigh bridges
- Enforcement of axle load limits on the road
- Close supervision of road construction to ensure that good quality of materials are used.
- Procuring services of good contractors.

Lack of routine maintenance of transportation infrastructure and facilities

Lack of routine maintenance and timely repair of facilities is another critical finding with respect to facilities and infrastructure. KURA, that is responsible for urban roads, is not even based in Lodwar; they have no presence in Lodwar. The town is served from Eldoret office. That distance obviously means that KURA is out of touch with reality of the condition of roads in Lodwar. No wonder there is continuous weathering of roads and deterioration of facilities.

Poor drainage along the urban roads

Generally the CBD of the Municipality is poorly drained. The poorly designed and constructed road drainage system has made matters worse for the roads and the transport system. There is inundation on the roads; during rains there is flooding of the roads making them impassable. This calls for

- Construction of drainage structures and bridges,
- Maintenance of the drainages and de-siltation of the system
- Flood mitigation measures that are well planned and designed is required.

Facilities for other transport modes

Lodwar municipality has limited transportation modes and their associated infrastructure and facilities.

There are no rail facilities that could expand opportunities for socio-economic development No other option in case of a problem on the roads, no rail transport system, except the limited air transport that is largely inaccessible to the common citizens. This has resulted into:

- Costly travel within and into and out of Lodwar Municipality;
- Dominance of the road transport, which is also very poor in state.

There is need for provision of more modes of transport; examples include rail and increased air transport services. There is an opportunity to introduce rail transport system. This has been provided for within the LAPSSET corridor.

Air transport in Lodwar

There are facilities for air transport in Lodwar. However the facilities are limited and the airstrip is not only small, but is also unsuitably and inappropriately located. It is close to the CBD and to a built up area hosting schools, institutions and residential premises. The size of the airstrip has implication on the number of flights it can handle as well as the type of aircrafts that can be serviced. The location indeed has great implication on safety, security and environmental dimensions. There is therefore need for relocation of the airport with a view to of expanding it and improving safety, security and facilities for higher and better air transport services.

3.7.3 Public Transport System

The municipality has no formal public transport system within its jurisdiction. The Municipality is characterized by presence ofò boda bodasò (uncoordinated informal public transport system by bicycles and motorcycles). Accidents are prevalent among these óboda bodasô, but the residents have no options for travelling. There is predominance of non-motorized transport; many residents are pedestrians even when the travel distance is long.

Absence of formal transport system has brought about many taxis operating in the Municipality as main motorized vehicular public transport mode. This has made travel expensive /costly (through taxi hire) as there is no mass public transport system. This cost is prohibitive for most of the residents who predominantly travel on foot. Travel on foot has also been made difficult due to lack of pedestrian facilities and dusty environment. There is need for:

- Turkana County Government to take its legal mandate/role in provision of public transport as an entity or through Public Private Partnerships (PPPs)
- Engage public private partnership in provision of affordable public transport system

3.7.4 Key Issues in the Transport Sector

Congestion

The transport issues form a very important part of the concerns as perceived by the residents. When asked about the key spatial planning problems they are facing in the town, the majority were unanimous on congestion in the town with 15.8% as given in Table 3.7.1.

Road conditions

The other key issues were revealed when the sampled populace were asked what their dream need for the town with respect to transportation is, 60.8% cited improvement and expansion of roads/ and tarmacking them. This need includes increase of accessibility of the transport network.

Model split

The survey carried out shows that the majority of the town residents are pedestrians, however far their destination within the urban area is. This is due to lack of public transport resulting into expensive travel by taxis andò boda bodasò. These ñboda bodaò public transport system, mainly constituting the use of motor cycles for long distance travel, are unregulated and prone to accidents. Table 3.7.3 give modal split for the Municipality. 72.3% make their trips on foot (as pedestrians) even without well designed and environmentally healthy pedestrian facilities.

Table 3.7.1: Perception of the residents on the spatial planning problems faced by Lodwar

Issues/Problems	Frequency	Percentage
Corruption	23	5.1
Land for expansion	46	10.2
Incompetent planners	12	2.7
Congestion	**71**	**15.8**
Unplanned structures	33	7.3
Lack of access roads/paths	28	6.2
Flooding/water logging/drainage	40	8.9
Land fragmentation	1	.2
Lack of sewerage disposal system	10	2.2
Unplanned residential areas	17	3.8
No marked plot boundaries	3	.7
Grabbing of public lands	4	.9
High pollution	3	.7
Inadequate planning personnel	1	.2
Negligence by planners	4	.9
No space for utility services e.g. water, road, power lines	20	4.5
Manyattas in town	1	.2
Air strip in the middle of town	1	.2
Lack of land zoning policies	2	.4
Political interference	8	1.8
Inactive physical planning dept in the municipal council	1	.2
Absence of spatial plan of the town	32	7.1
Does not know	88	19.6
Total	449	100.0

Table 3.7.2: The residents perceived needs for Lodwar town with regards to transport

Perceived Needs	**Frequency**	**Percentage**
Improvement of roads/ tarmacking and expansion	**345**	**60.8**
Airport and more planes	13	2.3
More Public vehicles	26	4.6
Traffic police and patrols	18	3.2
Building of bridges	4	.7
Reduction of transport costs	72	12.7
Relocation of airport	5	.9
Modern highways	19	3.4
Regulation of fares in public transport	4	.7
Traffic rules and regulations followed	9	1.6
Introduction of road signs and bumps	4	.7
Overcrowding / congestion minimized	10	1.8
Establishment of a spacious bus stage	9	1.6
Others: PSVs fitted with safety belts, overloading and drunkenness reduction and enforcement of PSV rules	29	5.1
Total	567	100.0

Table 3.7.3: Modal Split for Lodwar urban travel by Municipality Households

Modes of travel	**Responses**	
	Number	Percentage
Walking	**1780**	**72.3%**
Private Car	91	3.7%
Matatu/Bus	37	1.5%
Taxi	62	2.5%
Company transport	127	5.2%
School transport	136	5.5%
Bodas	212	8.6%
Tuk Tuk	5	0.2%
Bicycle	10	0.4%
Car hire	1	0.0%
Personal motorcycle	1	0.0%
None	1	0.0%
Total	2463	100.0%

Formal Public Transport System and car-ownership

The need for formal public transport system is very critical. This is derived from the fact that the majority of the residents do not own family cars. A very small percentage (5.3%) own bicycles for their travel, while car ownership stands at 6.6%. the vast majority of 84.3% do not own any means of travel, motorized or non-motorised. The MCL must take up their legal responsibility of providing or facilitating provision of public transport within its jurisdiction.

Table 3.7.4: Vehicle ownership within the households in Lodwar Municipality

Vehicle type	**Responses**	
	Number	**Percentage**
Bicycle	115	5.3%
Personal Car	145	6.6%
Motorbike	79	3.6%
Tuk-Tuk	3	0.1%
None	**1847**	**84.3%**
Total	2189	100.0%

The problems faced by the residents while travelling with public transport, whether from far distance to Lodwar or from Lodwar to other destinations or within Lodwar are given in Table 3.7.5. Three most important issues arise: poor road conditions (32.1%), high costs of travelling (25.8%) and congestion (11.3%)

Table 3.7.5: Problems do you encountered while travelling in public transport

Problems	Frequency	Percentage
High cost and instability of fares	**123**	**25.8**
Not safe	10	2.1
Poor roads	**153**	**32.1**
Rampant accidents	14	2.9
Careless driving	36	7.5
Loss of luggage	2	.4
Congestion	**54**	**11.3**
Undisciplined crews	8	1.7
Few vehicles	4	.8
Over loading	31	6.5
No safety belts	2	.4
Loud music	2	.4
Inconvenience and unreliability	17	3.6
Un-road-worthy vehicles	9	1.9
Insecurity	12	2.5
Total	477	100.0

Table 3.7.6: Problems encountered while travelling with 'boda boda' Motorcycles

Problems	Frequency	Percentage
Over speeding	**137**	**37.6**
Careless driving	11	3.0
High cost of fuel	11	3.0
High transport cost	**13**	**3.6**
Accidents	**81**	**22.3**
Insecurity	13	3.6
Poor roads	**55**	**15.1**
Frequent breakage of motorcycles	1	.3
Not reliable	4	1.1
Police harassment	3	.8
Untrained cyclists	7	1.9
Illegal/unqualified personnel	10	2.7
High cost of maintenance	5	1.4
Noise pollution	1	.3
Lack of parking bays in town	12	3.3
Total	364	100.0

Travelling using the informal motor cycle ñBoda Bodaò also has challenges as given in Table 3.7.6, namely: Over-speeding (37.6%), accidents (22.3%), poor roads (15.1%) and high costs (3.6%).

Non-Motorized Transport (NMT) System

As has already been noted, NMT forms a very important component of the transport system of Lodwar municipality given the level of development of the transport infrastructure and services of the town. However, there are very many challenges facing this means of movement as well. These are shown in Table 3.7.7. The main problems are: they are slow, especially for long distance travels (21.5%), tiresome (17.5%), time-consuming (17.1%) and they are affected very much with dusty roads which make them unhealthy for travelers (14.7%). There is therefore need to develop NMT facilities that are suitable and provide healthy environment for use of NMTôs. This calls for development of urban road network that is fully integrated with well planned and designed NMT facilities.

Table 3.7.7: The problems encountered while travelling using Non-motorised transport

Problems	Frequency	Percentage
Tiresome	**44**	**17.5**
Not safe	13	5.2
Insecurity	14	5.6
Time consuming	**43**	**17.1**
Flooding of roads	16	6.4
Dusty roads	**37**	**14.7**
Poor drainage	1	.4
Over speeding	11	4.4
Long distance	13	5.2
Slow	**54**	**21.5**
Hot climate	4	1.6
Over crowding	1	.4
Total	251	100.0

Summary of Key Areas of Concern in the transport Sector

The areas of concern in the transport sector can therefore be summarized as follows:

1) Poor road network and poor condition of all roads, most of which are unpaved (apart from the Class A1 road to Lokichogio) and the entire road network in the town is in a poor state.

2) Poor drainage along the urban roads

3) Absence of key road infrastructure and facilities such as NMT facilities, road signs, well designed drainages, bus parks, bus stops, street lights and other facilities

4) Insecurity along the roads especially from highway robbery and rustlers on roads into and out of Lodwar.

5) Fast deterioration of roads due various reasons such as poor construction materials, poor workmanship, lack of routine maintenance of transportation infrastructure and facilities and poor drainage system causing erosion and deterioration of roads.

6) Limited transportation modes; there are no rail facilities that could expand opportunities for socio-economic development for the area

7) No formal public transport system within the Municipality resulting in expensive costs of travel, mushrooming of informal ôboda bodaô transport system that is both insecure and prone to accidents. There is very poor modal split underlying this lack of formal public transport.

8) Inadequate lake transport; transport to Lake Turkana and interconnection to key socio-economic activity points in the region

9) Improperly located and small airstrip

10) Lack of alternative bridge for livestock movement during search of pasture

3.7.5 Opportunities for Planned Development Solution

There are many opportunities for solving these problems and challenges, namely:

1) The devolved governance within the framework of new constitutional dispensation; contribution of the county government is real opportunity due to close touch with local development issues

2) The integrated strategic planning process that is ongoing.

3) The public private partnerships framework by the Government which is going to enable an effective environment for engaging PPPs

4) Vision 2030 development strategy

5) The coming development of the Lamu-Juba railway transport corridor

6) The proposed Northern Corridor development

3.7.6 Urban Road Reserve

The general guidelines for road reserves widths in urban areas are provided in the table 3.7.8 below.

Table 3.7.8: Urban Road Reserve Width

Functional Class	**Road Reserve Width, m**
Major Arterial	60 - 80
Minor Arterial	20 - 45
Major Collector	18 - 40
Minor Collector	15
Major Local	12 - 15
Minor Local	9 - 12
Local Access	9 - 12

3.8 Utilities Services

3.8.1 Background

Water and sanitation infrastructure is a key component of investment climate and fundamental to human development. Utilities coverage in urban areas has been declining as utilities struggle to keep pace with population growth. Reforms inclined to increased coverage in the water and sanitation sector has been going after the enactment of Water Act 2002. After the operationalization of the new constitution, the Water Act requires a reviewed to align the institutions with the new dispensation. Currently, Water Act is under review.

1. Water and Sanitation Sector

Water and sanitation sectoral planning for Lodwar town includes the following areas of study and planning.

- Water supply
- Sewerage service provision (Onsite and Offsite)
- Storm water drainage management
- Solid waste management

Institutional Framework

The institutions that are involved in the regulation, protection, provision and management of the services under water and sanitation sector in Lodwar town are as follows:

Water Supply

No.	Name of Institution / Organisation	Responsibility / Task
1	Ministry of Environment, Water and Natural Resources	Policy formulation, sector coordination and financing
2	Rift Valley Water Service Board	Provision of water services based on SPA with the area service water provider.
3	Lodwar Water and Sanitation Company	Provision of water to consumers
4	Water Services Regulatory Board	Issue License to Rift Valley Water Services Board approving water service provision and tariff guidelines.
5	Water Resources Management Authority Regional Office	Issue license (permits) to abstract ground / surface water
6	Water Services Trust Fund	Provision of funds to improve access to water in underserved urban and rural areas
7	Lodwar Water Resources User	To protect water catchment

	Association

Sewerage Services – Offsite Sanitation

No.	Name of Institution / Organisation	Responsibility / Task
1	Ministry of Environment, Water and Natural Resources	Policy formulation, sector coordination and financing
2	Rift Valley Water Service Board	Provision of sewerage services based on SPA with the area service water provider.
3	Lodwar Water and Sanitation Company	Provision of sewerage to consumers
4	Water Services Regulatory Board	Issue License to Rift Valley Water Services Board approving sewerage service provision and tariff guidelines.

Sewerage Services – on site Sanitation

No.	Name of Institution / Organisation	Responsibility / Task
1	Ministry of Health	Policy formulation, sector coordination and financing
2	County Government of Turkana ï Lodwar Urban Area Management	Provision of onsite sanitation guided by the By-Laws
3	Lodwar Water and Sanitation Company	Provision of exhauster services
4	Water Services Trust Fund	Provision of funds to improve access to sanitation in urban and rural areas

Solid Waste Management

No.	Name of Institution / Organisation	Responsibility / Task
1	County Government of Turkana	Policy formulation, sector coordination and financing

2	Lodwar Urban Area Management	Provision of solid waste services guided by the By-Laws

Storm water Drainage Management

No.	Name of Institution / Organisation	Responsibility / Task
1	County Government of Turkana	Policy formulation, sector coordination and financing
2	Lodwar Urban Area Management	Provision of storm water services guided by the By-Laws

3.8.2 Water

Water Supply

Provision of water service within Lodwar Municipality is undertaken by Lodwar Water and Sanitation Company (LOWASCO). LOWASCO is a corporate entity established in 2007 under the companies Act Cap 486 of the laws of Kenya. The core business of LOWASCO as defined in the service provision agreement (SPA) between it and the Rift Valley Water Services Board is: ñthe efficient and economical provision of water and sanitation services.ò

Source of Water and Production

The main source of water supply for Lodwar Municipality is ground water consisting of shallow wells that lie along the Turkwel River. The ground water system consists of 8 No boreholes located along Turkwel River from where water is pumped to storage tanks and gravitated to consumers. The system has no conventional water treatment works; but the physical water quality is good as it is filtered through the natural sandy aquifer.

The operational detail of the boreholes and the service area is as shown on table 3.8.1 below:

Table 3.8.1: Operational details of LOWASCO Boreholes

Borehole No.	Yr drilled	Tested Yield, m^3/hr	Current Production, m^3/hr	Pump Running Hrs	Daily Production, m^3/day	Area served	Storage tank Capacity m^3
1(A,B)	1984	80	19 & 10	24	698	Town A,B and California	300(Masonry)
2	1984	64	13	24	306	Nakwamekwi	100 (Masonry)
3	1984	96	60	24	1436	Naiwatorong & DC area	300(Steel)
4	1998	20	1.5	24	30	Hospital and MTC	90 (Steel)
5	2001	20	5	6	30	Kanamkemer	100(Steel)
6	2005	22	20.5	4	82	Kanamkemer and parts of	100(Masonry)

						Naiwatorong	
7	2007	7		Not yet metered	Not yet metered	Napetet, Natotol	100 (steel), 20 plastic
8	2010	6		Not yet metered	Not yet metered		

Boreholes No. 7 and 8 have not been put into operation. Water from borehole No. 7 is saline and No. 8 was drilled and developed but the pump was not installed.

The yield from all the 8 No. boreholes is 7,560 m^3/day for a 24 hour pumping operation. Currently the production per day is 2,582m^3/day which is approximately 34% of the potential yield of the borehole.

The deficit between the production and the boreholes yield can be attributed to;

- The low capacity of existing pumps;
- Poor condition of the borehole casings (steel casings rust and collapse);
- Low running hours of diesel Engine powered generators for boreholes no. 5 and 6 and none abstraction of borehole 7 & 8.

Figure 3.8.1: Current source of water

	
Borehole near Lodwar Stadium	Turkwel River. The boreholes are located beside the River.

Recently, additional source of water was identified within the Municipality. Radar Technologies International (RTI) in collaboration with United Nations Educational, Scientific and Cultural Organization (UNESCO), carried out advanced survey of groundwater resources of Northern and Central Turkana County, Kenya in 2013. This study investigated shallow and deep aquifers in the region. One of the main aquifers was identified and confirmed by drilling in Lodwar, Napuu area which is estimated at about 4km from Lodwar Town. This auifer was

confirmed to host an estimated 10 billion cubic meters and its recharge was not ascertained accurately due to factors related to Turkwel River replenishment dynamics.

Figure 3.8.2: Solar panels installed in Napuu Aquifer

	
Water Storage tanks at Napuu Aquifer	Large solar panels pumping water at Napuu aquifer.

Protection of water catchments areas

The local Water Resources User Association (WARUA) is registered under the AGôs chamber. Currently the local WRUA are making every effort to conserve the water catchment (banks of river Turkwel) but local politics and lack of enforcement of riparian land protection has hampered their efforts.

Figure 3.8.3: Riverine Forest

	
Catchment Protection by Kenya Forestry	Catchment protection by Kenya Forestry and local WRUA.

Figure 3.8.4: Utilities Network

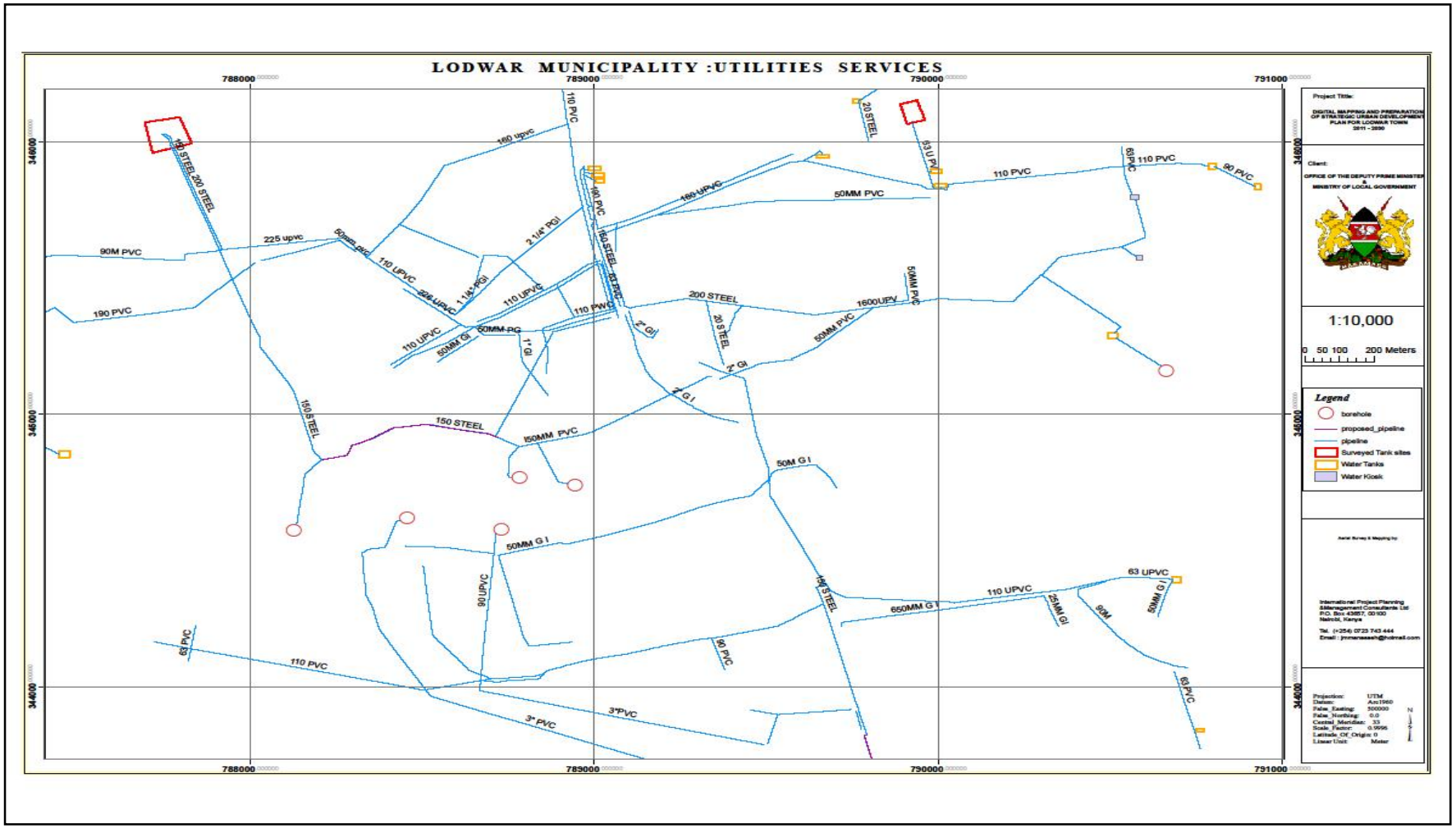
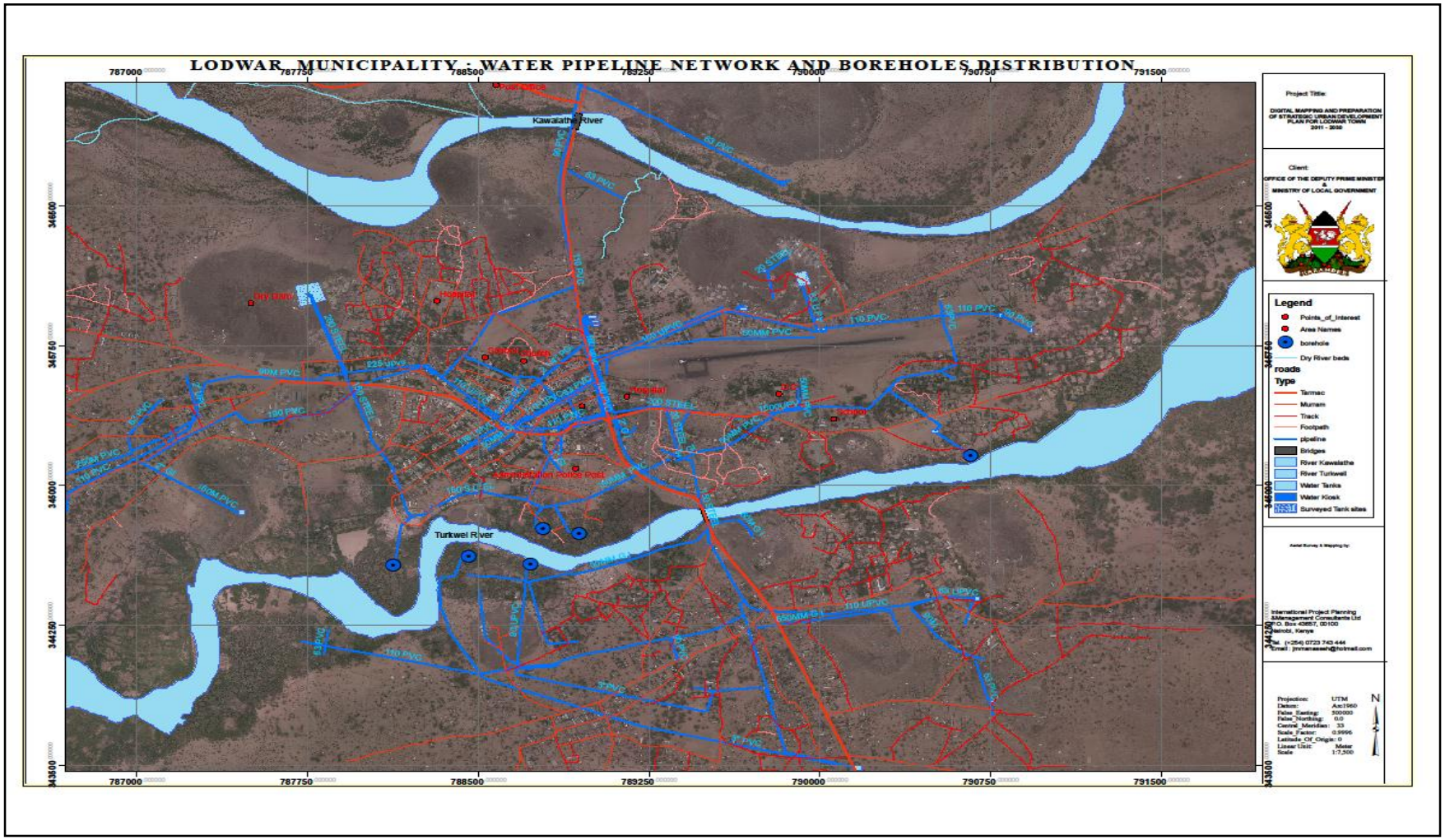


Figure 3.8.5: Pipeline and Boreholes



Population Projection and Water Demand

Population Projection

The average growth rate for Lodwar Municipality based on 1999 and 2009 population census is about 5.15%. This growth rate is maintained for projections between the years 2010 to 2020 and reduced to an average of 3.4% for 2021 ï 2030.

Table 3.8.2: Population Growth Rate for Lodwar Municipality, in %

Sub - location	1999 - 2009 Population Growth Rate	2010 - 2020 Projected Growth Rate	2021 - 2030 Projected Growth Rate
Lodwar Town	2.18	2.2	1.5
Nakwamekwi	4.89	4.9	3
Napetet	6.61	6.6	4.5
Kanamkemer	7.65	7.6	5
Naiwotorong	4.45	4.4	3
Average Growth Rate	**5.15**	**5.14**	**3.4**

Uses of Water and Water Demand Projections

The survey carried out indicated that 97.25 of the Lowdar population use water for domestic purposes.

Table 3.8.3 shows the various uses of water in Lodwar

Table 3.8.3: Main Uses of Water in a Household.

Use of Water	Percentage
Domestic	97.2
Livestock	1.9
Irrigation	0.9
Total	100.0

With the growth of the town, the uses of water will broaden to include domestic, institutional, commercial and industrial. Based on the above population growth rates, the total water demand projections considering domestic, institutional, commercial and industrial consumption categories are as indicated in table 3.8.4 below.

Table 3.8.4: Projected Water Demand for Lodwar Municipality, m^3/day

		2011	2015	2020	2025	2030
Projected Population	Urban	36,515	39,804	44,335	48,664	52,425
	Peri-urban	9,129	9,951	11,084	12,166	13,106
	Rural	15,215	16,585	18,473	20,277	21,844
	Total Population	**60,858**	**66,340**	**73,891**	**81,107**	**87,375**
Domestic Water Demand	Urban	2,921	3,184	3,547	3,893	4,194
	Peri-urban	297	323	360	395	426
	Rural	380	415	462	507	546
Institutional - Education		900	981	1,092	1,199	1,292
Institutional - Health		10	11	12	13	14
Commercial		720	784	874	959	1,033
Industrial		0	0	900	4100	6100
Total Water Demand		**5,227**	**5,698**	**7,247**	**11,066**	**13,605**

The water demand and supply for the year 2011 is 3,882 m^3/day and 2,582 m^3/day as shown on table 3.8.5 above.

Table 3.8.5: Water Produced against water demand for the year 2011

Consumer Category	**Existing Water Demand for 2011**		
	Urban	Peri-urban	Rural
Domestic Water Demand	2,921	297	380
Institutional Water Demand- Education	528.23	105.65	220.09
Institutional Water Demand- Health	10	10	10
Commercial	422.58	105.65	176.08
Total Water Demand, m^3/day	**3,882**	**518**	**787**
Total Water Supply, m^3/day	**2,582**		
Surplus (Deficit), m^3/day	**(2,605) for the entire municipality**		

The deficit between the production and the water demand is attributed to;

- The low capacity of existing the pumps;
- Poor condition of the borehole casings (steel casings rust and collapse);
- Low running hours of diesel Engine powered generators for boreholes no. 5 and 6 and none abstraction of borehole 7 & 8.

Storage

The existing storage capacity is approximately 1100 m^3. The required storage capacity should be approximately 50% of the demand.

Figure 3.8.6: Existing storage tanks

Elevated and Ground storage tanks

The manner of water storage at the user level varies from household to household. Table 3.8.6 below gives the means of water storage at the household level.

Table 3.8.6: Means of Water Storage at Household Level

Water Storage Means	Percentage
Plastic tanks	35.8
Cement tanks	2.1
Pots	3.8
Jerricans	56.4
Metallic tanks	1.0
Buckets	.9
Total	100.0

Water Distribution

The distribution system comprises of over 24 km of pipe lines of diameters varying from 100mm to 50mm and below. The existing pipes are composed of GI pipes and UPVC. Most of the original GI pipes are corroded due to the chemical composition of the soil. Furthermore, chambers within the distribution network are broken with marker posts missing. These will require reconstruction of the chambers and fixing new marker posts. The supply system also has 20 no. water kiosks, of which only 15 are currently operational.

The water supply coverage at present is approximately 33%. Rehabilitation and development of the existing water supply and distribution system is necessary to improve coverage to required levels.

Water Production and Unaccounted for Water (UFW)

The average water production per month for the year 2011 is 82,020 m3. Out of this, an average of 44,557 m3 was sold and 37,436m3 forms the unaccounted for water.

The level of UFW is high due to the dilapidated and aging water supply infrastructure. Table 3.8.7 below shows the level of water production, water billed and level of UFW for a period of 12 months in the year 2011.

Table 3.8.7: Water production and Billing per month for the year 2011

Month	**Year 2011**												**Average**
	Jan	**Feb**	**March**	**April**	**May**	**June**	**July**	**August**	**Sept**	**Oct**	**Nov**	**Dec**	
Monthly Production , m^3	86,470	82,130	86,935	88,997	79,589	80,670	80,380	78,308	76,612	76,863	77,420	89,860	82,020
Water Sold per month, m^3	40,520	39,263	43,270	48,812	47,276	48,803	44,328	44,108	44,344	45,073	42,833	46,050	44,557
Ufw per month, m^3	45,950	42,867	43,665	40,185	32,313	31,867	36,052	34,200	32,268	31,790	34,587	43,810	37,463
Ufw per month, %	0.53	0.52	0.50	0.45	0.41	0.40	0.45	0.44	0.42	0.41	0.45	0.49	0.46

Water Quality

The physical quality of water distributed by LOWASCO is good due to the natural filtration that occurs as it is abstracted through the sandy aquifer. Chlorine dosing equipment is in place at all the storage tanks and disinfection of water is being undertaken.

LOWASCO sample the water on a quarterly basis for testing in Ministry of Environment, Water and Natural Resources Laboratory. To ensure water quality, LOWASCO should acquire basic water quality testing equipment to avoid costly testing of water externally.

The study carried out during field data collection revealed that over 80% of water consumers believe that the water for drinking is safe as shown in the table 3.8.8 below.

Table 3.8.8: Safety of Drinking Water

Safety of Water for Drinking	Percentage
Good	81.2
Not Good	18.8
Total	100.0

Water supplied to the household receives various methods of treatment before drinking. Survey carried out revealed that water chlorination is the major water treatment used in Lodwar town for drinking water. Table 3.8.9 below indicates the methods used for treating water for drinking.

Table 3.8.9: Methods of Water Treatment

Water Treatment Method	Percentage
Boiling	17.9%
Chlorination	78.6%
Decantation	0.9%
Filtration	0.9%
Distillation	0.9%
None	0.9%
Total	100.0%

Water Supply Challenges

It is worth noting that the tested yield of the existing boreholes meets the current demand when abstracted to the permitted level. However, the challenges facing the service provision are sufficient to deny the residence their right to adequate and clean water. During data collection, the following problems were cited by those interviewed to be facing the service provision.

Table 3.8.10: Problems and Challenges of Water Supply

Problem	Percentage Expression of the Problem.
Corruption	2.5%
Water rationing	16.1%
High cost	24.9%
Unfair distribution/discrimination	0.9%
Long distance	4.0%
Delays in repair of breakages/leakages	5.3%
Dirty water	10.5%
Water scarcity	18.8%
Poor piping	0.9%
Inadequate water points	1.3%
Long Queues at water points- congestion	0.3%
Inadequate water personnel	0.3%
Pipes are old and rusty	1.3%
Inadequate plumbing materials	0.3%
Carrying water is tiresome	0.3%
Outbreak of diseases	0.6%
No problem	5.6%
Disconnection	6.1%
Total	100.0%

Other challenges faced during provision of water supply services are as follows:

- Aging infrastructure and dilapidated network. This results to frequent leakages, pipe bursts hence high quantity of unaccounted for water averaging 46% at present.

- Inadequate storage tanks and lack of space to construct clear water storage tanks. The current capacity is approximately 1100 m^3 against 1800m^3 required to balance the consumption fluctuations.

- Unsustainable power for water pumping. The use of electricity, diesel powered pumps is costly to Lodwar Water and Sanitation Company (LOWASCO). The cost of pumping is approximately 35% of the total cost of operation for the water supply scheme.

- Unpaid bills by the Government Department / Ministries including Heads of Government Departments. Despite the low tariff rates charged by LOWASCO, Government departments still owe the water service provider a lot of money which could have been used to improve services.

- Lack of laboratory to monitor the quality of water produced and supplied to consumers. Currently, LOWASCO uses external testing institutions to monitor water quality. This can be costly in the long run.

- Encroachment into the water catchment areas and interference of the water supply pipelines.

3.8.3 Sanitation Services

On site Sanitation

Lodwar Town has no water borne sewerage system. Households, commercial premises and institutions rely on plot sanitation facilities, predominantly septic tanks and pit latrines.

Exhauster service for the septic tanks and pit latrines is carried out by 2 No. exhausters (1 No. managed by Turkana County Government and 1 No. managed by LOWASCO). Sludge drying beds are non - existent and the council disposes the sludge on open ground approximately 5km along Lodwar ï Lokichogio class A1 road.

The charges of disludging septic tanks and pit latrines are as follows:

- Septic tank Kshs 12,000/=

- Pit latrines Kshs 5,000/=

Survey carried out indicated that disposal of liquid waste is not planned and being done in a crude manner both at the organised settlements and other settlements. Table 3.8.11 below shows the various ways of disposing liquid waste within Lodwar Municipality. From the Table 3.8.11 above 57% of the waste generated is dumped in an open ground which poses a great environmental risk.

Table 3.8.11: Method of Liquid Waste Disposal

Method of Liquid Waste Disposal	Percentage
Open ground	57.6
Pit latrine	37.5
Private firm	0.2
No means	0.4
Cess pit	0.4
Septic tank	0.9
Bush	0.2
River	0.5
Trenches	0.4
Water closets/ sewerage system	1.9
Drainage	0.2
Total	100.0

Wastewater Generation

Based on 80% of water demand, the wastewater generation of Lodwar Town is indicated in table 3.8.12 below.

Table 3.8.12: Sewerage Generation per day in Lodwar Town, m3/day

Year	2011	2012	2015	2020	2025	2030
Urban Water Demand, m^3/day	3,903	3,988	4,253	4,736	5,198	5,599
Sewerage Generation, m^3/day	3,122	3,190	3,403	3,789	4,158	4,479

Sanitation Challenges

The fast growing Lodwar town lacks fundamental sanitation infrastructure. Lack of sewerage services in the town stagnates the growth of the town and also a threat to the environment due to crude and unacceptable disposal of liquid waste.

Other sanitation challenges include:

- Inadequate exhauster facilities.
- Non-use and misuse of sanitation (self excretory) facilities.
- Lack of public toilets
- Collapsing of Toilets due to inadequate protection of the slopes.

3.8.4 Solid Waste Management

Refuse Collection System

Turkana County Government has licensed a private firm to collect and dispose solid waste generated within Lodwar Town. The frequency of collection and disposal is three (3) days in a week (Monday, Wednesday and Friday).

The private firm has limited equipments used in the collection of solid waste. Refuse is collected from the commercial and market areas using only one (1) pick up. The collection area is not zones and therefore the manner of waste collection is not coordinated.

Garbage collection service is equally inadequate though the County Government has installed collection bins in some parts of the town.

Quantity and Nature of waste

Solid waste in Lodwar Town is municipal waste in nature. The sources of waste mainly include domestic, markets, commercial and institutional.

Using a rate of 0.5kg/person/day solid waste generation rate, table 3.8.13 below gives the projected waste generated in the municipality.

Table 3.8.13: Solid waste generated per day in Lodwar Town, Kg

	2010	2011	2012
Urban Population	35,736	36,515	37,311
Solid waste generation, 0.5/ capita/day in Kg	17,868	18,258	18,655

Disposal Site

There is no designated dumping site. The municipal council identified a temporary dumping site approximately 10km along Lodwar Kalokol road. Open dumping and burning is a common scenario within many parts of the town. Stench from rotting waste especially around the market places is a nuisance.

Considering the entire Municipality, the following representation in table 3.8.14 gives the various methods of solid waste disposal.

Table 3.8.14: Method of Solid Waste Disposal in Lodwar Municipality

Method of Disposing Solid Waste	Percentage
Open ground	62.7
Pit latrine	28.9
Council collection	2.1
Private firm	.4
No means	.4
Burning	3.3
Burying	.4
Rubbish pit	1.2
Bush	.7
Total	100.0

By- Laws

Turkana County Government does not have By-Laws to regulate solid waste collection and disposal.

Solid Waste Management Challenges

Lodwar Town lacks designated and environmentally safe solid waste dumping site. Currently, dumping of solid waste is crude and more often indiscriminate burning of solid waste in the CBD.

The Municipality has not created a department to carry out the management of solid waste within the municipality and that the equipment for collection and disposal are also inadequate.

3.8.5 Storm water Drainage

The entire Lodwar Town does not have storm water drainage system. During rainy season, inundation of storm water is witnessed on most of the town roads.

Figure 3.8.7: Flooding in Lodwar Town

	
Inundation of Storm water in Lodwar Town	Inundation of access roads near KCB Bank

Storm water Challenges

Lodwar Town completely lacks storm water drainage. Storm water inundation is evident after a storm and dissipation period for the runoff ranges from days to months.

Flood management that may arise due to the flooding of Kawalathe and Turkwel River is lacking in Lodwar Town. This problem has to be addressed in detail during the stage of proposals and recommendations made for flood / disaster management.

3.8.6 Opportunities

The proposal to be made under the Integrated Strategic Urban Development Plan for Lodwar Town is a huge opportunity to address most of the challenges as mentioned. In addition, the system of devolved government is so critical in the sense that focus will be the development of the county headquarters.

The upcoming cross boundary projects like the LAPSSET offers a great opportunity to addressing of the challenges facing Lodwar Town at present. The availability of land to cater for ambitious proposals on the location of trunk sewers, sewerage treatment system and the solid waste dumping site is a great advantage to addressing of the sanitation challenges of Lodwar Town.

The Government Development Programmes through the Ministry of Lands, Housing and Urban Development such as Kenya Municipal Programme (KMP) can be used to address the storm drainage problems in Lodwar Town.

3.9 Institutional Framework & Human Resource

After an extensive tour of the Lodwar Municipality and holding stakeholders meetings as well as a review of various relevant documents, it is apparent that a number of problems do exist in terms of Institutional and Capacity Building for the municipality. First is that the level of education and training for councilors are very low. This means that a majority of the councilors cannot read and comprehend the contents of council files and minutes of the meetings of the council. This becomes even more difficult when it comes to reading and comprehending financial statements, budgets, councilôs policy statements, development plans and tender documents. The biggest problem, therefore, that the council has is lack of human capacity at the level of councillors. The council has nine (9) councillors. Out of these nine (9) five (5) are CPE graduates while four (4) are form four graduates. This creates a serious limitation in terms of the ability of councillors in formulating and implementing policy of the council.

The second level of attention is the professional staff of the Municipality. The complement control indicates that out of the 37 members of staff only two (2) are university graduates and these two are the Town Clerk and the Social Development Officer. There is no graduate in the professional cadres such as Works and Treasurerôs departments. It is worth noting that the council does not have a planning department. The council has only four departments. These are:-

- Town Clerkôs department
- Treasurerôs department
- Works department; and
- Community development department.

The third level of attention is the institutional level. A quick look at the institutional structures and the relationships between them demonstrates a dysfunctional system. The Municipality, like any other local authority in Kenya, is structurally controlled by the Central Government through the Ministerôs power over policy and operational activities. Control is also exercised through the appointments and secondment of chief officers. The structural system is complicated further by the existence of Central Government departments e.g. the Provincial Administration, alongside the council ones. This creates a very confusing situation with regard to which institution is responsible and answerable to the local residents for the provision of services.

PART FOUR: CONCEPTUALIZATION & DEVELOPMENT OF ALTERNATIVE PLAN MODELS

4.1 Summary to the Existing Land-Use

4.1.1 Landscape Analysis

It was noted:

1) That the town is located between two rivers Turkwel and Kawalathe.

2) That the general slope of the land is from North West-to-South East or generally towards Lake Turkana.

3) That the area space in between the two rivers tends to narrow in width as one moves towards their confluence but opens or widens up as one moves back to the higher ground to the North-West of the town.

4) That he area of the town to the South is also more elevated and with better soil conditions that are better drained. It is therefore better suited to urban development.

5) That the higher landscape between the rivers is associated with better drained and more stable soil conditions while the lower area are associated with more unstable soil conditions which are poorly drained and is unsuitable for urban development and settlement in general.

6) That the main town centre is located in the lower plains where the space between the two rivers begins to narrow down. This section of the town is located across the main road to the south and north and the north west of the country and therefore suffers the greatest impact of the floods.

7) That the area of the town across river Kawalathe from where the roads to Lokichogio and that to Lokitaung meet is also relatively raised in elevation and associated with relatively better drained and more stable soils that could support urban development better. This area is beginning to attract increased settlement and general development. It however lacks supportive physical infrastructure services.

8) Within the vicinity of the airstrip looking towards the north of the town, the Volcanic hills and peaks in the part of the town stand out very distinctly as they extend both along the length of the Kawalathe river and across the river into the higher background to the north and northwest of the town. On the more settled areas within the middle of the town they form distinct islands around which there is no settlement.

This emphasizes their visible rugged physical nature and their rocky features without much vegetation cover. These sites are therefore not suitable for settlement generally or physical urban growth.

9) As the two rivers progress towards their confluence, they both exhibit features/characteristics of early maturity as they tend to broaden or widen up the river course and especially with respect to the Kawalathe River it shows a clear meandering tendency. The Turkwel River also widens its course as it approaches much lower altitudes towards the lake.

10) These lower areas of the river courses have been associated with flooding for long and is the area of alluvial and more recent Lacastrine soils deposits mainly found along the Turkwel river valley and its tributaries such as the Kawalathe River. These areas of the town are therefore not well drained, prone to water logging and flooding.

Existing spatial settlement and development

From the spatial data derived from the digital topographical area mapping, it is observed:

1) That settlement is mostly densely concentrated in the main commercial centre of the town. This area of the town seems to be characterized by clearly well organized spatial pattern of roads with highest densities of built forms. These settlement developments seem to extend very close to the Kawalathe river banks in some sections especially sections west of the Kawalathe river bridge. This central settlement concentration continues to spread out along the narrow neck of the land between the two rivers towards the eastward lower ground starting from the main road across the town, across the air strip and continues farther down towards the narrower stretch between the rivers. The areas around the kalawathe river bridge have settlement extending very close to the river banks and the riparian reserves of the two rivers.

2) The west of the main town centre development concentration has two hills on either side that create a narrow pass or gap in between them through which settlement continues to the upper grounds farther up in the western background. The settlement pattern in this section of the Municipality is not planned and seems to be expanding fairly rapidly. It has extended farther into the higher plateau landscape following the alignment of the road network. It is not quite clear if this extended area of settlement could have the requisite infrastructure facilities to support settlement and human life. The development however seems to be guided by the factor of altitude and availability of well drained and stable soil conditions. It is also possible that the prevailing trust land ownership of land tenure, these areas may be associated with easy accessibility to land. This area is a major second concentration of urban settlement and requires planning.

3) The area across the Turkwel river bridge towards the southern banks of the river is also associated with rapidly expanding and intensifying settlement. These areas have better altitude and seem to enjoy well drained and stable soil characteristics. Most of the settlements are spreading out on either side of the main road to Kitale and Kapenguria, but seems to concentrate more on areas of higher landscape. This forms a third major concentration or urban settlement and development in Lodwar town with increased potential for further expansion and growth.

   i. Only a few sections of this area of the town exhibit semblance of some spatial planning organization of the settlement but these are isolated.

   ii. Generally, this area of the town requires very urgent comprehensive planning and the provision of supporting physical infrastructure facilities, utilities and community social services and amenities.

   iii. There is an area of the town across the river Kawalathe along the main road systems to Lokichogio and to Lokitaung which is beginning to attract new settlement. This area has good altitude advantage with more well drained soils that are stable and seems to be more suitable for urban settlement and growth. The area however surfers the disadvantage of poor transport connection and access across river Kawalathe. The bridge is submerged during floods and becomes impassable. To open up this area of the town to development, it would require a long term provision of a higher bridge that can be usable across the seasons and reliable.

   iv. A major programme of embankment of the river Kawalathe to reduce its overflow and flooding. Some form of channeling of the river may also be considered with the building of gabions along its banks.

   v. A strict enforcement of the riparian reserve rule will also help to restrict settlement too close to the river banks thus reducing the scale and scope of floods damage to people and property. An increase in urban settlement in this area of the town could significantly relieve the pressure on the old main municipal commercial centre by spreading out development to more reliable and safer higher ground areas. Land in this area is relatively cheap. However, settlement in these outer areas of the town will require proper physical planning and layout with commensurate provision of requisite physical infrastructure facilities, utilities and community social services and amenities to adequately serve development and promote community life. Emphasis should be on achieving a high degree of efficiency of community life and functional development.

It can therefore be noted that the spatial growth and development of Lodwar over the years is predominantly unplanned and unguided. It reveals very major tendencies towards conflicts of various factors of development and in general functional operation of the municipal site. Major site factors are ignored in the process of physical development leading to major development conflicts. The position of the town site in between the two rivers is a critical factor to be taken serious note of in the planning of the future expansion and growth of the town. The threats of flooding are real and should be avoided and controlled or minimised at all costs.

The site has important potential for expansion of urban development; this however requires to be captured in between the principles to guide the future growth and expansion of the town. It would be highly recommended that advantage be taken of the alternative elevated landscape within the municipal area and avoiding the vulnerability of the lower areas and especially the flood prone lowlands. The town does not need to be relocated but should be planned to expand to the more reliable areas and satisfactory, durable and appropriate control and conservation measures should be undertaken to contain and sustain the old commercial centres of the town. This will minimize the costs of development in the long run. There is a possibility for adopting a four prolonged urban development approach:

i. The conservation, re-planning and sustainability of the old municipal area.

ii. The planned expansion of development to the area across the Turkwel River and along and around the southern Kitale road.

iii. The planned expansion of development to the upper area west of the main municipal commercial area.

iv. The planned expansion of the development in the area across the Kawalathe river with the provision of a raised bridge

The main focus is on urban development and expansion in these four areas. This should therefore form an important structuring basis for the integrated strategic urban development plan for Lodwar.

4.1.2 Existing Land Use

It has been noted that the town of Lodwar had its first plan prepared in 1969 by the Physical Planning department. This plan was prepared based on information from a ñquickieò. This ñquickieò plan of 1969 provided some basic structure to guide the development of the town. There was another plan prepared for the town in 1974. This was a more elaborate plan and covered a more expansive area. The main focus of this plan was the categorization of land uses defining manly public purpose and utility parcels and settling out a circulation system.

The third plan for Lodwar was prepared in 1983. This plan was also elaborate and defined further land use zones for development.

The 1983 plan was mainly a form of spatial guiding framework for the spatial and physical development of Lodwar town. The period of this plan has already elapsed although it was never implemented.

A major problem in the planning of Lodwar has been lack of spatial information. That is why in 1969 reliance was made of a ñquickieò which referred to a plan based on very rough and unverified aerial photo information but which provided at least some rough indication of the nature and extend of the physical development on the ground. Also the entire town is largely trust land which implies a lack of security of land tenure. This has thus stagnated development especially private development, and at the same time, residential houses are built haphazardly with no requisite services. These and many other problems have necessitated the preparation of the current integrated strategic urban development plan.

It is noted that the coverage of the three initial development plans of Lodwar outlined above were only related to the old commercial and development area of the town constituting the first area of focus of development and expansion in Lodwar noted under the review of the existing spatial settlement and development of the town. The 1974 plan and the 1983 plans respectively therefore merely attempted to provide an outline spatial land use framework for development in a town with very limited development. Thus, even the land use zones defined in these two plans were simply a rough indication of the possible land requirements in each respective land use or future town of Lodwar without much accurate basis of estimation. The town then did not have much growth impetus as a potent of increased development investment activity. Both the town and its hinterland were highly underdeveloped and the whole of northern Kenya still suffered the stigma of isolation from main stream planning and policy focus for effective development.

It has been noted earlier how development circumstance have changed and continue to change with the Kenya Governments committed desire to open up this region for development. The activities in the Sudan and Ethiopia and other East African nations or the Great Lakes region have revealed new potential for development and growth in these northern regions of Kenya. Therefore, as indicated in the Kenya Vision 2030 plan the county of Turkana is earmarked for increased direct development contribution to the national development process. The town of Lodwar in this context is earmarked for increased accessibility for investment in the region beyond the national boundaries. This calls for more detailed planning of its growth and expansion. The digital topographical mapping has therefore been used to prove the much needed spatial data to form a sound basis for planning of the town. As seen earlier development in Lodwar has accelerated in recent years and even after the infill development of the old planned areas of the town, development is taking new dimensions and will not wait for the production of the plans.

The comparison of the extent of the old plans and the extent of the existing spatial development revealed by the topographical mapping reveals that development in Lodwar has gone farther out than the initial plans suggested.

4.1.3 Existing Land Use Situation

According to the consultants field surveys and information obtained from the District Physical Planning Officer in Lodwar and the stakeholder workshop, the following is the existing land use situation:

Education

Existing categories of educational institutions in Lodwar include primary level, secondary, tertiary level for example polytechnic, and university level. There are four private primary school, nineteen public schools and six secondary schools. These are distributed in the entire town. Each of the Schools has over twenty acres of land while the Mount Kenya University has been allocated one hundred hectares of land for its development. Most of the Schools do not have the basic built facilities. Only secondary schools have laboratories and only three secondary schools have boarding facilities. All the educational institutions have sufficient water and playgrounds. Most of the schools do not have over forty students per class while the catchment of the institutions is from all over the county.

Recreation

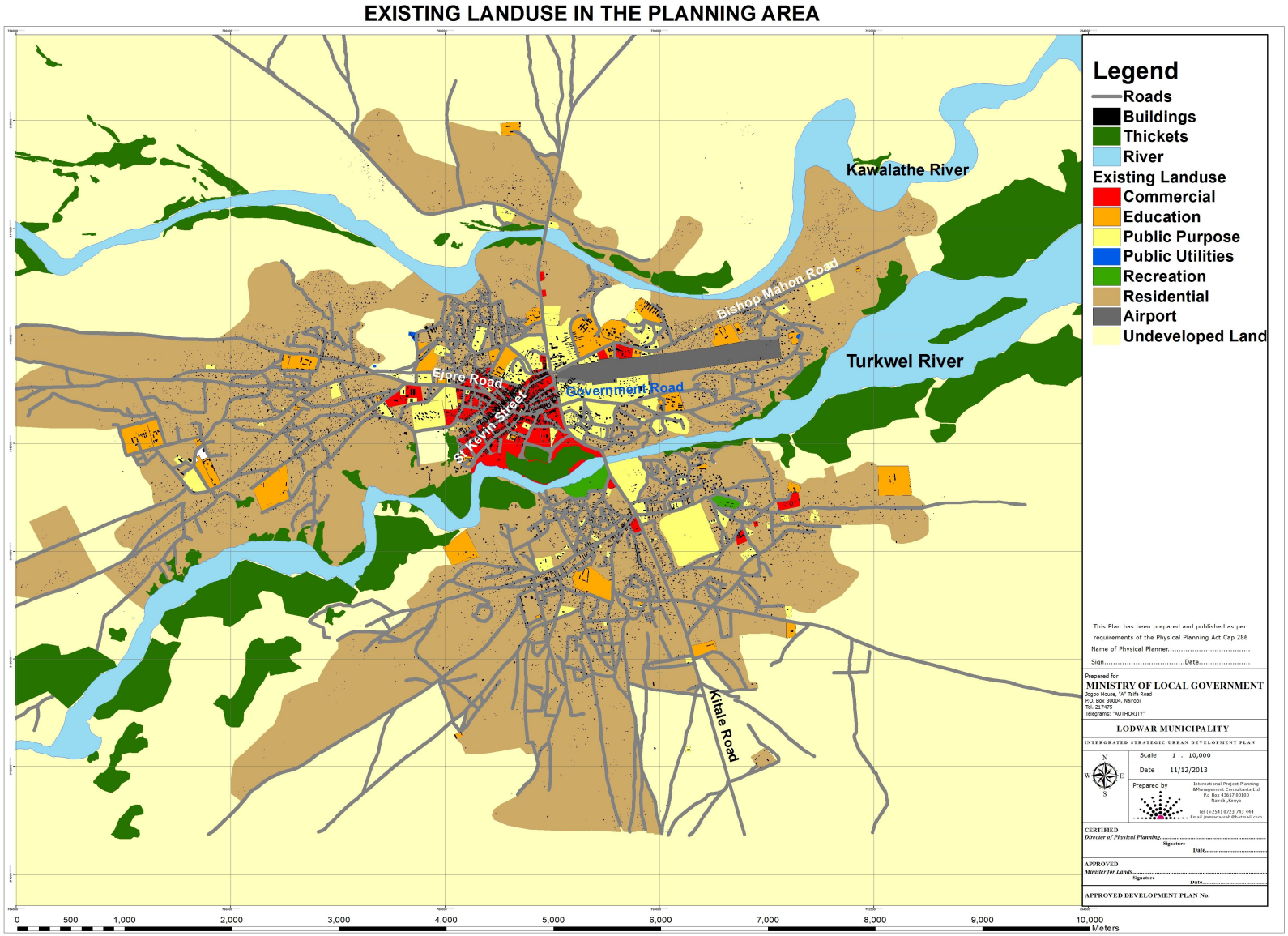
There are over six play grounds in the town. There are no plans by the municipal council for more recreational facilities while the level of demand for recreational facilities is very high. The existing recreational facilities are mostly used for relaxing, games and most of the facilities charge a fee of Ksh.30/= for membership per month.

Public Utilities

Water Supply

The state of water supply provision in the town is good and the quality is satisfactory. The distribution network of water provision is sufficient and water is accessible by people in all areas of the town. The state of the infrastructural facilities is excellent and the old pipes have been replaced with new ones. The demand for water in the town is high while the supply is up to the demand.

Figure 4.1.1 Existing Land use



Refuse

The refuse collection and disposal is not effective because the council has two exhausters which most of the time are not functional leading to the reliance on manual labour for refuse collection and disposal.

Sewerage

Waste disposal is mainly by use of septic tanks because the town does not have a sewerage service system. There is no treatment works for the sewerage system.

Transportation

The town is accessible through the road from Kitale, although the condition of the road is not very good. The estates are accessible from the proposed bus park while the access roads are in a bad state. Currently the town does not have a Bus Park. Generally the growth direction of the town is towards Kanamkmer and Kawalathe. These areas are suitable for urban development and settlement because of the availability of land for development but the main challenge seems to be the lack of effective and durable bridge especially during rainy seasons. The county development process will have to address this issue more effectively for better growth and development of Lodwar to be realized. There are no bus stops along the existing roads. There also are no road signs on most roads. A new Air strip is planned to be located five kilometres away from town. In the wake of this relocation of the air strip, most people in the town wish that the old airstrip should be used as a bus park. The site is more centrally located and would be more accessible to most people in the town. There are five existing petrol service stations which are distributed equitably while there are three more proposed. We still have to establish the location of these new service stations. There is no road reserve set outside for the non-motorized transport systems. In a town where majority of people move on foot, this should be considered as important. Lodwar has a serious problem of lack of public transport. So far only bicycles and motorbikes are the most utilized forms of public transport. But as Lodwar expands and movement distances increase this will become a major service need in Lodwar of the future. Lodwar does not have even the Matatu type of public transport service. Very few roads in the town are tarmacked. In fact only a few isolated through transport roads in the town area are tarmacked. The rest of the town roads are loose surface and murrum roads. Majority of roads are pot holed and are filled with stagnant water during the rainy season.

Commercial

The existing types of commercial activities in the town include retail, wholesale, hawking. The commercial services are equitably distributed within the town centre.

The business sub-zone and the residential areas, within the sub-zone, most of the commercial activities are undertaken in permanent houses. The commercial buildings are mostly on 50 x 100 plots size while the environment is not very clean.

Markets

There are several open air markets which are distributed within the town, mostly selling vegetable, clothes and handicrafts. The market spaces are generally inadequate; they also have few sanitation services and lack parking facilities.

Residential

The residential housing in Lodowar is mainly of low income housing found at Napetet while the low middle income housing is found at Nakwamekwi and Kawalathe estates. The residential facilities are sparsely distributed within the town. The middle class housing are mainly stone walled while the low income houses are mud walled and grass-thatched. The prevailing environment around residential areas is poor and insanitary, not conducive to human habitation. Movement and the road network status in the residential areas of Lodwar is poor. Many private developers have encroached on the roads. Changes have been taking place in the settlement systems in the last five years especially change from temporary to permanent settlements but the rate of change and improvement is still quite slow. Residential developments are mainly privately developed. The municipal council does not have any residential development of its own. The county council manages a few residential houses which accommodate some government officials. These houses were left behind by the NORAD, an NGO agency.

Industrial

The only existing forms of industries are the handicrafts which are woven along the roads. There are also four slaughter slates for hides and skins. These are located at Napetet, the town Centre, Nakwamekwi and Kanamkemer. Currently there is no area proposed for industrial development in the town of Lodwar.

There is also no provision for parking or loading in the light industrial area. Jua kali activities are fairly active in Lodwar although there are no deliberate plans for their development; these have great potential for income generation and employment creation especially among the youth. There are no special provisions for the water supply, effluence and sewerage disposal and also no treatment for the effluence from the industrial activities. Space for the handicrafts is not sufficient.

4.2 Structuring Opportunities & Constraints

From the situational analysis review, particularly findings and implications it has been found out that Lodwar town has unique natural characteristics that should be taken into account in the planning and development of the town. These two unique characteristics are the drainage/river system and the topography characterized by hills surrounding the town. An additional feature which is man-made is the current highway to Lokichogio and Kakuma. Under vision 2030, the proposed LAPSSET transport corridor with associated three resort Cities is earmarked to pass through the town. The above features provide constraints as well as opportunities for the planning and development of Lodwar town.

Five main structuring elements of the town singled out by the planning team are as summarized as follows;

i. Drainage/river system of River Turkwell and Kawalathe

ii. The hilly nature of the landscape units

iii. The current highway from Kitale Through the town to Kakuma

iv. The LAPSSET transport corridor

v. The proposed Resort Cities

The above structural/organizing elements led to the conclusion by the planning team that the spatial organization of Lodwar town has to take into account the above mentioned features. They provide opportunities as well as limitations in planning for the growth and development of Lodwar town. It also implies the town cannot be developed as one compact entity/ space but rather as a multiple nuclei town as defined or influenced by the features mentioned above.

The structuring elements have the following implications to the future planning of Lodwar Town.

i. The Drainage and Low lying areas

The above features provide the opportunity of spatially organizing the growth of the City into 4 development zones namely across the bridge of Kawalathe, towards the upper grounds between the rivers, across the Turkwel River towards Kitale and, main Central Business District of Lodwar

Each of the zones should be planned on a mixed land use basis with the current commercial centre serving as the main CBD while the other three will be planned to have subsidiary commercial centres.

The lower parts within the central business district are subject to flooding and extending towards the confluence of the rivers limiting development opportunities.

The lower parts have unsuitable soils for intensive urban development at higher densities.

Linking of the zones of the town with well integrated road system comprising motorized and non-motorized transport infrastructure is necessary.

The rivers are the principle lifeline of the town particularly as main water supply and their catchment area require protection by the central government.

Clearly Defined riparian areas reserved along the rivers for their protection and ensure constant water supply for the town by naturally recharging the water boreholes.

The drifts on the rivers have interfered with the river flow leading to flooding of some parts of the town and blocking movement into the town centre.

ii. The hilly nature of the Landscape units.

The hills are rocky in nature giving rise to sharp escarpment constraining development but they contribute directly to the character of the landscape and options for spatial organization of the town.

Due to the varied land landscape of the town it cannot be served by one sewerage system but a number of them for each of the different growth areas.

The hills present an opportunity for tree planting around them to enhance the beauty of Lodwar town and utilization as recreation parks.

iii. LAPSSET transport Corridor and transport infrastructure

The planning team has noted that the proposed transport corridor can either pass through the town dividing it into two or can by-pass the town and be linked to the town through strategic well designed points.

The transport corridor will have positive or negative impacts on the development of the town. Positive impacts include link to other areas for regional growth, and accessibility to the town creating opportunities for investment. The negative impacts are drastic reorganization of the town and resettlement and associated costs to be incurred.

The proposed centres require to be linked with appropriate roads and within the proposed development areas with a well coordinated hierarchical road network fully integrated with NMT facilities.

It is important to note that the location of current tracks provide direction of locating roads to be reviewed with a view to upgrade them to well planned roads of a appropriate hierarchy and identified missing links be developed for a complete road network.

The major junctions should have roundabouts which are useful in preserving land for future expansion and also facilitate efficient flow of traffic and lend themselves to easy expansion for future transport system development.

Given that Lodwar experiences prolonged dry spells and has fine volcanic dust leading to dust pollution, it is recommended that all roads & NMT facilities should be paved and all open areas along the roads should be planted with trees for both aesthetics and control of dust pollution.

Direct access to the LAPSSET transport corridor should be restricted and mainly done through well designed interchanges.

The main road that passes through Lodwar town require expansion into a dual carriage way with proper de-acceleration and acceleration lanes.

4.3 VISION

In view of the above discussion on structuring elements and their implications for future growth and development of Lodwar town, a vision for its future is essential. During the second stakeholder consultation in Lodwar town, the community and their leaders, the consultants, officers from government, formulated the vision of the future growth of Lodwar town as follows:

The future city of Lodwar: ñGreen City in Sunny Lodwarò.

ñLodwar town is expected to grow to be a Competitive, Inclusive, Regional Industrial, Commercial and Service City that providesò

i. Quality and sustainable infrastructure

ii. Effective and efficient governance systems

iii. Optimum utilization of land resources and Environment

iv. Affordable decent housing and Social facilities and Services

Following the observations on organizing elements, implications and the future growth of Lodwar as spelt out in the vision, it was deemed appropriate that the growth and development of this town will be premised on smart growth principles which are:

a) Flexibility

b) High environmental quality

c) Compact/cohesive of the City

d) Social choice and equity (community participation)

e) Energy conservation

f) Convenience - accesses

g) Health and safety

h) Citizen engagement

i) Vibrancy (socio/economic)

j) Efficiency (services provision, management, costs, function and management)

k) Environmental conservation.

4.4 Alternative Growth Models

The design/formulation of Alternative growth models of Lodwar Town were guided by:

a) The structuring elements

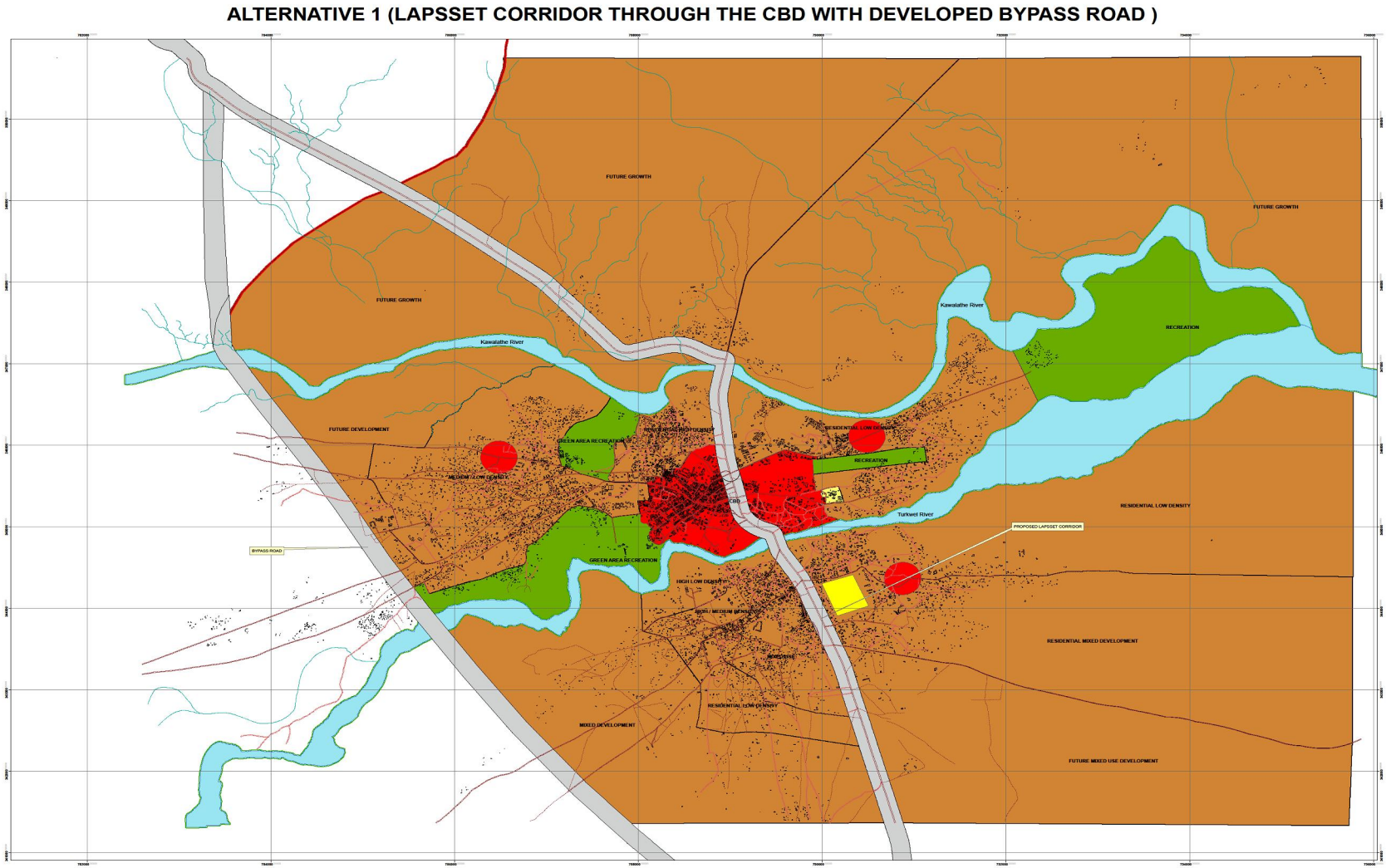
b) The vision

c) Smart Growth Principles

4.4.1 Alternative 1: Concentrated Model

This is defined by LAPSSET Corridor passing through the Centre of the town with a Developed by Pass road.

Figure 4.4.1 Alternative 1: Concentrated Model



Key Defining Elements

- The LAPSSET Corridor passing through the town.
- Functionally integrate the LAPSSET Corridor with the town through appropriate interchanges of overpass and underpass
- Development of a by-pass for future to ease congestion at the town centre
- Involve massive relocation of public and private buildings

Advantages of the Model

- Creates new opportunities for relocating the town.
- Creates new opportunities for investment in the town and generation of employment.
- Revitalization of the economic growth of the town through enhanced access.
- Enhanced regional accessibility and connectivity of Lodwar within the region.
- The connection of flood areas will be covered within the LAPSSET project.
- Location of new facilities (oil and railway station).

Disadvantages of the Model

- Maximum disruption of social and physical fabric.
- Relocation of buildings (public buildings, airstrip, private buildings).
- High cost of relocation.
- Separation of the town into two.
- Difficulty of cross movements (traffic).
- High costs of creating interconnections.
- Disruption of the existing development pattern.
- Soils not suitable for urban development particularly apartments.

4.4.2 Alternative 2: Dispersed Model

This is defined by the Alignment of LAPSSET CORRIDOR outside the town.

Key defining elements of the Model:

- Locating the LAPSSET transport corridor outside the town.
- Strategic location or establishment of commercial nodes to control the spillover of developments to the transport corridor.
- Securing the transport corridor by a 30 metre buffer on either side.
- Define appropriate interchange access to the transport corridor at two strategic points to allow integration with the town.
- Strengthen the current transport spine passing through the town through expansion into a dual carriageway.

Advantages of the Model

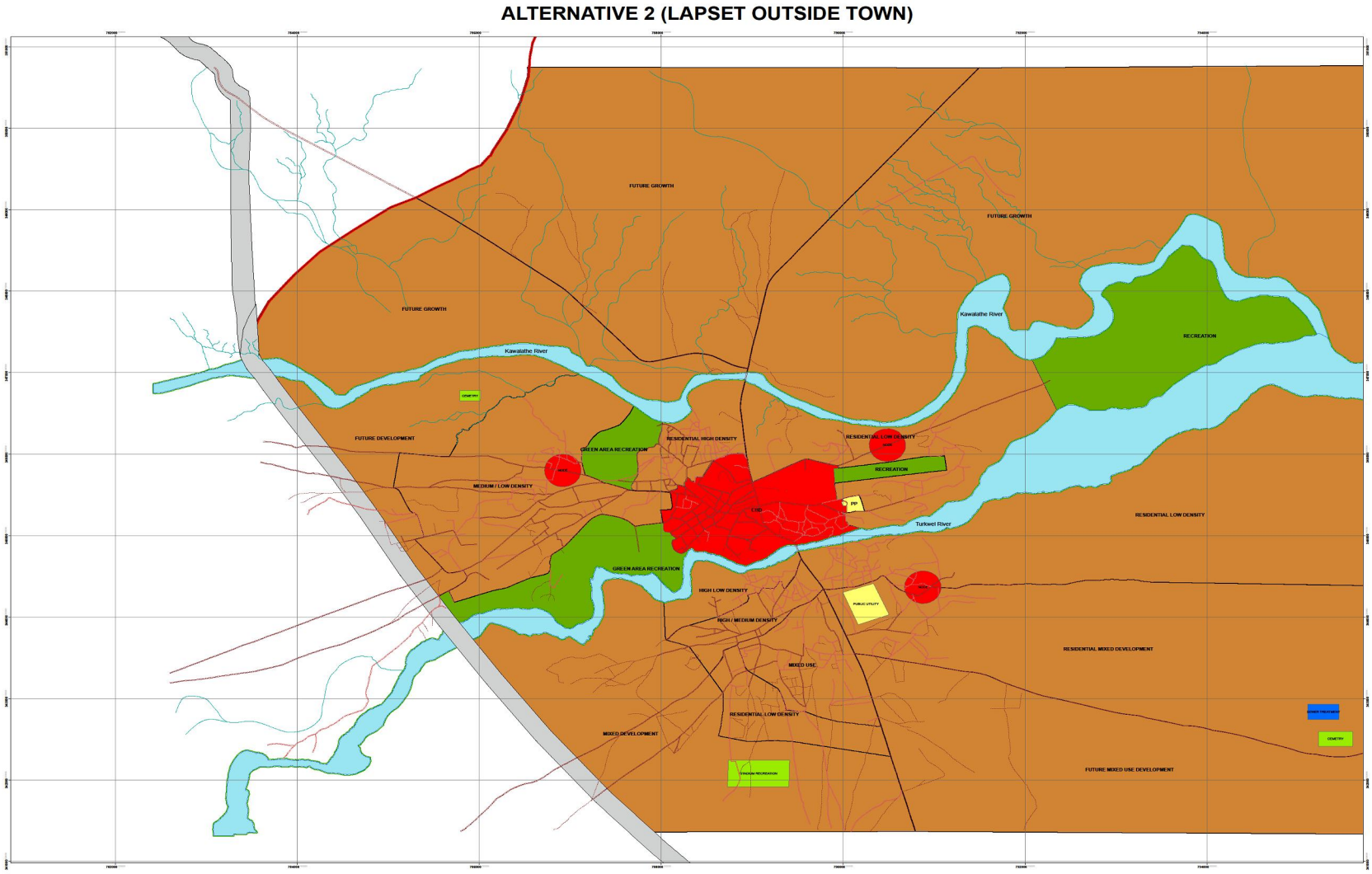
- Model focuses on regularization of land within the town.
- Leads to an easier way of transition from unplanned to planned development following the old built pattern.
- More economical and easier to implement.
- Minimum social economic disruption.
- Maintains the existing urban fabric, functionality, and image/character.
- Minimum disruption of existing facilities and properties.
- Creates new opportunities for investment and development.
- Alternative route to pass hence no congestion of the town centre.

Disadvantages of the Model

- Dispersed settlement is not easy to service.
- Management of flooding requires heavy technical equipment.

- Soil structure in the lower areas is fragile (alluvial deposits) and unable to support high rise buildings.
- Infrastructure development within low lying areas will be expensive (Napetet)
- Development of transport expenditure outside and into the town will be expensive.
- Development of the town will be biased towards the LAPSSET corridor leading to a decline of the main CBD.
- This option requires very strong development control mechanisms to ensure its benefits are realized.

Figure 4.4.2 Alternative 2: Dispersed Model



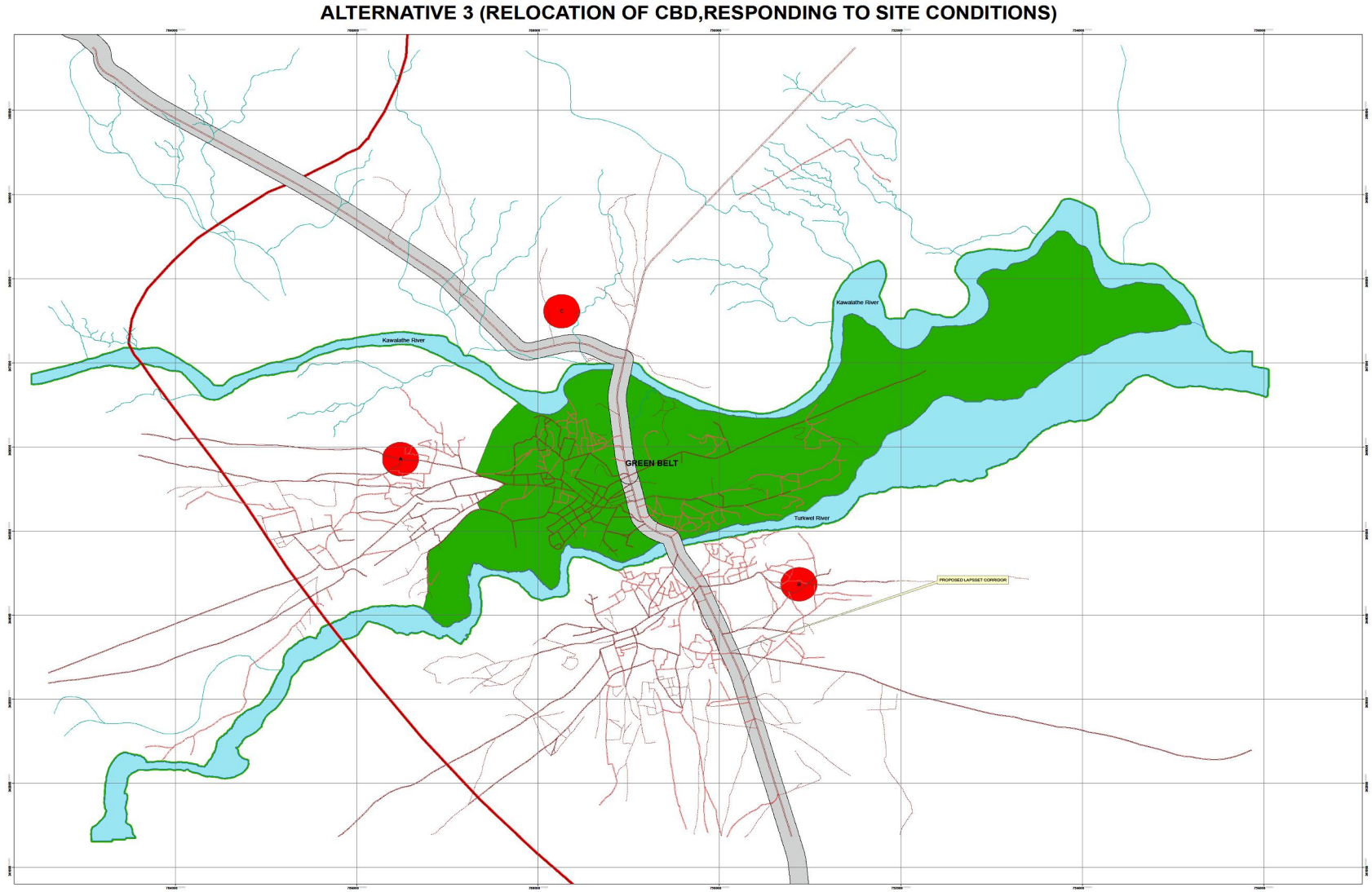
4.4.3 Alternative 3: Relocation

This responds to the Natural Site Conditions

Key Defining elements

- Guided by the principles of sustainability, make it like Nairobi with green open space in the CBD.
- It will have two sub options (a) Concentrated Model and (b) Dispersed model whose advantages and disadvantages have been noted above.
- Some sections of the town will be relocated.
- Social and physical fabric improved upon and enhances the cultural heritage of the town.
- Old CBD, mainly for recreation, entertainment, sports, and landscaping
- Establishment of a hierarchy of commercial nodes with the higher hierarchy having mixed use of commerce and light industrial functions.

Figure 4.4.3 Alternative 3: Relocation



Advantages of the Model

- Creates new opportunities for reorganizing the town.
- High environmental sustainability.
- Avoids and reduces the effect of flooding of the town.
- Reduces maintenance cost of infrastructure and properties.
- In the long run return on investments will be more enhanced.
- Highly diversified spatial structure which may lead to economy of services.
- Natural green city in the sunny Lodwar.
- Fits the natural landscape configuration of the town.
- Easy environmental management and aesthetics.
- Each spatial unit can be organized on smart city principles.

Disadvantages of the Model

- Relocation requires more resources to invest.
- High social and economic impact.
- Disruption of the existing fabric of the town.
- Displacement of the people.
- Compensation of the people and properties.
- Soil conditions not suitable for intensive urban development.

4.4.4 Alternative 4: The Preferred Model

The three models presented in *4.4.1 Alternative 1: Concentrated Model, 4.4.2 Alternative 2: Dispersed Model* and *4.4.3 Alternative 3: Relocation* are analyzed in terms of the advantages and disadvantages of each one of them. Disadvantages of the models would result in high cost to implement and inefficiency of the model functionally. A criteria was then developed on the basis of the advantages of the three models. This criteria is a fusion of the advantages of the three models in order to come up with the best possible model. The model is then analyzed on the same basis like the first three models in order to find out its advantages and disadvantages. Thus, the preferred model - *4.4.4 Alternative 4: The Preferred Model* - is cost effective to implement and efficient functionally as opposed to the other three models presented.

Organizational Principles:

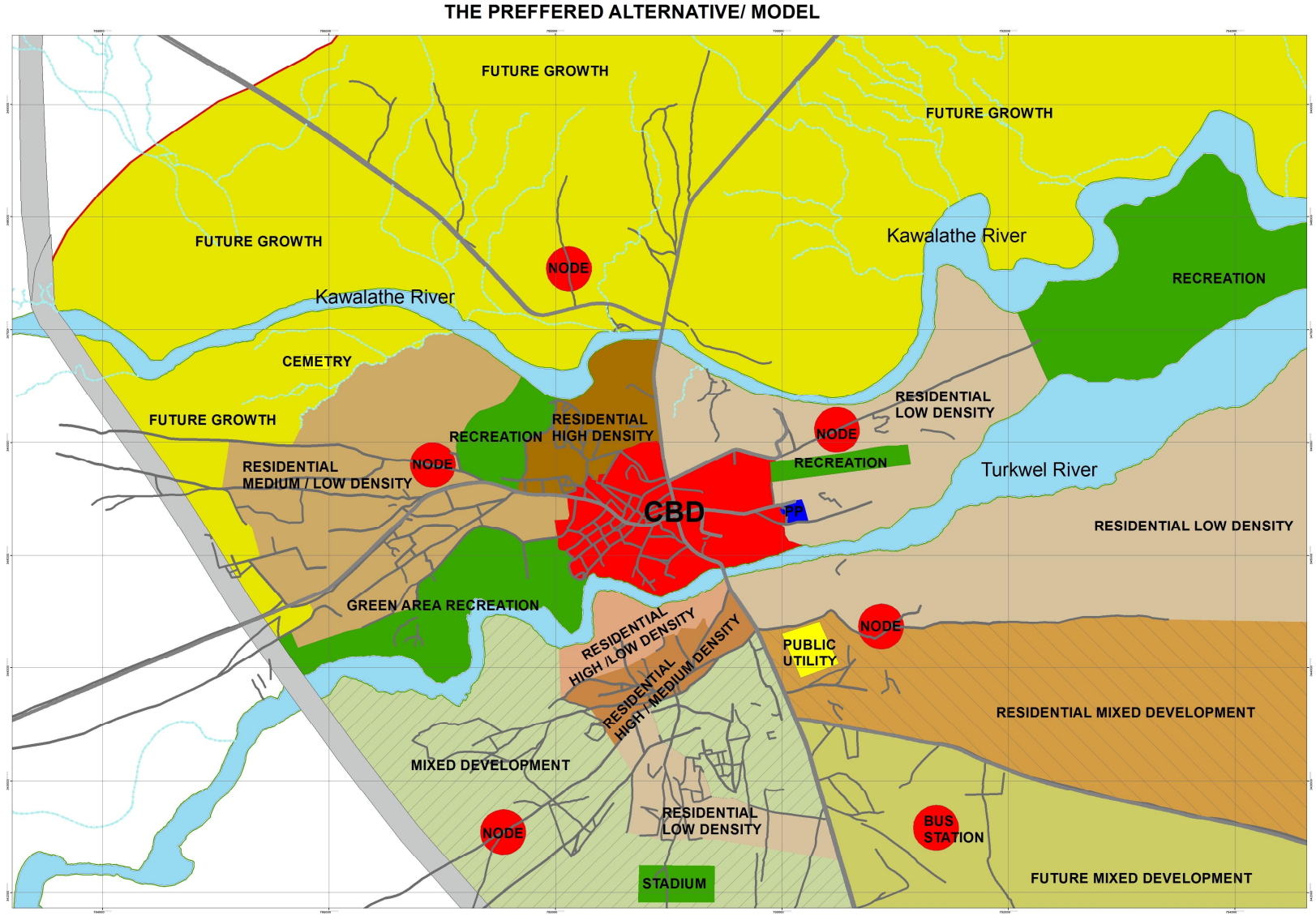
- The city must be functionally organic and remain as one entity respectful of the social and physical fabric that has been the basis of its growth and development.
- Planning and management of the City should be made easy.
- Utilize existing natural features of the town to enhance its uniqueness (The Green City in sunny Lodwar).
- Greenery for aesthetics and recreation.
- Minimization of the cost of development.
- Ensure vibrancy of the towns Growth (socio-economic).
- Social and physical cohesion of the City.
- Social choice and equity (community participation).

Key planning features

1. Minimization of the spread of the town to river banks, flood prone areas and flood plains with unsuitable soils that cannot support intensive urban development.
2. Creation of a green belt of 30 metres on either side of the LAPSSET transport corridor.
3. Connectivity of the City of Lodwar town to the LAPSSET Corridor to enhance economic vibrancy through strategic points linked to nodes.
4. The functional integration of the LAPSSET to the rest of the town.

5. A Railway station to connect the town to the LAPSETT corridor and two bus terminus for connection to the town.
6. Developments within the vicinity of the transport Corridor to be strictly controlled by the town and other parties to avoid interference with the corridor.
7. Existing road through the town should be expanded into a dual carriageway and bridges raised to avoid flooding (Lokitaung)
8. Improve the road connections from the town to other centres within the County (Lokichar, Kakuma, Kerio, Kalokol).
9. Creation of a proper hierarchy of roads within the town to enhance mobility and unlock development potential.
10. Remove the drift on Kawalathe and create a green belt of forest around the riparian reserve (200metres near the Drift).
11. Relocate People in the flood prone area and turn the dry areas into green areas (Soweto & Napetet zones).
12. Greening of the Turkwell river using the available greenery and demarcation where there is no clear riparian.
13. Relocation of airstrip and prisons due to incompatibility and utilize the land appropriately.
14. Creation of security of tenure and regularization of existing settlement with appropriate service provision for the core municipal area.
15. Establishment of a hierarchy of nodes with the higher ones having mixed use functions accommodating light industrial sites.
16. Establishment of two cemetery areas.
17. Establishment of other facilities and services such as solid transfer stations, bus station, stadium etc.

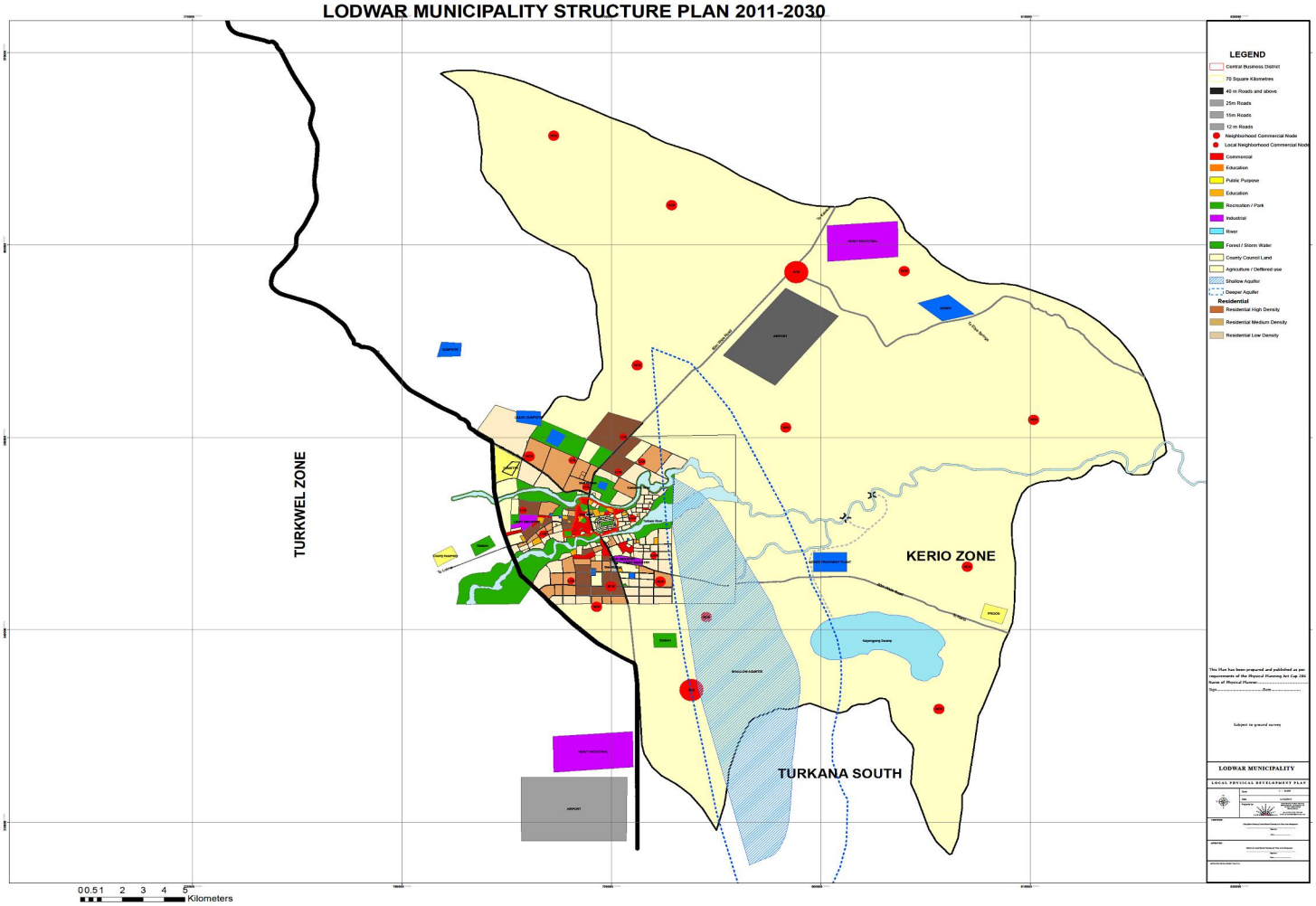
Figure 4.4.4 Alternative 4: The Preferred Model



PART FIVE: INTEGRATED SUSTAINABLE URBAN DEVELOPMENT PLAN

5.1 Overall Land-Use Plan

Figure 5.1.1 Overall Land-Use Plan in the wider Lodwar Town



Town of Lodwar extended its boundary to cover up to 700 km^2 and the detailed planning area is 70km^2. It is therefore critical to understand that the output of this work, the ISUDP for the planning area measuring 70 km^2, must be read and understood against the following;

- That the map above shows the structure plan for the entire total size of Lodwar town measuring approximately 700 km^2. It represents the general outlay of the projected structure for the town. The red circular points indicate the projected growth nodes in the wider town while the middle red-shaded part indicates the planning area measuring 70km^2 as prescribed in the Terms of Reference.

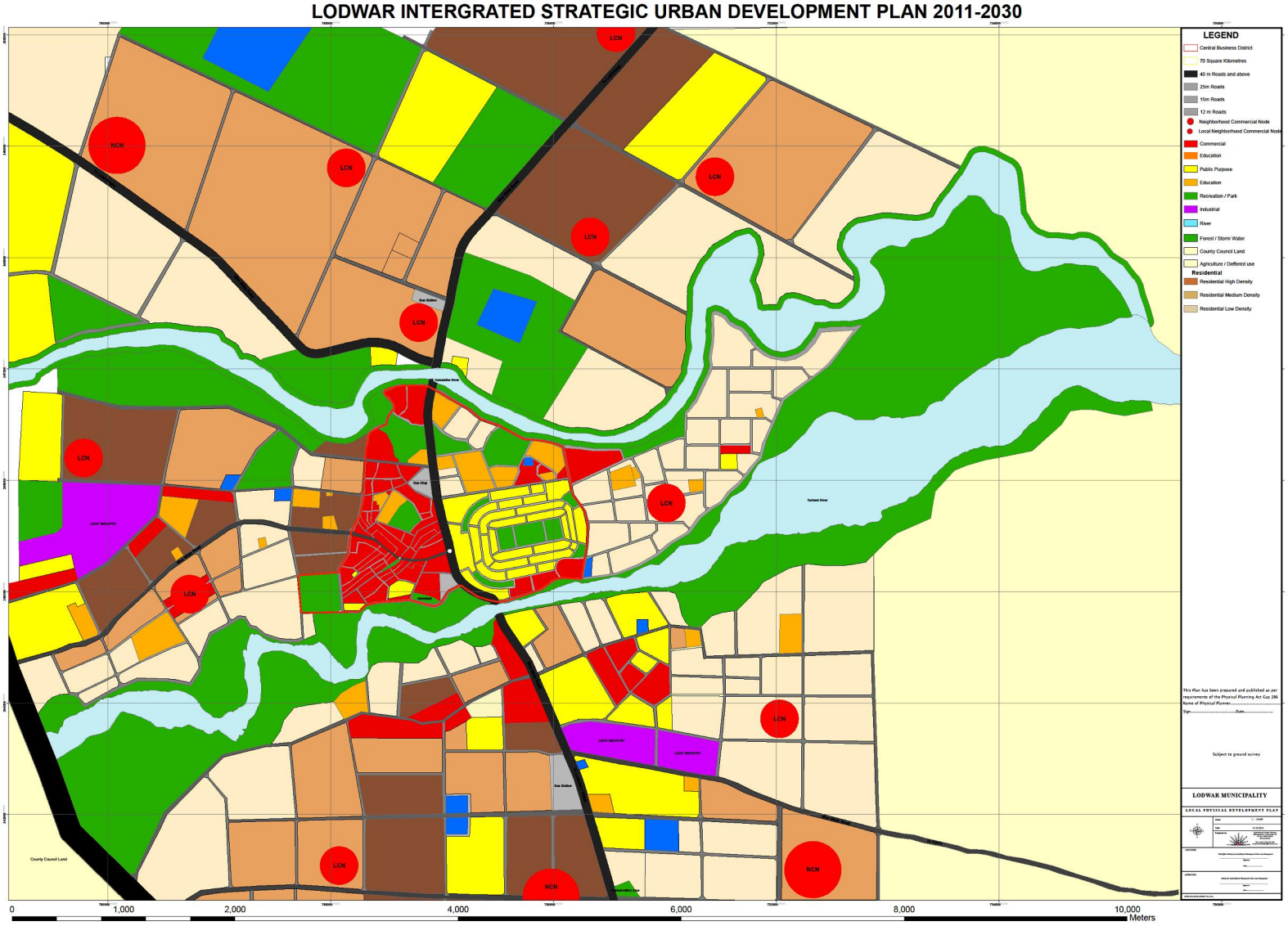
- While doing the structure plan for the entire 700 km^2 the consultants were alive to the fact that subject to temporal factors (e.g. change in the economic landscape, demographic factors among others); the entire town would experience a change in its space. And as matter of this appreciation it was prudent upon the consultants to give an indicative projection of the growth pattern even though it was beyond the horizontal scope of the Terms of Reference as given out by the client.

- The structure plan bears other fundamental land uses which could not be accommodated in the ISUDP planning area of the 70 km^2. These included the following;

    - The dumping site
    - The industrial land use
    - The sewer stabilization area
    - The prisons
    - The airport

- That for one to appreciate the Lodwar ISUDP, one need to equally appreciate this background that forms a critical hinge upon which it was developed.

Figure 5.1.2 Overall Integrated Strategic Urban Development Plan in the Lodwar Town Planning Area



5.2 Sectoral Plan Proposals

5.2.1 Social Sector

5.1.1.1 Key Findings and Policy Implications

Population

The most important finding concerning the population of Lodwar town is that it is predominantly young. The population also grows mainly through in- and out-migration. The youthful population has important policy implication. First, it calls for heavy investments in the provision of education, spanning the development of additional educational facilities (primary and secondary schools, tertiary colleges and universities), the upgrading of existing facilities and improvements in staffing and equipment. To prepare for the absorption of the young population in the labor market one or two decades to come also calls for aggressive employment creation policies in the planning area.

Stemming from the mainly youthful population is the high dependency ratio. This means that for the few working individuals to be able to sustain the non-working majority, it calls for economic policies that facilitate the creation of good jobs (or jobs that pay good wages). Of course, the ability of the population to take up such jobs is a function of educational attainment and training. However, as will be indicated shortly, the bulk of the population in the area has attained very low levels of education. The high dependency ratio also has implications for the level of poverty in the area. In terms of policy, the high poverty levels in the planning area call for development strategies that directly seek to alleviate poverty and improve the socio-economic wellbeing of the populace.

The Social Sector

To reiterate under the social sector are grouped education, healthcare, recreation, policing, prison services, post offices, social (community) halls, fire stations, and places of worship. The analysis emphasized not just the distribution of these across the planning area but also the quality of the services provided by each one of them. Overall, it was found that most of these facilities were inadequate in planning area. For instance, there were inadequate educational institutions right from primary to secondary, tertiary and university levels. Similarly, the planning area had inadequate healthcare facilities, recreational facilities, policing services, prison services, post offices, social (community) halls, fire stations and places of worship. In terms of policy, this calls for the setting aside of land for the construction of more of these faculties and services.

Another finding was that virtually all existing social sector facilities and services were plagued by certain problems that made them offer poor services.

Top on the list were inadequate staffing, congestion/ overcrowding, poor facilities, lack of equipment and/or supplies, and poor quality of service provision. To illustrate, the education and health components were characterized by high teacher-student and patient-doctor/clinical officer/nurse ratios, respectively. In lieu of this finding, there is need for an aggressive human resources training policies that will improve the number of skilled staff available in the social sector. However, it must be noted that training is not enough; a recruitment policy must exist to support the training policy by ensuring that these number of staff in these facilities is regulated and constantly monitored. Money must also be set aside to revamp all existing social services by renewing and/ or upgrading buildings and other important infrastructure.

Closely related to the education arm of the social sector is the educational attainment among the population in the planning area. The survey conducted as part of the situation analysis revealed that the population was characterized by low educational attainment. As indicated earlier, this manifests a serious lack of qualified and experienced human resources at the local level. This poses a major challenge to the development of the planning area, including capacity to implement the proposed plan that must be targeted through policy. Given the predominantly young population in the area, it also suggests the possibility of high dropout rates from school as well as poor performance at primary and secondary school levels which locks young people from the area out of tertiary institutions and universities. To address these challenges calls for policies and strategies targeted specifically at them.

Proposals for Education

Exiting information indicates that there are 23 primary schools (4 private and 19 public) and 6 secondary schools in the planning area. Furthermore, there are no tertiary colleges or other universities in the area; the Mount Kenya University has already been allocated land to establish a campus in the area. Table 5.2.1 presents the projected growth in the number of educational institutions during the period 2012 ï 2030. The projections take into account the three scenarios presented during the projection of the areaôs population.

Based on established planning standards, there should be one kindergarten independent of primary school for every 3 000 persons in the population, one pre-school/nursery school for every 3 500 persons, a primary school for every 5 000 persons, and one secondary school for every 20 000 persons in the population. This means that, within the context of scenario 1 of the population projections, by 2015 and 2020 the area will require any additional primary or secondary schools. However, by 2030, it will require four (4) additional primary schools and one (1) secondary school. If scenario 2 is embraced the area will not require additional primary and secondary schools by 2020 but will need 13 additional primary and three (3) additional secondary schools by 2030. For scenario 3, the projects show similar trends with no additional primary or secondary schools required up to 2020 plus a deficit of 14 primary and four (4) secondary schools by 2030.

Table 5.2.1: Projected Total Number of Educational Institutions, 2012-2030

Type of Institutions	Existing Institutions	Additional Required Institutions		
		2015	2020	2030
Scenario 1:				
Kindergartens[2]*	-	23? [23]	6 [29]	16 [45]
Pre-schools	-	20? [20]	4 [24]	14 [38]
Primary Schools	23	0 [14]	0 [17]	4 [27]
Secondary Schools	6	0 [3]	0 [4]	1 [7]
Scenario 2:				
Kindergartens	-	23? [23]	8 [31]	29 [60]
Pre-schools	-	20? [20]	7 [27]	25 [52]
Primary Schools	23	0 [14]	0 [19]	13 [36]
Secondary Schools	6	0 [4]	0 [5]	3 [9]
Scenario 3:				
Kindergartens	-	24? [24]	9 [33]	36 [69]
Pre-schools	-	20? [20]	8 [28]	31 [59]
Primary Schools	23	0 [14]	0 [20]	18 [41]
Secondary Schools	6	0 [4]	0 [5]	4 [10]

Note: The bracketed figures represent the total number of institutions required during that year.

Other major challenges facing the provision of education in planning area are inadequate facilities in existing schools, overcrowding in classrooms and understaffing.

[2] For kindergartens and pre-schools data were not available at the time of making proposals. Once available, the projections will be adjusted accordingly.

To arrest this situation, it is proposed that the Turkana County Governmentinvests in the upgrading, renewal (renovation) and the expansion of existing schools. Whereas overcrowding problem could easily be addressed through the provision of more public schools; the projections presented above show no need for extra school until past 2020. As such expansion of existing schools to a minimum of three (3) streams is desirable. To combat understaffing, the municipal Department of Education jointly with the Ministry of Education should ensure that more teachers are posted to the area.

Land Requirements

Existing planning standards recommend 0.15 - 0.25 hectares of land for a kindergarten and pre-school. The standards also prescribe 3.25 hectares and 4.0 hectares as the required land size for (3 stream) primary and secondary schools, respectively. Table 5.2.2 presents the projected land required to accommodate the additional educational institutions during the plan period, 2015-2030. As evident from the Table an additional 29.45 hectares will have to be set aside for the provision of educational facilities if scenario 1 projections are utilized. Scenarios 2 and 3 call for an addition 71.05 and 93.70 hectares, respectively.

Table 5.2.2: Land (in Hectares) Required for Additional Educational Institutions, 2015-2030

Year	Kindergartens	Pre-schools	Primary School	Secondary School	Total
Scenario 1:					
2015	3.45	3.0	0.0	0.0	**6.45**
2020	0.90	0.6	0.0	0.0	**1.50**
2030	2.40	2.1	13.0	4.0	**21.50**
Total	**6.75**	**5.7**	**13.0**	**4.0**	**29.45**
Scenario 2:					
2015	3.45	3.00	0.00	0.0	**6.45**
2020	1.20	1.05	0.00	0.0	**2.25**
2030	4.35	3.75	42.25	12.0	**62.35**
Total	**9.00**	**7.80**	**42.25**	**12.0**	**71.05**
Scenario 3:					
2015	3.60	3.00	0.0	0.0	**6.60**
2020	1.35	1.20	0.0	0.0	**2.55**
2030	5.40	4.65	58.5	16.0	**84.55**
Total	**10.35**	**8.85**	**58.5**	**16.0**	**93.70**

Proposals for Healthcare

Planning standards prescribe one health centre and one District hospital for every 20 000 and 50 000 persons in the population, respectively. Table 5.2.3 presents the projected growth in the number of health centres and district hospitals in the planning area during the development plan period, 2012 - 2030. As can be deduced from the Table, the area will require four (4) additional health centers and two (2) new district hospitals by the end of the plan period if scenario 1 is adopted. For scenarios 2 the deficit is six (6) health centers and three (3) district hospitals while for scenario 3 it is seven (7) health centers and three (3) district hospitals.

Table 5.2.3: Projected Total Number of Healthcare Facilities, 2015 - 2030

Type of Institutions	**Existing Institutions**	**Additional Required Institutions**		
		2015	**2020**	**2030**
Scenario 1:				
Health Centre	3?[3]	0 [3]	1 [4]	3 [7]
District Hospital	1	0 [1]	1 [2]	1 [3]
Scenario 2:				
Health Centre	3	1 [4]	1 [5]	4 [9]
District Hospital	1	0 [1]	1 [2]	2 [4]
Scenario 3:				
Health Centre	3	1 [4]	1 [5]	5 [10]
District Hospital	1	0 [1]	1 [2]	2 [4]

Note: The bracketed figures represent the total number of institutions required during that year.

The provision of healthcare services in Lodwar town is also faced other major challenges, including understaffing and poor facilities coupled with shortage of equipment and necessary supplies and overcrowding.

[3] The correct number of existing health centers in the planning area was not known by the time of making proposals. Once available the projections will be adjusted accordingly

To address these, it is proposed that the Turkana County Governmentin collaboration with the Ministry of Health invest in the upgrading and the expansion of existing healthcare facilities. While the overcrowding problem could easily be addressed through the provision of additional healthcare facilities, the first step appears to be the expansion of capacity of the existing facilities. To combat understaffing, the municipal Department of Health jointly with the Ministry of Health should ensure that more health care staff ï doctors, clinical officers and nurses are posted to the area. One way to increase staffing may be to establish a medical training centre (MTC) in the town.

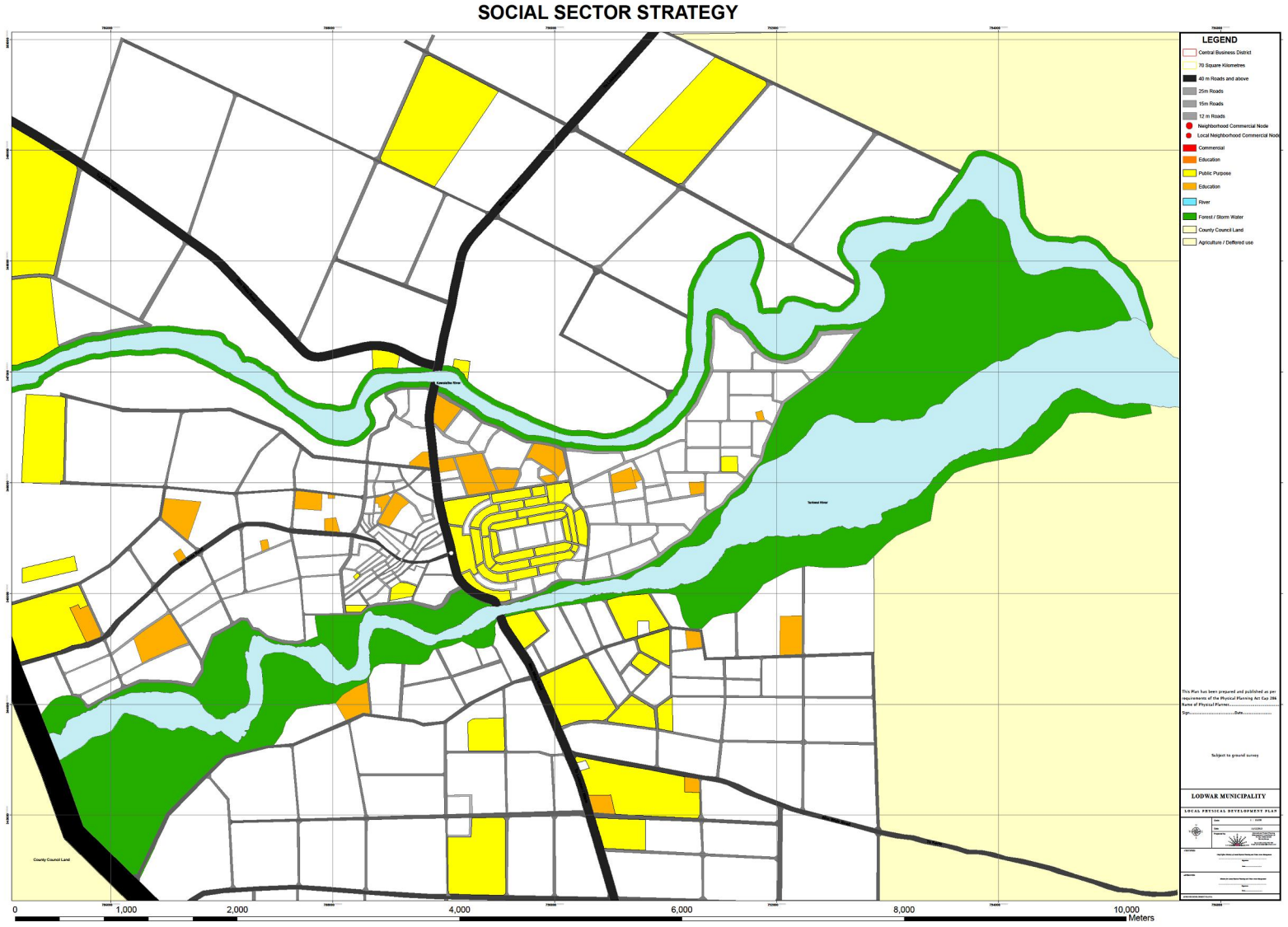
Land Requirements

Based on the existing planning standards, 0.4 hectares of land is required per health centre while a district hospital requires 8 hectares of land. Table 5.2.4 presents the projected land required to accommodate the additional health care facilities for the plan period, 2012-2030. As evident from the Table, to provide additional health centers and district hospitals to the end of the plan period will require a total of 17.6, 26.4 and 26.8 hectares for scenarios 1, 2, and 3 projections, respectively.

Table 5.2.4: Land (in Hectares) Required for Additional Healthcare Facilities, 2012-2030

Year	Healthcare Center	District Hospital	Total
Scenario 1:			
2015	0.0	0.0	**0.0**
2020	0.4	8.0	**8.4**
2030	1.2	8.0	**9.2**
Total	**1.6**	**16.0**	**17.6**
Scenario 2:			
2015	0.4	0.0	**0.4**
2020	0.4	8.0	**8.4**
2030	1.6	16.0	**17.6**
Total	**2.4**	**24.0**	**26.4**
Scenario 3:			
2015	0.4	0.0	**0.4**
2020	0.4	8.0	**8.4**
2030	2.0	16.0	**18.0**
Total	**2.8**	**24.0**	**26.8**

Figure 5.2.1 The Social Sector Strategy



5.2.2 Economic Growth & Development

Summary of Key Findings

The overall economic problem is weak economic base of the town. This is illustrated by the elaboration below.

Farming

Under utilization of agricultural potential where out of 20,950,000Ha of potential irrigable agricultural land only 735Ha is currently used

- Food insecurity whereby food produced is consumed in the County and nothing is exported.
- Application of non scientific methods in farming practices leading to low yields.
- Drought effect on farming.
- Conflicts in the use of available land where there is availability of water.
- Some crops with great potential like aloe not widely planted.

Livestock

- Efforts to step up livestock production have been through external donor support particularly European Union with some assistance from the Ministry of Livestock.
- Livestock products are exported outside the County in un processed form (Beef, hides & skins, bones etc).
- Prevalence of drought which affects availability of water and pasture.
- Prevalence of livestock diseases leading to livestock product bans.
- Constant raids on livestock by neighboring communities.
- Animals are highly valued culturally as a form of wealth and cannot easily be transformed into other form like money.
- Under utilization of available animal holding grounds.
- Infrastructure constraints particularly roads which hamper marketing of livestock produce.

- Limited or lack of extension services.

Fishing

- Capacity of fishing in the lake is at 20,000 tons annually but only less than 2 tons per annum is realized.
- Efforts to step up fish production has been through external donor support.
- Some amount of fish is exported outside the County but it is on the decline.
- Non investment in fishing and use of poor equipment and methods.
- Natural climatic factors-drying of Ferguson Gulf.

Tourism

- Tourism attraction features are available (Lake Beaches, Central Park in the Lake, Lake Islands, South Turkana National Reserves, Kenyatta house at Lodwar, Culture of the people, boat building, hot springs for health care, archeology site seeing, Eliye springs and Loiyangalani).
- Excluded from the tourism circuit (Northern, Central Rift and Western).
- Limited tourism facilities.
- Insecurity due to frequent raids.

Industry and Commerce

- Strategically placed commercial centre linked to other central places or towns within the County.
- Commercial and light industrial activities concentrated in the main municipal centre or node (types indicated in table 3.3.8).
- Poor road conditions and drainage.
- High energy costs and frequent black outs.
- Inadequate local participation in business.

- Products are sources from very long distances coupled with poor roads leading to high prices
- Lack of product variety or limited range of products
- Inadequate and costly ICT services
- Costly public transport due to the dominant use of motor bikes and taxis as a form of public transport besides non motorized

Municipal

- Lack of valuation role for the town.
- Nonpayment of rates due to low incomes

Planning Implications

From the findings above, it is apparent that there is more opportunity for expansion of crop farming under irrigation and application of scientific methods of farming oriented towards cash economy. It was also found out that frequent drought and cattle raids affects both crop farming and livestock production leading to inadequate food and reducing livestock numbers hence weak base for agro-industry. This however, requires clear assessment of the water flow regime of the two rivers mentioned, in addition to the underground water potential. Once established, the water can be used for crop farming, production of enough pasture, livestock drinking and for domestic use in towns. It will help alleviate the effects of drought on farming and livestock. Further appropriate methods of farming and training more local people as agricultural and veterinary officers will help to enhance both crop yields and livestock production. The effort to step up both production of food crops and animals should also work on the cultural beliefs of the people to be in line with the cash economy and enhancing of security. The working on the farming and livestock sectors will require proper links to urban centres and particularly Lodwar through road infrastructure so as to encourage the setting up of agro-processing industries and facilitate marketing.

Efforts to step up production have only been mainly donor supported with limited support from the Government of Kenya. These efforts have been towards establishment of cattle crushes and livestock holding grounds. The livestock infrastructure has experienced maintenance problems and under utilization further leading to declining livestock numbers. It points towards localization of the efforts towards creating appropriate livestock infrastructure based on increased pasture production and water availability. The trade in animal by products in raw form leads to less earnings accruing to the local people.

With efforts to increase livestock production, it implies more by products will be produced to enable set up value addition within to create more employment through forward and backward linkage. Backward linkages are to inputs trading and once there is enough production of crops and livestock brings forth raw materials to be used in agro processing as inputs. More industries will be set up to process packaging materials for the agro processed products. This will lead to the development of an industrial and commercial service centre to be distributed to other towns within the County.

Fish production potential exists at 20,000 tons annually, while current production is at less than 2 tons. It was also noted that though fish production has declined some is exported outside the County. This gives opportunity for more production if appropriate investment in fishing infrastructure is done. Reducing water levels requires proper land use utilization especially afforestation to help restore catchment areas. Enhanced production through proper management of donor support complemented by central government and local community efforts will require appropriate cold storage chain and road infrastructure links to facilitate marketing.

Tourist attractions are available, in addition to limited tourism facilities has tended to weaken the contribution of tourism to the economy of the town. This has been further weakened by the exclusion of the tourist attraction of the County from the main tourism circuit of the Country (Northern Kenya, Central Rift, and Western), tourism attraction remain un-tapped. In order to utilize this potential infrastructure linkage through the LAPPSET is crucial besides marketing of the potentials and provision of appropriate tourism facilities. Hotels will provide linkages to the farming sector as well as transport and curio production.

The location of Lodwar is strategic and the role it plays currently in the County as, a regional service centre. Currently it has concentration of light industrial and commercial activities in the main commercial centre of the town. It was also found that it has no public transport system and routes i.e. it relies on private and non motorist transport. This is very expensive and also limited the employment creation opportunities. The construction of the LAPSSET transport corridor and establishment of a tourist resort around Lake Turkana is set to enhance the regional commercial and service centre of the town. In addition to the flow of activities the value of buildings reflects the capital wealth of the town that has not been properly estimated. It therefore forms appropriate location for the establishment of agro-based processing industries and large scale commercial wholesale shops, as well as tourism facilities.

To play the above role it will require to be appropriately linked to other urban centres within, and externally (Kapenguria, Kitale, Mount Elgon, Eldoret, Nakuru, Marsabit, Isiolo, Sudan and Ethiopia). This should be accompanied by improved roads, enough power supply that is less costly, adequate supplies of water and sewerage. This will create a favourable environment for business; guarantee lower prices and product variety hence a boost to the urban economy.

The improved economy will help spar the growth of the building and construction industry in addition to attracting professionals in the town. More employment will be created and revenue base of the town enhanced. Enhanced incomes from employment is linked to quicker payment of rates hence resolution of nonpayment of rates. This will lead to a strengthened economic base that guarantees both the survival of the town and urban residents.

Strategic Proposals

- Creation of proper external links to Lodwar town in good working conditions to facilitate movement of people, goods and services to and from the town
- Overcome drought constraints to both crop and animal production using underground water potential linked to complete utilization value chain (Aloe, camel, and goat milk, hides and Skins). Farm production system to be organized on small holder and large scale
- Carry out value chain studies on aloe vera, camel goat milk, fish, hides and skins and solid waste with a view to establishing production levels, processes required for supporting industrialization
- Link Lodwar to tourism circuit of Northern Kenya, Central Rift, and Western Kenya to tap into the tourism potential enabling the town to develop tourist facilities and services
- Enhancement of security in the whole of Northern Kenya (Uganda, Sudan, and Ethiopia border with Kenya) besides internal security a rising due to conflict over resources and cultural practices
- Regularization of land tenure in the entire town to create an enabling environment of property rights for commercial, residential, office and industrial investments
- Provision of localized public facilities and services (integrated road network, drainage, water, sanitation, electricity, public transport and efficient licensing)
- Develop capacity to monitor and regulate the building and construction sector within the town which has greater multiplier effects
- The available land within the town should be carefully utilized bearing in mind the potential future land demands due to increasing urbanization and scramble for land occasioned by oil discovery (land is scarce)
- Commercial and Industrial Node along the LAPSSET Corridor between the Road systems accessing the corridor from the main CBD

Proposed Commercial and Industrial Activities

The vibrant City in the Sunny Lodwar will be realized through commercial, service industrial investments made possible by the aforementioned natural resource capacities, implementation of strategic proposals. The proposed economic activities for employment creation are indicated in table 1.

Table 5.2.5: Proposed Economic Activities

Industrial	**Commercial & Light Industrial**
Aloe Value chain	Carpentry & Basketry
Camel & Goat Milk Value Chain	Metal fabrication & Welding
Hides and Skins Value Chain	Motor Vehicle & Cycle Repair
Oil industry	Bakery & Confectionery
Building and Construction	Dress making and Tailoring
Recycling of Solid Waste	ICT and electronics
Complementary Industries	Shoe Making and repairs
Fish Cold Storage chain Facilities	Professional services
	Hotels, restaurants and Catering
	Educational & Training
	Wholesale, retail, and shopping malls/ supermarkets
	Equipment and vehicle spare parts

Source: Authors Construct 2012

The Spatial Organization of Economic activities in the proposed spatial structure

Commercial and industrial activities of the town will be organized according to a hierarchy of commercial and zones defined by population size, total land size, built up commercial and industrial spaces, and range of functions performed. The hierarchies are; Primary, Secondary, Neighbourhood and Local Neighbourhood.

1. Primary Commercial Node/CBD (Central Business District)

- Population of 100,000-200,000 for the first 15 years then the threshold will increase to 250,000

- Land size of 200-350 Ha

- Expected Employment estimates form 37,500 and 52,500 square metres of built up space with each employee required to have 19 square metres, and ware housing 65 square metres from a third of the total space.

- CBD: National offices, regional offices and supermarkets, hotels, restaurants, petrol stations, fresh produce markets, electronic shops, money transfer services, centre of mobile telephone companies, Bakery, professional colleges, All major banks, insurance and real estate, hostels, guest houses, ICT Centre, termini, light industry, Auto repair, veterinary

- Public offices and services : Postal & Telephone exchange services, Fire Station, Colleges for Technical Training, District Park, Sports Centre, Regional Library, Police Station, Public Hospital, County and Municipal offices

2. Secondary Commercial Node (Two proposed in the North & South)

- The commercial nodes are two, one to the South and to the North for Major Industrial developments containing ICT Parks

- Population of 30,000-70,000 for the first 15 years and is expected to have a maximum of 200,000 people

- Land size 70-100 Ha

- Expected employment estimate from 22,500 and 30,000 square metres of built up space at 19 square metres per employee from a third of the size.

- Functions and services; retail shopping and all offices, self contained supermarkets/malls, hotels, restaurants, entertainment, petrol stations, drug stores, fresh produce markets/community markets, electronic shops, money transfer services, centre of mobile telephone companies, Bakery, insurance, real estate, hotels, hostels and guest houses, ICT CENTRE, termini, auto spares heavy and light industry.

- Postal & telephone exchange, sub fire station, colleges for technical training, sports centre, district recreational park, branch library, police station, hospital both public and private, municipal decentralized offices highly accessible urban parking

3. Neighbourhood Commercial Node

- Population size 20,000 -50,000 and expected at a maximum of over 70,000 with increasing urbanization
- Land size 12-20 Ha
- Expected employment estimate from 18,750 and 26,250 square metres of built up space at 19 square metres per employee from a third of the size.
- Neighbourhood Commercial Node: 3-10 shops both retail and wholesale, supermarkets, commercial and all offices for local agencies, petrol station, laundry, car wash, money transfer services, Banking services, Forex Bureau, Chemist, Guest House, Hostels, fresh produce market & community market, book stationery shop, Jua Kali stalls,
- Public Services: Library, 2-3 secondary schools, primary schools, health centre, neighbourhood park, post office, community centre, administrative office, and religious sites

4. Local Neighbourhood Node

- Population size 5,000- 15,000
- Land size 7-10 Ha
- Expected employment estimate from 11,250 and 15,000 square metres of built up space at 19 square metres per employee from a third of the size.
- Local Neighbourhood Commercial Node: 2-3 retail and wholesale shops, supermarket, butchery, green grocer, bar, café , restaurant, clothing and tailoring, hair dressing, open air market, cottage industry, money transfer services, Jua Kali sheds,

Figure 5.2.2a The Economic Sector Strategy – Commercial Areas

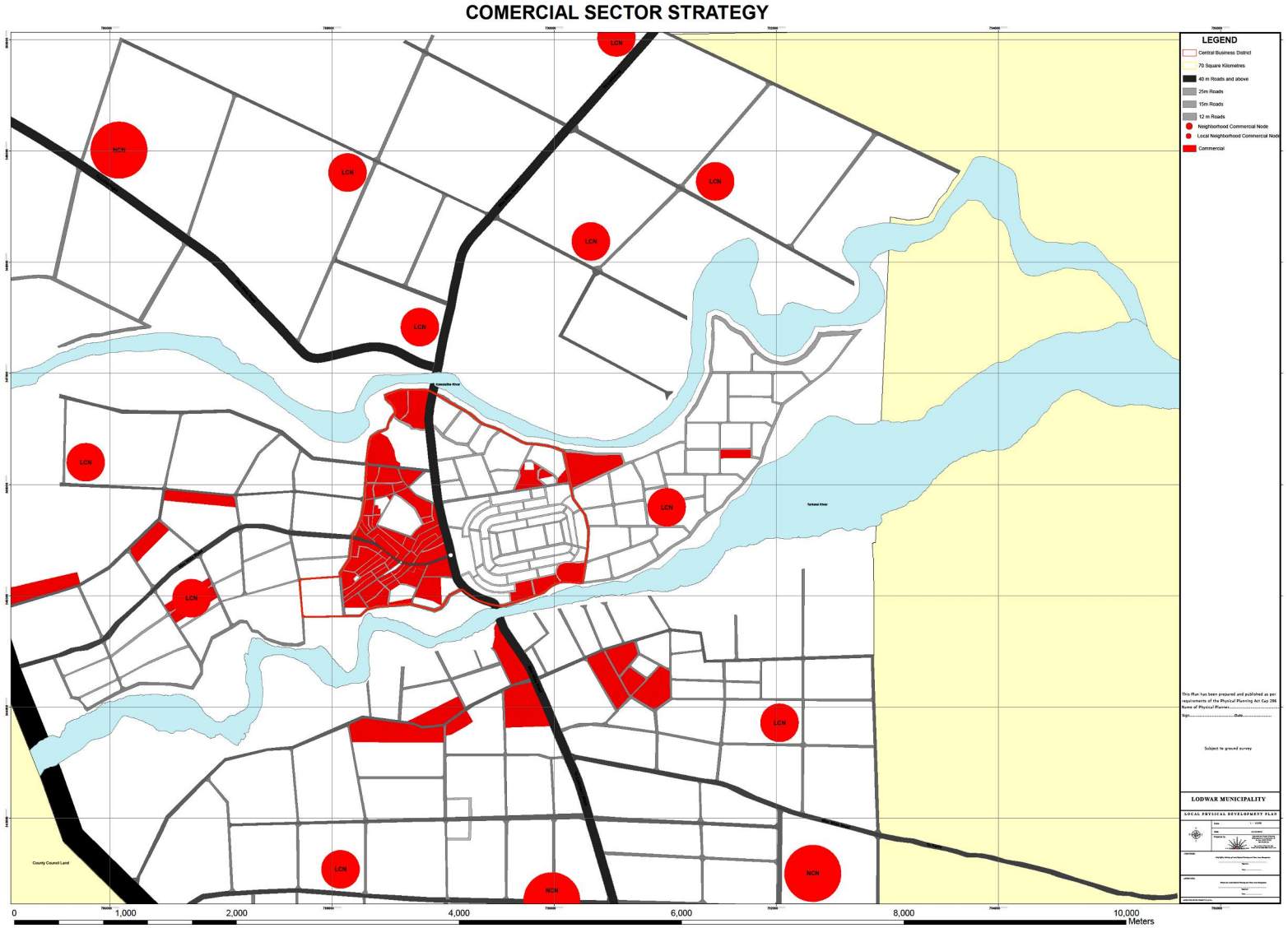
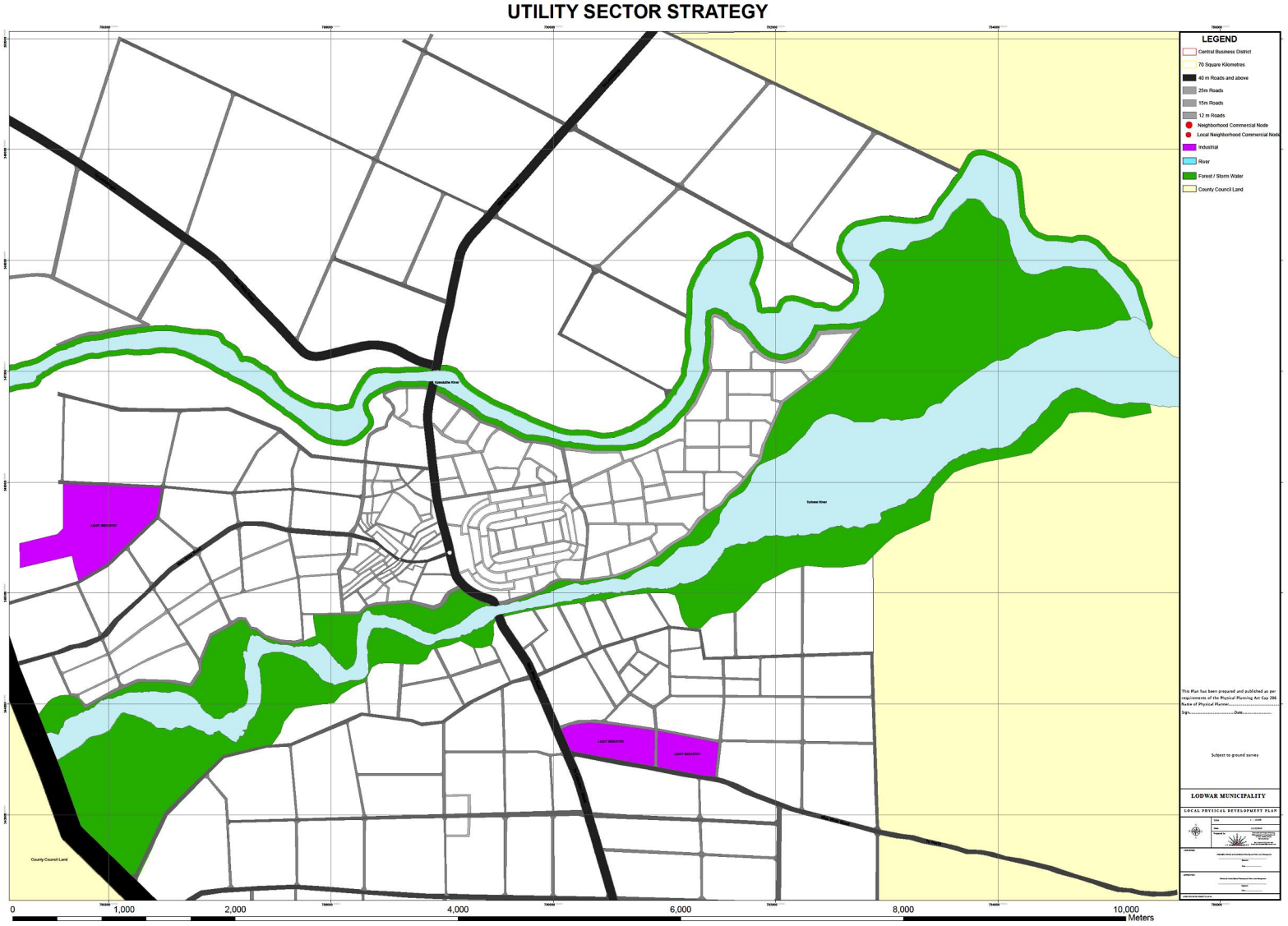


Figure 5.2.2b The Economic Sector Strategy – Industrial Zones



5.2.3 Financial and Investment Management

Key Findings and Policy Implications

- The two senior-most positions of Treasurer and Senior Accountant in the department are vacant. The council lacks capacity to analyze, formulate, and review financial policies and strategies.

- The Internal Auditor reports to the Treasurer and to the Town Clerk both of whose activities he is supposed to check and report on. The council is largely dependent on grant revenue.

- In 2008/2009 grant revenue amounted to 72% and collections from its own sources amounted to 28% of its total revenue. This is a risky situation; grant revenue is externally sourced and the council has no influence on the basis for assessing the size of the grant due to it

- The council is yet to develop and enforce an effective property tax system. The council has not developed a valuation roll and cannot therefore levy rates and does not maintain a complete register of owners of all plots in the town.

- In 2008/09 the council applied most of the resources at its disposal for payment of personal emoluments comprising councilorsô and staff emoluments (49% of revenue). The balance is insufficient to pay for services provision to satisfaction of residents and to maintain optimal investment I capital assets. More often than not, its operations result in revenue deficits.

- The level of the councilôs investment in capital assets is too low to enable it generate sufficient revenue to sustain a meaningful level of public services delivery.

- The revenue generating potential of the livestock market and the slaughter-slabs has never attracted serious consideration.

- Lack of a database of individuals and businesses subject to Single Business Permit (SBP) makes enforcement and monitoring of licenses revenue collection difficult. Licenses fees payment evasion is also rampant.

- Evasion of payment of council dues is rampant. Most residents, even business people and market plot owners consider themselves too poor to be subject to any form of local taxation and the council agents seem to agree as they do not rigorously enforce collection of plot rents arrears.

- The council does not have suitably qualified staff to follow-up collection of plot rent arrears through courts.

- The council lacks enforcement officers with skills and knowledge to interpret and enforce council by-laws. The market attendants are overworked, have a very low morale and too few to control markets activity transacted everywhere and at any time. For example the Market Attendant deployed at the livestock market works up to 11.00 am when the market continues to late afternoon.

- Market fees and other user charges are generally low and cannot guarantee related cost recovery.

- There are no designated parking places for buses, matatus, Bodabodas and the long distant travelling trucks which park in the town overnight.

- Public private partnership in municipal services provision has never been considered.

Proposals

Staff Competence

In the short-term run, the council should recruit appropriately qualified staff into the vacant positions of Town Treasurer and Senior Accountant. In the medium and long-terms, the councils should review its terms of service for its financial staff with a view to attract and retain appropriately qualified and experienced personnel.

The council should also recruit competent staff to enforce market by-laws and impose heavy penalties for confirmed cases of evasion of payment of council dues. Civic education programs for councillors, council staff and the wider public should be mounted to enhance their awareness of their responsibility to pay taxes and other council dues.

Internal Audit

The council should be re-organised to create an Audit Committee of the council which will supervise the internal audit oversight function. The Internal Audit function should be independent of the Town Clerkôs and town Treasurerôs departments.

Increase reliance on local revenue sources

The council will continue relying on revenue derived from its traditional sources - the LATF and RMLF grants, property taxes, SBPs, market fees, user fees and charges to finance its operating

and capital expenditure. To reverse deficit operations and to attain financial sustainability the council needs to be funded more by locally generated revenue than by externally sourced grants. The greatest potential lies in increased rating of land and increased cessing of the livestock business. The council manages over 700 square kilometres of land most of which can be planned and developed for ratable uses and is also the commercial centre of an expansive livestock dependent area.

Property Tax System

The council should develop and enforce an effective property tax system, It should develop a valuation roll to form the basis of charging rates and make all land parcels in the town liable to land rents or rates payment. If the council adopts improvement rating, it is expected that the council will be able to raise enough revenue to pay for all its operating expenses and remain with a substantial surplus for capital investment.

Operating and investment assets base

The council needs to increase and sustain investment in operating assets and equipment for efficient services delivery e.g. in refuse collection / disposal equipment and in cess pit emptying equipment and also in income generating assets such as markets, bus parks and rental housing.

The councilôs modern market and two pit latrines are yet to be commissioned for use as residents consider their locations inappropriate. The council should consult with residents in selecting convenient sites for public utilities e.g. markets, pit latrines and slaughter houses and on fixing market days.

Computerization

The council is installing a computerized accounting and financial reporting programme through adoption of the Local Authority Integrated Financial Operational and Management System (LAIFOMS), accounting software being developed by the KLGRP to address the unique accounting and other information needs of local authorities in Kenya. The council should ensure implementation of all accounting modules of the programme.

Linkage of Tax Registers to Geographical Information System (GIS)

The council should conduct surveys to set up and regularly up-date registers of land parcels in its area (with details as to their numbers, sizes, location, use, and details of owners) and registers of businesses operating in the Town. This will facilitate improved assessment, invoicing and collection of revenue due to the council.

The council needs to implement a property taxation system which ensures that all transactions relevant to property tax assessment, invoicing and collection are captured and recorded. Property tax registers should be linked to and up-dated simultaneously with other that land information databases that record/carry information such as location, owner, size, usage and occupancy of all properties in Town. Such a database may also be integrated with data collected by classical surveys of the area into digitized geo-referenced maps showing all the properties identified and their sizes, number and levels of buildings, number of occupants in the buildings and other features such as roads, rivers, schools, recreational grounds, etc. Details on the map can be stored in a Geographical Information System (GIS) for quick retrieval and provide essential geo-data base for fixing tax rate and generating tax invoices

User Charge Services Cost Recovery

The council should ensure that revenue generated by user charge facilities such as markets, ambulance service, and public conveniences, fully cover related staff, operating, and maintenance expenses and realizes reasonable savings contribution towards a fund for expansion of the scale and coverage of the service as well as for eventual renewal or replacement of the capital assets used.

The council is empowered by law to regulate and control the location and operation of certain persons, matters, premises, trades and occupations. The purpose of the SBP fees it collects for the permits it issues is to facilitate regulation and control regulation. For this reason it is desirable that nominal fees are charged to ensure recovery of the cost of regulating and controlling businesses. (Actors: NCC, Minister for Local Govt, residents, business community)

Apportionment development costs to beneficiaries

Borrowed funds are best suited for financing the development of bankable projects (e.g. markets, bus-parks, slaughter houses) whose expected returns are sufficient to service the loan repayment. Justification for use of borrowed funds exists when both the residents and the council do not have resources to immediately satisfy a genuine public need e.g. development of an access road or sewer connection. The council may negotiate and secure the loan, apply it on development of the required facility, apportion the total cost of the facility to properties served by it, and recover the cost in form of a localised special development rate loaded onto rates normally charged by those served by the facility). The council can then use the proceeds to service the loan and to manage the use and maintenance of the facility. (Actors: NCC, property owners/rate payers)

Grants and donor funds

The purpose and use of grant and donor funds may not change significantly in the future.

Some grants like the RMLF and bursary grants will be given to the council for specific purposes while other grants may be availed for general purposes to finance both operations and capital investments. The council should present its funds requirements to managers of devolved public funds and to representatives of donor agencies based in the area. The Education Bursary grant finances the provision of education to bright children from poor backgrounds. The National Aids Control Council grants fund advocacy against spread of HIV-AIDS among the youth and support to HIV-AIDS patients. These are examples of grants and donations availed to the council to finance specific operations and maintenance programmes.

The council may also receive grants and donations from Government and development partners to finance the development or acquisition of long-term investments as it did in 2009/10 when it received a grant through the Economic Stimulus Fund for development of a fresh produce market in the Town. Development grants and donations may be given in cash with conditions requiring that they be used for development or acquisition of specific capital assets. Alternatively the donor community may develop or acquire assets and pass them over to the council as grants in kind. (Actors: NCC, NGOôs GoK, Stakeholders, development partners)

Privatization & services contracting arrangements

Where the council is not in a position to provide a service, it may contract it to private sector operators to provide the service with such conditions as will ensure sustained availability of the service at an affordable cost to all who need it. Services that can be privatized include water supply, solid waste management, slaughter houses, rental housing, nursery schools, markets, hotels, lodges and restaurants. (Actors: Lodwar Town Administrator, Residents, Stakeholders, Private sector)

Public private partnership

Public private partnership in municipal services provision and in problem solving is a recent idea in the town and is still a subject for further consideration by the council and interested private sector parties especially in connection with the provision of user charge services such as conservancy, markets, bus-park and slaughter house which can also be run effectively for the benefit of the general public by the council in partnership with the private sector.

Provision of Pre-primary school education mainly by Religious Organisations, NGOs and parents-teachers associations is a good example of private sector participation in the provision of public services in the town. Provision of exhauster services in Lodwar Town is a purely public affair of two public institutions, Lodwar Water Services Company (Lowasco) and Turkana County Council.

Two public toilets constructed in 2010 are not yet in use because the council has no capacity to manage them. These are indeed ripe candidates for sub-contracting to be managed by the private sector.

5.2.4 Environment

Key Findings and Policy Implications

Implications of Riparian encroachment

There are several implications to the environment, the river itself and to the encroachers when a wetland is encroached upon. Both rivers that pass to the north and south of Lodwar (the Kawalathe and Turkwell Rivers respectively) are large rivers. The Kawalathe River, in particular, is known to burst its banks during the rainy season, leading to cars at the lagger and homes which have encroached it being swept away. Encroachment causes destabilization of the banks which in turn leads to soil erosion. The consequence of soil erosion is siltation downstream. Cultivation too close to the river may result in crops being washed away in the season of heavy rains. The most serious consequence, however, is loss of life as homes are sometimes washed away by the swollen rivers. This avoidable loss of life can be prevented when a riparian buffer zone is observed and respected.

Implications of encroachment and destruction of riverine forests

Destruction of riverine forests contributes towards soil erosion and destabilization of river banks. The root system of trees helps maintain the integrity of soil; once this is destroyed there is nothing to hold soils in place. The result is soil erosion. Strict observance and protection of trees along the river, as well as the riparian, will help prevent destruction of riverine forests.

Implications of dust storms

Air pollution has a serious implication on air quality and living conditions. Constant dust storms make it difficult to keep homes, offices and business premises dust-free, and this in turn reduces indoor air quality. Aesthetically this leads to a poor living environment, and health risks are elevated, in particular risks related to the respiratory system and allergies.

Location of air-strip

The air-strip is located in the middle of the town. This results in noise pollution, with the added safety risk of the proximity to town residents of the aeroplanes as they take off and land.

Implications of Ponding and Flooding

Due to poor sanitation facilities, during heavy downpours the streets end up being polluted with faecal matter as a result of ponding and flooding. The implications of this are serious as disease, such as cholera, can easily spread. The polluted air is also offensive.

Foul odour due to open defecation

Turkana traditional homesteads do not have toilets. With modernization, and a gradual shift away from pastoralism, several Turkanas have adopted modern life-styles; however the tradition of retreating to an isolated place to defeacate has remained unchanged. Lodwar town has only two public toilets. The town, as a result, has many open areas that have a foul odour.

The implication of the above is air pollution and risk of disease.

Other implications are inaccessibility to the area north of Lodwar. The river over-flow necessitates relocation of pupils to other more reachable examination centres during exam time; sometimes examinations have had to be flown in when the road becomes impassable.

Proposals

Riparian protection

Sensitization of the community that live within the proximity of the river, and among those who have already encroached into the riparian, on the significance of observing a riparian distance as stipulated by WARMA ï the Water Resources Management Authority. An acceptable distance ranges from 6 ï 30 m; what determines the width of the riparian belt is the topography of the land (i.e. where banks are steep smaller riparian distances are observed; in flatter land a wider riparian is recommended).

In areas where soil erosion on river banks has already occurred, bank stabilization measures, such as gabions should be considered.

Riverine forest protection

Strict measures on forest preservation and afforestation will need to be put in place to protect and enhance trees on the river frontage. The roots of these trees help provide stability along the river banks which maintains the integrity of the river.

The Kenya Forestry Service has a strong presence in Lodwar. Possibilities of them partnering with the Turkana County Government should be explored with the aim of protecting and improving the riverine forests.

Dust Storms

Dust storms can significantly be reduced once a road network is in place which would reduce the available surface area which produces dust when there are strong gusts of wind. More trees would substantially create effective wind-breakers which would reduce the impact of the strong gusts of wind, and which would also prevent the ground from drying up too much to the extent that the top layer of soil is constantly loose and susceptible to being blown up into dust whirlwinds.

Location of airstrip

The airstrip should be moved away from its present location for the following reasons:-

1. It will significantly reduce noise pollution which currently is brought about by planes landing and taking off;

2. It will create a safer environment ï less risk of accidents;

3. It will be in a place that is a lot more spacious which in turn would mean it would also have space for expansion as the town grows.

Ponding and Flooding

A drainage system is of utmost importance to prevent ponding and flooding of the streets when it rains heavily. The community should be sensitized on waste disposal so as to prevent drainage system blockages, a problem which is common in other towns that do have a drainage system. The town should be actively involved in garbage collection, to prevent waste being blown into the drains by the strong winds which are a common feature in Lodwar.

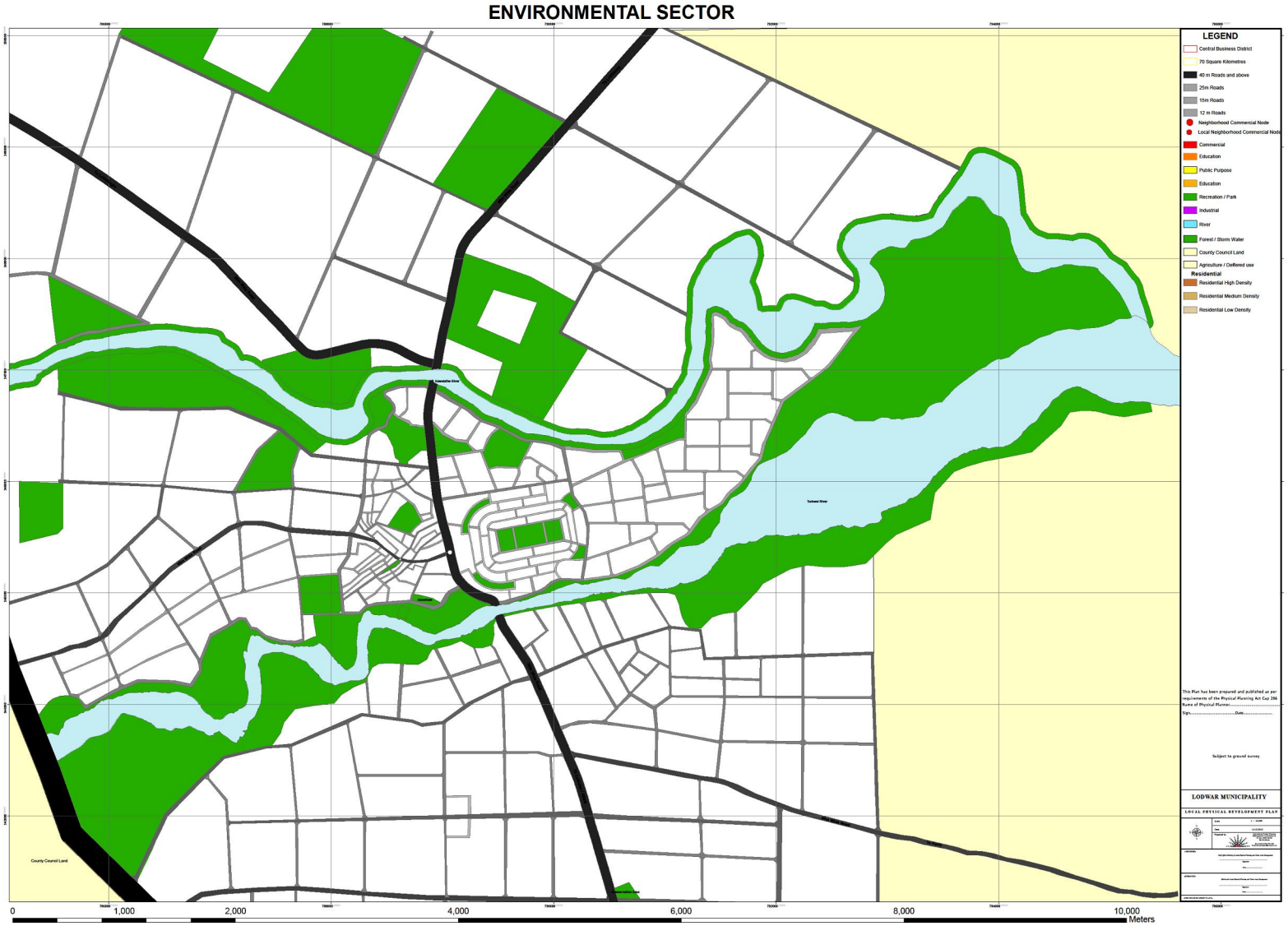
Foul odour

Traditionally the Turkana do not have sanitation facilities in their homesteads. This has led to air pollution in several places which is evident when one walks through the town. There is need for public toilets. More importantly perhaps there is a need to have a cultural shift whereby the local people are encouraged to include sanitation facilities in their homesteads, thus leaving public areas free of offensive odours.

Flooding of Kawalathe River

Due to the delicate riverine ecosystem, further studies on ecosystem management of rivers would need to be undertaken to come up with the most suitable way of watershed management.

Figure 5.2.4a The Environmental Sector Strategy



Alternative Sources of Energy

1) Extension of Kenya Electricity Transmission Company (KETRACO) transmission line
The nearest transmission line is currently over 100km away from Lodwar Town. With the projected growth of the town due to investment attractions, power total load could increase therefor justifying the need to extend the transmission line to Lodwar Town and beyond.

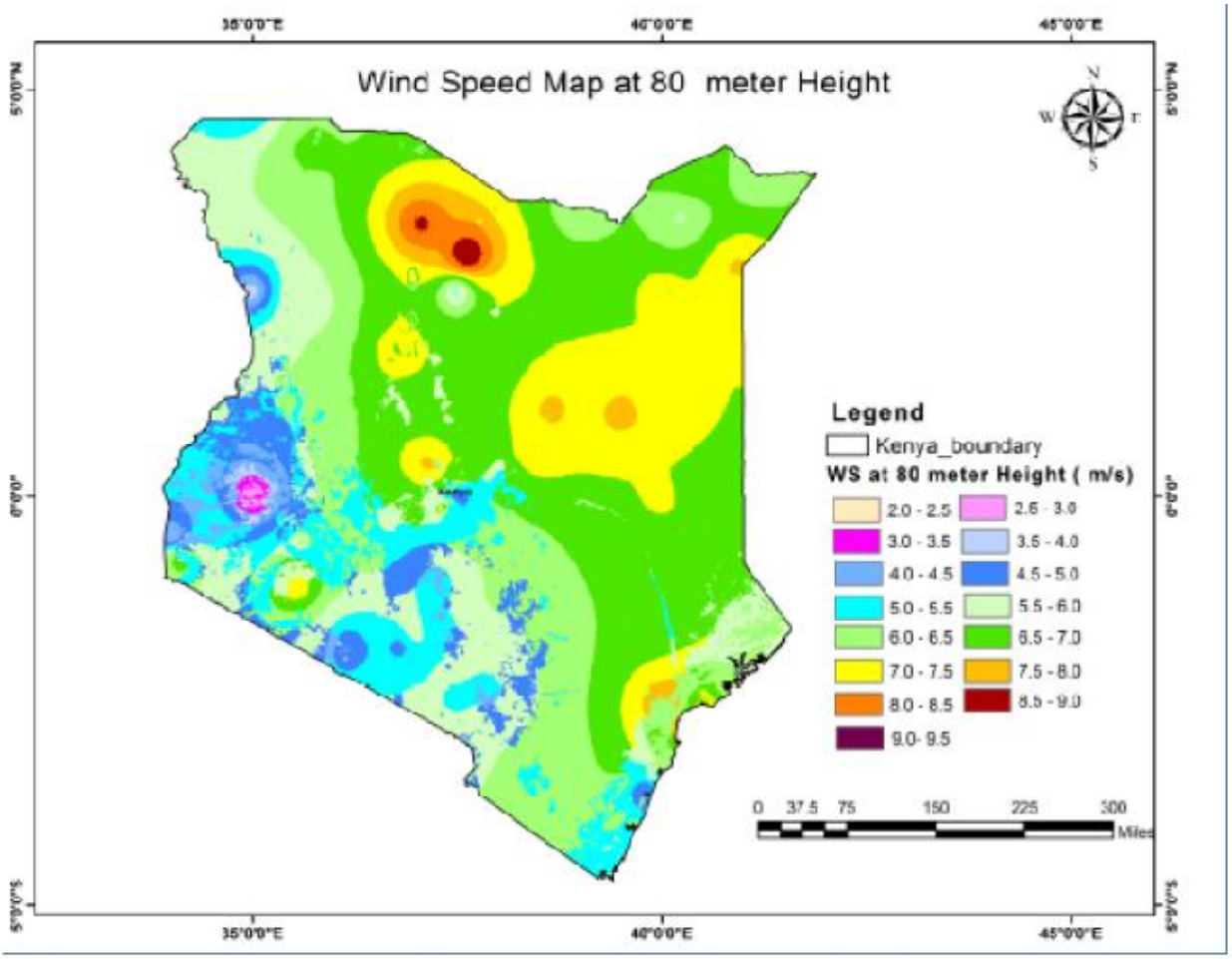
Figure 5.2.4b Status of Kenya Electricity Transmission Company Lines

From the figure above, it shows that Lodwar line is categorized as ongoing and therefore there are plans to extend the transmission lines.

2) Wind Energy

Wind speed in Turkana is in the order of 5.5 - 6m/s at 80m height from ground. Currently, Lake Turkana Wind project is under development and the transmission line would be extended to Loyangalani and subsequently to Lodwar Town depending on the power requirements along the proposed route to Lodwar Town. However, feasibility study is recommended to determine the suitability of wind power infrastructure in Lodwar Town or close to Lodwar.

Figure 5.2.4c Wind Speed In Kenya



3) Solar Energy

The area has above average insolation as per SWERA report and therefore ideal for solar plant. However, a solar power plant is costly investment and detailed study is required to determine the investment returns.

5.2.5 Housing

Key Findings and Policy Implications

The areas of concern in the housing sector can therefore be summarized as follows:

1. Lack of decent affordable housing for the residents of Lodwar town. This has led to residents living in overcrowded conditions and in poor quality structures.

2. Lack of security of land tenure for residential development by the residents and private developers. No developer wants to invest where there is no security of land tenure.

3. There is no initiative by the Government and the LMC for the development of housing for the residents of Lodwar town.

4. Residential land use is not planned except for the central town centre, the rest of the town remains unplanned.

5. Building materials are too expensive. This leads to very expensive housing product in turn high rents/mortgages if any.

6. Lack of affordable loan facilities for house construction/mortgage for Lodwar residents.

7. There are no private developers (Realtors) to provide a mix of housing typologies and sizes for the different residentsô housing needs.

Opportunities for Planned Development Solution

There are many opportunities for solving these problems and challenges, namely:

1. The integrated strategic planning process that is ongoing opens opportunities for solving most of the above highlighted problems especially land use planning and the cityôs future growth.

2. The devolved governance (County structure) within the framework of new constitutional dispensation in the country; contribution of the county government is real opportunity due to close touch with local development issues.

3. The LAPSSET project, Lamu-Juba transport corridor development provides opportunities for the development of Lodwar town.

4. Vision 2030 development strategy

Proposals

1. The county government should initiate a housing development programme to cater for the residents of Lodwar. This will involve both the public and the private sector. The private sector will participate in such a programme if only guaranteed economic returns. There is need therefore for the government to provide an enabling environment.

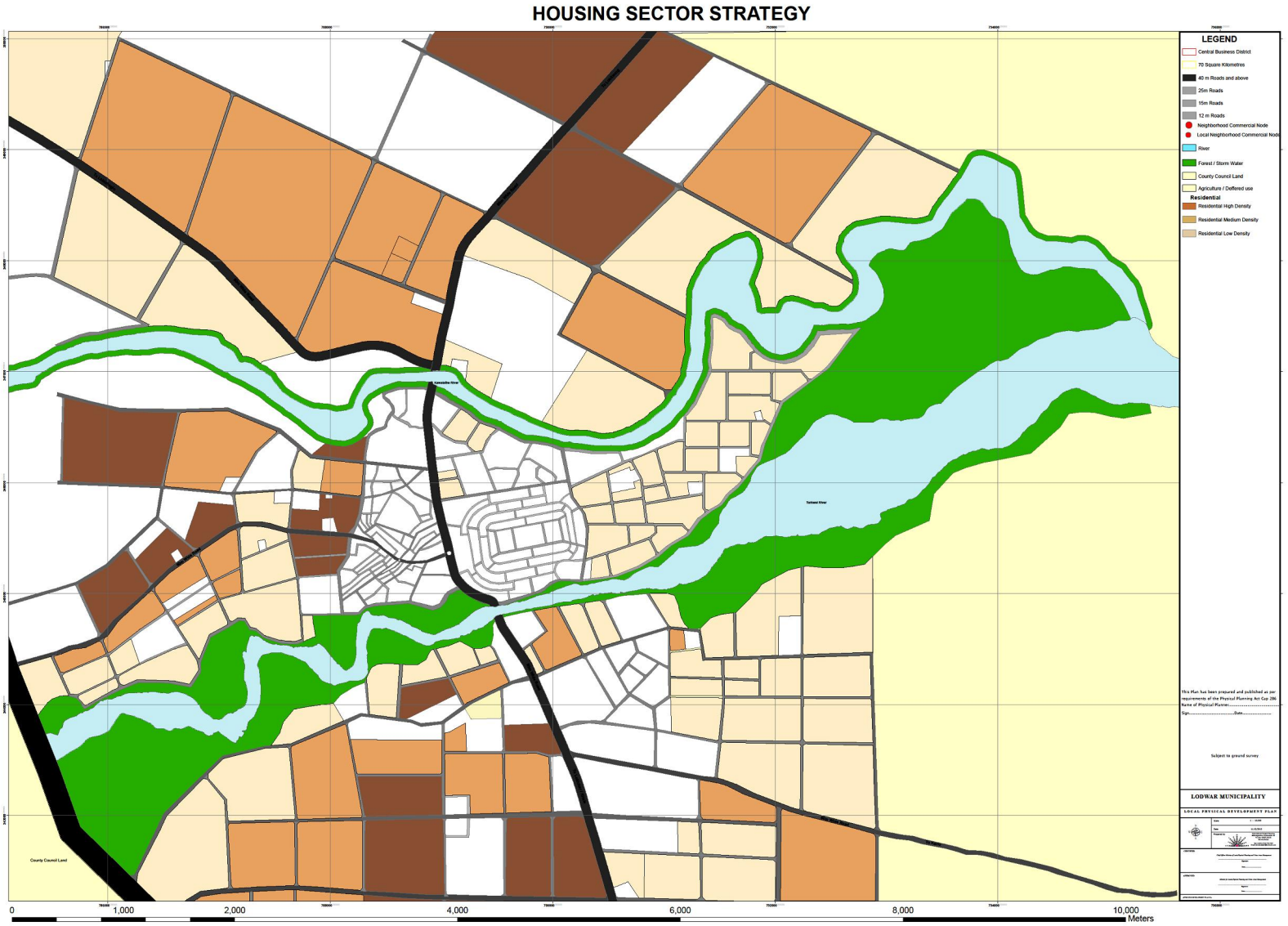
2. Lack of security of tenure is key in the development of housing by the residents and any other actor. It is important the land tenure system be changed from the current trust land to leasehold owned by the Lodwar town. Thus, the town will be able to allocate this land to investors in the various sectors including housing.

3. The current strategic plan of MCL being prepared will provide direction of growth of the town. The various land uses including residential will now be planned and grow in a more organized manner than it has been. This planning exercise needs to be completed as soon as possible and be implemented to the letter.

4. The cost of building materials is about 60 percent of the cost of a house. Thus, the use of locally available materials will cut down on the cost of the finished dwelling. However, the government and the MCL should reduce the levies charged on locally available building materials in order to attract private investors and for the local residents to be able to build their own houses.

5. A mechanism should be put in place by the government to make the cost of long term building loans cheaper than the available commercial loans on the market. This should be through local initiatives and resources set aside through for example, cooperative bank, national bank and any other innovative loan facility arrangements.

Figure 5.2.5 The Housing Sector Strategy



5.2.6 Transportation

Proposals

- *Road network plan and development*

The hierarchy of the road network system composed of major arterials, minor/secondary/principal arterials, major collectors, minor collectors and local streets should be efficiently developed, in line with the new urban road classification in the Classification Guidelines Report, December 2008, of the Ministry of Transport and Infrastructure, pages 9-12 as the Appendix.

Major arterials (urban class H roads) provide for through traffic and for relatively long-distance movements between widely separated parts of Lodwar Town. They should have a high level of service that maximizes speed and mobility, consistent with safety, and should include some form of access control, including segregation of pedestrian and other non-motorised (NMT) movements. They should connect at the defined urban boundaries with a rural arterial of equivalent class. Road reserve is 60-80m

Minor/principal arterials (urban class J roads) provide the main means of moving between different zones of the urban area, other than the function supplied by any rural class roads. They should have a high level of service that maximizes speed and mobility, consistent with safety, and normally include some form of access control, including segregation of pedestrian and other non-motorised (NMT) movements. Road reserve is 20-45m

The roads of all classes, arterials, collectors and local streets, are to be fully integrated with NMT facilities.

Given the type of soil (light/fine volcanic) and the windy conditions in the planning area, it is proposed that all roads as well as the NMT facilities be paved; the indigenous trees that adaptable to the soil and climatic conditions in the area should also be planted in all open spaces, especially next to the roads and transport facilities to the heavy dust pollution.

In general, the road reserve width with respective functional class is provided in the table below.

Functional Class	**Road Reserve Width, m**
Major Arterial	60 - 80
Minor Arterial	20 - 45
Major Collector	18 - 40
Minor Collector	15
Major Local	12 - 15
Minor Local	9 - 12
Local Access	9 - 12

- *Development of secure bridges*

  All the drifts be replaced with well designed and well raised bridge for all roads crossing

- It has been noted that the proposed transport corridor will have an either positive or negative impacts on the development of the town.

  Positive impacts include link to other areas for regional growth, and accessibility to the town creating opportunities for investment. The negative impacts are reorganization of the town and resettlement and associated costs to be incurred.

- The proposed centres should be linked with appropriate roads and within the proposed development areas a well coordinated hierarchical road network fully integrated with NMT faculties should be established. It is important to note the location of current tracks will be reviewed with a view to upgrade them to well planned roads of a appropriate hierarchy and identified missing links be developed for a complete road network.

- The major junctions should have roundabouts which are useful in preserving land for future expansion and also facilitate efficient flow of traffic and lend themselves to easy expansion for future transport system development

- Given that Lodwar experiences prolonged dry spells and has fine volcanic dust leading to dust pollution. It is recommended that all roads & NMT facilities should be paved and all open areas along the roads should be planted with trees for both aesthetics and control of dust pollution.

- Direct access to the LAPSSET transport corridor should be restricted and mainly done through well designed interchanges.

- The LAPSSET transport corridor internationally links Lodwar to Uganda, Southern Sudan, the Sudan, Ethiopia and Somalia. There is need to link the town with the immediate hinterland within the County (To Lake Turkana, Kalokol, Lokitaung, Lokichiogio) and the wider resource hinterland within Kenya (Eldoret, Kitale, Nakuru, and Baringo).

- The current airstrip Lodwar should be relocated to an appropriate site and be expanded to offer higher air transport services in view that it is expected to be developed as a major resort City with industrial, commercial & other facilities

- Given the important role Lodwar is going to play there is need to have an active presence of oversight road authorities namely (KURA, KeNHA & KeRRA) instead of serving the region from Eldoret.

- The pipeline fuel depot to be established at Lodwar to serve the entire region in terms of fuel supply.

- The dumpsite should locate away from the airport.

- For the development in Lodwar town to be realized the land tenure should be changed from trust land to leasehold owned by Government so as to facilitate private sector investments. We should plan to avoid the types of problems being experienced in Juba in Southern Sudan where owing to insecure land tenure the Government has been forced to relocate the Capital City.

- For effective implementation of planned development of Lodwar town it is considered important that the resource capacity of finance & human skill for the town and Turkana County have to be significantly be strengthened. Efforts for collaboration & cooperation between the central government, local government agencies and public private partnerships

- The location of the LAPSSET transport corridor proposed to go along the current transport alignment is planned to have a land reserve width of 200 metres for the three transport facilities namely; road, railway and pipeline. It will have impact on the current land use development and planning proposals made for the Lodwar Town.

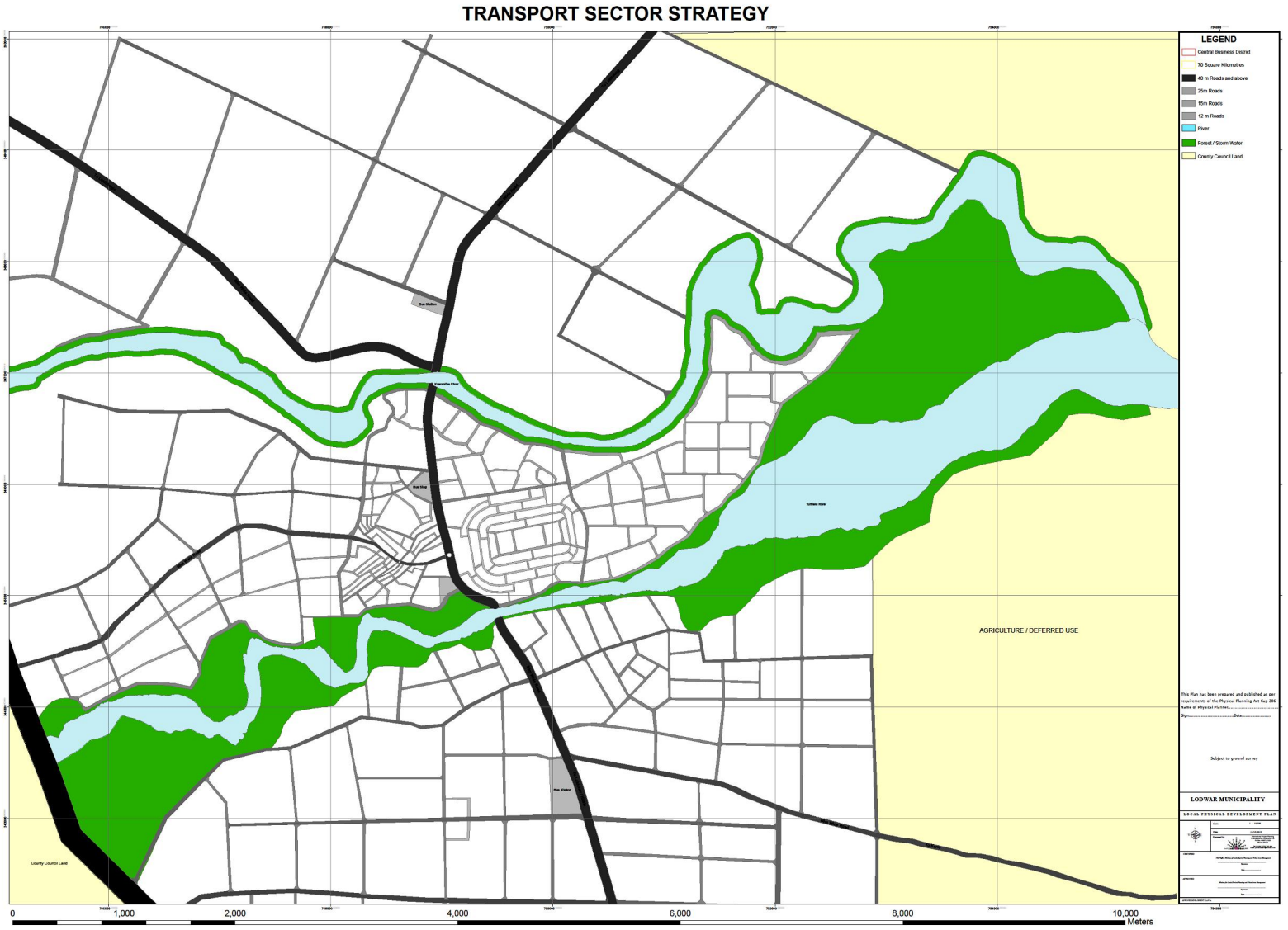
- *Development of Livestock Movement Corridor*

Currently, movement of livestock across the two rivers is done during the night due to high traffic flow across the bridge during the day. The plan underscores the improvement of the livelihood of the pastoralist community. The livestock migratory route will enable free flow of livestock in search of pasture and water. The plan proposes a livestock migratory corridor down south east crossing Kerio Road towards the Turkwel River. This corridor is to act as a buffer for the aquifer. The river crossing structure for the livestock for accessing the northern part of the town will consist of two options:

Option 1: 200 meter long livestock crossing bridge 2Km downstream the aquifer

Option 2: 100 meter long livestock bridge 4Km downstream the aquifer

Figure 5.2.6 The Transport Sector Strategy



5.2.7 Utilities Services

Key Findings and Policy Implication

The table below gives the highlights of the key findings and policy implications for the provision of utility services in Lodwar Town.

Water Supply

Key Finding (s)	Policy Implication
1. Inadequate water supply. The demand for urban water is 4,334m^3/day and the supply is 2,734m^3/day. The safe yield from the boreholes is 4,536m^3/day which when fully utilized will meet the current water demand. 2. Aging infrastructure 3. Inadequate water storage to cushion water demand fluctuations. 4. Lack of water testing laboratory for monitoring water quality 5. Lack of enforcement for water catchment protection.	**Water Act 2002** 1. The Ministry of Environment, Water and Natural Resources to provide funds for expanding water supply to meet the planned water demand. 2. Rift Valley Water Services Board (RVWSB) to facilitate the expansion of water infrastructure in Lodwar Town 3. Water Resources Management Authority to give permits for water abstraction from the wells and aquifers 4. LOWASCO to plan for any proposed expansion of water supply services in terms of quality and levels of service 5. Lodwar Water Resources User Association to be equipped and supported to protect the water catchment (River Turkwell). 6. County Government to drill and develop water boreholes at the identified Napuu aquifer **Urban Areas and Cities Act 2011, County Government Bill 2012** 1. The County Government of Turkana will provide land for the location of water supply infrastructure. **EMCA Act 1999** 1. NEMA to approve the implementation of the water infrastructure.

Sewerage Services (Off site sanitation)

Key Finding (s)	Policy Implication
1. Lack of sewerage service	**Water Act 2002** 1. The Ministry of Environment, Water and Natural Resources to provide funds for developing sewerage infrastructure. 2. Rift Valley Water Services Board (RVWSB) to facilitate the development of sewerage infrastructure in Lodwar town. 3. LOWASCO to plan for any proposed development of sewerage services in terms of quality and levels of service **Urban Areas and Cities Act 2011, County Government Bill 2012** 1. The County Government of Turkana will provide land for the location of sewerage infrastructure. **EMCA Act 1999** 1. NEMA to approve the implementation of the sewerage infrastructure.

On-site Sanitation

Key Finding (s)	Policy Implication
1. Lack of regulation on on-site sanitation 2. Unhygienic disposal of night soil. Night soil is disposed on an open land along Lodwar ï Kalokol Road	**Public Health Act Cap 242.** 1. The Ministry of Health to regulate the provision of on-site sanitation. **Urban Areas and Cities Act 2011, County Government Bill 2012** 1. The County Government of Turkana to provide sanitation services such as exhausting services and approving the location of disposal point. 2. The developer / investor finance the type of on-site

	sanitation appropriate for the type of investment.

Solid Waste Management

Key Finding (s)	Policy Implication
1. Lack of solid waste management plan 2. Lack of approved solid waste transfer stations, dump site and land fill 3. Lack of adequate facilities and staff at the town to manage solid waste	**Urban Areas and Cities Act 2011, County Government Bill 2012** 1. The County Government to provide policy formulation, sector coordination and financing. 2. The County Government to undertake the development Solid Waste Management Plan and disposal facilities. 3. Preparation of regulations / laws on solid waste collection by the town and private waste collectors 4. The County Government will provide land for transfer stations and land fill.

Storm Water Drainage

Key Finding (s)	Policy Implication
1. Lack of storm water drainage in Lodwar Town.	**Urban Areas and Cities Act 2011, County Government Bill 2012** 1. The County Government to provide policy formulation, sector coordination and financing. 2. The County Government will provide land for way leaves and outfalls of storm water drainage. **Roads Act 2007.** 1. The Kenya Urban Roads Authority (KURA) to coordinate with the County Government in managing storm water from Roads.

Proposals

Water Supply

For successful implementation of Lodwar Integrated Strategic Urban Development Plan, water supply strategies should be implemented based on the increasing water demand. The following are the proposed measures to meet the water demand for Lodwar Town.

Immediate Measures – 2013 - 2015
Implement the measures as proposed by the five year strategic plan. The measures include: - Extending water distribution network by 3km every year and rehabilitating dilapidated networks - Redevelopment of the existing 7 No. boreholes by installing new casing, screen, test pumping and air valves - Connect the borehole No. 5 and 6 to the electricity grid and replace the diesel engine powered generators with electrical powered machines - Drill and develop 2 No. additional boreholes - Drill and develop boreholes at Napuu aquifer - Construction of water supply rising mains to main water storage tanks and extend water reticulation in the town - Increase the water storage by to 3,000m^3 to improve the distribution capacity - Increase the number of water kiosks - Facilitation of company staff to improve levels of water service provision and quality of water supplied - Planting of environemntaly friendly trees such as bamboo trees, apuu and water reeds on the Napuu aquifer area to conserve water
Long –Term Measures (2016 – 2030)
For the long-term, the following measures are proposed: - Rift Valley Water Services Board to launch feasibility studies, preliminary design and detailed design for expansion of water supply for the planned area under preparation. This study will consider ground water resource assessment and the option of pumping water to storage tanks then supply to the consumers. - The County Government of Turkana to provide land for the establishment of the storage and distribution tanks and way leaves for the water supply pipelines The Study on The National Water Master Plan carried out by Japan International Cooperation Agency (JICA) recommended shallow wells along River Turkwell as the main source of water

for Lodwar Town. The shallow wells shall be developed upstream or downstream of the existing location of the boreholes.

If the existing airport is relocated, the direction of settlement will be towards the airport. A water supply for the airport is expected to be independent but depending on the yield of the source, LOWASCO can still share the same sources. As a preliminary indications of the future supply of water, the following sources and zonal distributions are proposed:

Location of the Shallow Wells

- Upstream and downstream of the existing shallow wells
- Napuu aquifer

Location of Deep Boreholes

- Napuu aquifer

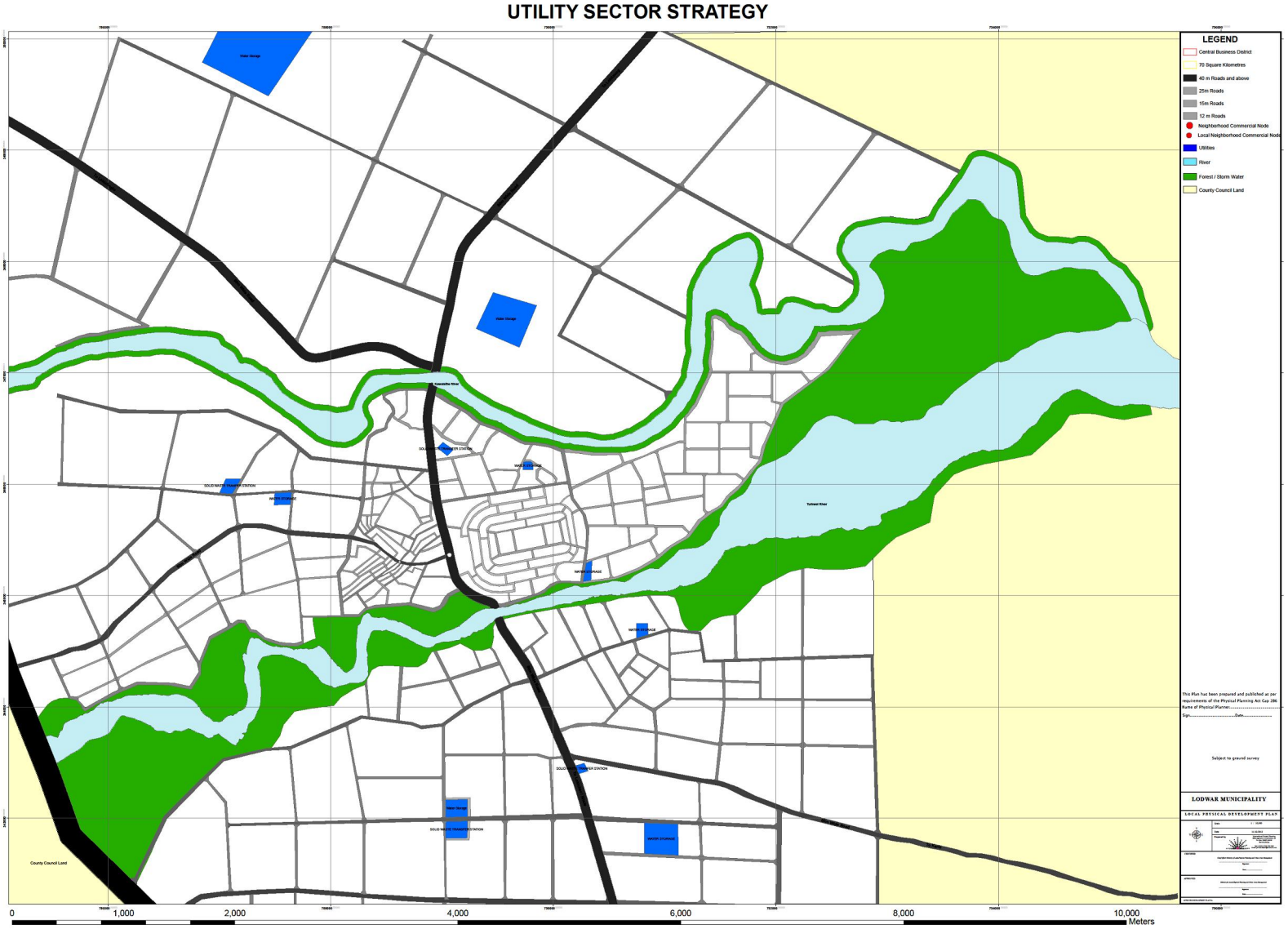
Location of the Storage and Distribution Tanks

- Kawalathe Zone ï Kawalathe Hill
- Kenyatta, Nakwamekwi and Napetet ï Hill adjacent to Mahon Primary School
- Kanamkemer, Naiwarotong and Napuu ï the highest point in the supply zone.

The feasibility study and detailed design that will be done will indicate if the storage tanks will be ground or elevated.

The attached map shows the proposed locations of the shallow wells and the storage and distribution tanks.

Figure 5.2.7a The Utilities Sector Strategy



Sanitation Services

The preliminary investigations on the sewerage service provision indicate that the wastewater from the build area of the town cannot be sewered to a single treatment plant. In the short term, the town will still depend on on-site sanitation and for the long term proposals on sewer network and sewerage treatment plant.

The location of sewerage treatment plant will largely depend on the topography and the direction of settlement of the town. It is also important to note that the location of the new airport to be established will influence the thinking of investors hence settlement.

In view of these factors, the following proposals on sanitation services for the planning area are proposed.

Immediate Measures – 2013 - 2015
The sanitation measures for the short ï term include: - Identification of sludge disposal site and approval by NEMA is a prerequisite. - Improvement of pit latrines to VIP standards including protection of the slopes - Design of septic tanks based on the population to be served - Embracing of new technologies on wastewater treatment especially sizeable institutions - Large institutions to have their independent wastewater treatment plant
Long –Term Measures (2016 -2030)
For the long-term, the following measures are proposed: - Rift Valley Water Services Board to launch feasibility studies, preliminary design and detailed design for development of sewerage services for the planned area under preparation. - The County Government to provide land for the establishment of the sewerage treatment plant and way leave for trunk sewer lines The Study on The National Water Master Plan carried out by Japan International Cooperation Agency (JICA) proposed sewerage investments in Lodwar Town. National services such as airport influence the thinking of investors. The sewer network and the location of the sewerage treatment plant will be influenced by the planned locations of services. Preliminary investigations for the provision of long term sewerage services are as follows: <u>Location of the wastewater treatment Plant</u> Due to availability of land, wastewater stabilization ponds are the most feasible for the

planning area. The topography may not allow for a single wastewater treatment plant for the entire town or planning area.

Sewerage Service Zones

- Zone 1: Kawalathe Zone with its wastewater treatment plant
- Zone 2 : Kenyatta, Nakwamekwi, Town Area, Kanamkemer, Naiwatorong and Napuu and Napetet to have its wastewater treatment plant
- Zone 3: Lower parts of Napetet and other areas where sewer lines are not feasible to continue with onsite sanitation.

Solid Waste Management

The mandate of solid waste management under the Urban Areas and Cities Act 2011 will be under County Government of Turkana ï Lodwar Urban Area. The solid waste management proposals for the Integrated Strategic Urban Development Plan for Lodwar Town are based on the following:

a. Effective insitu collection, transportation and disposal of the solid waste.

b. Transfer stations

c. Land fill disposal.

The preliminary siting of the transfer station and land fill is based on the factors not limited to the following:

- available land space/land requirement,
- type/amount of wastes to be stored at the transfer station and disposed in the landfill,
- the composition of wastes,
- Location of airport,
- general accessibility of the area and the distance from waste generation areas,
- aesthetic value of the landscape,
- availability of services such as transport,
- hydrology of the areas (river systems),
- geology of the areas,
- settlements patterns

In view of these factors, the following proposals on solid waste services for the planning area are proposed.

Solid Waste Proposals

Location of transfer stations

- Kawalathe Transfer Station
- Town Centre Transfer Station
- Kanamkemer Transfer Station

Location of Landfill Site

Efficiency of sanitary landfills operations are normally subject to availability of transfer stations at the designated solid waste generation zone. The Lodwar Integrated Development Plan has proposed such stations. This provision comes with environmentally friendly ways of solid waste management such as recycling depending on the efficiency of sorting of the waste at the source. At the design stage, the waste transportation routes will be minimizing health and safety risks to the public.

Protection of the groundwater prominently featured in the choice of the sites especially the southern sanitary landfill and how it relates with the Napuu Water Aquifer. The following factors have been considered

- release of leachate, together with landfill gas migration, poses the greatest hazard and the most severe consequences for a landfill operation.
- all groundwater must be considered a valuable resource (whether it is currently used or not) and therefore must be protected from contamination by pollutants from the landfill.
- a preferred site for a landfill is one that minimises the risk of groundwater pollution by providing a natural, unsaturated attenuation layer beneath the liner for contaminants that may leach through it.

The choice of these sites was guided by two topographical factors.

- The soil type is midloam. It is a naturally attenuating soil.
- The proposed site on the southern landfill is located on a gently sloping land in between the drainage regimes of River Turkwel and recharge seasonal streams of the swamp. This choice was hinged on the premise that if it were sloping towards the south east, then there would be a possibility of the runoff leachate flowing to the swamp which is assumed to be part of the recharge system of the Napuu Water Aquifer.

However, to allay fears of any kind of pollution from the landfills, the team advises that regardless of the location, the sites should further be subjected to the process of a hydrogeological risk assessment and surface water pollution.

Storm Water Management

Storm Water Management Proposals
For effective management of storm water, solid waste management should be of high standard. The topography of planning area is unique. The DEM for the area indicates that zonal drainage of storm water is feasible. The outfalls for the drainage channels are expected to be River Turkwel and Kawalathe. Discharge of storm water will require sustainable storm water drainage management to minimize natural watercourses pollution. The attached map shows the possible drainage zones and outfall for the entire planning area.

5.2.8 Institutional Framework & Human Resource

Proposals

Structural Re-alignment

Urban Areas and Cities Act, 2011 outlines the procedures of integrated plan preparation, implemented of related projects and development control. The County Government Act 2012 also gives the government structures of Towns and Municipalities. The Implementation of Lodwar Integrated development plan must therefore complies with the governance provisions made in the Urban and Areas and Cities Act of 2011.

The plan will be implemented by the Ministry of Lands, Physical Planning and Urban Areas Management. The ministry is structured into three Main Departments that is:

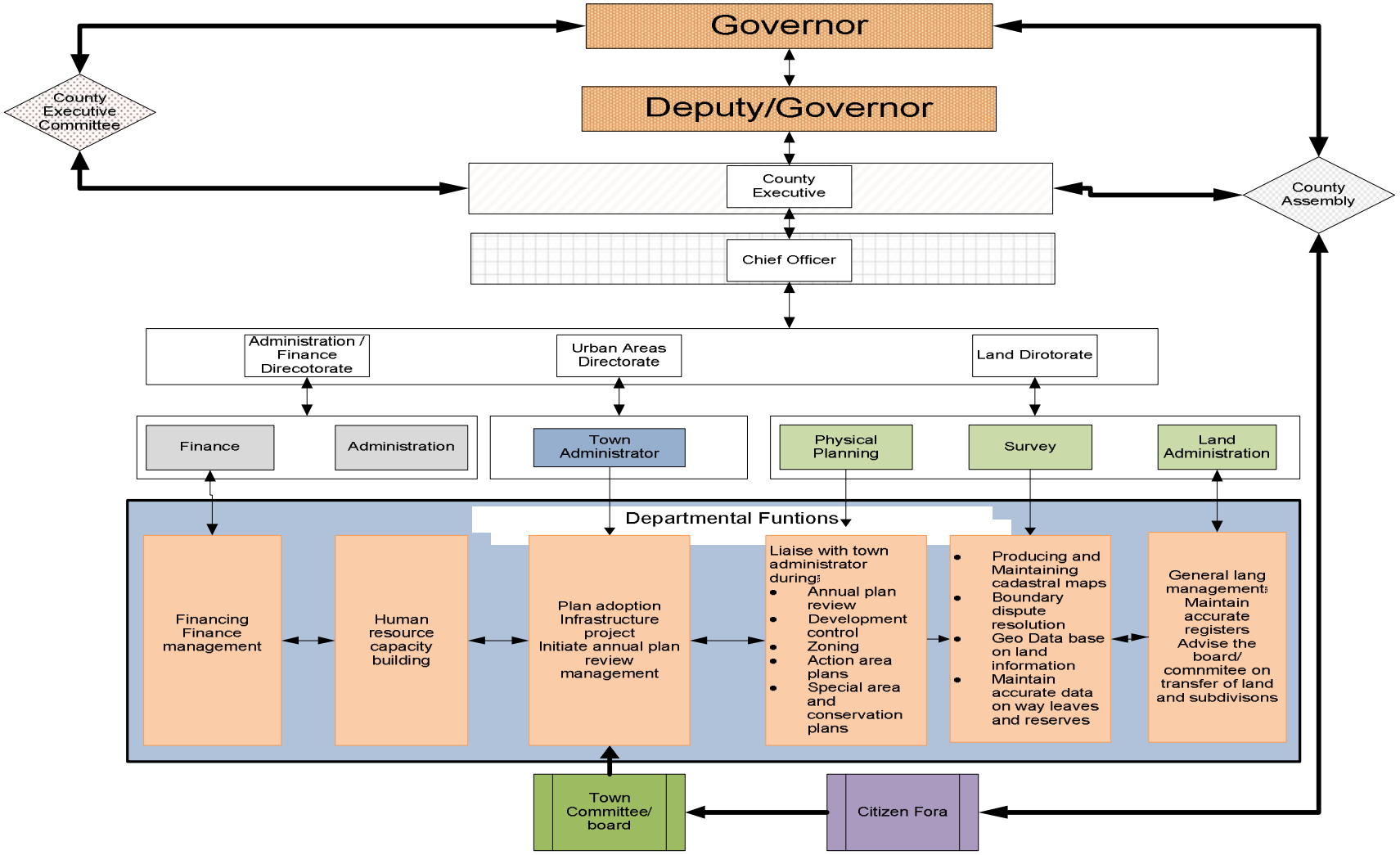
(a) Administration and finance

(b) Urban areas

(c) Lands

The main actor in the implementation process will be Director of Urban Areas who will also link with other departments. The structure is illustrated in figure below

Figure 5.2.8 The Proposed Organization Structure for Lodwar Town management



In relation to the above structures the Key players roles are indicated below:

The Governor

1. The Governor will have the main role will be to appoint the Lodwar Town management committee.
2. In liaison with the Committee enter in agreement with utilities providers within the Town including Public Private partnership

Deputy Governor

The deputy governor will be the principal assistant of the Governor. He will perform the governorôs duties when he/she is not available.

County Executive Committee

The County executive Committee role will be:

a) Reviewing the integrated development plan and make recommendations;

b) Submit the plan to the county assembly for its approval.

Note there will be annual review of the plan once approved

CEC

Present the cabinet memo to the county executive committee in relation to Lodwar Integrated development plan. The memo should indicate the summary of the planning processes and the components. The Minister also forwards the cabinet resolution pertaining the adoption process to the county assembly for approval.

Chief Officer

a) In liaison with the Minister he should prepare the memo to the cabinet.

b) Policy formulation on the management of the planned Lodwar Town

c) Liaise with the town committee in the process of wider stakeholder engagement and resource mobilization

Lodwar Town Management Committee

a) Develop and adopt policies, plans, strategies and programmes, and may set targets for delivery of services. Once the plan is approved they should also steer the process of preparing action area plans.

b) formulate and implement an integrated development plan;

c) control land use, land sub-division, land development and zoning by public and private sectors for any purpose, including industry, commerce, markets, shopping and other employment centres, residential areas, recreational areas, parks, entertainment, passenger transport, agriculture, and freight and transit stations within the framework of the spatial and master plans for the city or town as may be delegated by the county government;

d) as may be delegated by the county government, promote and undertake infrastructural development and services within the city or town;

e) develop and manage schemes, including site development in collaboration with the relevant national and county agencies;

f) maintain a comprehensive database and information system of the administration and provide public access thereto upon payment of a nominal fee to be determined by the board;

g) enter into such contracts, partnerships or joint ventures as it may

h) monitor and, where appropriate, regulate city and municipal services where those services are provided by service providers other than the board of the city or town;

i) prepare and submit its annual budget estimates to the relevant County Treasury for consideration and submission to the County Assembly for approval as part of the annual County Appropriation Bill, collect rates, taxes levies, duties, fees and surcharges on fees;

j) monitor the impact and effectiveness of any services, policies, programmes or plans;

k) establish, implement and monitor performance management systems;

l) promote a safe and healthy environment;

m) facilitate and regulate public transport

Town Administrator

a) Submit to the executive committee, a copy of the integrated development plan as adopted by the board or committee. The adoption may include amendment proposals. The submitted plan must have

    a. a summary of the process of its formulation plan

    b. a statement that the process has been complied with, together with any explanations that may be necessary to clarify the statement.

Director of Land

The director of urban areas will provide professional advice during the plan approval and implementation process. His advices will also be needed during annual review, project planning and development control. He/she must ensure that once the plan is approved, its legality is upheld. This will be done by evaluating all development projects submitted for approval before implementation by development proponents. Planning standards should be adhered to and he/she should timely initiate reviews and action area plans for various zones and special areas.

Under his stewardship road reserves and way leaves for infrastructural facilities should be conserved, he should also hold a position within the Town management board/committee, develop land information systems data bases and environmental management plans.

Director of Urban areas

a) Coordinate service provision and implementation of both physical and social infrastructural facilities proposed in the plan.

b) Liaise with the Chief officer, Town Management Committee in sourcing for funds to implement projects within the town

Citizen Fora

The Constitution of Kenya 2010 stipulates that, all citizens must participate in the formulation of policies and strategies to improve their well being. During the annual review and action plans preparation the citizens should be consulted through forums organized by the town management. Their views have to be consolidated and integrated in the plan. All projects within the town must be a forecast of needs assessment identified by the residents.

County Assembly

The county assembly is an entity which represents the wider residents of Turkana County. There role will include:

a) Approval of the plan in order to make it legal binding

b) Formulate and legislate on bylaws needed to implement the plan. The bylaws will touch on issues related to development control, zoning and protection of environmentally sensitive areas identified in the plan.

Table 5.2.6: Proposed Training Programmes for the MCL

No.	Type of Training	Target Group	Duration	Estimated Cost
1	Workshop on good Governance and management	MCAs, County/sub-county administrators, Officers, Departmental Heads and stakeholder representatives	Four Days	Kshs. 800,000.00 NB: On the basic of 40 participants residing in a hotel or public institution
2	Resource Mobilization and Service Delivery Workshop	ñ	ñ	ñ
3	Local Economic Development and Poverty alleviation Workshop	ñ	ñ	ñ
4	Workshop on Supervisory and Enforcement Approaches	Enforcement officers, supervisors and stakeholder representatives	ñ	ñ
5	Workshop on Integrated Urban Investments, Planning and Development	Chief officers stakeholders representatives	ñ	ñ
6	Workshop on project cycle and participatory planning	MCAs, County/sub-county administrators and Stakeholder representatives	ñ	ñ
7	Workshop on law of meetings	Chief Officers and Committee		
8	Environment and Sustainable Development Workshop	MCAs, County/sub-county administrators, Chief Officers and Stakeholder representatives		
9	Workshop on Designing Urban Planning Policies	Councillors, Chief, Officers and Stakeholder Representatives	ñ	ñ
10	Workshop on Budgeting and Budgetary Control	All Council of Staff	ñ	ñ
11	Workshop on Tourism Promotion in Turkana County	MCAs, County/sub-county administrators, Chief Officers and Stakeholder representative	ñ	ñ
12	Workshop on Public Private Sector Partnership	ñ	ñ	ñ
13	Workshop on conflict and conflict resolution	ñ	ñ	ñ
14	Workshop on communication skills	MCAs, County/sub-county administrators	ñ	ñ

Table 5.2.7: Short Courses

No.	Type of Training	Target Group	Duration	Estimated Cost
1	Introductory course on Devolved Government Management	All Chief Officers	One Week	NB: Depend on the institution offering the course
2	Course on Project Development and Management	Chief Officers, MCAs, County/sub-county administrators and Stakeholder representatives	ñ	ñ
3	Course of Revenue mobilization and revenue use	Revenue collectors, Auditors, Members of Finance Committee and Representative of Business Community	ñ	ñ
4	Course on Economic and infrastructure investment	MCAs, County/sub-county administrators and Chief Officers	ñ	ñ
5	Course on ways and means of promoting Housing Development	MCAs, County/sub-county administrators and Chief Officers.	ñ	ñ
6	Course on Promoting Social Services	ñ	ñ	ñ
7	Leadership Skills Course	Chief Officers and MCAs	Four Weeks	NB: Depends on the Institution offering the course
8	Resource mobilization, revenue generation and financial management course	MCAs, County Government Staff and Stakeholder Representatives	One weeks	ñ
9	Course on Information Management System	Chief Officers, Supervisors and all secretaries	ñ	ñ

PART SIX: PROJECT PRIORITIZATION & IMPLEMENTATION FRAMEWORK

6.1 Phased Implementation of Investment Projects

Strategic reforms and other activities proposed in the 2012-2030 Lodwar Town Strategic Urban Development Plan will be implemented in three phases.

- Interventions that can be implemented within the councilôs current resource base and those that must be initiated almost immediately in preparation for major implementation programs will be done in Phase I (Short-term period) lasting the first five years 2012-2017 of the plan period.

- Reforms that will be implemented in the next medium term five year period, 2018 to 2022, of the plan duration are programmed for implementation in Phase 2

- Large scale interventions that may require commitment of considerable time and resources, including those continuing from the first and second phases, are expected to be done through to completion in Phase 3 comprising the last 8 years (long-term period) of the plan.

- Monitoring and Evaluation of the Plan implementation process will be undertaken as a continuous activity over the life of the plan.

Most of the recommended reform measures will be implemented through projects for development or procurement of commodities and services. Table 6.1.1 below summarises the sectoral projects proposed for implementation in the short-term, medium term and long-terms periods including their estimated costs stated in Millions of Kenya Shillings (Kshs. Millions). Where a project is expected to involve acquisition of land, an estimate of the value of land required is included in the cost estimate.

Table 6.1.1: Proposed Investment Projects Cost Summary

	Short-term	Medium-term	Long-term	Total
	[1-5 years] 2012-2017	[6-10 years]	[11-20 years] 2023-2030	Plan period 2012-2030
	Est. Cost	2018-2022	Est. Cost	Est. Cost
	(MKShs)	(MKShs)	(MKShs)	(MKShs)
Education projects	33	34	59	174
Health care projects	500	500	1,200	2,200
Social amenities projects	305	55	335	695
Housing projects	337	598	785	1,720
Water supply projects	92	340	440	872
Sewerage & Sanitation projects	60	530	1,000	1,590
Solid waste management projects	93	270	500	863
Storm water drainage projects	170	700	1,000	1,870
Energy projects	50	3,000	5,000	8,050
Environment proposals	2	166	253	420
Transport sector projects	530	1,450	4,250	6,230
Other development projects	15	130	175	320
Total for all planned projects	**2,187**	**7,773**	**14,997**	**25,004**

6.2 Funding of Proposed Investments

The Council is expected to arrange for and avail funds amounting to Kshs. 2.2 Billion to finance implementation of phase I projects, Kshs 7.8 Billion to finance implementation of phase II projects and Kshs. 15 Billion to finance projects in phase III of the plan. Total plan implementation is estimated at Kshs. 25 Billion.

The council will use locally raised revenue and established grants from the national government to finance proposed projects. It should implement revenue enhancement measures outlined in paragraph 5.2.3 above. Generally, the Council:

- Must encourage and stimulate Public Private Partnership financing for provision of some public services and infrastructure needed in the town.
- Should introduce rating of improved (developed) land and through Turkana County, adopt by-laws to levy cess on income generated by the principal industries in the area including livestock production, mining, tourism, petroleum oil production, derived from within its area.
- Must ensure all user charge services are self-financing, otherwise they be privatized.
- Should ensure continued compliance with all conditions to qualify for a share of grants availed by the National Government through the County Government.
- Should consider the option of raising loans for investment in public facilities and/ or provision of services with the potential to generate sufficient cash flows to enable due servicing and repayment of the borrowed funds.

6.3 Monitoring and Evaluation

For a much improved MCB, there will be need for a monitoring and evaluation system (M&E) which is linked to the councilôs annual budgetary controls and integrated with the national performance contracting monitoring and evaluation system. Sanctions and rewards system should be introduced in the management of the Townôs finances to guide and direct performance for senior officers and councilors. There is need for a human resource management and development policy to secure high level financial performance and continuing stability.

6.4 Detailed Listing of Proposed Investment Projects

Table 6.2 below projects funding necessary for implementation of individual investment projects proposed in the detailed sectoral thematic subsections of the 2012 to 2030 Lodwar Town Strategic Urban Development Plan. Sectoral subsections of the plan.

Table 6.4.1: Projected Urban Investments for Lodwar

	Short-term	**Medium-term**	**Long-term**	**Total**
	[1-5 years] 2012-2017	**[6-10 years] 2018-2022**	**[11-20 years] 2023-2030**	**Plan period 2012-2030**
	Est. Cost (MKShs)	**Est. Cost (MKShs)**	**Est. Cost (MKShs)**	**Est. Cost (MKShs)**
Education:				
Nursery Schools	33	24	9	66
Primary Schools	-	-	-	48
Secondary Schools	-	10	50	60
	33	**34**	**59**	**174**
Health Care:				
Healthcare Centres	-	-	200	200
District Hospitals	-	500	1,000	1,500
Private Hospital	500	-	-	500
	500	**500**	**1,200**	**2,200**
Social Amenities:				
Public Parks	35	15	55	105
Police Stations	-	10	20	30
Prisons	50	-	50	100
Post Offices	40	10	10	60
Community Centres	20	5	25	50
Public Libraries	60	15	75	150
Fire Stations	100	-	100	200
	305	**55**	**335**	**695**
Housing				
Develop housing	187	373	560	1,120
Provide service plots	100	150	150	400
Land use planning	50	75	75	200
Total Social Sector	**337**	**598**	**785**	**1,720**
Water Supply:				
Assess existing system	7	-	-	7
Rehabilitation works	50	50	-	100
Feasibility study	30	30	-	60
Implementation	-	250	400	650

Institutional capacity	5	10	40	55
	92	**340**	**440**	**872**
Sewerage & Sanitation:				
Assess existing system	5	-	-	5
Onsite sanitation works	25	-	-	25
Feasibility study	30	30	-	60
Implementation	-	500	1,000	1,500
	60	**530**	**1,000**	**1,590**
Solid Waste Management:				
Plan immediate works	10	-	-	10
Develop SWM laws	3	-	-	3
Develop SW disposal site	25	-	-	25
Equipment for SWM	30	-	-	30
Feasibility study	20	20	-	40
Implementation	-	250	500	750
Institutional capacity	5	-	-	5
	93	**270**	**500**	**863**
Storm Water Drainage:				
Storm water/floods plan	20	-	-	20
Delineate leave ways/areas	50	-	-	50
Implement phase I, II & III	100	700	1,000	1,800
	170	**700**	**1,000**	**1,870**
Energy:				
Plan for thermal energy	50	-	-	50
Implement phase I & II	-	3,000	5,000	8,000
	50	**3,000**	**5,000**	**8,050**
Transport sector				
Survey / locate proposed roads	100	-	-	100
Develop secure bridges	100	250	500	850
Develop access to centers	-	300	1,000	1,300
Develop 3 bus stations	50	75	100	225
Design, build road junctions	50	75	100	225
The public transport system	30	50	250	330
Relocate Lodwar Airstrip	100	500	2,000	2,600
Dev. Institutional capacity	100	200	300	600
	530.00	**1,450.00**	**4,250.00**	**6,230.00**
Environment conservation				
Re-afforestation	1	15	2	**18**
Solar Farm:	-	150	250	**400**
Wind mills:	1	1	1	**2**
	2	**166**	**253**	**420**
Other development projects				
Cadastral survey	5	70	100	175
Marketa in commercial centres	-	40	40	80
Integrated Information Systems	5	10	20	35
Plan Monitoring & Evaluation	5	10	15	30
	15	**130**	**175**	**320**
Total for all projects	**2,187**	**7,773**	**14,997**	**25,004**

PART SEVEN: ZONAL SPATIAL POLICY FRAMEWORK

Introduction

Having reviewed planning of Lodwar Town, it was found out that there is no existing spatial policy framework to direct the development of the town; the planning has been uncoordinated leading to poorly structured townscape.

A spatial policy framework in Table 7.1.1 is recommended to guide the development of Lodwar town up to the year 2030. The policy takes into consideration a number of factors including:

- The existing plot sizes vary from 0.05 hactares onwards. It is recommended that the minimum size of a plot be 0.1 hactares for both commercial and residential due to the hot and dry weather conditions.
- Existing 0.05 hactares plots that have been developed with permanent structures will not be subjected to this new policy. However, plots that are developed with temporary structures or undeveloped will be subjected to the new policy framework.
  All developments will be required to meet the conditions set out in the policy framework including: use of Solar/wind energy, Water recycling, Rain water harvesting, Separation of waste, recommended heights, among others.

Table 7.1.1: Zonal Spatial Policy Framework

ZONE	SUB ZONE	AREA/DESCRIPTION	GR	PR	MIN AREA (HA)	TYPE OF DEVELOPMENT	POLICY ISSUES/REQUIREMENTS
1	**CBD**	The main Central Business District of the current town centre as defined on the map.	50	2.5	0.05 Ha	Commercial/Mixed Developments	Use of Solar/wind Energy Water Recycling Rain water Harvesting Separation of Waste Limit height to 4 floors due to geological reasons.
2	**Secondary Commercial Node**	Commercial Node ï Mixed Development	50	3.0	0.05 Ha	Commercial/Mixed developments	Use of Solar/wind Energy Water Recycling Rain water Harvesting Separation of Waste
3	**Neighbourhood Commercial Node**	Mixed developments	50	2.0	0.05 Ha	Commercial/mixed developments	Above conditions apply
4	**Local Neighbourhood Commercial Nodes**	Mixed developments	50	1.5	0.05 Ha	Mixed developments	As above
5	**Industrial**	Industrial	50	1.5	0.1 Ha	Industrial	Use of solar/wind energy,
5	**5A**	Low Density (High Income) residential neighbourhoods.	25	1.0	0.2Ha	Single and double storey developments	Use of Solar/wind Energy Water Recycling Rain water Harvesting Separation of Waste
	5B	Medium Density (Middle Income) residential neighbourhoods	35	1.0	0.1Ha	Bungalows, maisonettes, double storey buildings	Use of Solar Energy Water Recycling Separation of waste Rainwater harvesting
	5C	High Density (Low Income) residential neighbourhoods. Flats	50 50	1.0 1.5	0.05 Ha 0.1 Ha	Residential Apartments	As above 2 No Car Parks per Flat 20% Greenery for residential Onsite parking for flats ï 1.5 cars per 3 bedrooms flat.

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ANNEXURES

Annexure 1: Household Questionnaire

Questionnaire No: é é é é é é é é é é é é é .

A. BACKGROUND INFORMATION

Name of town é é é é é é é é é é é é . Date of interview: é .....é é é é é é é é é é é ..

Name of the Political Ward ..... Name of the Village.....

Name of interviewer é é é é é é é é ..

Name of HH member		Ethnic group	Religion	Sex	Age	Marital Status	Education	Occupation	Main Source of Income	Place of employment
Father										
Mother										
Siblings	1)									
	2)									
	3)									
	4)									
	5)									
	6)									
	7)									
Other members	(1)									
	(2)									
	(3)									
	(4)									

B. MIGRATION TRENDS

1. Where were you born? é é é é é é é é é é é é é é
2. How long have you lived in this town ***(years)*** é é é é é é é é é é é .
3. Reasons for coming to this town ***(multiple response possible)***
   (i) Business
   (ii) Employment
   (iii) Education
   Others (Specify) é é é é é é é é é
4. (i) Do you at any time of the year move out of this town?
   (a) Yes
   (b) No ***(go to Sec C qtn 5)***

(ii) If yes, please indicate whether to: ***(multiple response possible)***
a) Another town (Specify name) é
....
....
b) A rural area (specify name)
é ....
....

(iii) Give reasons why you move to this particular town and/or rural area?
é é
é é
é é

C. HOUSING

5. (a) Type of house occupied (participant observation) ***(choose one response)***
   (1) Bungalow
   (2) Flats
   (3) Single rooms ***(go to qtn 5c)***
   (4) Maisonettes
   (5) Manyatta ***(go to qtn 5c)***
   (6) Tented
   (7) Huts
   (8) Others (specify) é

(b) How many rooms are there in this house? Number [...............]

(c) Is this house adequate for your family needs?
(i). Yes ***(go to qtn 5e)***
(ii) No

(d) What size of a house would be adequate for your family? Number of rooms [.....................]

(e) How many floors is this building ***(Observe)***? Number [................]

6. (a) Ownership of this dwelling? ***(Single response)***
   (1) Owner occupied (***go to qtn 6b)***
   (2) Employer ***(go to qtn 7)***
   (3) Rental ***(go to qtn 6b)***
   (4) Squatter ***(go to qtn 7)***
   (5) Others (specify) é .

(b) If owner occupied, is it, ***(single response) (go to qtn 7)***
(1) Purchased?
(2) Constructed?
(3) Inherited?
(4) Others (specify) é ..

(c) If rented/provided,

(i) Whom is it rented from? ***(Single response)***
(1) Government
(2) Local authority
(3) Parastatal
(4) Private Company
(5) Individual
(6) Other Specify é

(ii) How much rent do you pay per month? Amount Khs ....

7. Dominant construction materials of the house

Type of House	Roof	Wall	Floor
Permanent			
Semi-permanent			
Temporary			

KEY: Permanent - concrete floor, stone/brick/concrete blocks walling, Iron sheets/ tile roof]
Semi-permanent - cement/sand screed floor, mud wattle walls, Iron sheets roof]
Temporary - murram floor, mud wattle/ off-cuts walling, tin/grass/plastic paper roof]

D. LAND OWNERSHIP

8. (i) Do you own any land within this town?
(1) Yes
(2) No

(ii) If yes, what is the nature of land ownership? ***(Single response)***
(1) Trust land
(2) Free hold
(3) Leasehold
(4) Others specify) é é é é é é é é é é .

(iii) (*In Acres*) What is the size of your land? é é é é é é é é é é é é é é é é é é

(iv) How much is paid annually for rent in Kshs...

(v) . In this neighbourhood, how much does a plot measuring 50 by 100 costs? Kshs..........................

E SOCIAL AMENITIES, COMMUNITY FACILITIES AND HEALTH SERVICES

E (I) HEALTH FACILITIES

9. (i) How many health facilities are you accessible to?
....
....
....
(ii) ***(Approximately)*** How far are they located from your home?
....
....
....
(iii) Could you highlight for me some of the main problems associated with health services in this town?
é é
é é
é é
é é

E (II) EDUCATION FACILITIES

10. (i) How far is your school from your home?
   a. For Pre-primary é é é é é é é é é é é é é é é é é é é ..
   b. For Primary (Especially day school) é é é é é é é é é é .
   c. For Secondary (especially day school) é é é é é é é é é
   d. For College (Tertiary, University etc)...

(ii) Which are the main problems, associated with education facilities?
é é
é é
é é
é é

E (III) RELIGIOUS FACILITIES

11. (i) What is your main religious affiliation?
   (a) None
   (b) Christianity
   (c) Islam
   (d) Hinduism
   (e) African traditional religion
   (f) Other (specify)é .

ii) How far is your place of worship from home in Kms?...

E (IV) RECREATION FACILITIES

12. (a) Do you and your family go for recreation services?
   (1) Yes
   (2) No ***(go to 13)***

(b) Where do you, your partner and siblings go for recreation activities? é é é é é é é é é é é é é é
(c) How far are the facilities from your home? é .
(d) What problems are associated with your recreation site? *(Multiple response possible)*
   a. Accessibility
   b. Security
   c. Long distance from home
   d. Cleanliness
   e. Other (specify)
   é
   é

E (V) POLICING AND PRISON SERVICES

13. i) How far is the nearest police station/ Chiefôs camp from your home? é é é é é é é é é é é é é é é é

ii) Which are the main problems, associated with security services in this town?
é é
é é
é é

iii) How far is the nearest prison from your home? é é é é é é é é é é é é é é é é

iv) Which are the main problems, associated with prison services in this town?
é é
é é
é é

E (VI) POSTAL SERVICES

14. i) How far is the nearest post office from your home? é é é é é é é é é é é é é é é é

ii) Which are the main problems associated with postal services in this town?
é é
é é
é é
é é

E (VII) SOCIAL HALLS

15. i) How far is the nearest social Hall from your home? é é é é é é é é é é é é é é é é

ii) Which are the main problems associated with social Hall services in this town?
é é
é éé é é
é é
é é

F. INFRASTRUCTURE AND UTILITY SERVICES

F (I) WATER

16. (i) What are your sources of water? ***(Multiple response possible)***

Source	*(Tick)*	*Approximate distance in meters from the house (m)*	**Amount spent per month (Kshs.)**
River/stream			
Boreholes			
Water springs			
Piped ï Individual Connection			
Piped ï Communal Water Point / Kiosk			
Rain water			
Wells			
Others (Specify)			

(ii) What are the main uses of water within your household? ***(Multiple response possible)***
(a) Domestic
(b) Livestock
(c) Irrigation
(d) Other (specify) ....

(iii) What are your means of water storage? ***(Multiple response possible)***
(a) Plastic tanks
(b) Cement tanks
(c) Pots
(d) Jerricans
(e) Metallic Tanks
(f) Others (specify) é é é é é é é é é é é é .

(iv) What are the major problems associated with water supply? ***(list them)***
é éé é é
é é
é é
é .

(v) Does your main water supply provide safe water for drinking?
(a) Yes
(b) No ***(go to 17)***

(vi) If yes what methods do you use to treat? ***(List them)***

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é é
é é

F (II) ENERGY SOURCES

17. (i) What are your sources of energy? ***(Multiple response possible)***

Type of energy	Amount spent per month (Kshs.)
Gas	
Charcoal	
Paraffin	
Electricity	
Solar	
Firewood	
Other (Specify)	

(ii) What would you prefer as your source of energy for lighting and cooking?

Type of energy	Lighting	Cooking
Gas		
Charcoal		
Paraffin		
Electricity		
Solar		
Firewood		

G. INFORMATION AND COMMUNICATION TECHNOLOGY

18. (i) Which of the following modes do you use for communication and getting information? ***(Multiple response possible)***
    (a) Telephone
    (b) Radio
    (c) Television
    (d) Newspaper
    (e) E-mail
    (f) Cell phone
    (g) Barazas
    (h) Others (specify) é ..

(ii) What are the problems associated with communication and information systems?
é é
é é
é é
é é

H. TRANSPORTATION

19. Household transport characteristics

Listing Number	Household Member	Gender	Year of birth/Age in Yrs	Place of Work/ School (Name & Street or Road)	Most Frequent Means of transport	Transport Vehicles Owned by Household	Income per month
	1. Father 2. Mother 3. Son 4. Daughter 5. Relative 6. Other (Specify)	1. Male 2. Female	1. Below 12 years 2. 12-15 3. 16-19 4. 20-23 5. 24-30 6. 31-35 7. 36-54 8. 55+		1. Walking 2. Private Car 3. Matatu/Bus 4. Taxi 5. Company transport 6. School Transport 7. Bodas 8. Tuk Tuk 9. Other (specify)	1. Bicycle 2. Personal Car 3. Motorbike 4. Tuk Tuk 5. None 6. Other (Specify)	1. Below 3,000 2. 3,001-5,000 3. 5,001-9,000 4. 9,001-15,000 5. 15,001-20,000 6. 20,001-30,000 7. 30,000+ 8. Dependent
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

20. Approximately how much on average do you use on transport within the town in a month (in Kenya Shillings)
    1. In Person (alone) Kshs.....
    2. As a household Kshs.....

21. How many of the household members travel using

    1. Nissan Matatus .....
    2. Minibus matatus .....
    3. Buses .....
    4. Private Car .....
    5. Boda Boda .....
    6. Bicycle .....
    7. Walking .....
    8. School Transport .....
    9. Other (specify) .....

22. Where do you most frequently travel to and what is the purpose

    (a) During the week?

	Most Frequent	**Others (specify)**
Place		
Purpose		
Time		

    (b) During weekend

	Most Frequent	**Others (specify)**
Place		
Purpose		
Time		

23. For those who walk or use Bus/Matatu to work, ***(Not Applicable to those who do not work)***

    (a) Do you own a bicycle?
        a. Yes
        b. No

    (b) If YES in 23(a) above, why donôt you cycle to work?
    _____
    _____
    _____

    (c) If NO in 23 (a),
        i. Why donôt you own a bicycle and cycle to work?
            a. Cannot afford
            b. Not safe
            c. Cannot cycle
            d. Other (specify).....
        ii. Why donôt you cycle to work?
            a. Not safe
            b. Cannot cycle
            c. Other (specify).....

(d) If you had one, would you cycle to work?
   a. Yes
   b. No

24. How far are the following places from your house?

Destinations	**Distance (in Kilometers)**	**Time spent**
Work place		
Market		
Church		
Business		
Recreation		
Other (specify)		

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25. What problems do you encounter while travelling through the following?

Mode of transportation	**Problems encountered**
Public transport	i._____ ii_____ iii_____
Private transport	i._____ ii_____ iii_____
Motorcycles	i._____ ii_____ iii_____
Non-motorised transport	i._____ ii_____ iii_____

26. What are the conditions that exist or must be met for you to change your mode of travel to public transport? **(Arrange in terms of importance form most important to least important)**

_____
_____
_____
_____
_____

I. WASTE DISPOSAL

20. How do you dispose of solid wastes that you generate? *(Multiple response possible)*

(a) Open ground
(b) Pit latrine
(c) Council Collection
(d) Private firm
(e) No means
(f) Other (specify) é é é é é é é é é é é é é é é é .

21. How do you dispose of liquid wastes that you generate? *(Multiple response possible)*

(a) Open ground
(b) Pit latrine
(c) Private firm
(e) No means
(f) Other (specify) é é é é é é é é é é é é é é é é .

J PLANNING PROBLEMS

Could you mention some of the problems you feel are faced by this town with regard to spatial planning?
é é
é é
é é
é é
é é

K VISION

What is your dream for this town?

Sector	**Vision** *(Start like this: I would like to see ………….. happening to this sector………………..)*
Water	a. é b. é c. é
Housing	a. é b. é c. é
Health	a. é b. é c. é
Energy	a. é b. é c. é
Solid Waste	a. é b. é c. é
Transport	a. é b. é c. é
Security	a. é b. é c. é
Education	a. é b. é c. é
Community facilities	a. é b. é c. é
Other (specify)	a. é b. é c. é