Government of Kerala

Local Self Government Department

Kerala Sustainable Urban Development Project

(PPTA 4106 – IND)

FINAL REPORT

VOLUME 2 - CITY REPORT

KOZHIKODE

MAY 2005

FINAL REPORT

VOLUME 2 – CITY REPORT

KOZHIKODE

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List of Abbreviations and Acronyms

ADB	Asian Development Bank
ADS	Area Development Society
BOT	Build Operate Transfer
BOO	Build Own Operate
BOOT	Build Own Operate and Transfer
CBO	Community Based Organization
CDS	Community Development Society
DFID	Department for International Development
DPC	District Planning Committee
DWCUA	Development of Women and Children in Urban Areas
EIA	Environmental Impact Assessment
EDII	Entrepreneurship Development Institute of India
GDP	Gross Domestic Product
GIS	Geographical Information System
GoI	Government of India
HRD	Human Resources Development
HUDCO	Housing and Urban Development Corporation
IEE	Initial Environmental Examination
IKM	Information Kerala Mission
IMA	Indian Medical Association
IMR	Infant Mortality Rate
IT	Information Technology
JBIC	Japan Bank for International Cooperation
KocMC	Kochi Municipal Corporation
KolMC	Kollam Municipal Corporation
KozMC	Kozhikode Municipal Corporation
KSEB	Kerala State Electricity Board
KSPCB	Kerala State Pollution Control Board
KSRTC	Kerala State Road Transport Corporation
KSUDP	Kerala Sustainable Urban Development Project
KUDFC	Kerala Urban Development Finance Corporation
KUDP	Kerala Urban Development Project
KWA	Kerala Water Authority
LFS	Land Fill Site
lpcd	Litre Per Capita Per Day
LSGD	Local Self Government Department
MFI	Micro Finance Institutions
MGP	Modernizing Government Program
MIS	Management Information System
MLD	Million Litre Per day
MSL	Mean Sea Level
NABARD	National Agricultural Bank for Rural Development
NATPAC	National Transportation Planning and Research Centre
NGO	Non Government Organization
NH	National Highways
NHG	Neighborhood Group

NRY	Nehru Rojgar Yojna
NSDP	National Slum Development Program
O&M	Operation and Maintenance
PIU	Project Implementation Unit
PMO	Project Management Office
PPP	Public Private Partnership
PPTA	Project Preparation Technical Assistance
PWD	Public Works Department
RIS	Repayment Information System
SC/ST	Schedule Caste and Schedule Tribe
SHG	Self Help Groups
SJSRY	Swarna Jayanti Shahari Rozgar Yojna
STP	Sewage Treatment Plant
SWM	Solid Waste Management
TCPO	Town and Country Planning Organization
ThMC	Thiruvananthapuram Municipal Corporation
TMC	Thrissur Municipal Corporation
TRIDA	Thiruvananthapuram Development Authority
TUDP	Trivandrum Urban Development Project
UFW	Unaccounted Water
USEP	Urban Self Employment Program
UBSP	Urban Services for the Poor
VAMBAY	Valmiki Ambedkar Awaz Yojna
WTP	Willingness to Pay

1. BACKGROUND AND SCOPE

1.1 Introduction

The Final Report (FR) is the forth main output from the ADB TA4106-IND for the preparation of a project to attract loan funding from the Asian Development Bank for improving infrastructure and municipal service delivery in the five municipal corporations of Kerala. The five cities are Thiruvananthapuram, Kollam, Kochi, Thrissur, and Kozhikode. The project will include investment in physical infrastructure at city level and with proposals for capacity building and institutional strengthening of municipal and state authorities.

An Inception Report was submitted to the State Government and the ADB in April 2004 (revised June 2004), a Mid Term Report (MTR) was prepared and submitted in November 2004 and the Draft Final Report submitted in February 2005. Throughout the PPTA there has been a high level of participation from the stakeholders from the Project cities, GoK agencies and the private sector. Baseline socio-economic surveys were conducted during the second stage of the PPTA which provided community and business perceptions on municipal services delivery. Topic-specific questionnaires also solicited specific data from the cities. The design has learnt from ADB experiences in Karnataka, Rajasthan and Madhya Pradesh and other donor agencies in Kerala. The design has also capitalized on the GoK's own initiatives in municipal decentralization and urban management reform.

1.2 Project Goal and Objectives

The project goal is to encourage sustainable economic growth and poverty reduction in urban Kerala. The objective of the Project is to provide sustainable growth and poverty reduction through the provision of urban infrastructure services and the promotion of good urban governance to urban local bodies in Kerala.

1.3 Study Outputs

The outputs from the study are a series of components to improve city wide urban infrastructure services with the integration of poor settlements within the overall urban development process. Specifically, the Project will provide (i) basic infrastructure services to increase economic opportunities and to reduce vulnerability to environmental degradation and urban poverty, and (ii) improve urban governance and increase capacity of the municipal corporations to undertake urban planning activities. The Project will also focus on improving the conditions of the poor through undertaking community infrastructure development and poverty alleviation activities at each municipal corporation.

1.4 Scope of the Report

The FR is presented in 9 volumes. Volume 1, the Main Report, provides an overall view of the project and concentrates on State level policy, social-economics and urban management plus issues that are common to all the five project cities. Volume 2 provides separate reports for each individual project city covering mainly technical and financial issues that are particular to that city. Volumes 3 to 7 provide comprehensive details on: Social Impacts and Poverty; Economic Analysis; Initial Environmental Examination; Technical Analysis and, Urban Management and Institutional Development; Volume 8 provides support documents on social and environmental safeguard frameworks and Volume 9 provides the Project Resettlement Plan.

2. CITY CONTEXT

2.1 Geography and Climate

Kozhikode is situated on the west coast of Kerala at Latitude 11°-15' N and Longitude 75°-47'E. The city is 434 km to the north of Thiruvananthapuram, the State capital, and 215 km North of Kochi. The city is well connected by air, rail and road, and is approximately 678 km from the nearest metropolitan city, Chennai.

Kozhikode occupies a nodal position in the Malabar Coast and has an undisputed economic standing of its own being the trade centre for a large and resourceful hinterland. It is the market place of hill products like pepper, cardamom, etc. It also has large timber yards along the banks of the Kallai River. **Figure 2-1** indicates the geographical location of the Kozhikode Municipal Corporation area.

The city has a linear form bounded on the west by the Arabian Sea and on the east by gently rolling hills. The city is fairly flat, the average altitude above Mean Sea Level being four meters. The altitude varies from one meter at the coast to about 16m in the east. The terrain east of Conolly Canal is dotted with larger hills, many of which are too steep for urban development.

Kozhikode has a mean annual temperature of 27.1°C. The mean annual rainfall is 3,100 mm. The southwest monsoon occurs between May and October. On an average, 116 rainy days occur in a year. Excessive rainfall from June to August causes frequent floods in the rivers and canals in the area, submerging low-lying areas.

2.2 Population Trends and Urbanization

Urbanization along with urban population growth are pointers towards the change in the occupational pattern of the community from agriculture and allied means of livelihood to industrial and other non-agriculture occupations.

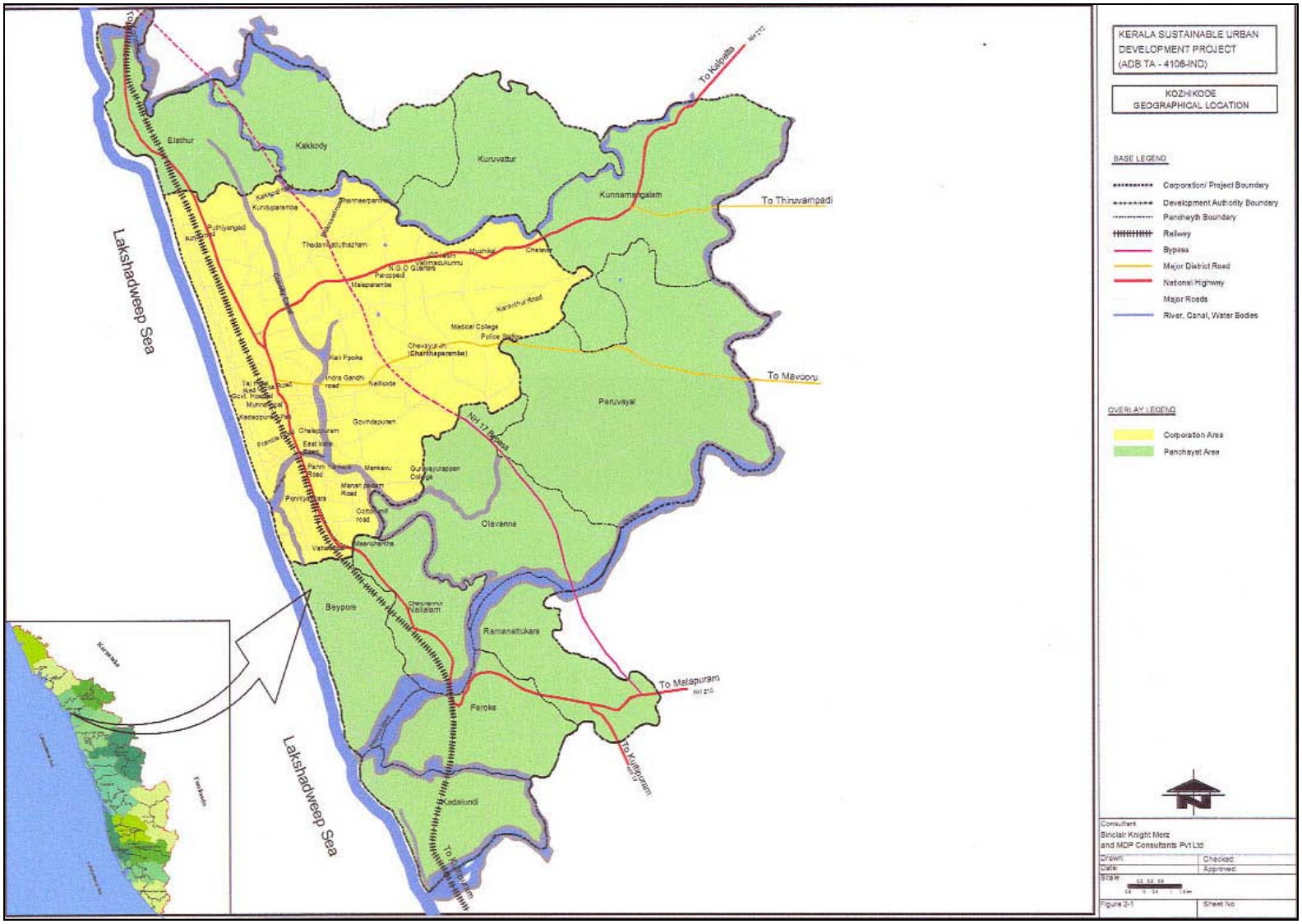
Kozhikode city alone accounts for 40% of the urban population in the District. Kozhikode Development Authority (KDA) area encompasses the Municipal Corporation area and adjoining 11 Gram Panchayats. The total area under the Municipal Corporation jurisdiction is 82.68 sq. km and the area under the Panchayats is 196.39 sq. km. The KDA area cover 279.07 sq. km. with a total population of 924,815, includes 436,527 persons in the Municipal Corporation area (Census 2001).

According to Census 2001, the average population density of KDA area is 3,314 persons per sq. km. In the city's central area, the population density is as high as 5,280 persons per sq. km while it is 2,486 persons per sq. km in the outer fringes of the city. **Figure 2-2** indicates the population density distribution in Kozhikode.

2.3 Economic Development

2.3.1 Sectoral Growth

Due to non-availability of city-level data, district-level data has been considered for analysis. Kozhikode District with 8% of the State's population makes a 12% contribution to the State's income.


KERALA SUSTAINABLE URBAN DEVELOPMENT PROJECT (ADB TA - 4106-IND)
KOZHIKODE GEOGRAPHICAL LOCATION
BASE LEGEND
Corporation/ Project Boundary
Development Authority Boundary
Panchayth Boundary
Railway
Bypass
Major District Road
National Highway
Major Roads
River, Canal, Water Bodies
OVERLAY LEGEND
Corporation Area
Panchayat Area
Lakshadweep Sea
Elathur
Kakkody
Kuruvattur
Kunnamangalam
Olavanna
Beypore
Ramanattukara
Feroke
Kadalundi
Peruvayal
To Kozhikode
To Thiruvampadi
To Mavoor
To Melapuram
To Kottakkal
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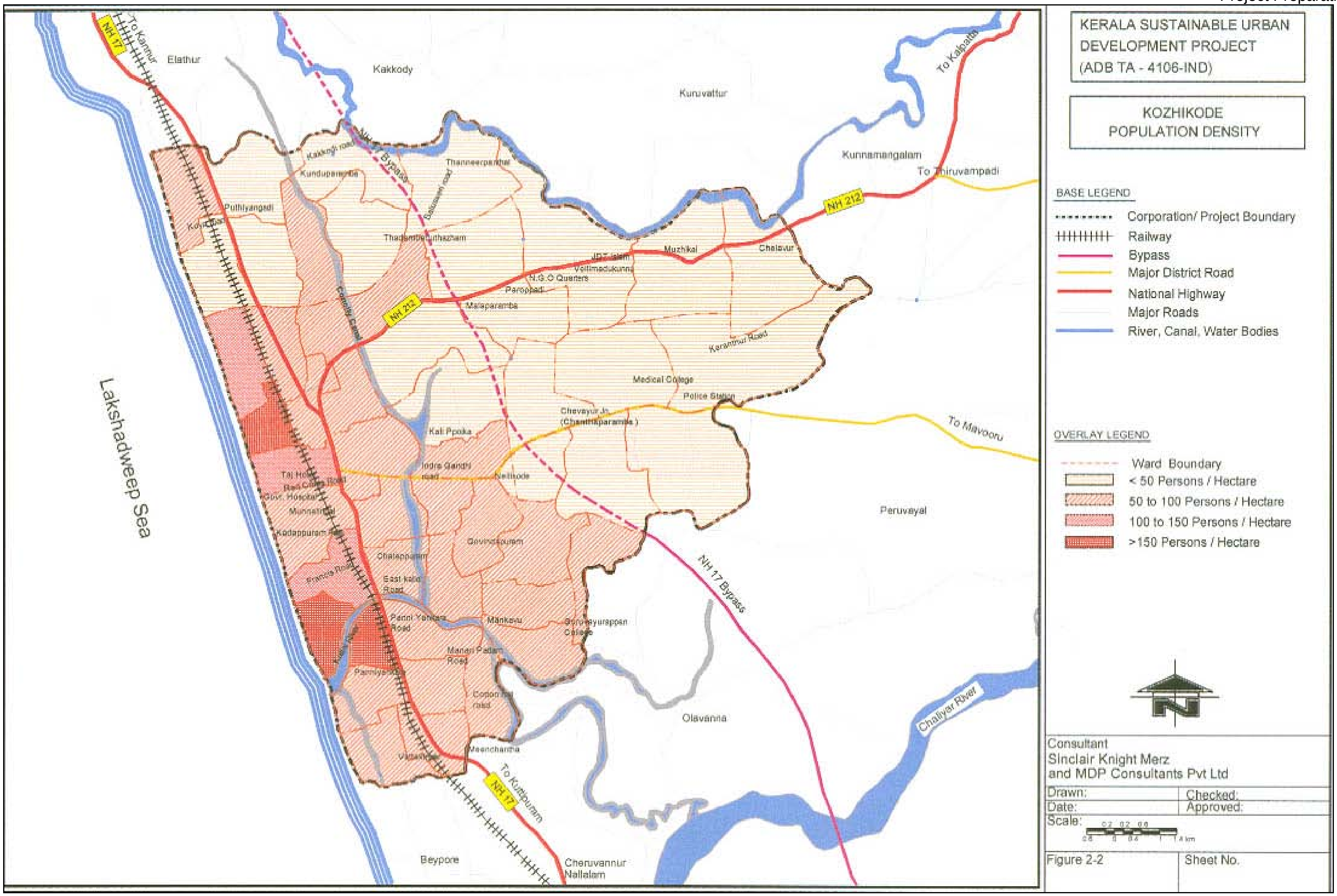
KERALA SUSTAINABLE URBAN DEVELOPMENT PROJECT (ADB TA - 4106-IND)
KOZHIKODE POPULATION DENSITY
BASE LEGEND
Corporation/ Project Boundary
Railway
Bypass
Major District Road
National Highway
Major Roads
River, Canal, Water Bodies
OVERLAY LEGEND
Ward Boundary
< 50 Persons / Hectare
50 to 100 Persons / Hectare
100 to 150 Persons / Hectare
>150 Persons / Hectare
Consultant
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and MDP Consultants Pvt Ltd
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Figure 2-2
Sheet No.
Lakshadweep Sea
Elathur
Kakkody
Kuruvattur
Kunnamangalam
To Thiruvampadi
NH 212
NH 17
Chelavur
Muzhikal
Medical College
Police Station
To Mavooru
Peruvayal
NH 17 Bypass
Olavanna
Chaliyar River
Beypore
Cheruvannur
Nallalam
To Kuttipuram
Meenchantha
Kali Pooka
Malaparamba
Thanneerpanthal
Puthiyangadi
Mankavu
Govindapuram

Table 2-1: Kozhikode District Sectoral Growth of Net Domestic Product

Components	1999-00	2000-01	2001-02	2002-03
NDP (Rs. Million at constant prices)				
Primary	7,046	5,415	5,388	5,197
Secondary	5,444	6,108	5,667	5,920
Tertiary	16,581	18,404	20,100	22,074
Total	29,071	29,927	31,155	33,191
Growth NDP (% over preceding year)				
Primary	-	-23.2	-0.5	-3.5
Secondary	-	12.2	-7.2	4.5
Tertiary	-	11.0	9.2	9.8
Total	-	2.9	4.1	6.5
Composition (% of NDP at current prices)				
Primary	24.7	19.8	16.9	15.4
Secondary	20.2	22.4	23.9	24.5
Tertiary	55.1	57.9	59.3	60.2
Total	100	100	100	100

Source: Economic Review 2003, State Planning Board.

Though the sectoral contribution and its changes in Kozhikode district during the period 2000-03 were similar to the State trend, the following specific observations are inferred from **Table 2-1**.

- Declining trend in the primary sector is substantial;
- Average annual growth rate in the secondary sector for Kozhikode District is equal to that of the State AAGR (at 2.8%); average annual growth for the District's tertiary sector is marginally greater than for the State;
- Per capita NDP income for Kozhikode District (Rs.11,282) is less than that of the State (Rs.11,388) for the year 2002-03; and
- Tertiary sector contribution to the District economy is high at 60% of the total NDP for 2002-03, mainly due to the presence of the services sector in Kozhikode city; the corresponding figure for the State is 58%.

2.3.2 Industrial Development

In the recent past, the State has made serious efforts to identify new opportunities and equip it to meet emerging challenges. While traditional industries like handlooms, coir and cashew are in a difficult phase of development with their inherent problems, the present Industrial Policy and other related policies of the State are aimed at enhancing investment opportunities, especially in the industrial sector. Emphasis is on information technology, which has started showing positive signs through promotion of IT enabled services. A wide range of initiatives by the State on IT includes "E-Literacy for one member per family" and sophisticated systems development in IIM-Kozhikode.

Average annual growth of registered factories in Kozhikode District (2.6% growth) over the period 1995-02 is less than that of the State (4.9%). Number of persons employed in registered factories has increased during the same period at an average annual growth rate of 13.5%; the corresponding figure

for the State is 4.9%. During the period 1995-2002, the district share of registered factories and employment in the State was about 10% and 4%, respectively.

Registered small-scale industrial units, along with their associated investment and employment provided in Kozhikode District have decreased during the period 2002-03; the declines are -21.7%, -37.5% and -6%, respectively.

The Economic Review, 2003 report reveals that the average growth of registered small-scale units in Kozhikode District as compared to that of the State is declining. Employment provided in Kozhikode District (-26.9%) is also declining but it is lower than that of the State (-24.3%).

Traditional handloom products of Kerala are extremely popular for their distinct blend of elegance, simplicity and excellence in design. This sector employs about 175,000 persons and is the second largest employer after the coir industry, among the traditional based industries of the State. Kozhikode District has 43 handloom cooperative societies, which constitutes 6% of the State's handlooms, and this share was relatively constant during the period 2000-03.

Various agencies such as KSIDC, KINFRA, and KFC are involved in industrial promotion by providing financial and infrastructure assistance to industrial units.

2.3.3 Tourism Growth and Potential

Kozhikode is famous for its boat-building yard, timber industry and historic temples and churches. There are a large number of tourist locations in the District while tourists visiting Kozhikode are attracted more towards leisure tourism including beaches and historical monuments. Kozhikode functions mostly as a transit point for domestic and foreign tourists. There are 148 classified hotels in Kerala, as listed by the Tourism Department, 22 hotels are located in Kozhikode city and constitute 15% of the State's total classified hotels.

Foreign tourists in Kozhikode District comprised 1.3% of the State's foreign tourist population in 2002. However, there was a decline of 1.1% in the foreign tourist population in 2003; Domestic tourists comprised 8% of the State domestic tourist population in 2002 and 2003. The number of domestic tourist in Kozhikode District has grown by 43% during the period 2002-03, indicating that the District has potential for tourism development.

2.3.4 Growth Trends and Projections

Assessment of city economic development and urban growth indicates a decadal population growth rate of 3.98%. The city is expected to grow at the same rate over the next three decades. **Table 2-2** indicates the population growth projections for Kozhikode city.

Table 2-2: Population Growth and Projections

Year	Population
1991	419,830
2001	436,530
2011	454,000
2021	472,000
2031	490,000

3. SOCIO-ECONOMIC PROFILE

3.1 Introduction

Kozhikode is the anglicized form of Kalikut, the Arabic for the Malayalam, Kozhikode. It was also called the Cock Fort. Kozhikode is now one of the five corporations in Kerala State. Kozhikode became a municipality on 3rd July 1866. Its population then was 36,602, inhabiting an area of 28.48 sq. kms. It was raised to the status of a Corporation with the first Corporation Council assuming office on 1st November 1982.

Under KSUDP, a socio-economic study was conducted to collect data to help determine the demand for improved basic urban services including urban social services required for poverty alleviation.

Interviews and focus group discussions were organized for city-level stakeholders[1] to assess their perception about the city's development, through a participatory process, and their willingness and capacities to be involved in the Project. The survey covered a sample of 1% of the city's households for quantitative information, while group discussions, interviews and case studies were conducted for qualitative information. The study covered poor households, Low Income Groups (LIG), Middle Income Groups (MIG) and High Income Groups (HIG) categories. The survey sample size in Kozhikode was 970 households and the population was stratified in the aforesaid groups.

Further stratification was carried out on the below mentioned basis:

- To gain insight into the poverty and vulnerability of economically backward groups, the 'poor' were divided into Most Vulnerable (MV), Just above Vulnerable (JV) and Upper crest of the Poor (UP). This classification is purely based on the risk factors identified and used by Kudumbashree for their poverty eradication programs;
- LIG is identified in terms of the economic basis, as households with a monthly income less than Rs.5,000 and who do not come under the poor category as mentioned above;
- MIG is also identified in terms of the economic basis and are households with a monthly income greater than Rs.5,000 but below Rs.10,000 and
- Likewise HIGs are households with a monthly income greater than Rs.10,000.

Considering the risk factors, especially on the economically weaker section, the sample proportion was distributed among the Poor, LIG, MIG and HIG as 30%, 35%, 30% and 5% of the households, respectively. Care was taken to include women headed households in the sample.

3.2 Household Profile

The population of Kozhikode Corporation has steadily risen from 1866 when it stood at 36,602 to 436,527 in 2001. The family size of Kozhikode MC is calculated as five. Among the Just above

[1] Elected Representatives, Government Representatives/Staff, Women Groups, Resident Welfare Associations, Business Groups, Merchants/Traders Associations, Business Chambers, etc.

Vulnerable and the Upper Crust of the Poor category the family size was 5.82 and 5.87, respectively. For MIG and MV it is calculated as 4.23 and 4.67 respectively.

Women headed families primarily belong to JV and UP groups and constitute 29% of the total poor families surveyed. There is a steady increase in the proportion of male-headed families across the city, from the MV category to the HIG category.

With regard to the heads of the families under the socio-economic study, 31% of JV and 38% of UP households are women headed.

3.2.1 Employment

Unemployment in Kerala has increased as revealed by the high registration at employment exchanges. The unemployment rate of Kerala is 11.6% in rural areas and 12.2% in urban areas, whereas the comparative figures for the country as a whole are 2.3% and 5.7%, respectively. (Economic Review, 2003).

13% of the households surveyed do not have employment and 30% of the population earns their livelihood as daily wage earners. Among the poor household 48% are daily wage earners.

3.2.2 Income and Expenditure

Monthly Income. The average monthly income from the survey of the Most Vulnerable (MV) group is Rs.2,613, the Just Vulnerable (JV) is Rs.1,510, the Upper crust of the Poor (UP) is Rs.3,430 and Low Income Group (LIG)of the non poor is Rs.3,195. The average monthly income of the poor across all categories is Rs.2,520. The members of the MIG category have an average monthly income of Rs.5,475 and members of the HIG category have an average monthly income of Rs.24,315.

Monthly Expenditure

- The average expenditure on food by the poor is up to Rs.1,360 per month and LIG spend around Rs.2,840 per month on food. The MIG and HIG category spend between Rs.1775 to Rs.2,400 per month on food.
- The respondents spend on average Rs.210 per month on medical expenses. The HIG spend Rs.460 per month on the same. The Most Vulnerable (MV) spend on an average Rs.150 per month towards health care and depend on government hospitals for free treatment.
- The average spending for education across all categories per month is Rs.355. The poor sections (the vulnerable groups) spend up to Rs.90 per month on meeting children's education expense. Average monthly expenditure by the LIG on children's education is Rs.190; MIG households spend Rs.265 per month and HIG households spend Rs.1,390 per month on children's education. The poor send their children either to government schools or aided schools where fees and other expenditures are low. LIG, MIG and HIG send their children to private/unaided schools.
- The average expenditure on other items (house rent and repayment of house loan, transportation fuel charges etc) constitutes a monthly expenditure of Rs.485 for all categories. These monthly expenses constitute a maximum of Rs.60 for the poor, Rs.405 for LIG, Rs.425 for MIG and Rs.1,600 for HIG.

3.2.3 Land and Housing

Topographically the Kozhikode district has large areas of sandy costal belt, small portion of rocky highland formed by the hilly portion and a lateritic midland. Total land area of Kozhikode Corporation is 84 sq. kms. Large portion of the city land is utilized by residences (52.57% of total area).

The socio-economic survey reveals the following data about the housing condition and the ownership of the respondents.

- Housing Typology. 42% of all households in the city live in individual houses. Only 3% of the poor live in independent houses; 58% of the poor respondents reside in row houses and on average 38% of the poor respondents reside in slums.
- Ownership of houses. 80% of the respondents owned houses. Among the poor categories, the average house ownership is 66%; 95% of the total LIG respondents have their own houses. The MIG and HIG respondents own 94% and 96%, respectively.
- Housing Condition. On average only 24% of the household across all income groups live in pucca houses. Among the poor, 79% of the Most Vulnerable category live in kutcha houses. Among the Just Vulnerable category, 75% live in kutcha houses. The data indicates that there is a direct relation between the income category and the housing condition.

3.2.4 Social Capital

Social capital refers to the trust based networks among people that are reinforced by norms of behavior. Like other forms of capital (financial, physical, human and natural), social capital is an asset that helps people and groups cope with poverty. Social capital analyses the nature of donor and beneficiary through the social contacts. Social capital is the network of contacts, reciprocal obligations and political influenced that can be called upon if needed. Social capital facilitates constrictive collective actions in a society and is considered an important element for success in a project.

Social Organizations. Neighborhood Groups (NHG), Area Development Societies (ADS) and Community Development Societies, the three tier Community Based Organizations evolved under Kudumbashree is emerging as a strong social capital structure having crucial say on the design and development of programs for the poor. There are 44 ADS and 700 NHG's in the city. There are also resident welfare associations in Kozhikode, which focus on household problems. There is a Federation of Residents Association (FRAT) representing these associations. There are also consumer groups and citizens groups, which create a civic conscious for the social and cultural development of city.

3.2.5 Health

Kerala has the most extensive medical infrastructure among all states in India.

The Socio-Economic Baseline Survey revealed:

- Water borne disease. Water borne diseases was not found in the Kozhikode survey. Only one respondent from JV and MIG each were affected with Diarrhea and Typhoid.
- Satisfaction level of Health Services. 48% of the poor are not satisfied with the health care facilities. The dissatisfaction level of LIG is 66%, MIG and HIG is 52%.

3.2.6 Education

Kerala has achieved a high literacy rate of 90.92% (2001 census) as against the all India rate of 65.38%. Schools exhibit a healthy enrolment and retention rate up to secondary education; however, from the higher secondary level the drop-out rate is high, especially among the poor.

3.3 Access to Services

This part of the report reviews the socio-economic profile in relation to available infrastructure. The following are the findings from the baseline study:

3.3.1 Water Supply

- Water Source. 54% of the non-poor have access to water through household water connections / piped water supply and 72% of the poor respondents depend on stand posts for water. Across all respondents, 27% are using open wells or bore wells. The use of open well and bore well water is more among the non-poor i.e., 46% households.
- Satisfaction Levels with the Water Supply System. The satisfaction level of the various groups in Kozhikode regarding water supply is good. More than 90% of MV and HIG, more than 80% of UP, LIG and MIG households and more than 65% JV households are satisfied with the current water supply.
- Willingness to Pay for Improved Water Supply (WTP). Among the poor only 8% households are willing to pay for improved water supply. Among non-poor, 18% LIG households, 17% MIG households and 4% HIG households are WTP for improved services.

3.3.2 Sanitation

The following are the findings from the baseline study:

- Type of Access. Among the poor, 85% of the Most Vulnerable, 31% of the Just Vulnerable and 82% of the Upper Crust of the Poor own toilets. 59% of the Just Vulnerable depends on public toilets and only 5% of the poor resort to open defecation. Among the non-poor, 97% of MIG and LIG have own toilets.
- Type of System Used. The most common type of system available to 84% of the households uses a septic tank. Low cost sanitary toilets are used by 19% LIG households, 3% UP households, and 7% MV households.

- Satisfaction Level of the Present Sanitation System. 84% of the poor and 87% of the non poor are satisfied with the sanitation system; 95% of the Most Vulnerable and 65% of the JV category are satisfied with the sanitation system.
- Willingness to Pay for Better Sanitation. Except 26% of MV, other groups have not responded positively. Significant percentages of respondents are indecisive and it depends on how Municipal Corporation plans to win them over.

3.3.3 Drainage

The following are findings from the baseline study:

- Details of Flooding. Flooding affects the MV, and UP households i.e., 78% and 50% respectively. For others it is ranging from 16-28%. HIG households have not responded about flooding.
- Average Cost of Damage per Occurrence. The average cost of damage per occurrence, caused by flooding, for the MV category is Rs.126 and for the UP category is Rs.710.
- Satisfaction Level of Present Drainage System. Only 15 of the MVs were satisfied with the present drainage system. Among the UP and LIG, 25% to 28% households were satisfied with the current drainage system. 28% of MIG were satisfied with the current system. Majority of very poor and HIG did not specify anything.

3.3.4 Solid Waste Disposal

Following are the finding of baseline study:

- Usual Mode of Disposal. 54% of the total households surveyed practiced waste/garbage burning frequently, to dispose of certain portions of the total household waste generated. 11% of the households surveyed dispose waste within their own premises, which is an indication of space availability for disposal and 16%dispose waste in open area. Kudumbashree sanitation groups have started the household collection of garbage, a paid service from October 2004. This is expected to bring good response from the public, like the support it gets in other towns. Collections by Corporation from dustbin location have been reported by 20% of Most Vulnerable and 12% of Upper crest of the poor.
- Solid Waste Management Satisfaction Levels. More than 50% from MV, LIG, MIG and HIG groups are satisfied with current solid waste management services. 28% of JV and 40% of UP are also satisfied with current services.
- Willingness to Pay for Improved Services. Willingness of the people to pay for improved solid waste collection services indicates that 8% MV households, 5% JV households, 5% of UP households, 11% of the LIG households, 19% of the MIG households and 11%of the HIG households are willing to pay for improved services.

3.3.5 Roads, Street Lighting & Access to Public Transport

The following are findings from the baseline study:

- Level of Satisfaction. 75% of all respondents indicated satisfaction regarding the road condition.
- Street Light Functioning. From all categories approximately 50% of the respondents expressed satisfaction about the functioning of street lights.
- Satisfaction Level regarding Public Transport System. 60% of the respondents across all categories were satisfied with the Public Transport System.
- Willingness to Pay for Better Transport Services. 9% of MV, 8% of LIG and 12% of MIG are willing to pay for the improved transportation services. JV and HIG are not willing to pay for improved service.

4. POVERTY AND VULNERABILITY

4.1 Overview

The following analysis is based on information obtained from the socio-economic baseline household survey and from the qualitative assessments obtained from the participatory rapid appraisal (PRA). The survey has also provides insights into the risk faced by poor households, vulnerability issues and access to urban services.

It is widely understood that poverty is experienced through a variety of dimensions of which low income is only one. There are varying issues associated with poverty including the relative vulnerability of different groups, the ability of poor households to graduate from poverty and for the poor to withstand livelihood risks such as unemployment, sickness, etc. Effective poverty reduction programs need to be able to differentiate these groups and design appropriate and targeted responses.

The following sections seek to provide a more detailed analysis of the Most Vulnerable (MV), Just Vulnerable (JV) and Upper Crust of the Poor (UP) categories of households.

For the project and the socio-economic study, the poor have been classified into Most Vulnerable (MV), Just above Vulnerable (JV) and Upper Crust of the Poor (UP). This classification is purely based on the revised risk parameters identified and accepted for poverty eradication by the State Poverty Eradication Program, Kudumbashree. The nine risk parameters adopted for urban areas comprise:

1) No land/less than 5 cents (approximately 2,400 sq feet) of land;

2) No house/dilapidated house;

3) No sanitary latrine;

4) No access to safe drinking water within 150 meters;

5) Women headed household/presence of a widow, divorcee/abandoned lady/unwed mother;

6) No regularly employed person in the family;

7) Socially disadvantaged groups (SC/ST);

8) Presence of mentally or physically challenged person/chronically ill member in the family; and

9) Families without color TV.

Family having at least four of the above factors is classified as a ‘Family at Risk’ or ‘Poor Family’. Since the location of poor households and their distribution across the city was identified in consultation with Kudumbashree i.e. State Poverty Eradication Mission officials.

4.1.1 Employment

The main income earner in 48 % of all poor households is in informal employment (informal employment refers to daily wage earning activity related to small shops, manual workers in trade and

service, construction worker, etc.). The study indicates that the main income earner was in an informal sector for 63% of MV households, 30% of JV households and 51% of UP households. Unemployment is reported among 11% of the poor households and 15% of the non-poor households.

Women as the main income earners were observed among 22% households across all categories that were surveyed in the city. In the poor households, 30% had women as the main income earners. Among different categories of poor households 32% of the MV, 31% of JV and 30% of the UP households had women as the main income earners.

4.1.2 Financial Capital

The total average monthly expenditure of the MV, JV and UP households was Rs.1,925, Rs.1,860 and Rs.2,300 respectively with a city average of Rs.3,570. Poor households spent an average of Rs.1,410 per month on food; the non-poor spent Rs.2,340 per month.

Among the poor households 65% of MV, 50% of JV, and 83% of UP households lived in self-owned houses. 79% of MV, 75% of JV, and 70% of UP households live in kutcha structures.

Household Facilities. As per the social survey, 30% to 50% of the poor own TV sets. There are no other assets owned by the poor worth mentioning. Sewing machines are seen among 6.56% of the Just Vulnerable category. The asset ownership is comparatively less in Kozhikode households than other cities. The division between rich and the poor and the middle class and HIG is quite noticeable.

4.1.3 Perceptions of Poverty in Kozhikode

Swarna Jayanthi Shahari Rozgar Yojana (SJSRY), National Slum Development Program (NSDP) and Valmiki Ambedkar Beem Awas Yojana (VAMBAY) are the major poverty eradication programs implemented through Government of India funding. The funds are routed through the State Poverty Eradication Mission (SPEM) known as Kudumbashree, to the local bodies.

Poverty Eradication by the Municipal Corporation. Poverty eradication programs by the MC are undertaken through Community Development Societies (CDS), Area Development Societies (ADS), and Neighborhood Groups (NHGs). The Municipal Corporation has provided loans for self-employment programs by utilizing Central and State Government funds.

The officials of the State Poverty Eradication Mission in collaboration with the Municipal Corporation are launching innovative programs to reach out to more areas of support for the poor and scale up the on-going activities.

Funds channeled through the poverty eradication program are activity specific and do not permit any flexibility for utilization beyond the activities indicated under the program.

The following were findings of the Baseline Study regarding the welfare / social security schemes availed by the respondents:

- Government and Public/Private sector undertakings have initiated welfare programs and social security schemes to safeguard people in case of crisis and risks;
- Overall access and utilization of welfare and social security services by the poor households is inadequate; and
- Out of six welfare and social security programs studied (unemployment benefits, ESI, PF, Gratuity, Family Pension and Insurance) only 17% (i.e., 167) of respondents had used them. 6% of the poor households surveyed had accessed these schemes, but were limited to: Pension / Family Pension and insurance schemes. Even among the non-poor households surveyed, only 6% availed of the insurance schemes and 10% availed of the pension schemes.

Out of the total beneficiaries of these schemes only 12% of the poor had used the schemes, which were limited to widow pension and insurance schemes. Among the non-poor, LIG have availed more welfare schemes.

There is a need to enhance the coverage of social security measures to the poor through social mobilization and special intervention to support the off-take of these schemes.

5. INSTITUTIONS, MANAGEMENT AND CAPACITY

5.1 Decentralization

Kerala Development Program. Subsequent to the 74th Constitution Amendment Act (CAA), 1992 the Government of Kerala (GoK) embarked on a policy of decentralization of powers to local governments. The Kerala Municipalities Act, 1994, was drafted based on decentralization principles laid down in the 74th CAA. In September 1995, GoK transferred powers and functions to local governments; along with institutions, offices and functionaries. Key features of the decentralization initiative comprised: (i) transferring health related institutions (except medical colleges and regional specialty hospitals) to local governments; (ii) transferring all schools to Urban Local Bodies (ULBs); (iii) planning and implementing centrally sponsored poverty alleviation schemes through ULBs; (iv) planning social welfare schemes, implementing Integrated Child Development Scheme (ICDS), affecting payment of various social security pensions, and creating centers for disabled care as ULB responsibilities; and (v) planning and providing urban basic services, including water supply, sanitation, storm water drainage and urban roads (excluding those provided/maintained by the State Public Works Department).

GoK chose to operationalize the decentralization process through participatory local-level planning which was initiated through the People's Plan Campaign or the Kerala Development Program. The Annual Plan of the Municipal Corporation (MC) comprises development projects planned at the grass-root level and approved by the Council – financing of all approved projects is through ULB own funds, loans from Financial Institutions and plan grants under State and Central schemes.

Financial devolution formed the backbone of decentralization and comprised: (i) providing approximately 30-40% of the total plan size of the State as untied devolutions to local governments for developmental works – of the total allocation to a local self government institution (LSGI), 30% is allocated for SC/ST development and 70% is allocated for general purposes (comprising 10% in productive sectors, 10% for slum infrastructure, not more than 50% on infrastructure, and 30% for service sector); (ii) stipulating that no part of the devolved funds should be used for staff salaries and establishment expenditure; and (iii) releasing funds in fourteen installments during a fiscal year; any shortfalls in fund usage would result in allocation lapsing. Of importance is the feature regarding planning and implementing projects prepared by local self governments – 30-40% of the plan size of the State's budget was set apart for local self governments with 15% of the said amount earmarked for ULBs.

5.2 Service Delivery and Inter-Agency Coordination

According to the KM Act, 1994, the Municipal Corporation/local self-government is responsible for:

- Civic service delivery that consists of: (i) preparing and implementing a water supply and sewage disposal schemes (ii) providing adequate sanitation through solid waste collection and disposal, low cost sanitation and surface drainage; (iii) providing street lighting facilities; (iv) constructing and maintaining roads; and (v) providing facilities for public conveniences.

- Administrative services that consist of: (i) issuing various certificates; (ii) maintaining public amenities; (iii) maintaining public utility services; and (iv) providing ambulance services.
- Regulatory services that consist of: (i) issuing licenses and permits; (ii) registering births, deaths, marriages, and private hospitals; (iii) issuing notices and other certificates for taxation purposes; (iv) maintaining records and registers of all municipal transactions; and (v) abating nuisances.
- Transferred services that consist of undertaking: (i) maintenance and operations of health and educational institutions; (ii) economic development in the LSGI jurisdiction; (iii) social welfare programs; and (iv) social security schemes.

State-level Departments, Programs and Missions, and Institutions also govern urban management and basic service delivery in the State's ULBs.

a) **State Level Departments** of Local Self Government, Water Resources, Public Works, Revenue and Housing, General Administration, Power, Health, and Science, Technology and Environment provide policy and administrative directions to various State and local-level agencies for effective urban basic service delivery. Departments overseeing transferred functions like education; health, etc. also play a key role in urban service delivery.

b) **Missions** constituted by GoK effectively administer the process of good governance, facilitate urban environmental management, improve financial management in ULBs and assist in poverty alleviation; these include the Modernizing Government Program (MGP)[2], Clean Kerala Mission (CKM), Information Kerala Mission (IKM), and State Poverty Eradication Mission (Kudumbashree).

c) **Institutions** supporting activities in urban management include Kerala Water Authority (KWA), Kerala Urban Development Finance Corporation (KUDFC), Kerala Institute of Local Administration (KILA), and Development Authorities.

Inter-agency Coordination. Inter-agency coordination depends upon the service provision type and the legal context for the said provision. The following are key issues associated with the aforesaid services:

- While the KM Act, 1994, and amendments therein requires the MC to maintain and arrange water and sewerage services, KWA continues to provide the said services in Kozhikode.
- New/additional lines within the MC area are constructed as deposit works, with the MC making a deposit with KWA for the identified work.
- Non-remittance of the water tax component in the property tax, apportioned towards capital contribution, to the Kerala Water Authority affects repayment of funds towards capital creation to improve water supply.

[2] The Asian Development Bank aids the MGP mission. GoK launched MGP in 2002 with an objective of improving governance in various State departments. With specific reference to local governments, MGP focuses on frameworks for preparing five-year plans, performance focused basic service delivery, local economic development potentials, systems to strengthen accountability, budgeting, accounting and resource mobilization systems, training needs for local government personnel, and policy decisions for effective governance.

- Reduction in State transfers to the MC from duty on transfer of property. Through a 1994 Government Order, GoK ensures that KWA receives payment towards demand raised by KWA on the MC towards operational cost on headworks and street taps (25% of the duty on transfer of property, transferred by GoK to the MC, is deducted and apportioned to KWA).
- GoK through a Government Order has created a system of coordination between KWA and the MC regarding operation and maintenance; the same may be further refined to facilitate large-scale/citywide projects.
- Dredging activities along main drainage channels are carried out by the Irrigation Department based on the gravity of the problem. Holistic approach to drainage maintenance not adopted; Irrigation Department and MC maintain drains/channels within their control.
- Substantial utilization of Centrally Sponsored Scheme fund by the MC (channeled through Kudumbashree / State Poverty Eradication Mission) with 124% utilization of SJSRY funds and 81% utilization of NSDP funds, but poor progress under VAMBAY schemes with only 14% progress.
- Under Section 30 of the KM Act, 1994, the MC is required to carry out spatial planning; this function is currently carried out by the TCPD at the MC's request. The MC oversees land use zoning originally the responsibility of the Kozhikode Development Authority (KDA).

5.3 Organization Structure of the Municipal Corporation

Kozhikode functioned as a Municipality since 1866 until it was reconstituted as a Municipal Corporation in 1962. The Kerala Municipal Corporations Act, 1961, governed the MC's functions until the enactment of the Kerala Municipalities Act, 1994, which now governs all municipal functions in Kozhikode MC. Municipal administration, is carried out in 51 divisions/wards.

5.3.1 Deliberative/Executive Wing

A Mayor (elected from the councilors) chairs the Council meetings, and is responsible for overall supervision and control of administrative functions of the Municipal Corporation. The Council is composed of all elected councilors and subject to the provisions of the KM Act, the administration of the MC vests in the Council; the Council's period extends for five years. The MC through the Council has all the powers, authority and responsibilities of the Government, to enable it to function as an institution of self-government in respect of the matters entrusted to it. The Council, subject to the provisions of the KM Act, may constitute committees for exercising its powers, discharging such duties or performing such functions, as it may delegate to the Committees. A Deputy Mayor presides over Council meetings during the absence of the Mayor. The Mayor devolves his/her functions on the Deputy Mayor when he/she is indisposed or out of the Sate. The Deputy Mayor is also the Chairman of the Finance Standing Committee.

Standing Committee. According to the KM Act, every Municipal Corporation shall constitute Standing Committees on the following subject areas and may exercise such powers as delegated to it by the Council:

- Finance. To supervise the utilization of budget grants and oversee the timely assessment and collection of taxes, fees, rents, etc.;

- Development. To deal with dairy development, cooperation, small-scale industries, institutional finance, etc. and to prepare development plans;
- Welfare. To deal with matters of welfare of women and children, development of SC/ST, social welfare, etc.;
- Health and Education. To deal with matters of public health, education, etc.;
- Works. To deal with matters of public works, housing, etc.;
- Town Planning and Heritage. To deal with matters regarding town planning, etc.; and
- Appeals Relating to Tax. To dispose of appeals on taxation, etc.

Steering Committee. The KM Act lays down that every MC shall have a Steering Committee consisting of the Mayor, Deputy Mayor and Chairmen of the Standing Committees and the Mayor shall chair the Steering Committee. The Steering Committee is to coordinate and monitor the functioning of all Standing Committees and shall have the powers as delegated by the Council.

Ward Committee. The Ward Committee consists of ward councilor as Chairperson and the members are drawn from the residents association, registered neighborhood groups, educational institutions in the ward, registered trade unions, etc. The Ward Committee disseminates information at the ward level regarding development and welfare activities. The KM Act lays down that even the Council shall not alter the priority of the development work list prepared by the Ward Committee.

5.3.2 Administrative Wing

The Secretary is the administrative head of the MC and carries out resolutions of the Council, reports compliance to the Council, exercises powers and discharges duties conferred under the KM Act. The Secretary implements all the decisions/directions of the Mayor, ensures safe custody of the Municipal Fund and attends to all litigations for or against the MC. Seven departments manage the functions of the Municipal Corporation (refer **Table 5-1** for staff by department and **Figure 5-1** for Organizational Set-up). The functions of the MC are carried out from the Central Office; there are no Zonal Offices in Kozhikode MC (inter departmental coordination is detailed in **Volume 7 – Urban Management and Institutional Development**.).

a) General Administration Department. The General Administration Department (GAD) manages staff postings and transfers, defines staff duties and responsibilities, prepares administration reports and ensures proper communication between the departments and the Corporation Council. The Deputy Secretary heads the GAD and is assisted by the PA to Secretary.

b) Accounts Department. The Accounts Department (AD), a key department of the MC, manages MC finances and monitors the use of allocated funds for different schemes. It plays a major role in the formulation of the budget. The Accounts Officer is responsible for supervising all financial transactions related to the MC, advising the Secretary on all internal financial matters, maintaining records of financial receipts and expenditure in accordance with the purpose and utilization of funds, reporting deviations in utilization of funds in any of the approved schemes, assisting the MC in budget preparation, maintaining accounts regarding stamp duty surcharge and State grants, maintaining petty cash book and general cash book and attending to audit

requirements and other such accounts-related duties. The AD is also responsible for internal audit of all bills for payment, audit clearances, preparation of annual financial statements and the demand, collection and balance statement (DCB).

c) Engineering Department. A Superintending Engineer (SE) heads the Engineering Department and is assisted by two Assistant Executive Engineers (AEE) and six Assistant Engineers (AE). The major duties and responsibilities of the Engineering Department include construction and maintenance of roads, drains and other public works. A Head Draughtsman along with a team of six persons in the Drawing Section supports the Engineering Department in preparing requisite detailed engineering drawings for undertaking works; additional support is provided to the Project Engineer. An Executive Engineer (EE) in-charge of projects handles major schemes of the Municipal Corporation. The EE (or Project Engineer) is supported by three AEEs (one specifically for electrical works) and five AEs in overseeing construction of major schemes like shopping complexes, bus terminals, etc.

d) Revenue Department. The Revenue Department (RD) is another key department of the Municipal Corporation, consisting of a Revenue Officer (RO), six Revenue Inspectors and 39 Bill Collectors. Some of the major responsibilities of the Revenue Officer include responsibility for collecting taxes such as, property tax, advertisement tax, and entertainment tax; issuing notices for recovery of tax; and monitoring revenue collections of the Municipal Corporation.

e) Health Department. A Corporation Health Officer (CHO) heads the Municipal Corporation's Health Department (HD). The HD is responsible for conservancy services, sanitation facilities, solid waste management and other public health duties. The CHO is assisted by Health supervisor, a Lady Medical Officer, 18 Health Inspectors and 42 Junior Health Inspectors (JHI). The JHI are in-charge of works at the field level, which includes monitoring and supervising the work of sanitary laborers in the wards under their charge and attending to specific local complaints.

f) Town Planning Department. A Town Planning Officer (TPO) heads the MC's Town Planning Department (TPD). The TPD is primarily responsible for enforcing Master Plan regulations, awarding building permissions and facilitating land acquisition for major schemes. The TPD also conducts routine inspection of MC properties. Two Assistant TPOs and one Town Planning Surveyor support the department's functions.

g) Council Department. A Council Secretary heads the Council Department (CD), which manages records relating to Council meetings and records all resolutions undertaken by the Council.

Table 5-1: Staffing Pattern of Kozhikode Municipal Corporation

Department	Regular / Sanctioned	Regular / Filled	Contingent / Sanctioned	Contingent / Filled
General Administration Department	38	36	-	-
Revenue Department	84	77	-	-
Accounts Department	19	19	-	-
Engineering Department	49	49	-	-
Health Department	142	139	740	714
Town Planning Department	33	32	-	-
Education Department			-	-
Others Departments, Council Section	25	25	-	-
Total	**390**	**377**	**740**	**714**

Source: Kozhikode Municipal Corporation.

Transferred Institutions. Health Institutions (except Medical Colleges, General Hospitals and other Specialized Hospital) are now under the direct control of the Municipal Corporation; daily management and maintenance of facilities is under the MC's control, however, staff salaries, recruitment and transfers is managed by GoK. General Education (comprising High Schools, Higher Secondary and Vocational Higher Secondary, Primary and Upper Primary Schools) is also under the MC's direct control; GoK is responsible for management and staff salaries, etc., similar to responsibilities for health institutions.

A similar division of responsibility is observed for other transferred institutions like social welfare, agriculture, animal husbandry, dairy, fisheries and SC/ST. Under social welfare, most social security schemes[3] are transferred to the MC; social security pension payment for eligible persons (under the following categories and based on stipulated norms: old age, widow, agriculture workers, physically handicapped) and unemployment wages is in accordance with GoK fund transfer to the MC. The MC's workload has increased due to the additional responsibility, however, provisions for commensurate staff has not been made.

5.4 Capacity Building

As a service organization, capacity building of the MC is critical for planning and asset creation, and continued core service delivery and asset management.

Planning. According to the State's Urban Policy and Action Plan (2002) and the KM Act, the MC requires:

- Undertaking responsibility of urban planning, where the MC requires building staff capacity to undertake preparation of the Municipal Development Plan including urban planning to reduce State agency involvement in urban planning and implementation;
- Undertaking preparation of Development Vision and Citywide Development Plans, which the MC is currently undertaking but the planning mechanism does not provide for a holistic

[3] Previously under the State-level Departments like Revenue, Labour, Social Welfare, etc. The funds are now transferred from these departments to the MC for disbursal.

approach; MC staff capacity should be built to ensure integration of plan works and adoption of a holistic approach to citywide infrastructure provision; and

- Establishing a Planning Department within the MC which should undertake all planning responsibilities for the preparation of the Municipal Development Plan including spatial planning and land use management for the identification of land for specific projects, such as, solid waste treatment / disposal plants.

The MC's Planning Department will ensure works implementation and monitoring, and asset management by the Engineering and Health Department. Immediate focus is required to address requirements under the Kerala Development Program, where no specific post was sanctioned or department created within the Municipal Corporation to carry out decentralized planning[4].

In formulating local-level plans, Ward Committees[5] play an active role supported by the MC's Engineering Department. However, procurement is carried out on the basis of the Stores Purchase Manual and PWD Manual; the MC lacks access to a comprehensive Works Manual comprising procedure from planning through implementation. Besides proving to be a pressure on the MC's resources, works are disjointed and do not adopt a holistic view to planning.

Core Service Delivery and Asset Management. GoK's Urban Policy and Action Plan (2002) focuses on core service delivery with specific emphasis on:

- Improving urban drainage, where it is imperative for the MC to develop Storm Water Master Plans that should be part of integrated planning within the Municipal Development Plan;
- Undertaking solid waste management and sewerage provision, where GoI guidelines suggest waste disposal should be under the direction of a Municipal Environmental Engineering Department instead of the present Health Department;
- The MC undertaking water and sewerage services, where Section 315 of the KM Act, 1994, provides the Municipal Corporation with a mandate to provide water supply and sewerage services within its jurisdiction;
- Preparation of annual maintenance plans, where training is required for the preparation of Municipal Development Plans; and
- Implementing urban poverty alleviation programs, where the MC is undertaking steps to ensure increase in fund utilization with assistance from Kudumbashree.

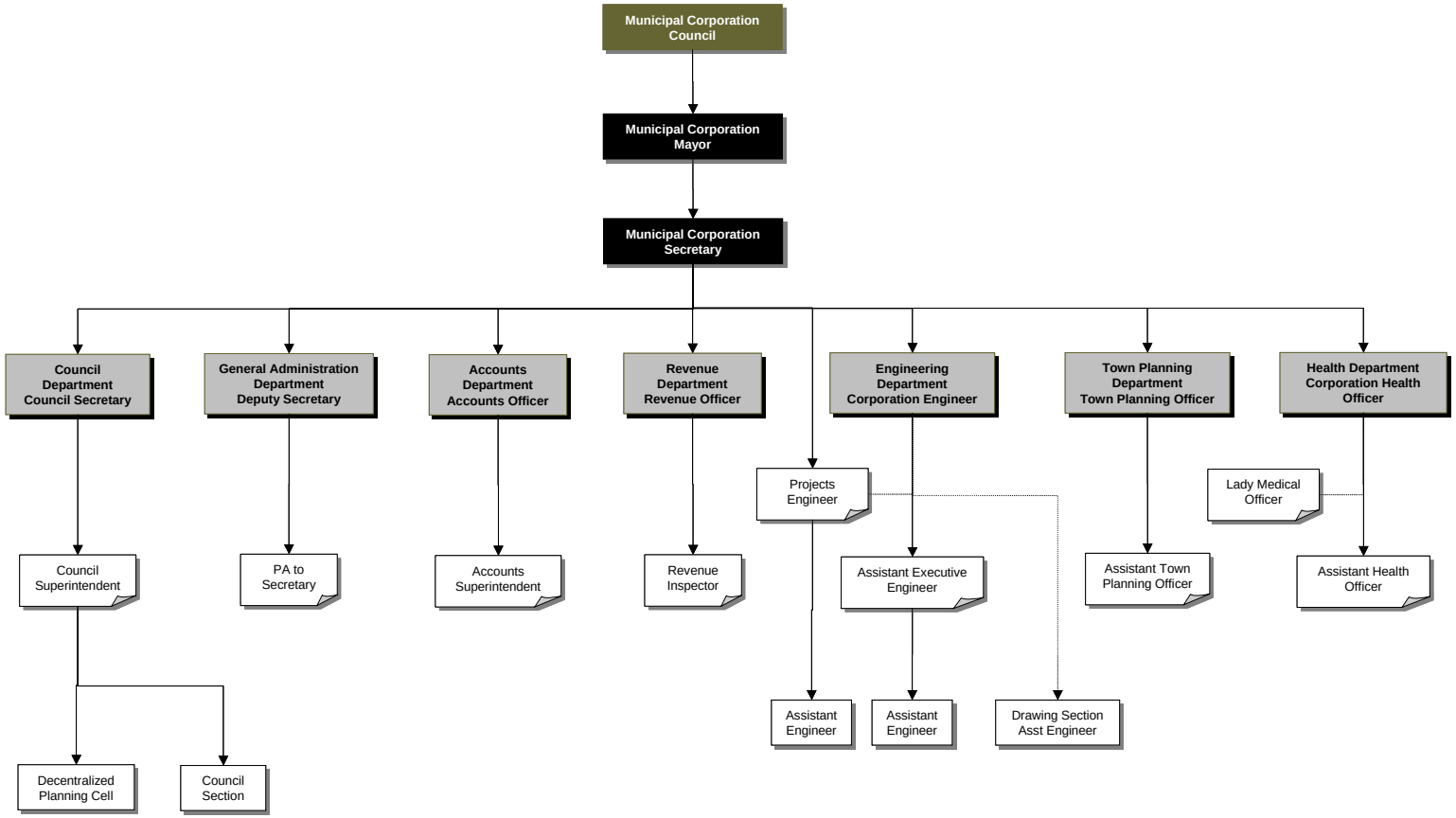
[4] Technically qualified staff was absent in Panchayats; hence, they were allowed to procure external assistance for plan/estimate preparation.
[5] Ward Committees are constituted in LSGIs with population exceeding 100,000 persons. For all LSGIs with population less than 100,000 Ward Sabhas are constituted.

Institutional Development. Primarily the State Finance Commission recommendations and the KM Act govern institutional development in the MC, which focus on:

- Reorganizing decentralized operations based on magnitude of works/revenue collection/municipal functions to satisfy the requirement for preparing Municipal Development Plans;
- Introducing information technology (IT) enabled services and streamlining municipal systems and procedures; the Information Kerala Mission oversees property mapping and introducing computerized accounting and management information systems (MIS); and
- Addressing human resource development, through appointment of additional and appropriately qualified staff for Municipal Development Plan preparation and implementation.

Regarding project implementation capabilities, the MC currently undertakes new projects through the Engineering Department (through the Project Engineer in larger municipal corporations). However, these projects are limited to construction of shopping complexes, marriage halls, etc. and are largely limited to buildings. Major urban infrastructure projects are generally outsourced to State Line Departments on a deposit work basis, wherein the entire cost of the project is deposited with the State Department for undertaking the project; the State Department is responsible for designs, contract award and project management. The Municipal Corporation has no control on the progress and quality of the work carried out. Staff in the Municipal Corporation's Departments attend to operation and maintenance or basic service delivery and are not equipped to handle project design, detailed engineering or construction supervision of urban infrastructure projects. It is therefore imperative to build staff capacity to handle the aforesaid functions in order to manage sub-projects under KSUDP.

Figure 5-1: Organization Set-up of Kozhikode Municipal Corporation



6. MUNICIPAL FINANCE

6.1 Municipal Fund

All cash received by the municipal corporation constitute a fund called the Municipal Fund (Fund) under the Kerala Municipality Act 1994 (KM Act 1994). The items of income credited to the Fund consist of the following:

- Own source revenue which includes taxes, duties, cess and surcharge, fees from licenses and permissions, income from municipal properties, and income from other miscellaneous items;
- Share of the taxes levied by the Government and transferred to the municipal corporation;
- Grants released to the Municipal Corporation by the Government for the implementation of schemes, projects and plans formulated by the municipal corporation;
- Grants released to the municipal corporation by the Government for implementation of schemes, projects and plans assigned or entrusted to the Municipal Corporation under the KM Act 1994; and
- Money raised through donations and contributions from the public and non-governmental agencies.

The municipal corporation keeps its books of accounts under the cash-based system rather than the accrual method of accounting. Revenues are recorded only when received while expenditures are recognized only when paid.

The KM Act 1994 mandates the publication, not later than first week of June, of an annual financial statement of the municipal corporation of the preceding year showing a classified abstract of receipts and payments of the municipal corporation under Revenue, Capital and Debt heads, a demand, collection and balance statement and a statement of the general financial position of the municipal corporation.

6.2 Revenue Account

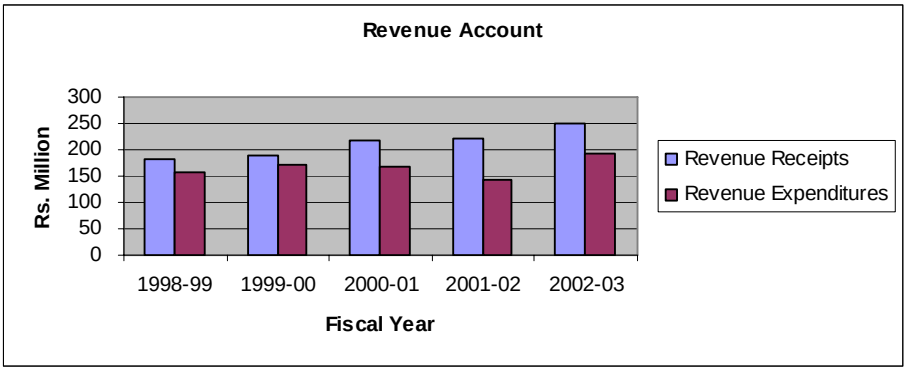
The Revenue Account deals with the recurring Revenue Receipts and expenditures of the municipal corporation. Presented in **Table 6-1** is the Revenue Account of the municipal corporation for the fiscal years (FY) 1998-99 to 2002-03.

During those years, the municipal corporation had revenue surplus annually. The revenue surplus was highest in FY 2001-02 at Rs.79.149 million (36% of Total Revenue Receipts) and was lowest in FY 1999-2000 at Rs.18.473 million (10% of Total Revenue Receipts). Total Revenue Receipts increased annually at a much higher rate of 8.3% than Total Revenue Expenditures at 5.4%.

Table 6-1: Revenue Account (Rs. Million)

Particulars	1998-99	1999-00	2000-01	2001-02	2002-03
Revenue Receipts					
I. Own Source Income:					
A. Tax Income					
a) Property tax	44.43	44.81	52.05	61.70	67.10
b) Profession tax	6.41	13.11	17.84	17.67	22.37
c) Entertainment tax	40.27	40.84	36.73	35.89	32.87
d) Other municipal taxes	0.82	1.34	1.48	1.56	1.56
Total Tax Income	**91.93**	**100.10**	**108.09**	**116.83**	**123.90**
B. Non-Tax Income					
a) Receipts from municipal properties	24.60	29.24	30.13	27.72	45.28
b) License fees	9.78	11.16	13.08	11.22	11.44
c) Others	11.53	8.95	10.41	8.14	16.46
Total Non-Tax Income	**45.91**	**49.36**	**53.62**	**47.08**	**73.18**
Total Own Source Income	**137.84**	**149.45**	**161.70**	**163.91**	**197.08**
II. Assigned / Shared Taxes					
a) Surcharge on stamp duty	24.70	24.45	42.89	39.49	39.16
b) Motor vehicles tax	8.80	9.80	0.96	9.70	11.80
c) Basic tax	0.00	0.00	0.10	0.00	0.00
Total Assigned / Shared Taxes	**33.50**	**34.25**	**43.95**	**49.19**	**50.96**
III. Grants-in-Aid from Central / State Government					
a) Grants-in-aid & contributions	1.48	4.81	12.12	8.13	0.54
b) Grants for running transferred institutions	7.57	0.00	0.08	0.00	0.00
Total Grants-in-Aid	**9.05**	**4.81**	**12.20**	**8.13**	**0.54**
Total Revenue Receipts	**180.40**	**188.52**	**217.86**	**221.24**	**248.59**
Revenue Expenditure					
a) Management and Collection of Taxes	46.17	35.69	34.57	34.05	68.59
b) Public Works	40.99	50.74	43.31	23.65	27.97
c) Town Planning	2.18	3.31	4.20	4.88	2.62
d) Education	0.29	0.15	0.50	0.18	0.36
e) Water Supply & Drainage	9.54	13.17	16.36	11.04	10.68
f) Public Health & Sanitation	53.01	62.65	61.73	62.57	70.15
g) Street Lights	4.14	3.34	6.16	5.40	7.95
h) Municipal Properties	0.00	1.00	0.86	0.33	4.63
i) Non Plan Operation Expenses	0.00	0.00	0.00	0.00	0.00
j) Miscellaneous Expenses	0.00	0.00	0.00	0.00	0.00
Total Revenue Expenditure	**156.33**	**170.05**	**167.68**	**142.09**	**192.94**
Revenue Surplus / (Deficit)	**24.06**	**18.47**	**50.17**	**79.15**	**55.64**

Source: Kozhikode Municipal Corporation



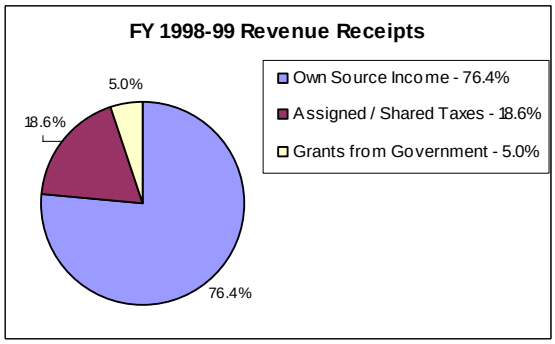
6.2.1 Revenue Receipts

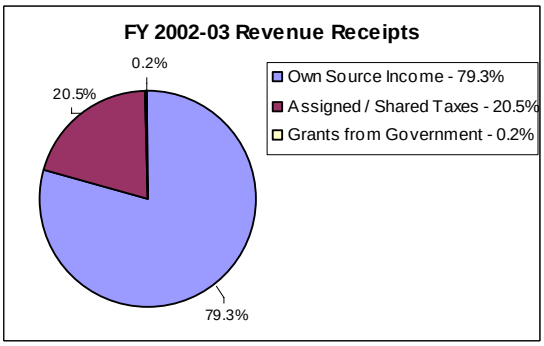
The Revenue Receipts of the municipal corporation can be classified into 3 types of revenue source:

- Own source income;
- Revenue from assigned and shared taxes; and
- Grants-in-aid from the Government.

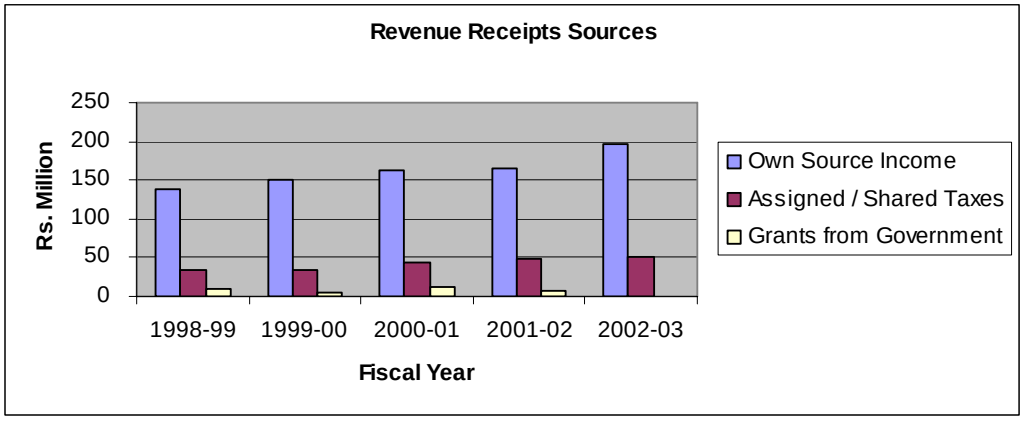
Own source income refers to those revenue items, which the Municipal Corporation is responsible for in terms of their assessment and collection. Assigned and shared taxes are taxes collected by the Government but the revenue is assigned to or shared with the municipal corporations. Grants-in-aid from the Government come in the form of plan, maintenance of assets, general and specific purpose grants.

During the FYs 1998-99 to 2002-03, the percentage share of grants from the Government to the municipal corporation's Total Revenue Receipts has significantly dropped from 5% in FY 1998-99 to 0.2% in FY 2002-03 while own source income and assigned/shared taxes increased their share from 76.4% to 79.3% and from 18.6% to 20.5%, respectively.



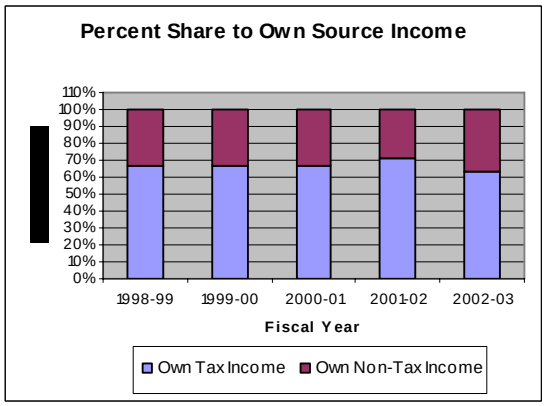


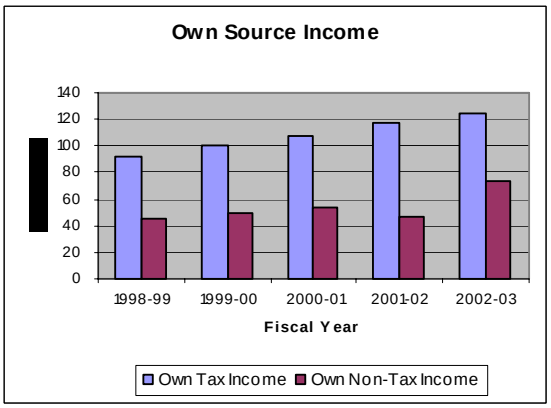
In terms of average annual growth rate, own source income grew at 9.3%, assigned/shared taxes grew at 11.1% while grants-in-aid from the Government declined at 50.5%.



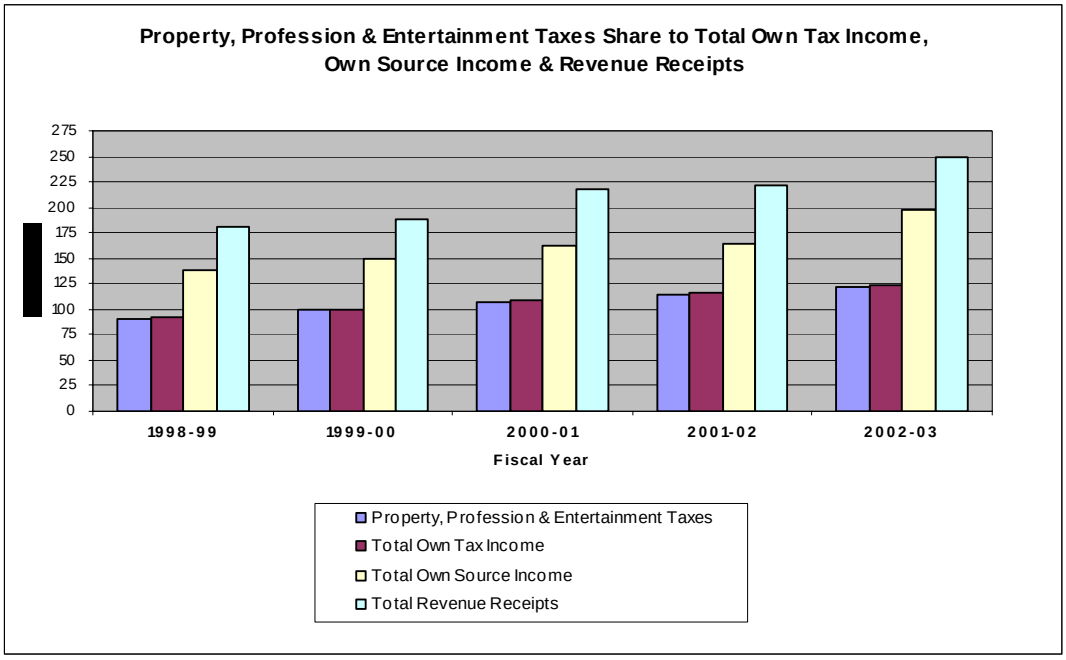
Own Source Income. Own source income is in the form of own tax income and own non-tax income. Own tax income refers to taxes, which the municipal corporation is responsible for in terms of their assessment and collection from taxpayers. Own non-tax income includes fees from licenses and permissions, income from municipal corporation's properties, and income from other miscellaneous items.

During the FYs 1998-99 to 2002-03, the percentage share of Own Tax Income to Total Own Source Income slightly declined from 66.7% in 1998-99 to 62.9% in 2002-03 while the share of Own Non-Tax Income increased correspondingly. During the same period, Own Tax Income grew at an annual average rate of 7.7% while Own Non-Tax Income grew at 12.4%.





The major items of own tax income are: property tax, profession tax and entertainment tax. These 3 municipal taxes contributed about 98.7% to the municipal corporation's Total Own Tax Income, about 62% to Total Own Source Income and about 49.2% to Total Revenue Receipts for the FY 2002-03.



Property Tax. Property Tax is the biggest source of own tax income of the municipal corporation. It contributed about 54% to the municipal corporation's Total Own Tax Income, about 34% to Total Own Source Income and about 27% to Total Revenue Receipts for the FY 2002-03. During the FYs 1998-99 to 2002-03, it grew at an average annual rate of 10.9%.

The KM Act 1994 provides that the aggregate percentage to be levied for property tax, in the case of a municipal corporation, shall not be less than 13% and not more than 25% of the annual rental value (ARV) of all buildings or lands within the municipal area unless exempted under the Act or other law.

The property tax may comprise of a tax for general purpose and a service tax. The service tax may include:

- Water and drainage tax to provide for expenses connected with the construction, maintenance, repair, extension or improvement of water or drainage work provided or hereafter to be provided;
- Lighting tax to provide for expenses connected with the lighting of the municipal area by gas, electricity or any other means; and
- Sanitary tax to provide for expenses connected with the general sanitation of the municipal area and the removal of rubbish, filth and carcasses of animals from the private premises.

Where water tax and drainage tax are levied, the Corporation Council shall declare what proportion of tax is levied in respect of water works and the remainder shall be deemed to be levied in respect of drainage works.

The property tax rate schedule as prescribed in the KM Act 1994 and those presently in force in the municipal corporation are as follows:

Table 6-2: Property Tax – Rate Schedule

Sl. No.	Particulars	Minimum Rate (%) for a Municipal Corporation – KM Act 1994	Present Rate (%)	
			Old Mun Area	New Ext Area
1	Tax for general purposes	6	9.50	8
2	Lighting Tax	2	3.75	2
3	Drainage Tax	2	2.25	2
4	Water Tax	1	2.75	1
5	Sanitation Tax	2	3.0	2
	Total	13	21.75	15

The municipal corporation maintains a demand register for all properties assessed for property tax. The last survey of properties was carried out in the year 1994-95. There is a proposal to computerize the property tax database. Under the present system, ARVs are revised once in four (earlier till 1999 was five) years. There has been no change in the property tax rate and ARV since 1992.

According to the 2001 census, the population of the municipal corporation was 436,527 and the total number of holdings was 121,555. As of 31st March 2004, the number of holdings according to the municipal corporation's records is 93,951, which indicate that some properties are not in the tax net.

The details of demand and collection (current and arrears) for the last three fiscal years are shown in **Table 6-3**.

Table 6-3: Property Tax – Demand & Collection (Rs. Million)

Account Type	2001-02	2002-03	2003-04
Demand			
Current	68.4	95.8	99.6
Arrears	14.8	21.5	50.2
Total	83.2	117.3	149.8
Collection			
Current	49.6	56.1	65.4
Arrears	12.1	11.0	14.6
Total	61.7	67.1	80.0
Balance			
Current	18.8	39.7	34.2
Arrears	2.7	10.5	35.6
Total	21.5	50.2	69.8
Collection Efficiency (%)			
Current	72.5	58.5	65.6
Arrears	81.7	51.1	29.0
Overall	74.1	57.2	53.4

The proposal linking property tax assessment to plinth area assessment is still pending for approval by the State Government. Under the proposal, all ULBs are required to switch to a zonal area-linked system involving self-assessment of ARV by the assessed. The new system will classify the municipal area into more than one zone on the basis of, as far as possible, similar locations of the buildings and lands situated therein.

Profession Tax. Profession Tax is a major own tax income of the Municipal Corporation. It contributed about 18% to the municipal corporation's Total Own Tax Income, about 11% to Total Own Source Income and about 9% to Total Revenue Receipts for the FY 2002-03. During the FYs 1998-99 to 2002-03, it grew at an average annual rate of 36.7%.

Profession tax is levied on companies and individuals vide Section 245 of the KM Act 1994. All companies and individuals transacting business or engaged in a profession in the municipal area for at least 60 days in a half year shall pay the tax at rates prescribed by Government. However, Article 276(2) of the Indian Constitution has fixed the maximum tax leviable per year at Rs.2,500. In respect of salaried employees, the definition of income includes dearness allowance in addition to basic salary. The demand and collection performance for the year 2003-04 is outlined below.

Table 6-4: Profession Tax – Demand & Collection (Rs. Million)

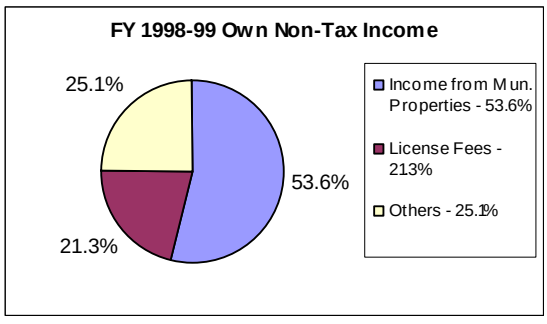
Account Type	Demand	Collection	Balance
Current	21.63 (100%)	20.23 (94%)	1.40 (6%)
Arrears	1.04 (100%)	1.02 (98%)	0.02 (2%)
Total	22.67 (100%)	21.25 (94%)	1.42 (6%)

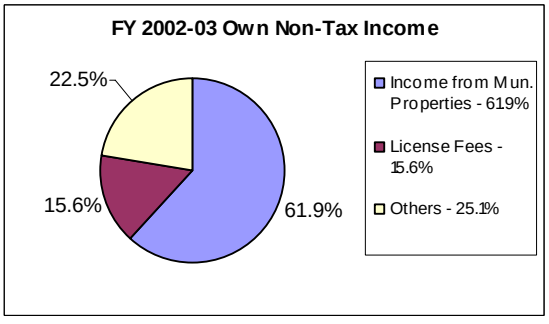
Entertainment Tax. Entertainment Tax is another major own tax income of the municipal corporation. It contributed about 26.5% to the municipal corporation's Total Own Tax Income, about 16.7% to Total Own Source Income and about 13% to Total Revenue Receipts for the FY 2002-03. During the FYs 1998-99 to 2002-03, it declined however at an average annual rate of 4.9%.

The tax is collected according to the provisions of Section 3 of the Local Authorities Entertainment Tax Act. A proposal to tax on the basis of seating capacity and occupancy is pending for approval by the State Government. Entertainment tax is presently fixed between 24 to 48% of the price of admission.

Own Non-Tax Income. During the FYs 1998-99 to 2002-03, Own Non-Tax Income grew at an annual average rate of 12.4%. It contributed about 37.3% to the municipal corporation's Total Own Source Income and about 29.4% to Total Revenue Receipts for the FY 2002-03.

Income from municipal corporation's properties contributed the biggest share to Own Non-Tax Income during the FYs 1998-99 to 2002-03.

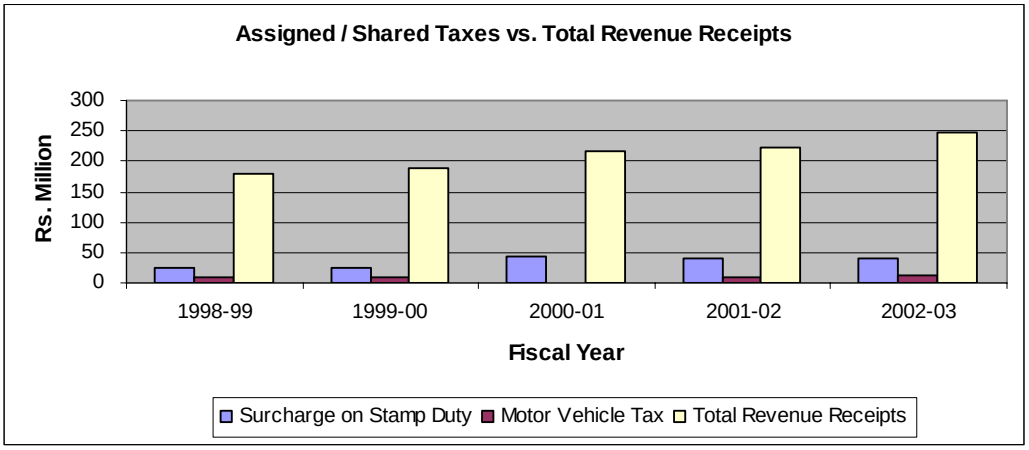




Water supply within the municipal corporation area is presently being carried out by the Kerala Water Authority (KWA), an autonomous body created in the year 1986 / 87. The Municipal Corporation, therefore, does not have any revenue from water charges.

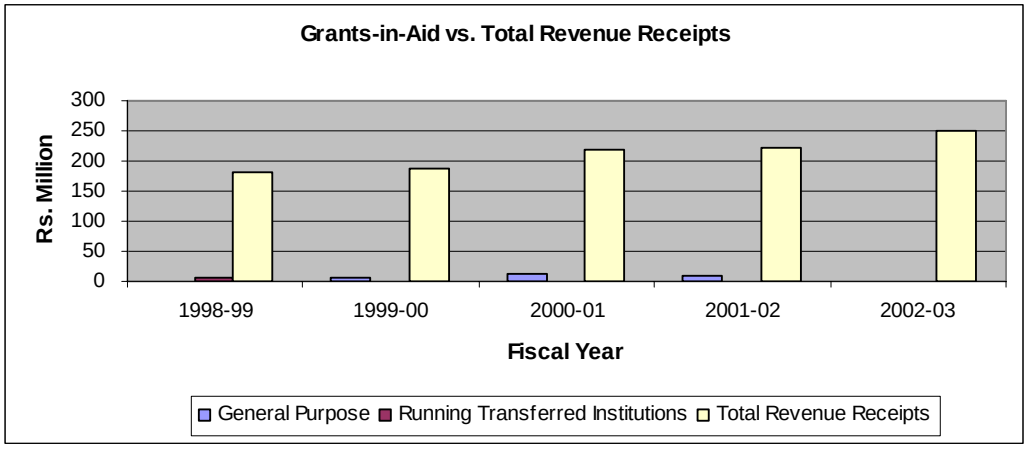
Assigned and Shared Taxes. At present, there are 2 assigned and shared taxes from the State Government with the local governments. These are the surcharge on stamp duty and motor vehicle tax. Under Section 270 of the KM Act 1994, the surcharge on stamp duty shall be at such rate fixed by the Government but shall not exceed 5% of the value of property transacted. On the motor vehicle tax, the Government shares 20% of the net collection of the tax and is distributed among Village Panchayats and ULBs as per formula based on unit length of roads.

During the FYs 1998-99 to 2002-03, assigned/shared taxes grew at an average rate of 11%. With the growth, their contribution to Total Revenue Receipts increased from 18.6% to 20.5%. Individually, surcharge on stamp duty contributed 13.7% in FY 1998-99 and 15.8% in FY 2002-03 to the municipal corporation's Total Revenue Receipts while motor vehicle tax contributed 4.9% and 4.7% respectively.



Basic Tax, a general tax on land recommended by First State Finance Commission for devolution to the local governments, is still pending before the State Government for implementation.

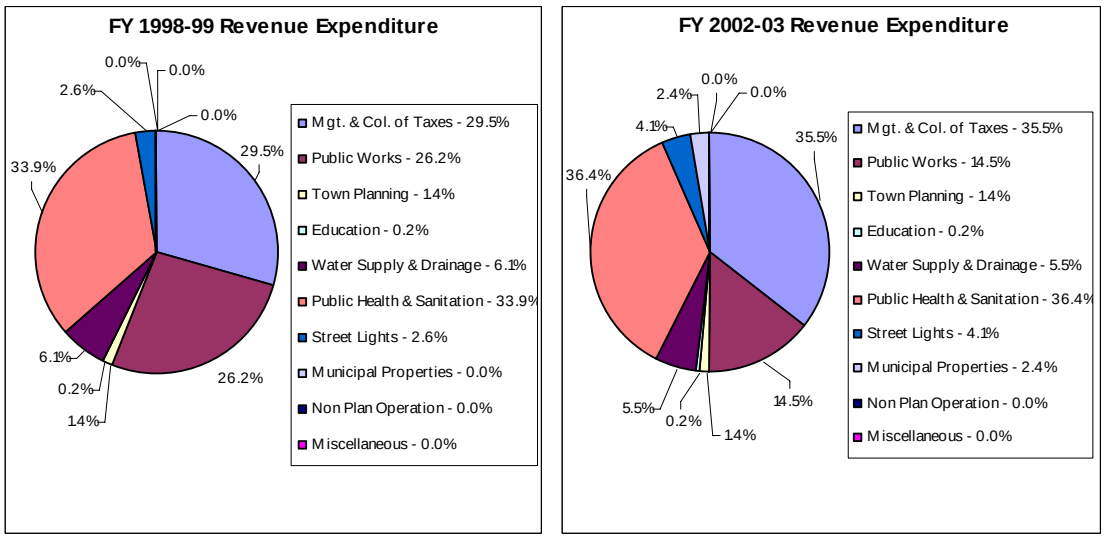
Grants-in-Aid. During the FYs 1998-99 to 2002-03, the percentage share of grants from the Government to the municipal corporation's Total Revenue Receipts has significantly dropped from 5% in FY 1998-99 to 0.2% in FY 2002-03. During the period, grants declined at an average annual rate of 50%. Grants for running transferred institutions accounted for 84% of the total grants in FY 1998-99 and 0% in FY 2002-03.



6.2.2 Revenue Expenditures

The Revenue Expenditures of the municipal corporation are classified and recorded according to the following cost centers: (i) Management and Collection of Taxes; (ii) Public Works; (iii) Town Planning; (iv) Education; (v) Water Supply and Drainage; (vi) Public Health and Sanitation; (vii) Street Lights; (viii) Municipal Properties; (ix) Non Plan Operation Expenses; and (x) Miscellaneous Expenses.

During the FYs 1998-99 to 2002-03, the three most significant cost centers were Management and Collection of Taxes, Public Works and Public Health and Sanitation. The three cost centers accounted for 89.6% of Total Revenue Expenditures in FY 1998-99 and 86.4% in FY 2002-03.



The expenditures for Management and Collection of Taxes grew at an average annual rate of 10.4% from Rs.46.175 million in FY 1998-99 to Rs.68.587 million in FY 2002-03. With the growth, its percentage share to Total Revenue Expenditures increased from 29.5% in FY 1998-99 to 35.5% in FY 2002-03, thus coming second to Public Health and Sanitation as having the highest expenditure share. In contrast, the average annual growth rate in Own Tax Income however was lower at 7.7% making the current tax collection efforts less cost efficient.

Public Health and Sanitation had the highest expenditure share. The expenditures for Public Health and Sanitation grew from Rs.53.008 million in FY 1998-99 to Rs.70.147 million in FY 2002-03 or an average annual rate of 7.3%. With the growth, Public Health and Sanitation slightly increased its percentage share to Total Revenue Expenditures at 33.9% in FY 1998-99 to 36.4% in FY 2002-03.

Public Works expenditures decreased from Rs.40.991 million in FY 1998-99 to Rs.27.97 million in FY 2002-03 or an average decline rate of 9.1%. With the decline, Public Works decreased its percentage share to Total Revenue Expenditures at 26.2% in FY 1998-99 to 14.5% in FY 2002-03.

Other major cost centers were Water Supply, Drainage and Street Lights. Water Supply and Drainage grew slightly at an average annual rate of 2.9% but its percentage share to Total Revenue Expenditures declined from 6.1% in FY 1998-99 to 5.5% in FY 2002-03. Major part (95%) of the expenditure on Water Supply and Drainage was payment to Kerala Water Authority for water at public standpipes while cleaning of drainage accounted for the balance. Street Lights expenditure increased from Rs.4.141 million in FY 1998-99 to Rs.7.947 million in FY 2002-03 or an average annual increase of 17.7%. With the increase, its percentage share to Total Revenue Expenditures slightly increased from 2.6% in FY 1998-99 to 4.1% in FY 2002-03.

The expenditures of the other cost centers had been insignificant during the period. Town Planning's percentage share to Total Revenue Expenditures was 1.4% in FY 2002-03, Education was 0.2% and Municipal Properties was 2.4%.

As on 31 March 2004, debt liabilities were primarily on loans borrowed from Financial Institutions (Rs.111.84 million) and State Government loans (Rs.2.43 million). The Financial Institution loan was drawn from the Kerala Urban Development Finance Corporation (KUDFC) and Housing and Development Corporation (HUDCO), which accounted for monies towards construction of stadium, solid waste management, road improvement works and market construction. The total outstanding as of 31 March 2004 was Rs.107.2 million.

6.3 Capital Account

6.3.1 Overall Account

The Capital Account deals with the non-recurring Capital Receipts and Expenditures of the municipal corporation. Presented in **Table 6-5** is the Capital Account of the municipal corporation for the FYs 1998-99 to 2002-03.

The municipal corporation had capital surplus in all fiscal years. The capital surplus was highest in FY 1998-99 with Rs.78.095 million (48% of Total Capital Receipts) and lowest in FY 2001-02 with Rs.39.01 million (31% of Total Capital Receipts). Over the five-year period, the cumulative capital surplus was Rs.286.48 million.

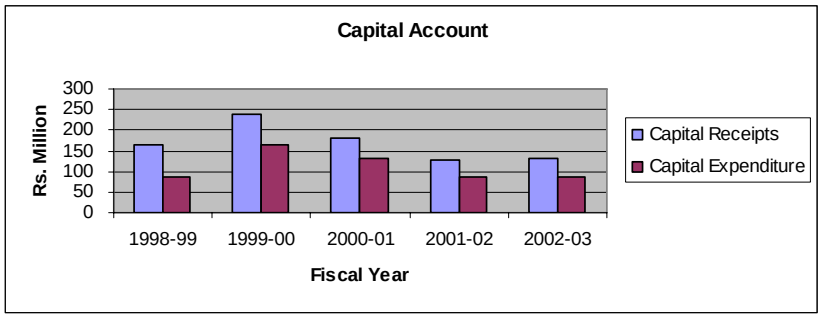


Table 6-5: Capital Account (Rs. Million)

Particulars	1998-99	1999-00	2000-01	2001-02	2002-03
Capital Receipts					
A. Funds from Government					
a) Government Grants - Plan Schemes	1.63	55.94	19.49	9.00	0.00
b) Government Loans – Plan Schemes	0.13	0.00	38.98	0.00	1.14
c) Government Grants - Transferred Institutions	17.35	0.00	0.00	0.00	0.00
d) Government Grants - Kerala Development Proj.	121.36	151.11	122.50	117.58	122.71
Total Funds from Government	**140.46**	**207.05**	**180.98**	**126.58**	**123.85**
B. Funds from Financial Institutions – Borrowings	**22.34**	**31.81**	**0.00**	**0.00**	**8.50**
C. Transferred from Revenue Account	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total Capital Receipts	**162.79**	**238.86**	**180.98**	**126.58**	**132.35**
Capital Expenditure					
a) Management	0.00	4.21	1.65	0.66	0.54
b) Plan Schemes	0.00	31.90	25.71	15.90	25.95
c) Poverty Eradication	0.00	5.28	11.70	0.00	0.00
d) Transferred Institutions	12.01	0.00	0.00	0.00	0.00
e) Education	0.00	0.00	0.00	0.00	0.00
f) Water Works & Drainage	0.00	1.30	6.41	3.22	0.07
g) Public Health	0.00	0.00	3.83	17.84	5.96
h) Street Lighting	0.00	0.04	0.00	1.00	0.27
i) General Items of Expenditure	0.00	0.00	0.00	0.00	0.00
j) Expenditure under Kerala Development Proj.	72.69	121.11	83.31	48.97	53.60
Total Capital Expenditure	**84.70**	**163.84**	**132.61**	**87.57**	**86.37**
Capital Surplus / (Deficit)	**78.10**	**75.03**	**48.37**	**39.01**	**45.98**

Source: Kozhikode Municipal Corporation

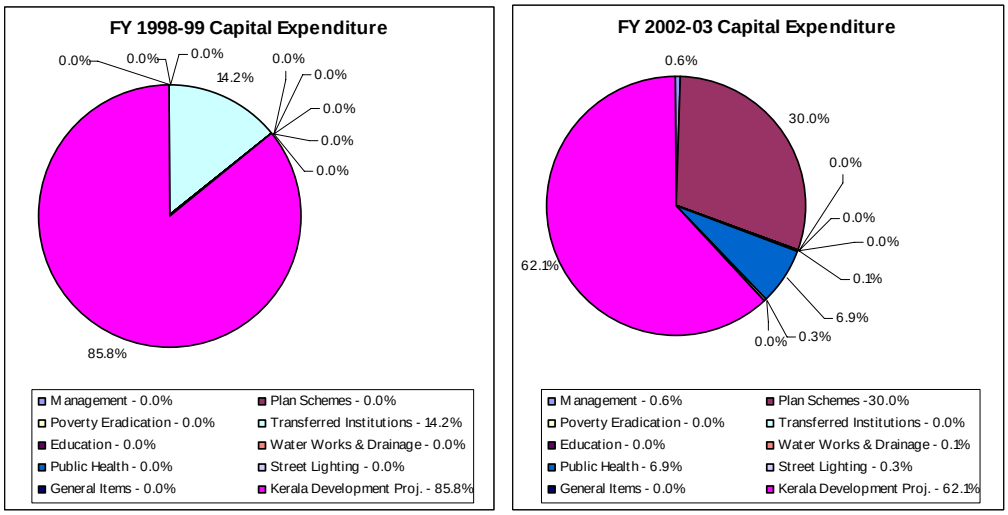
6.3.2 Capital Receipts

Capital Receipts come in the form of capital grants released by the Government for the implementation of schemes, projects and plans formulated by the Municipal Corporation; capital grants released by the Government for the implementation of schemes, projects and plans assigned or entrusted to the municipal corporation under the KM Act 1994; loans from the Government for the implementation of schemes, projects and plans; loans from financial institutions; and transfers from the Revenue Account when the Municipal Corporation has revenue account surplus. During the FYs 1998-99 to 2002-03, the percentage share of grants from the Government to Total Capital Receipts was 87.8% and loans from the Government and financial institutions accounted for the balance. The Municipal Corporation did not transfer any amount from the revenue account surplus during the period.

6.3.3 Capital Expenditures

The municipal corporation classifies and records Capital Expenditures according to the following capital cost centers: (i) Management; (ii) Plan Schemes; (iii) Poverty Eradication; (iv) Transferred Institutions; (v) Education; (vi) Water Works and Drainage; (vii) Public Health; (viii) Street Lighting; (ix) General Items; and (x) Kerala Development Program.

Plan Schemes and the Kerala Development Program, which is actually a Plan Scheme also, accounted for over 86% of capital expenditures during the FYs 1998-99 to 2002-03 while Poverty Eradication and Public Health accounted for 3.1% and 5%, respectively, during the same period.



6.4 Key Financial Issues

Municipal finance plays a key role in any local government. While municipal corporations are empowered to levy and collect their own taxes and user service charges, they must be efficient in revenue administration so they can generate sufficient funds from various sources to deliver and finance municipal services. In their delivery of the municipal services, the municipal corporations, however, must be cost efficient and control expenditures within their reasonable limits. Otherwise,

municipal corporations cannot accumulate adequate surplus funds to undertake additional and future development programs.

The key financial issues affecting the municipal corporation that need immediate action are:

No.	Issues	Actions Required
1.	Property Tax collection performance is unsatisfactory (about 63% collection efficiency for the last 2 years).	Municipal corporation must exercise all its statutory powers to enforce collection from chronic defaulters. In addition, it must also explore other means like extensive public awareness campaign or reminder to settle property tax, appointment of tax collectors on commission basis, giving discounts or other incentives for early payment, full or partial condonation of surcharges if past accounts are settled in full, etc.
2.	There has been no change in the Property Tax rate and ARV since 1992.	State Government must act urgently on the legislation required to put the new system in place, i.e. plinth area based Property Tax and once every four years revision.
3.	The database on property holdings is outdated. The last property survey carried out was in 1994-95.	Municipal corporation must undertake another detailed survey to identify properties that are not included yet in the tax net. In addition, it must speed-up the computerization of the database.
4.	Cost of tax administration is high and is rising as a percentage to own taxes actually collected (about 50% in FY 1998-99 to 55% in FY 2002-03). Own tax income grew at the rate of 7.7% while cost of tax administration grew at 10.4%. With cost outgrowing income, tax administration is not cost efficient.	Municipal corporation must review and rationalize staffing with regards to (a) general administration related to tax management (b) billing, including preparation of demand notices and transmitting them to the tax payers (c) collection (d) maintenance of records and reconciliation. It must likewise control other cost items within reasonable limits.
5.	There has been no regular revision of other taxes and non-tax income items while the costs of revenue administration and delivery of municipal services have risen.	State Government must act on the legislation required to introduce automatic indexation or periodic revision of other taxes and non-tax income items.
6.	There is a lack of adequate financial management and information system. Adequate financial management and information system is necessary for effective revenue administration and cost control. There is also a lack of reliable information as to the assets required to be maintained.	State Government must prescribe that accounts be maintained under a double entry accrual based accounting system. Asset register must also be kept and regularly updated.

6.5 Kerala Water Authority Finance

6.5.1 Mandate and Sources of Finance

The Kerala Water Authority (KWA) was constituted as an autonomous body by the Government of Kerala on 1st April 1984 under the Kerala Water Supply and Waste Water Ordinance 1984 as a successor to the erstwhile Public Health Engineering Department of the Government of Kerala. The ordinance was replaced by the Kerala Water Supply and Sewerage (KWSS) Act 1986.

Section 15 of the Act has given KWA the following mandate:

- To obtain periodic or specific information from any local body;
- To prepare and carry out schemes for water supply and sewerage;
- To abstract water for drinking purposes from any natural source and disposal of wastewater;
- To lay down schedule of fees for all services rendered to Government, local bodies, institutions or individuals;
- To fix and amend tariffs and charges for water supply and sewerage services and collect all such fees;
- To borrow money, issue debentures, obtain subventions, capital contributions, loans and grants, to incur expenditure and manage its own funds; and
- To grant loans and advances to such persons or authorities as the KWA may deem fit.

In the initial years of its establishment, KWA had a monopoly over the planning, designing, execution, operation and maintenance of water supply and sewerage schemes across the entire State. This monopolistic role of KWA in providing piped water supply and sewerage services underwent a change after the 73rd and 74th constitutional amendments. Under these amendments, the responsibility of supplying drinking water was vested with local bodies. The change is more marked in the case of rural water supply. Government issued orders in March 1998 defining the procedures for the implementation of small type of water supply schemes covering a single panchayat by the local bodies with technical assistance from KWA and other agencies. As a result, KWA's role is changing from that of a monopoly provider of water to that of a facilitator and supervisory agency implementing only urban and major comprehensive rural water supply schemes. KWA, however, continues to be responsible for the large underground sewerage and sanitation schemes.

In line with its mandate, the sources of finance for KWA are water and related charges collected from its customers, grants and loans from the Government of Kerala, grants from the Government of India, and loans from financial institutions like Housing and Urban Development Corporation (HUDCO) and Life Insurance Corporation of India (LIC).

6.5.2 Cost Recovery

The State Government's policy on cost recovery for KWA operations is articulated in the KWSS Act 1986. The Act states that KWA "shall not, as far as practicable and after taking credit for any grants or subventions or capital contributions or loans from Government, carry on its operations at a loss and shall so fix and adjust its rates of taxes and charges as to enable it to meet as soon as feasible the cost of its operations, maintenance and debt service and where practicable to achieve an economic return on its fixed assets." The Authority, however, has to take prior approval from the State Government for the revision of its rates.

Water Supply

The existing water tariffs shown in **Table 6-6** came into effect on 1 April 1999 but have not been revised since.

Table 6-6: KWA Water Tariff Schedule

Customer Category	Monthly KL Consumed	Rate
Domestic	0 –10	Rs.2/KL subject to minimum of Rs.20 / month + Rs.2 as MIC
	10 –30	Rs.22 + @ Rs.3 /KL for above 10 KL
	30 –50	Rs.82 + @ Rs.5/ KL for above 30 KL
	Above 50	Rs.182 + @ Rs.7.35 /KL for above 50 KL
Non-Domestic	0 –50	Rs.7.35/KL subject to a minimum of Rs.100 / month + Rs.2 as MIC
	Above 50	Rs.370 + Rs.10.60 /KL for above 50 KL
Industrial	Whole consumption	Rs.10.60/KL subject to minimum of Rs.200 / month + Rs.2 as MIC

Water connection fees are Rs.500 for domestic and Rs.1,000 for non-domestic. Government local bodies are charged for the standposts / street taps provided in their areas at the rate of Rs.2,628 per street tap each year. Local bodies, however, are not charging any fee directly from street tap users. Water charges per month are collected by KWA under the Provisional Invoice Card System.

KWA had requested the State Government in January 2000 to increase the water tariff by 30% effective 1 April 2000 and to allow KWA to revise the water tariff from time to time corresponding to the increase in power tariff. The State Government is yet to take a decision on this request.

All water connections are supposed to be metered. But, as per KWA's Water Supply Regulations, the responsibility of the safe custody and sound condition of the water meter is vested with the consumer. If the meter is found defective the consumer shall repair or replace the defective meter within 30 days on receipt of notice, at his own cost. In case of default, a surcharge is imposed at the rate of 25% on the monthly water charges for the first month after the expiry of the notice period; 50% for the next two months and 100% beyond that period. In case of continued default, KWA shall have the power to disconnect the water supply to the premises without further notice.

It is estimated that more than 50% of water connections have defective meters. However, KWA has not been successful in implementing its regulations on defective meters. The consumers have challenged the regulations on defective meters as being against the KWSS Act 1986. A proposal to amend the Act is now under consideration.

Sewerage

At present, sewerage schemes are in operation only in two cities in the State, i.e. Thiruvananthapuram and a part of Kochi. Except for a sewer connection fee, see **Table 6-7,** there are no monthly or annual sewerage service charges collected.

Table 6-7: KWA Sewerage Connection Fee

Customer Category	Rate
Domestic	10% of the estimate cost - minimum Rs.500
Non-domestic	10% of the estimate cost - minimum Rs.1,000
Casual	10% of the estimate cost - minimum Rs.1,000
Industrial	10% of the estimate cost - minimum Rs.2,500

Source: KWA

6.5.3 KWA Financial Performance in Kozhikode

KWA's operation in Kozhikode has total service connections of 24,635. Presented in **Table 6-8** is a summary of income and expenditures directly related to the Kozhikode water supply operations of KWA.

Table 6-8: Kozhikode Water Operations – Income and Expenditure (Rs. Million)

Particulars	2001-02	2000-01	1999-00
Income			
Operating Income	59.97	53.99	51.47
Non-Operating Income (mostly penalties)	69.00	53.31	33.84
Total Income	**128.97**	**107.30**	**85.31**
Expenditure			
Salaries & Allowances	50.65	52.30	47.83
Power Charges	16.36	21.12	31.64
Consumables (including chemicals)	2.14	1.56	1.82
Repairs & Maintenance	11.38	13.75	11.77
Administrative & Other Expenses	1.84	2.07	2.15
Total Expenditure	**82.38**	**90.80**	**95.21**
Surplus (Deficit)	**46.59**	**16.51**	**(9.89)**

The expenditures above exclude depreciation of Kozhikode fixed assets and indirect costs, which could be allocated like interest and head office expenses.

During the FY 1999-00 to FY 2001-02, operating income grew at 8% while operating costs decreased by 7%. Operating cost recovery ratio therefore improved from 54% in FY 2000-01 to 73% in FY 2002-03 or an average of 62% during the period. This was due to the increase in consumer base and cost control measures undertaken by KWA. Kozhikode operations, however, continued to incur operating losses due to the extremely high non-revenue water (NRW) estimated at about 60% of water produced. The surpluses in the last 2 years of the period were only due to the late payment charges imposed and collected by KWA. Non-operating income grew at 43%. Collection efficiency on Kozhikode accounts was about 19%, which was lower than the state average efficiency of 22%.

6.5.4 Key KWA Financial Issues

The key issues affecting the financial performance of KWA that need immediate attention can be summarized as follows:

Non-Revenue Water (NRW)

Issue: The high NRW in KWA has been the major cause of its financial losses. The level of NRW has reached to a point that it could outweigh the financial benefits to be derived from other revenue enhancement and cost control/reduction measures to be implemented by KWA.

Action Recommended: KWA needs to put in place a comprehensive NRW reduction program. The program should include other parts of the state in addition those that will be implemented under KSUDP and JBIC funded projects on water supply.

House Connections *versus* Standposts

Issue: The census 2001 indicated that only 40% of the urban population in Kerala had access to safe drinking water, compared with the national average of 69%. This statistic has been recognized by the state government, which has an un-written social policy to improve the state percentage. As a result, water lines have been extended and public standposts provided, often irrespective of the pressure and volume of water available for distribution.

Action Recommended: As part of the NRW action, a policy should be agreed to increase the provision direct house connections in place of providing public standposts. This action would reduce the burden of the ULBs for the payment of standposts by increasing consumers directly connected into the water tariff net. Standposts that are required due to social 'safety-net' necessity should be metered as part of improving accountability and management procedures. The overall result will provide a better service to all customers by reducing wastage.

Defective Meters

Issue: The huge number of defective meters could render ineffective any kind of measures to reduce NRW. Without functioning meters to measure actual water production and usage, water consumption is prone to wastage and consumers tend to be under billed.

Action Recommended: KWA should give priority for the replacement of defective meters. If the present regulations on defective meters could not be implemented due to differences in the interpretation of some sections in the KWSS Act 1986, KWA should get a court ruling on this issue or have the Act amended to clarify the issue once and for all. For proper operational management of the system, KWA should be responsible for the provision and maintenance of consumer meters.

Collection Efficiency

Issue: Collection efficiency has been very low. Implementation of disconnection policy on long overdue accounts has been lax. KWA's cash flow has been hampered by the chronic delay in payment by government local bodies and a large portion of outstanding accounts belonging to them.

Action Recommended: Strict implementation of disconnection policy on long overdue accounts should be carried out. Customers normally pay if disconnection policy is strictly implemented. The State Government should assist KWA with regards to the collection of accounts owed by the government local bodies. The Government should devise an inter-government payment system that facilitates the accounts settlement among the different government bodies and institutions without sacrificing the proper recording and accounting of expenses and control procedures of the concerned institutions.

7. URBAN PLANNING AND LAND USE MANAGEMENT

7.1 Planning Efforts in the Past

The first Master Plan for Kozhikode was prepared by a private town planner in the year 1957, vide G.O. Rt. 1474/ dated 06.04.1957. The draft Master Plan[6] prepared was forwarded to the Chief Town Planner to the Government in 1962. It was observed that the plan required certain adjustment in order to make it economically viable and feasible. Delimitation of the area for the urban expansion had to be made functional after the formation of the City Corporation in 1962. The municipal area was 21.26 sq. km, but after becoming a Municipal Corporation the town limit was extended to 84.17 sq. km.

Meanwhile, the State Government in G.O. (MS) 644/62/DD, dated 7-8-1962 sanctioned the preparation of a Regional Plan for Calicut (Kozhikode) and surrounding 43 panchayats. This led to further recasting of the draft Master Plan for the city by the Department of Town Planning and Architecture. Detailed surveys and studies in respect to the extended areas of the Corporation commenced in 1964 and thus the Interim Development Plan for Calicut urban area was finalized for the period 1967-1981.

The Interim Development Plan mainly consists of land uses, indicates lines of communication and transportation by land, water and air, and prescribes zoning and population density, housing, public and semi-public facilities and civic amenities including utility services.

However, rapid urbanization trends in the city periphery have necessitated a larger Development Plan area. The Development Plan (1981-2001) for Kozhikode is basically an extension of the Interim Development Plan and covered an area of 111.9 sq. km with a projected population of 800,000.

Currently, Kozhikode Development Authority (KDA), Kozhikode Municipal Corporation and the Town & Country Planning Department (TCPD) have undertaken the preparation of a Perspective Plan for Kozhikode Region for the period 2001-2021. The planning process is discussed in **Table 7-1**.

Table 7-1: Proposals and Status of Development Plan (2001)

Component	Major Proposals in Development Plan	Status
Canal improvement	Development Plan proposal to augment the capacity of the Conolly canal by deepening and widening.	40% the canal have been desilted, it is expected to complete on 2005.
Housing	Housing requirement by 2001 is 64,000 and slum improvement schemes.	NSDP Program implemented through Kudumbashree: from 1983 to 1993 nearly 1700 houses have constructed which includes all the LIG and EWS. Individual housing loan schemes have been introduced, funded by HUDCO & KUDFC

[6] The first Master Plan for Kozhikode is referred to as the Draft Master Plan.

Component	Major Proposals in Development Plan	Status
Transportation	Widening of Mavoor road.	From Indira Gandhi junction to medical college four laning completed.
	Meenchanda- civil station road.	In advance stage, under MLA road scheme
	Widening of Beach road (R.O.W) starts from Beypore port to madras -Calicut- Cannanore road at Vengali.	Improvements ongoing.
	Widening of canal road, starts from Kallai to Nellikkappali palam.	Widening of road is ongoing.
	Mini Bye Pass road.	Presently it has two/four lane CW. Proposal are to widen the entire road to four lane.
	Inter city bus terminals at Mavoor road	Fully completed & started functioning.
	Beach - CWRDM Road up to Mini Bypass (East - West Axis).	These proposals are pending.
	Beach - Vellayil ROB.	
	Vellayil ROB - Christian College Jn (NH17).	
	Christian College Jn (NH17) - NH212 (Wynad Road).	
	NH212 (Wynad Road) - Mini Bypass.	
	Mankavu - Nellikode (Mavoor Road).	
	Mankavu - Govindapuram Jn - Nellikode (Mavoor Road) section of Mankavu - Civil Station Road.	
	Fransis Road - Methottuthazam at NH Bypass up to Mini Bypass.	
	Fransis Road / Kallayi Road Jn - Madhavan Nair Road - Muriyad Bridge.	
	Muriyad Bridge - Mini Bypass.	
	Puthiyangadi - Kakkodi - Thannerpanthal Road.	
	Coastal Road - Puthiyangadi section including a ROB.	
	Puthiyangadi - NH Bypass	
	Mini Bypass from Meenchanda to West Hill	
	Meenchanda – Mankavu	
	Mankavu - Arayidathupalam	
	Arayidathupalam - Eranjipalam	
	Eranjipalam - Karaparamba Jn	
	Karaparamba Jn - East Hill	
	East Hill - West Hill Jn	
	Pavamani Road	
	From Stadium to Mini Bypass	
	Jail Road from Poonthanam to Mini Bypass	
	Poonthanam Jn - Jail	
	Jail - Mini Bypass	
	Oyitti Road (ROB to Town Hall along the rail line)	
Tourism	Dream city project	Nearly 30 acres near Kottuli adjacent to Conolly canal is identified and frozen for Theme park.

Source: Development Plan (2001).

The major problem in preparation of Development Plans is up-dating town base maps and existing land use maps which are used as a basis for formulating development proposals. The existing land use (1981) map is outdated and is not accurate for authentic physical planning. Recent developments and extension of the cities are often not included. Aerial photographs and high-resolution satellite images are potential data sources for spatial information for future planning activities.

7.2 Land Use Management

7.2.1 Land Use Pattern

The main impact of urbanization processes has been expansion and constant change of urban land use. Physical, social, political and economical factors have played their decisive roles in forming Kozhikode's land use pattern. **Table 7-2** provides a break-up of different land use in the city.

Table 7-2: Existing Land Use in Kozhikode

Land use	Area in sq. km	Land use (%)
Residential area	44.03	52.27
Commercial area	1.22	1.45
Industrial area	3.79	4.50
Public & semi public area	14.28	16.95
Transportation area	0.64	0.76
Agriculture	1.87	2.21
Water course	11.17	13.26
Parks & open spaces	7.24	8.60
Total	**100.00**	**100.00**

Source: KSPCB- Model SWM System- Kozhikode.

The land use pattern indicates that 52.27% of the total developed area is under residential use. With better planning and phased development, lesser area of land could have accommodated the existing population / properties. The present high percentage of land use for residential area is due to the local preferences for low-rise/low density housing.

7.2.2 Development Pattern

In general, the physical development of Kozhikode city and the surrounding Panchayats is along major transportation corridors in a radial form. There are concentrations of urban development on major nodal points in the area. Kozhikode is a commercial center and also a hub for the boat making industry. Recreational centers such, as parks, open spaces and other socio-cultural centers are located in the central city. Major commercial centers are at Big Bazaar (CBD) and along areas adjacent to the railway station. Major industrial development has taken place in the Northern region and this has attracted educational institutes and improved accessibility. Even though land is available along the southeast direction, development is occurring along the northeast direction due to:

- Availability of flat land along northeast direction;
- Large number of educational institutes like the National Institute of Technology and Civil station at Wayanad road;
- Although the NH Bypass (from Kannur to Malappuram) is finished, work on the link between Nellikode to Olavanna is still to be completed; and
- Undulated terrain along the southeast direction.

7.3 Key Urban Development Issues

Key issues include:

a) Informal Development in Fringe Area. Areas like Olavanna, Cheruvannur Nallalam, Kunnamangalam, Beypore and Feroke are under pressure for further urban growth but do not have the level of infrastructure and development control. Poor control has resulted in the conversion of prime agricultural land and infilling of water bodies for urban use.

b) Dearth of Infrastructure. In Kozhikode, significant areas of land for housing were subdivided and sold but are lying vacant. As a result, the condition of infrastructure provided in the area has deteriorated.

c) Shelter. There is a shortage of affordable housing in most of the planning area. The urban poor find it difficult to get developed sites for house construction at affordable prices because of high land cost. This has resulted in the growth of slums and Economically Weaker Section (EWS) colonies. The Development Plan (2001) has identified present deficiencies in the housing stock and future requirements but it has not indicated how shelter and land for housing for the urban poor should be provided. It is essential to estimate the actual housing needs of the populace (including affordability), particularly for those Below Poverty Line.

d) Poor Management of Water Bodies/Tanks. Deterioration of water quality in Conolly Canal and other water bodies due to discharge of untreated domestic and industrial effluents. Water bodies and low-lying marshy areas are reclaimed due to demand for land for development, weak regulations and non-enforcement of environmental regulations that exist to safeguard water bodies. Ground water is the primary source for domestic consumption in newly developed areas but over extraction has resulted in brackish water, especially along the coastal belt. Thus for any future use, ground water exploitation should be effectively monitored and controlled.

e) Lack of Co-ordination in Planning. Industrial, residential and infrastructure investment decisions are uncoordinated particularly in the fringe areas where pressures for urban expansion are increasing and it's becoming increasingly difficult to monitor and control development. There is a lack of clarity over departmental responsibilities for land use planning, development, maintenance and enforcement. This has resulted in ineffective and uncoordinated decision-making processes and actions.

8. SUBPROJECT RATIONALE - NEED AND DEMAND

8.1 Approach to Subproject Selection

The approach taken during the Project scoping exercise and identification of suitable project components included numerous meetings with the Municipal Corporation Mayors and technical staff as well as state line agencies, such as KWA, PWD and Irrigation Department in their respective sectors to determine their development plans and priorities.

In addition, surveys and focus group discussions were undertaken with city households and business communities in order to obtain their considered view on priorities for city development investment.

8.1.1 Municipal Corporation Priorities

At the Mid Term Workshop, as part of the working group session, the City Mayors and officers were requested to proportion any funding that might be available for infrastructure improvements as an indicator of civic priority. The results for Kozhikode are presented in **Table 8-1**.

Table 8-1: Kozhikode Municipal Corporation Priorities

City / Sector	Water Supply	Sewerage /Sanitation	Urban Drainage	Solid Waste Management	Roads & Transport	Poverty Alleviation
Kozhikode	N/A	50%	10%	10%	25%	5%

8.1.2 Community Priorities

As part of the Project preparation, a Baseline Socio-Economic Survey was undertaken in all 5 Project cities. The 1% sample household survey included questions on municipal service delivery and priorities for improvement. For simplicity the results in **Table 8-2** show the aggregate of both poor and non-poor for each city against each sector.

Table 8-2: Kozhikode - Community Municipal Service Priorities

City / Sector	Social Category	Water Supply	Sewerage /Sanitation	Urban Drainage	Solid Waste Management	Roads & Transport
Kozhikode	Poor	1	2	3	4=	4=
	Non-Poor	1	2	3	4=	4=

Clearly, the community priority is for improvements in water supply, sewerage/sanitation and urban drainage, in that order.

8.2 Subproject Objectives and Component Selection Criteria

The Project purpose has been defined to assist the selected municipal corporations to “promote good urban management and develop and expand urban infrastructure to increase economic opportunities and to reduce vulnerability to environmental degradation and urban poverty.” The total investment in each city will vary, depending on the level of current basic needs, the city’s affordability, and the assessed implementation capacity of the city or its agencies. Additional details on the Project objectives and selection criteria are provided in **Volume 1 – Main Report**.

9. URBAN INFRASTRUCTURE SERVICES

9.1 Water Supply

9.1.1 Review of Existing System

Development of Water Sources

Two major rivers namely Chaliyar and Poonurpuzha are the main sources of water supply to the corporation. The then Kozhikode Municipality had its first piped water supply scheme designed for 4.5 MLD in 1953 using the Poonurpuzha river as the source. However, the scheme was later abandoned due to inadequate summer flow in the river to meet demand. In 1965, a 2.25 MLD capacity treatment plant was constructed at Moozhikkal, again using the Poonurpuzha river as the source exclusively for Medical College Campus.

Later a full water supply scheme was designed to supply 54 MLD of filtered water to the city using the river Chaliyar as source. The scheme was implemented in two phases. Phase 1 consisted of intake works, treatment plant, transmission and distribution networks, a booster station at Kuttikattur, one balancing reservoir at Velliparamba and three ground level service reservoirs was executed in 1971. Phase 2 comprising of a treatment plant and extension of the Kuttikattur pumping station was implemented during 1992. In 1985, an additional 4.5 MLD scheme with Poonurpuzha river as source with head works at Moozhikkal and one reservoir at Balamandiram and its transmission main was executed to supplement the supply.

Water Treatment and Transmission

Two conventional water treatment plants are in operation of a total capacity of 42.75 MLD, located at Moozhikkal (capacity 6.75 MLD) and at Koolimadu (capacity 36 MLD). Both treatment plants need major rehabilitation work and hence are underutilized.

The transmission system consists mainly of PSC pipes and Cast Iron pipes. The total length of transmission main is about 36.70 km. Treated water from Moozhikkal is pumped directly to the Medical College Campus and Balamandiram GLSR through separate 225 mm and 300 mm CI mains.

Service Reservoirs and Distribution

The present storage capacity of the service reservoirs is 10.8 ML, which is only about 10% of the 1991 filtered water demand of 107 MLD. The City is divided into four zones for the purpose of distribution of water. Zone I and Zone II cover majority area of the city.

Some of the existing pipes were laid as early as in 1952 but the majority of the distribution network was laid down between 1964 and 1974. The total length of the local distribution mains is about 132 km. All service connections are metered. The slum and people below poverty line are supplied water through 1,900 stand posts, which are un-metered.

9.1.2 Water Demand

Design Criteria

Kerala Water Authority has adopted an average per-capita demand supply of 200 Lpcd for planning new water supply schemes for major urban areas, 135 Lpcd for peri-urban areas and 100 Lcpd in rural areas where sewerage is not expected to be installed. In analyzing the future requirements for Kozhikode the design parameters / level of services were considered in **Table 9-1**.

Table 9-1: Water Supply Design Parameters

Design Parameter	Present Situation	Design Criteria	Comments
City Population	440,000 (2004)	490,000	Design horizon 2036.
Population with access to city water supply	400,000 (2004)	480,000	At least 98% population with access to mains water.
Supply Rate	61 Lpcd (average)	200 Lpcd where sewerage planned 135 Lpcd in semi-urban and 100 Lcpd in rural areas	Minimum requirement for sewerage. Excluding 15% UFW. Bulk supply to Commercial Institutional and industries to be assessed separately.
Water production	54 MLD	282 MLD	Includes other semi-urban and rural demands plus assumed reduction in UFW.
Water pressure	0-3m head	2-7m head	Requires public awareness to reduce wastages.
Supply period	4-6 hrs per day	24 hrs	30 year target.
Un-accounted for water (UFW)	55% of production	Less than 20% of production	30 year target.

Water Supply Demand and Production Development

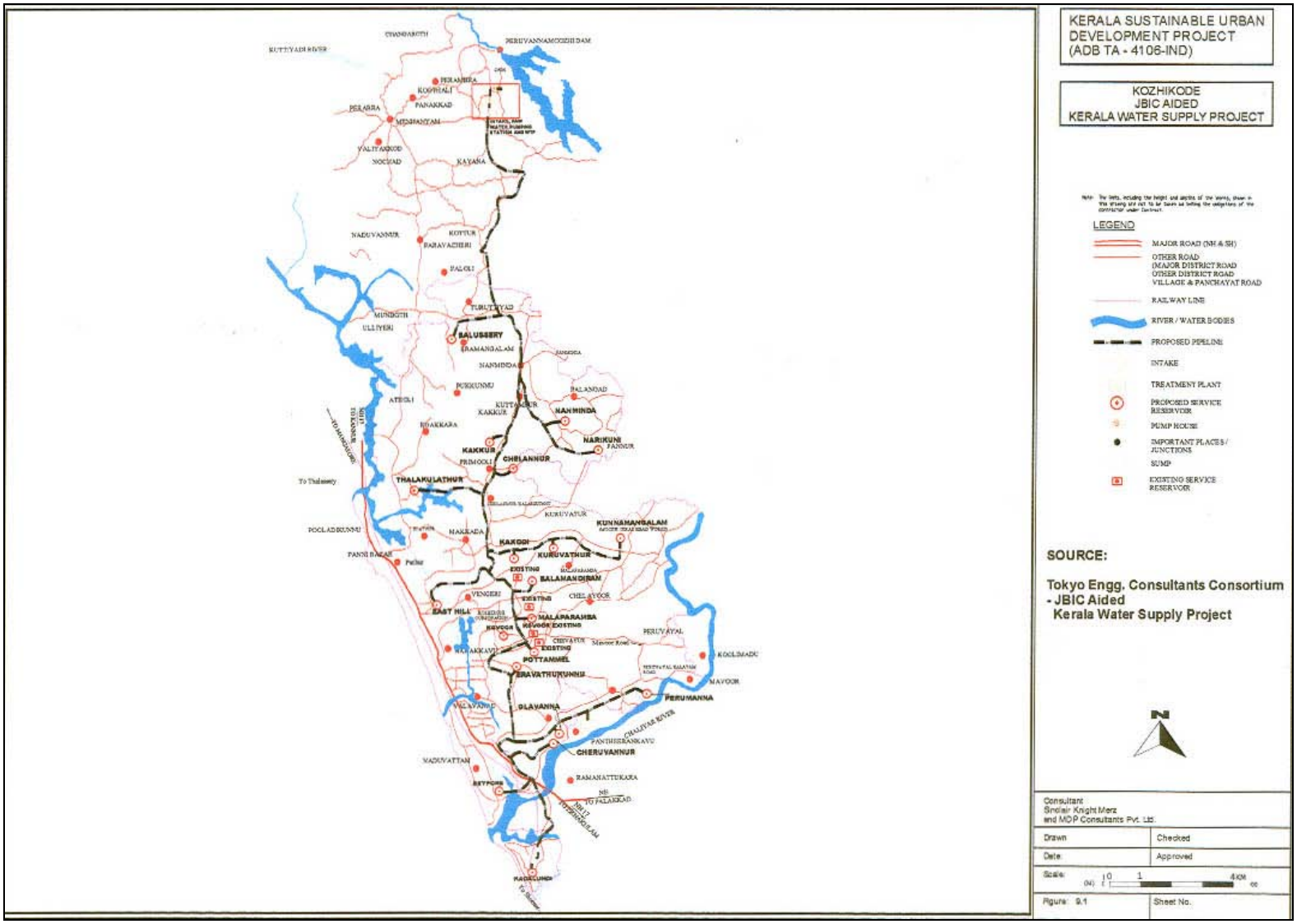
Allowing for 22% distributional and other operational losses, the water supply demand is given in **Table 9-2**.

Table 9-2: Water Supply Demand and Phased Development

Description of Item	2006	2011	2021	2036
Corporation Population	445,300	454,000	470,000	490,000
Corporation demand of water supply (JBIC projection)	69.0 MLD	71.8 MLD	77.5 MLD	88.2 MLD
Semi-urban and rural population (other)	631,000	669,000	738,000	813,000
Other demand of water supply (other areas)	69.9 MLD	75.6 MLD	86.9 MLD	101.4 MLD

9.1.3 Water Supply Improvements Scheme

JBIC has agreed funding improvements to the water supply system for Kozhikode Corporation, which includes seven urban extensions, two abutting villages and en-route villages to benefit a population of over 1.3 million by 2036, refer **Figure 9-1**. Peruvannamuzhi reservoir at 45 km north of the Kozhikode city has been identified as the alternative dependable source for meeting the balance water needs of the above beneficiaries. It has also been proposed to construct a water treatment plant, lay transmission main consisting mainly of MS pipe and connected feeder mains, construct four more new service reservoirs and remodel the distribution system. The Corporation area will be divided into six water supply zones. Total quantity available on the completion of the above scheme will be 272.24


KERALA SUSTAINABLE URBAN DEVELOPMENT PROJECT (ADB TA - 4106-IND)
KOZHIKODE JBIC AIDED KERALA WATER SUPPLY PROJECT
LEGEND
MAJOR ROAD (NH & SH)
OTHER ROAD (MAJOR DISTRICT ROAD OTHER DISTRICT ROAD VILLAGE & PANCHAYAT ROAD
RAILWAY LINE
RIVER / WATER BODIES
PROPOSED PIPELINE
INTAKE
TREATMENT PLANT
PROPOSED SERVICE RESERVOIR
PUMP HOUSE
IMPORTANT PLACES / JUNCTIONS
SUMP
EXISTING SERVICE RESERVOIR
SOURCE:
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MALAPARAMBA
POTTAMMEL
ERAVATHUKUNNU
OLAVANNA
CHERUVANNUR
PERUMANNA
EAST HILL
KOZHIKODE

MLD and Kozhikode Corporation area will get 145.55 ML. In addition to the existing four Service Reservoirs having a total capacity of 10.8 ML, 6 new service reservoirs having an additional capacity of 61.97 ML will be constructed.

9.1.4 Analysis of Existing Situation and Needs

The analysis above confirms the current need for system improvement. However, it is understood that the on-going JBIC project will address the current shortfall in supply capacity as well as the need for reduction in water losses to adequately cater for current and future water supply needs in the Project Area. Based on the estimated demand and expected improvements, the supply of water in the project area will be adequate after implementation of the JBIC funded project for the proposed expansion of sewerage and therefore no water supply component for Kozhikode is included under this Project.

9.2 Sanitation and Sewerage

9.2.1 Existing Sewerage and Sanitation System

Sewerage. The Kerala Water Authority (KWA) prepared a sewerage scheme for Calicut City in 1973. The municipal area was divided into three zones for planning purpose. Zone I covers part of present MC area, which is bounded by Conolly Canal on the Eastern side, Kallai River on the Southern side and the Arabian Sea on the Western side. Zone II covers the MC area bounded by Kallai River on the Northern and Northeastern side and the Arabian Sea on the Western side. Zone III covers the remaining area of the MC to the Eastern side of the city. Zone I is further divided into four blocks, numbered I through IV.

Block I of Zone I is bounded between the National Highway (NH-17) on the East, Arabian Sea to the West, Kallai River to the South and Gandhi Road to the North, spreading over 412 Ha. Approximately 17 km of gravity sewer lines were constructed in Block I of Zone I between 1980 and 1986. The other major works carried out include acquisition of 90 acres of land for constructing the Sewage Treatment Plant. No sewerage works have been carried out since 1986. According to KWA records expenditure of Rs.36.54 million was made till 1998. The works were terminated due to fund paucity.

Sanitation. Existing sanitation facilities in Kozhikode mainly consist of individual septic tanks generally in middle and high-income residential areas, and shallow pit latrines generally in areas with low-income groups. Sullage from houses is discharged into roadside drains and the Conolly Canal, which crosses the central city from North to South. In addition, there are a number of drains that carry sullage from hotels and commercial establishments and directly discharge into the Arabian Sea. Sanitation facilities are not adequate in slum areas, which primarily exist in ward nos. 48, 47, 39, 38, 28, 29, 31, 32 near the Arabian Sea coast and few non-coastal areas like ward nos. 27, 26, 37, 43, parts of 20, 21, and 22. The population density in the above wards is high and varies from 8,000 to 22,000 persons per sq. km. There are 79 slums in the city identified by the department of Town & Country Planning Dept. (TCPD), GoK with a population of 76,892. According to TCPD records, there are 11,247 dwelling units in slums with approximately 60% lacking latrines.

Sanitation improvement in slums/urban poor areas was initiated under the National Slum Development Program (NSDP). Financial grant assistance of Rs.2,000 per household has already been disbursed by the Municipal Corporation for constructing 1,400 Twin Pit Pour Flush Latrine (TPPFL) for households (HH) that do not have adequate sanitation and are considered as families below poverty line (BPL). A further 1,400 households have been identified by the Municipal Corporation requiring assistance.

9.2.2 Key Issues / Service Adequacy

There is no functional sewerage system in the city and the present sanitation system uses on-site processes, such as, TPPFL or pour-flush toilets with septic tanks. Sullage from houses is discharged into roadside drains. Many of these drains discharge directly into the Conolly Canal, which is heavily polluted at many stretches and is a potential health hazard. KWA is currently implementing a water supply improvement project in the Municipal Corporation area and adjoining Panchayats with funding assistance from Japan Bank for International Corporation (JBIC). The JBIC water supply project is designed to provide 200 lpcd, which will require an efficient sewerage system to collect and treat

wastewater produced. Based on the projected population and water use, the Municipal Corporation area alone will produce approximately 80 MLD of domestic sewage within the next five years. Implementation of a sewerage system would be undertaken in phases starting with the high density areas between Conolly Canal and the Arabian Sea coast.

The sewerage and sanitation issues to be addressed through short-term and long-term measures include:

a) Location and condition survey, rehabilitation / replacement and commissioning of the existing sewers (17 km) in the Municipal area, plus construction of sewage pumping stations;

b) Extension of the sewerage system in other parts of the Municipal Corporation;

c) Construction of Sewage Treatment Plant; and

d) Sanitation improvements not covered by the sewerage scheme, especially in slums through the on-going NSDP program to reduce pollution of the Conolly Canal and coastal waters.

KWA has been responsible for planning, designing and implementing of water and sewerage facilities in the State and has maintained a sewerage sub-division in Kozhikode since the 1980's, specifically for planning of the sewerage system.

The sewers already laid in some part of the city needs to be surveyed to ascertain the present condition and adequacy before commissioning. Also, the sewage pumping stations are still to be constructed. Sewage from the MC needs to be properly treated before disposal. Treatment of sewage is possible by both off-site and on-site methods. Off-site treatment is financially viable in areas with high population density with sufficient water supply provisions. KWA has acquired land for the purpose of constructing a centralized STP for the sewage from the whole MC area at Karimbanapalam, which needs to be kept intact and secured for its intended purpose. The 24 Ha. site for the proposed STP includes areas of marshy land and stands of native forest which during the Initial Environmental Examination were considered sufficiently good examples for being retained. There is no alternative land available for the STP, so only a small proportion of the available area will be utilized for constructing the STP.

Census 2001 indicates that out of 110,809 households in Kozhikode, 5,693 households do not have access to any sanitation facilities and 9,178 households have pit latrines. Majority of 5,693 households that do not have any latrine are located within slums. These units need to be provided with Twin Pit Pour Flush Latrines (TPPFL). The Households with pit latrines are both in slums as well as non-slum areas, which need to be included in the sewerage project or converted into TPPFL. Full coverage of NSDP could be realized through the poverty alleviation component of KSUDP.

9.2.3 Project Identification

Based on the needs assessment for a sewerage and sanitation facility in Kozhikode Municipal Corporation area, the sub-project component was identified and is detailed in the following section.

The Southern Railway Line, Conolly Canal and Kallai River within the MC area, technically separates the MC area into four major drainage zones. It would not be techno-economically feasible to

prepare an integrated sewerage scheme for these areas and hence separate zone-wise sewerage systems are proposed. The average density of MC area varies widely between 2,000 and 22,000 persons per sq. km. with the coastal belt and slums exhibiting the maximum population density.

The four sewerage zones within the Municipal Corporation area are shown in **Figure 10-1** and are described as follows:

a) **Zone A.** Zone A is bounded by the railway line (east side), Arabian Sea coast (west side), Gandhi road (north side) and the Kallai River (south side). Some of the major areas included in this zone are Kadappuram Pally, Nellikode, and areas around beach road. This zone covers an area of 8.2 sq. km and 70,000 persons. On completion of the JBIC water supply project, the ultimate sewage generation in this area is estimated at approximately 13 MLD, including infiltration. Sewage from the above area will be collected and pumped to the proposed centralized STP at Karimbanapalam. While 17 km of sewers have already been laid in this zone, they need to be surveyed and assessed for condition and adequacy for adoption and operation.

b) **Zone B.** Zone B Area bounded by the railway line (west side), Conolly Canal (east side), Kallai River (south side) and the corporation boundary (north side). Some of the areas covered under this zone are Puthiangudiand Chalapuram. This zone covers an area of 10 sq. km with 75,000 persons, with an average population density of 7,500 persons / sq.km. The sewage generation is approximately 14 MLD including infiltration and sewage from this zone will be pumped to the proposed centralized STP at Karimbanapalam.

c) **Zone C.** Zone C is bounded by Kallai River on the North and corporation boundary on the south and includes Panniyankara and Vattakkinar. This zone has large slum pockets where a combination of sewerage and on-site sanitation system may be applied. Households in this zone that cannot be connected to the sewerage system will be provided assistance for improving their in-house sanitary latrines. This zone covers an area of 7.4 sq. km and 60,000 persons with a population density of 8,000 persons/sq.km. The Southern railway line bisects the zone. Sewage generation is approximately 12 MLD including infiltration. The sewerage system of Zone C can be extended at a later date, subject to urban densification and fund availability. In addition, the initial environmental screening of the STP location at Kareembanapalam suggests limiting the use of proposed STP site due to the need to protect some of the marshy areas. A separate STP for Zone C extension will therefore have to be identified at a suitable alternative location.

d) **Zone D.** Zone D includes the MC areas on Eastern side of Conolly Canal including wards 2, 4, 6-23, 34-36, 41-43. This zone covers the remaining area of the Municipal Corporation (53.37 sq. km.) and is recommended for coverage in a later phase. This is the least densely populated part of the city in comparison to Zones A, B and C. The average population density in this Zone is only 4,000 person/sq. km. The population of this zone is approximately 260,000 persons, out of which wards 14-17 have very low density (20-30 persons/Ha) where it would be economically unviable to provide sewerage in. The population to be served with sewerage system in this Zone should be approximately 200,000 with the corresponding sewage generation of approximately 35 MLD. A suitable site for a separate 35 MLD STP for Zone D requiring 2.6 Ha. based on FAB technology needs to be identified at suitable location. The land requirement for STP modules for treating sewage from various zones is given in **Table 9-3**.

Table 9-3: Zone wise details of STP

Zone	STP capacity, MLD	STP area requirements	STP Location	STP Status
Zone A	13	1.2 Ha	Karimbanapalam	KWA land. No acquisition required
Zone B	14	1.2 Ha	Karimbanapalam	KWA land. No acquisition required
Zone C	12	1.0 Ha	-	Site to be identified and acquired
Zone D	35	2.6 Ha	-	Site to be identified and acquired

Proposed Centralized Sewage Treatment Plant. Zones A, B and C comprise the old municipal area and are more densely populated in comparison to Zone D. It is therefore proposed to take up the sewerage works in phases to suit funds and city growth. The first priority will be for a location and condition survey of the existing sewers and construction of new sewer lines and pumping stations for Zones A & B, with the STP of 27 MLD at Karimbanapalam. Since part of the land owned by KWA at Karimbanapalam is marshy, the treatment technology to be adopted should require the minimum possible area while still satisfying all the discharge norms of sewage treatment.

Based on techno-economic evaluation and cost comparison of different treatment technologies, Upflow Anaerobic Sludge Blanket (UASB) and Fluidized Aerobic Bed (FAB) based plants are comparable in terms of overall investment. However the land requirement of FAB reactors is less than half the requirement of UASB plant, therefore FAB is recommended as the most suitable technology. The initial 27 MLD STP will require approximately 2.4 Ha. of land and the treated effluent from the STP will be discharged into the Conolly Canal.

Zone A and Zone B are the Municipal Corporation priority and pose no social or environmental problems since sufficient space is available for the construction of the STP for these two zones. The proposed STP would include screening, degritting, biological treatment, sludge treatment and disposal. The digested sludge produced from the FAB Reactors would be thickened and dried in sludge drying beds before disposal. A techno-economic evaluation and cost comparison of different treatment technologies preliminary designs and preliminary site layout plan for the 27 MLD FAB based STP is given in **Volume 6 – Technical Analysis, Section B**.

Based on city priorities and capacity for implementation within the project timeframe the sub-project component proposed is summarized in **Chapter 10**.

9.3 Stormwater Drainage

9.3.1 Existing Drainage

Kozhikode city has an undulated topography with a ground level variation of about 14 meters. Its natural slope is from east to west with small hilly terrain located in the eastern and central part of the city. Average annual rainfall is about 3,000 mm with an average 115 rainy days a year. A number of natural drainage channels exist in the city. These channels mostly act as secondary drainage outlets and carry both storm as well as wastewater either to the Conolly Canal or to the Arabian Sea. The Conolly Canal is a man made canal connecting the Elathur River in the north and Kallai River in the south of the city and is the main recipient of the surface water runoff. The catchment area of the canal covers about 35 to 40% of the total Municipal Corporation area of the city. The existing secondary drains are often inadequate to carry the entire storm water runoff of the city particularly during the monsoon season. About 40% of the existing roads in the municipal corporation area have side drains; but only about 30% of the existing drains are covered. The quantitative description of the existing drains in the city is provided in **Table 9-4**.

Table 9-4: Drainage Categorization

Description of the Item	Quantity (Km)
Total length of drains/canals	249.95
Total length of Primary Drains	95.40
Total length of Secondary Drains	102.30
Total length of Roadside Internal Drains	52.25

Source: Data obtained from the Kozhikode Municipal Corporation.

Certain areas of the city experience water logging, particularly during the monsoon. Normally, water logging occurs during the period of rainfall of high intensity and/or for extended duration. Some of the major water logged areas are Bus Stand and its adjoining area, M. Sankarankutti, Kommeri, Payyanakkal, Thadambattuhazham Vellayil (adjoining Ganghi Junction), Puthiyakadavu, Ayyappankavu (in the slum areas), Jafar Khan Colony and Chelavur. One of the major water logged areas of the city is the low-lying plain located in the western side of the Conolly Canal. This area is parallel to the sea and extends for about 50sq.km as a strip of land with approximate length of 10km. Major city roads including the National Highways 17 and 212 pass through this area. Movement of traffic in these roads is often affected due to water logging. The main reasons identified for cause of waterlog/flood in the city are:

a) Decreased carrying capacity of the existing canals/drains due to heavy silt deposition, discharge of solid wastes in the canals/drains and growth of vegetation in the canals/drains;

b) Overloading to the existing primary and secondary canals/drains due to unplanned development and haphazard filling of low land/water bodies without giving due consideration to the drainage;

c) Blockage of the primary drains/canals at the outfall points due to deposition of silt;

d) Missing links in the existing drainage network;

e) Inadequate or no drainage facilities in certain areas; and

f) Irregular and inadequate maintenances of the existing canals and storm water drains.

Operation and Maintenance (O&M). The existing city drainage system lacks proper maintenance. The Kozhikode Municipal Corporation (KMC), State Irrigation Department and Public Works Department are jointly responsible for operation and maintenance of the existing drainage system of the city. Type of drains vis-à-vis agencies responsible for their O&M is tabulated as under:

Type of Drain/Canal	Agency Responsible
Drains along internal roads	Kozhikode Municipal Corporation
Drains along the National Highways	PWD (National Highways)
Drains along State Highways, District Roads & any other major roads	PWD (Road & Bridge)
Drainage Canal & other water bodies	State Irrigation Department

Better coordination between these agencies is essential for maintenance of the overall drainage system of the city. Lack of public awareness is also a factor for poor functioning of the existing drains/canal. Citizens should be made aware of the fact that indiscriminate disposal of the wastes into the waterways not only create drainage problems, but also detriment to their health and hygiene. Separation of city wastes (both liquid and solid) from the storm water flow is very important for the improvement of the existing drainage system of the city. These aspects will be included as part of a Project public awareness program.

9.3.2 Drainage Component Identification

The following improvement schemes have been identified based on the service inadequacy with an intention to minimize/eradicate the flood problem of the city:

A. Detail study of the city drainage system and preparation of Drainage Master Plan: No detail study has been undertaken for the drainage system of the entire city. This results in a lack of adequate information to deal with the city's drainage problems. The low lands, which otherwise were the recipients of storm water runoff, have been filled due to haphazard and unplanned urban growth without giving due consideration to drainage. A comprehensive study of the entire city drainage system is therefore essential to achieve the following objectives:

a) Preparation of a base map of the city for drainage with contours;

b) Preparation of storm water drainage inventory for easy identification of the status of the existing drains/canals and their catchment areas;

c) To identify missing links and areas not covered in the drainage network and prioritization of works; and

d) To have a comprehensive database and mapping for better planning and management of the city drainage.

As part of the Detail Design a study of the city drainage system will be undertaken and a drainage master plan prepared to determine the short and long-term drainage proposals for the city.

B. Improvement of Secondary Drains and Inlets to Elathur-Kallai (EK) Canal: Elathur- Kallai (EK) Canal also known as Conolly Canal is a major primary drain and passes through the developed areas in the city. The carrying capacity of the canal is reduced due to encroachment and deposition of silt and solid waste. The improvement works of the EK canal have already been taken up by the Irrigation Department. About 40% of the canal length has already been desilted. The remaining works are likely to be completed by May 2005. In view of this, the improvement work of the EK canal is not being considered under the KSUDP.

However, a number of secondary drains outfall to the EK canal from both sides. Most of these secondary drains are in poor condition. The carrying capacity of these drains is reduced considerably due to deposition of silt and waste, leading to the growth of vegetation. In addition, the sides of the drains are not protected from erosion. As a result, because of overflow from these drains, local areas become waterlogged or flooded. These secondary drains therefore require improvement. Heavy silt deposition (about 40-50 cm depth) at the inlet points of some of the secondary drains of EK canal restricts or blocks the flow; provision of silt chambers at the inlets will minimize the problem.

C. Development of Drainage Channels at Wards 15 and 17. The poor condition of the existing main drainage channels in Chelavur and Mundikkalthzham areas causes waterlogging/flooding in these and adjoining areas.

D. Construction of Drainage Outlets Connecting the Sea. A series of primary drains terminate near the sea. These drains mainly carry the storm water runoff of the catchment area in the western side of the NH17. The outlets of these drains are frequently blocked due to deposition of sand and silt. The sand deposition is caused mainly due to the tidal effect of the sea. Once the outlet of these drains is blocked, the drains overflow and flood the adjoining area. Moreover, termination of the drains near the sea beach creates nuisance at the outfall locations. The drainage outlets are therefore, to be extended by constructing new drains up to the sea to avoid these problems.

E. Construction of Culverts at Kuzhippavayal and Varuthichery Vayal. Two road culverts at Kuzhippavayal and Varuthichery Vayal are proposed to minimize flooding of the adjoining areas.

F. Construction of Parapet Wall and Fencing to EK Canal from Karaparamba Bridge to Arayadathpalam on National Highway Bypass. A considerable portion of the Conolly Canal runs alongside the NH bypass. The area in this stretch of the canal is developed and densely populated. There is no proper barrier in the canal along its length on the NH bypass side to provide safety for the pedestrians and waste from the adjacent localities being directly deposited in the canal. Construction of a parapet wall and M.S. net fencing at the NH bypass road side for a length of 4 km is proposed.

G. Improvement of Other Secondary Drains. Kozhikode Municipal Corporation has proposed improvements to a number of existing primary and secondary drains throughout the city. The nature of improvements includes desilting, widening, side protection, re-section and providing cover slabs. In addition, it is also proposed to construct some new drains in certain areas where the existing drainage is inadequate. Some of the primary and secondary drains have been selected from a long list and proposed for improvement under KSUDP in order to minimize the water logging problem of the city. Out of a total length of 114.15 km primary and secondary drains as proposed by the Kozhikode

Municipal Corporation, 76.60 km have been included under KSUDP. However, prioritization of these drains should be made based on the detail study of the city drainage system.

The priority drains to be taken up under KSUDP for implementation and estimated costs provided in **Volume 6 – Technical Analysis, Section C**.

Based on city priorities and capacity for implementation within the project timeframe the sub-project component proposed is summarized in **Chapter 10**.

9.4 Solid Waste Management

This section analyses the solid waste management system prevailing in Kozhikode in terms of collection, transportation, treatment and disposal. The situation analysis addresses both the qualitative and quantitative aspects in terms of process, mechanism, tools and equipment used and other related issues. Deficiency analysis is undertaken, comparing the prevailing situation with that of various standards/norms available. Finally, issues and problems related to various aspects of solid waste management are summarized for necessary improvement measures and to determine tentative cost estimates.

9.4.1 Present Situation Analysis – Municipal Solid Waste

Waste Generation

The residents of the city generate solid waste at an estimated average of 727 grams per capita per day. Based on the Census 2001 population figures of 0.44 million for Kozhikode city, the total waste generated would be 317.50 MT/day[7]. The major waste-generating source is the domestic sector; waste generated by 70,000 households. Vegetable markets in the city generate waste in the order of 40-50 MT/day; construction industry generates 20 MT/day, and drain silt clearing accounts for 7.5 MT/day.

Table 9-5: Physical Composition of Solid Waste in Kozhikode (2003)

Sl. No	Category	Net Weight in %
1	Bio-degradable	70 – 75 (approximately)
2	Recyclable-Paper, plastic, metal, rubber, glass	15
3	Inert	10

Source: Kozhikode Municipal Corporation.

The waste has a free carbon (organic carbon) of 20% by weight and Nitrogen 0.5% by weight with an average of 55% moisture content. This gives a C/N ratio of 40, which is higher than the ideal ratio for composting. Calorific value is in the range of 800-1100 k cal/kg, which is low for self-sustainable thermal conversion[8].

Street Cleansing

Under the Kerala Municipalities Act 1994, road/street sweeping and drain cleaning are obligatory responsibilities of the Municipal Corporation (MC); the MC shall also arrange to collect and dispose solid waste generated in the city. The Municipal Corporation area is geographically divided into 51 wards deploying Sanitary Workers and Drivers under the supervision of a Sanitary Inspector. The sweepers of the Kozhikode Municipal Corporation (MC) are provided with the tools/equipments like brooms made of coconut leaves, baskets, wheelbarrows/push carts and shovels for street cleansing operations. Only the main roads and city center area are cleaned daily between 07:00 hours and 13:00 hours; other parts of the city are not. Street sweepers keep the waste collected in small heaps, which are removed by a handcart collection crew.

[7]Detailed Project Report for Rehabilitation and Modernisation of Solid Waste Management System of Kozhikode City, A Model System, Kerala State Pollution Control Board, Thiruvananthapuram, 2003.
[8] Kozhikode Municipal Corporation, September 2004.

Primary Collection and Storage

On 15th August 2004 the Kozhikode MC along with Kerala State Pollution Control Board (KSPCB) and Ministry of Environment and Forest (MoEF) launched the "Setting up of Model Facilities for Demonstration of Management of Municipal Solid Wastes for Implementation of the Municipal Solid Wastes (Management and Handling) Rules, 2000 at Kozhikode", which is also known as the "Model Project". Under this project, Kozhikode MC provides households with green bins for biodegradable waste and white bins for non-biodegradable waste. At present, this scheme is being implemented in 24 wards out of the city's 51 wards; by end October 2004, the MC expects to cover the balance 27 wards. At present the wards, which are not covered under this project normally do not practice segregation of waste at source but separate recyclable/reusable waste for sale to scrap dealers.

Kudumbashree, through the CDS system is operating in the aforesaid 24 wards of the city with ten members in each ward divided into two groups of five members each. Each group operates a three-wheeler "pick-up van" with six plastic covered containers of 50 litres each and two persons are in charge of the vehicle. They operate between from 06:30 hours to 12:30 hours. The groups are presently assigned 100 houses each. In every ward, there are pick-up points were the tractor-trailer come each day to load waste directly from the auto pick-up. The biodegradable waste is loaded on to the trailer manually. The non-biodegradable refuse is collected only on Sundays and loaded on a separate trailer.

In the 27 wards where the "Model Project" has not yet been launched the primary collection system of municipal solid waste in practice comprises of residents leaving their household refuse at the nearest open temporary storage point in the morning from where the Corporation workers collect and transport the waste. Market waste is directly collected from the transfer stations at the markets. No market stall has individual containers.

There are 134 recognized waste collection points located within the Kozhikode MC area for primary collection and storage of solid waste. KMC has provided three types of temporary waste storage points within its jurisdiction comprising: (i) plastic/metallic bins; (ii) open storage points; and (iii) dumper placer containers.

Table 9-6: Details of Storage Bins

Type of Community Storage	Bins	Location
Metallic/plastic both end open/closed bins	20	Along road margin with no proper flooring.
Dumper placer containers	9	Market, slaughter house and major collection points
Open collection points[9]	5	Different parts of the city where waste is stored openly prior collection and disposal.
Litter bins	100	-

Transportation of Wastes

Kozhikode MC's Health Department has a fleet of 34 collection vehicles. Loading and unloading operations are both mechanical and manual. At present there are five waste transfer points (dumping yard) mainly for market waste and rest of the city waste is transported directly to the disposal site by pick-up vehicles from community bins or from waste collected by Kudumbashree members. Transportation is carried out during the day except at the Central and Palayam Markets where garbage is cleared at night.

There is no routine planning for the collection and transportation of waste from different parts of the city. Vehicles collect waste from pick-up points in residential areas covered under the "Model Project". In other parts of the city, vehicles collect waste from open storage yards/dustbins as and when required. These sites are often attended to based on complaints rather than on a regular collection system. Most open storage points/dustbins are not cleared on a day-to-day basis. The garbage is removed from 06:30 hours to 12:30 hours.

Kozhikode MC does not have its own workshop facility. Vehicles are sent to private workshops for maintenance as and when necessary. Ten out of 23 tractor-trailers are presently not operational. Approximately 60% of the waste generated is collected and transported for treatment and disposal.

Disposal and Treatment of Wastes

Processing of waste is done at the Njellamparamba disposal site in Cheruvannur Panchayat, which is 8km from the city center and situated along National Highway 17. EXCEL Industries installed a mechanical windrow aerobic compost plant of capacity 272 MTPD in 2000; Kozhikode MC paid Rs.62.6 million for the plant construction. Waste of 104 MT is transported to the plant. Wynsum Agrotech, a private firm, now operates the plant on a lease basis.

The rejects of the treatment plant are disposed of in the adjacent open dumping ground. The operations are not engineered or properly controlled which results in leachate and wind blown waste polluting the surrounding area. Immediate remediation action is therefore required. The present disposal site should be re-engineered to contain the existing stored waste to prevent further seepage of leachate plus proper fencing and tree planting to contain and visually screen the disposal operations.

[9] Secondary open collection points are the open places of waste disposal conveniently identified by the conservancy staff for the disposal of waste from households, street sweepings and drain cleanings.

The compost plant and disposal site covers an area of 7.41 Ha. However, the area required for a sanitary landfill site in the year 2021 is 8 Ha and the MC has identified additional land which it proposes to acquire. **Figure 9-2** indicates the solid waste management system in the city.

Bio-Medical Waste. There are 41 private clinics, hospitals and nursing homes within Kozhikode Municipal Corporation. The Corporation does not collect and dispose any biodegradable or medical waste from the hospitals. Medical College Hospital disposes its waste within its own compound.

9.4.2 Proposed Solid Waste Management Component

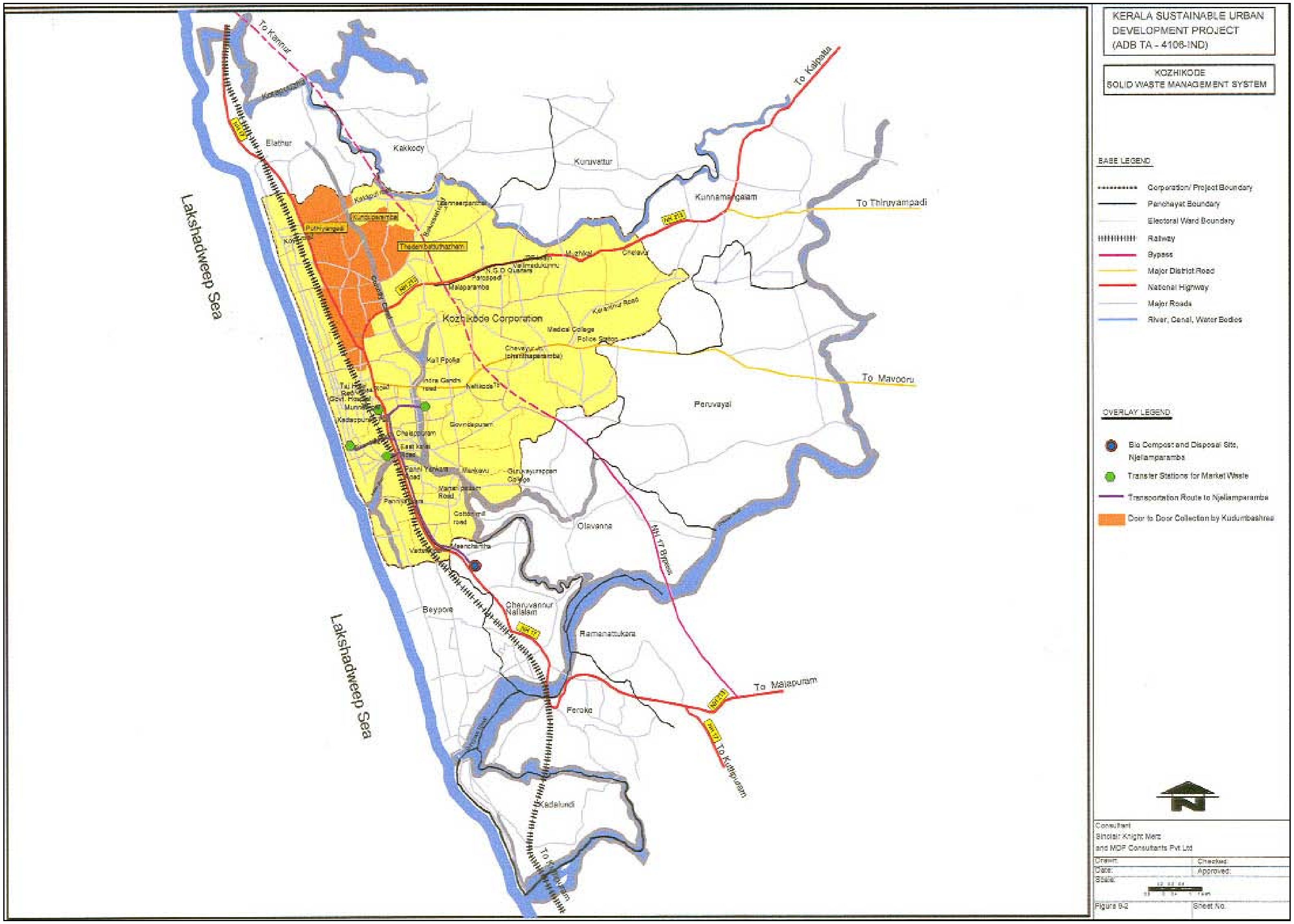
Design Assumptions

Deficiency analysis is carried out based on the norms/standards prescribed in the 'Manual on Municipal Solid Waste Management, Ministry of Urban Development and Poverty Alleviation, Government of India, New Delhi, May 2000' (referred to as "the Manual"). Infrastructure need was identified for: (i) primary collection and storage; (ii) secondary collection and transportation; and (iii) waste treatment and disposal. **Additional analytical** details are provided in **Volume 6 – Technical Analysis, Section D**. The above works will improve the existing solid waste management system for the city center and developing areas. Based on city priorities and capacity for implementation within the project timeframe the solid waste management component proposed is summarized in **Chapter 10**.

Table 9-7 summarizes the solid waste management infrastructure need for Kozhikode and is based on the following assumptions:

- Waste Generation. The Manual prescribes a waste generation norm for this size of city of 210 grams per capita per day (gpcd), but Kozhikode Municipal Corporation estimates waste production to be 727 gpcd which is considered too high and should be verified. Thus, for estimation of waste generated a rate of 210 gpcd is assumed (in accordance with the Manual); waste generation is expected to increase at a compounded annual growth rate (CAGR) of 1.41%[10]. Based on the above-mentioned generation and growth, daily waste generated at the city was determined for 2011, 2021 and 2031; for current analysis, the requirement in 2011 is determined.
- Street Cleansing. Sanitary workers will be supplied with adequate tools and equipment for street and drain cleaning purposes, in accordance with the Manual. The following pattern is assumed: (i) market areas will be swept at least twice daily and other areas will be swept once daily; (ii) commercial waste will be collected after street sweeping beats; and (iii) drains (less than 60 cm deep) will be cleared at noon. Burning waste in the street is strictly prohibited under the Kerala State Pollution Control Board (KSPCB) regulations and it is assumed that this practice will be discontinued.

[10] The consumption of raw materials and finished product by the community is directly proportional to the Gross National Product (GNP) of the country. Solid waste quantities are directly proportional to the quantity of material consumed and thus the increase in per capita solid waste quantities would be directly proportional to the per capita increase in GNP. Based on a World Bank study on the relation between GNP and per capita waste generation, waste generation is expected to grow at a compounded rate of 1.41% per annum.


KERALA SUSTAINABLE URBAN DEVELOPMENT PROJECT (ADB TA - 4106-IND)
KOZHIKODE SOLID WASTE MANAGEMENT SYSTEM
BASE LEGEND
Corporation/ Project Boundary
Panchayat Boundary
Electoral Ward Boundary
Railway
Bypass
Major District Road
National Highway
Major Roads
River, Canal, Water Bodies
OVERLAY LEGEND
Bio Compost and Disposal Site, Njeliamparamba
Transfer Stations for Market Waste
Transportation Route to Njeliamparamba
Door to Door Collection by Kudumbashree
Consultant
Sinclair Knight Merz and MDP Consultants Pvt Ltd
Drawn:
Checked:
Date:
Approved:
Scale:
Figure 9-2
Sheet No.
Lakshadweep Sea
Lakshadweep Sea
To Kannur
To Kalpatta
To Thiruvampadi
To Mavooru
To Malapuram
Elathur
Kakkody
Kuruvattur
Kunnamangalam
Kozhikode Corporation
Peruvayal
Olavanna
Beypore
Cheruvannur Nallalam
Ramanattukara
Feroke
Kadalundi
NH 17 Bypass

- Waste Storage. It is recommended to transit into a two-bin system of waste segregation and storage at source – for organic and inorganic waste, as per the "Model Project". However, this transition will be gradual and an awareness program is imperative to facilitate this transition. The following storage system is assumed: (i) household waste will be preferably stored in litter bins, which will either be disposed into street side dustbins (100 kg capacity spaced at 500 m and one dustbin for 250 persons) or collected through the door-to-door collection system – it is assumed that households generate 65% of the total waste; (ii) bins of 0.5 cum and 1 cum capacity are recommended for storing trade waste or hotel waste – it is assumed that commercial establishments, marriage/function halls and markets generate the balance 35% of the total waste; (iii) hazardous and/or hospital waste will be stored in special containers at one container for every 10,000 persons; and (iv) construction debris should be stored within the premises. Storage receptacle capacity is assumed as 1.25 times the waste being generated.
- Primary Collection. Primary waste collection from households is proposed through auto tippers. The current system of waste collection practiced by Kudumbashree is recommended. It is assumed that the auto pickups will collect all domestic waste and dump the waste into 3 m^3 dumper placer bins – this collection is either door-to-door and/or from street side dustbins. Wheelbarrows or pushcarts will also be used for primary waste collection.
- Secondary Collection. Secondary waste collection is proposed through dumper placer vehicles and refuse collectors/compactors; 100% waste transfer is recommended with all waste from receptacles transferred to the treatment/disposal site. Dumper placer vehicles will collect and transfer waste from the 3 m^3 dumper placers to the compost/landfill site at Njellamparamba. Refuse collectors/compactors would collect and transfer waste from the 0.5 m^3 and 1 m^3 bins to the compost/landfill site. Existing trucks will collect waste from peripheral areas. A "routing plan" will be developed by the design consultant post-PPTA. It is also assumed that a maximum of 50% of current vehicles will be operational in 2011.
- Fleet Size. Trip patterns and quantum determine the vehicle units, the following is recommended: (i) auto tippers will make short trips from source to 3 m^3 bin points making five trips daily and carrying a maximum of 500 kg per trip (equivalent to 2.5 MT/vehicle/day); (ii) twin dumper placers will undertake three trips daily and carry 3 MT of waste per trip translating into 9 MT/vehicle/day; and (iii) refuse collectors/compactors will undertake three trips daily and carry 8 MT of waste per trip translating into 24 MT/vehicle/day.
- Waste Treatment/Disposal. Waste treatment shall comprise composting and landfill. The following waste composition is assumed for the treatment/disposal process: (i) 40% of the waste is organic in nature; (ii) 60% of the waste is inorganic in nature; and (iii) 30% of the waste treated (composted) is a reject. The inorganic waste and compost rejects will be used in the landfill; a tipper truck of 8 MT capacity will transfer compost rejects to the landfill site. Kozhikode MC proposes to improve infrastructure in the compost plant and has prepared a project costing Rs.700 million with KSPCB. 50% funding for the project is from the Ministry of Environment and Forests (MoEF), 10% from KSPCB and the balance 40% from the MC. Improvements to the compost plant will ensure adequate composting and improve the quality of compost produced. The site area is sufficient for sanitary landfilling of compost rejects till the year 2021.

Additional analytical details are provided in **Volume 6 – Technical Analysis, Section D**. The above works will improve the existing solid waste management system for the city center and developing areas. Based on city priorities and capacity for implementation within the project timeframe the solid waste management component proposed is summarized in **Chapter 10**.

Table 9-7: Preliminary Requirement for Integrated SWM System

Sl No.	Item	Unit	2004	2011	2021	2031	Gap (2011)
1	Population	nos	441,000	453,897	471,875	490,608	12,897
2	Daily Waste Generation	MT	93	105	126	150	13
3	Daily Per Capita Waste Generation	grams	210	232	266	306	22
4	Street Length	km	723	749	787	827	26
5	Sanitary Workers	nos	714	1,497	1,574	1,654	783
6	Waste Storage, Collection and Transportation						
	Primary Collection and Storage						
	Pushcarts / Wheelbarrows	nos		28	34	40	28
	Dustbins (~ 100 kg)	nos		1,816	1,888	1,962	1,816
	Drain Desilting carts	nos		21	25	30	21
	Secondary Collection and Transportation						
	Utilization Factor for Receptacles & Vehicles			**1.25**	**1.25**	**1.25**	
	Design Mass for Receptacles	MT		131	157	188	131
	Design Volume for Receptacles	cum		263	314	376	263
	Waste Containers (0.5 cum)	nos		79	94	113	79
	Waste Containers (1 cum)	nos		53	63	75	53
	Dumper Placer (3 cum)	nos		57	68	81	57
	Auto Pickups for Direct Collection	nos		29	35	41	29
	Twin Dumper Placer Vehicles	nos		9	11	14	9
	Refuse Collectors / Compactors	nos		2	2	3	2
7	Waste Treatment and Disposal						
	Tipping Trucks	nos	-	1	1	1	1
	Compost Plant	MT	104	42	50	60	-
	Sanitary Landfill	MT	-	76	91	108	76
	Sanitary landfill Area requirement	Ha.	0.234	0.264	0.317		
	Total landfill area requirement	Ha.	0.234	1.72	4.91		
	Area of the identified site*	Ha.	7.4				

* Sufficient upto 2021

9.5 Roads and Transportation

9.5.1 Overview

Roads and urban transport proposals under the Kerala Sustainable Urban Development Project (KSUDP) are based on a Conceptual Road Network Plan (CRNP) prepared for each Project city. The CRNP was developed based on previous comprehensive traffic and transport schemes (CTTS) prepared for each Project city. The CRNP also drew from inputs based on discussions with officials from concerned municipal corporations (MCs), Development Authority, Town Planning Department, Public Works Department and the Transportation Advisor to Government of Kerala (GoK), Prof. Dr. NS Srinivasan. The CRNP also takes into consideration the existing network, directions of likely development, Master Plan/Traffic Study proposals, stakeholder's suggestions, etc. Details on the CRNP are provided in **Volume 6 – Technical Analysis, Section E**.

The Urban Policy and Action Plan-2002 formulated by the Government of Kerala (GoK) aims at providing basic services and economic growth in urban areas and address the transport and road safety issues. The role of urban transport planning is to integrate other city infrastructure sub-sectors for achieving the desired development vision and economic growth targets.

This section focuses on roads and transportation improvement requirements in Kozhikode city. The urban transport sub-sector review includes: (i) a detailed assessment of the existing system; (ii) review of prevalent operational practices; (iii) identification of critical issues; (iv) review of on-going development initiatives, including the role of private sector participation; (v) need for additional infrastructure strengthening to address the identified critical issues effectively; and (vi) identification of financial implications. The analysis and recommendations made are based on the review of available secondary data and proposals, site visits, field surveys (to the level required to update available data and undertake the need assessment and analysis) and discussions with the stakeholders including the officials of the municipal corporation (MC), Kozhikode Development Authority (KDA), Town and Country Planning Department (TCPD), Kerala Urban Development Project (KUDP), Public Works Department (PWD) and National Transportation Planning and Research Centre (NATPAC).

Areas covered. The areas covered under urban transportation include:

a) Road network system comprising of road availability, traffic and travel characteristics (radial roads, by-passable traffic, central city area, junctions, parking and pedestrian facilities) and road safety;

b) Street lighting; and

c) Public transport system.

Project identification. The criteria adopted for identification of sub-projects from a long list are as follows:

a) Need analysis based on demand assessment and supply gap;

b) Urban strategy and existing Development Plans;

c) Environmental and social impact;

d) Financial viability and project sustainability;

e) Compatibility with committed projects;

f) Project implementation strategy;

g) Exclusion of committed projects under different schemes;

h) Capacity augmentation to major radial roads in the outer city area and major arterial/sub-arterial roads in the intermediate city area so as to activate the desired dispersal of activities. The road network concept of 'ring and radial' pattern developed in the Development Plan for Kozhikode City is considered as the guiding factor. The capacity augmentation shall include:

   - Missing links in the identified ring roads of different categories in city road network;
   - Important links providing vital connectivity between the ring roads; and
   - All major radial roads up to city limit or to a suitable ring road/bypass.

i) Access to major activity centers like tourist destinations, transport terminals, solid waste disposal / processing yard, inter-modal integration and industrial / medical / educational centers;

j) Existing traffic demand corridors with high volume-capacity ratio;

k) Segregation of through traffic from central city by providing appropriate link roads or by-passes;

l) Road safety aspects covering pedestrian facilities, junction improvements, parking aspects, road signage, lane marking, etc.; and

m) Design and selection criteria prescribed by the Indian Roads Congress (IRC).

Guidelines for Sub-Project Selection. Apart from the discussions with stakeholders, schemes proposed in various reports and documents were considered for sub-project identification. The documents reviewed comprise:

a) Interim Development Plan for Calicut Urban Complex (1967), Department of Town and Country Planning, Govt. of Kerala;

b) Development Plan for Calicut Urban Area (2001), Department of Town and Country Planning, Govt. of Kerala;

c) Traffic Improvement Schemes for Kozhikode City, Draft Final Report (2000), NATPAC; and

d) Road Development and Traffic Management, Project Summary (1992), Kerala Urban Development Project, GoK.

Traffic Surveys. In order to understand the traffic characteristics, update the available study results and facilitate the sub-project preparation in identification, design and costing, primary traffic surveys were carried out in limited level. They include:

a) Link volume at eleven locations;

b) Turning volume count at three junctions;

c) Rail level crossing survey at one location; and

d) Speed and delay survey on selected major road sections.

Also detailed road inventory survey was carried out on selected eleven major corridors totaling 29 km, so as to understand the available road space and its usage, pedestrian facilities, street lighting, drainage, parking locations, bus stops etc. Potential scheme locations are given more consideration in selecting the traffic survey locations by eliminating the committed project locations. Details of survey analysis results are provided in the **Supplementary Report (Roads and Urban Transportation)**.

9.5.2 Existing Roads

With 83-sq.km area, Kozhikode city has a road network of 723 km of which nearly 57% is surfaced. The road density is 8.7 km per sq. km area.

Table 9-8: Road Network in Kozhikode City

Road Category	Length (Km)	% Share
Black Top Road	361	49.93%
Metal Road	54	7.47%
Concrete Road	49	6.78%
Others	259	35.82%
Total	**723**	**100.00%**

Source: Directorate of Urban Affairs, Govt. of Kerala.

Of the available road network within the city, following constitute major roads and they include:

a) Ramanattukara Road (NH17);
b) Kannur Road (NH17);
c) Wynad Road;
d) Mavoor Road;
e) Mini Bypass from Meenchanda to West Hill;
f) Beach Road;
g) CH Flyover;
h) Oyitti Road;
i) Town Hall Road;
j) Railway Station Road;
k) Gandhi Road;
l) MM Ali Road;
m) Pavamani Road;
n) MCC Cross Road;
o) Rajaji Road;
p) Jail Road;
q) Puthiyangadi-Kakkodi Road; and
r) Francis Road.

The city lacks an established road network. Lack of proper supporting network to the arterial roads, inadequate parallel roads to NH 17 in north-south axis and lack of proper road corridors to the eastern part where new developments are coming up renders a weak road network to the city. Mini Bypass between Meenchanda and West Hill through Mankavu provides the much-needed relief to urban

section of NH 17 to a certain extent. The on-going NH Bypass development will provide the second level ring to the city. These rings will require adequate radial roads emanating from the concentrated western part of the city, so as to reduce the traffic problems in the narrow central city roads. Considering these problems, CES Study (1992)[11] had identified the following roads for improvements:

a) Coastal road;
b) Mini Bypass between Arayidathupalam and Mankavu;
c) Wynad road upto Malaparamba;
d) Beach-CH Flyover section;
e) Gandhi road-MCC road junction including ROB; and
f) Francis road.

Several other studies carried out by NATPAC have recommended area specific improvements, including development of Mini Bypass, Beach-CWRDM road, improvement to critical junctions, reconstruction of the pedestrian subway at Palayam junction, etc. Most of these proposals are not completed or at various stages of implementation.

Most of the roads in the central city in and around Palayam are narrow with intense commercial activities and heavy traffic causing frequent traffic congestion. Footpaths were inadequate or absent in most of the major roads. Generally, the road surface was found to be poor with cracks, rutting and potholes.

Problems and Issues:

a) Narrow width of roads in central part of the city;
b) Heavy traffic congestion at the central area due to the mix of intra-city and inter-city traffic. This is due to the absence of adequate by-passes as well due to the locations of bus terminals and wholesale market in the central city area;
c) Heavy pedestrian traffic in central part of the city;
d) Mixed traffic conditions with the presence of slow moving vehicles on critical road sections;
e) Unorganized on-street parking demand along the major corridors and the absence of off-street parking facilities at critical locations;
f) High trip attraction of the central city around Palayam area due to the concentration of activities like commercial (wholesale and retail), work, health, education and recreation;
g) Presence of rail level crossings on major roads;
h) Encroachment of right of way for non-transport purposes;
i) Idle parking and uncontrolled loading/unloading activities by trucks near go-downs and wholesale markets within the central city;
j) Absence of planned bus bays;
k) Non-scientifically designed intersections; and
l) Bad road conditions.

[11] Road Development and Traffic Management – Project Summary (1992), Consulting Engineering Services Ltd (CES), New Delhi,

Most of the arterial and sub-arterial roads are under Public Works Department (Roads and Buildings Division and National Highway Division) and collector roads under the MC and responsible for development and maintenance for their roads. Inadequate maintenance by these agencies due to various reasons, frequent road cuttings by utilities, etc., has resulted in poor riding quality for most of the city roads. All the problems together have resulted in speed reductions during the peak-hours in city roads. The speed at the selected major city road sections found in the range of 14 to 37 km per hour (**Table 9-9**).

Table 9-9: Speed and Delay Characteristics at Selected Links

Sl No	Name of the Road	Length (Km)	Peak Hour			Off-peak Hour		
			Journey Speed (Km/hr)	Delay (Sec)	Running Speed (Km/hr)	Journey Speed (Km/hr)	Delay (Sec)	Running Speed (Km/hr)
1	Beach road to Mini Bypass via Vellayil ROB	3.00	17.70	161	24.05	23.63	43	26.09
2	Mankavu - Nellikode road via Govindapuram	2.50	31.36	41	36.59	36.44	23	40.18
3	Mini Bypass form West Hill to Meenchanda	12.00	27.55	175	31.01	38.40	64	40.72
4	Puthiyangadi-Kakkodi-Thannerpanthal road	5.50	37.15	55	41.42	40.49	29	43.04
5	Francis road/Kallai road junction to Mini Bypass	3.00	24.11	81	29.43	31.67	33	35.06
6	Pavamani road	0.60	16.36	39	23.23	25.71	18	32.73
7	Jail road from Poonthanam junction to Mini Bypass	0.70	14.65	30	17.75	23.77	16	28.00
8	Oyitti road (ROB to Town Hall)	0.50	15.38	18	18.18	35.29	11	45.00

Source: Primary Survey under ADB PPTA, 2004.

Growth Rate. Based on peak hour traffic on comparable junctions and road links[12], the average annual traffic growth rate for the city roads during the period 2000-04 was found to be 5.8%. Hence, 6% annual growth is considered for projection purpose. However, this growth rate should be taken as indicative as it is based on only a few road sections.

Prospects. Different agencies are involved in planning, construction, and maintenance of the urban road network in Kozhikode City. Major committed projects comprising of on-going and sanctioned are summarized below.

Committed Urban Transport Projects in Kozhikode City

a) PWD (R&B)

1) Junction Improvement;
   - Pottammal Junction on Mavoor Road (partially completed); and
   - Proposal to improve Eranjipalam Junction along with widening of the Canal Bridge by 3m (estimated cost Rs.30 million).

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submitted to Kerala Urban Development Project, Government of Kerala.

2) Road Widening;
   - Improvement to Mavoor Road.
     - From Indira Gandhi Jn to Medical College four laning completed.
   - Improvement to Nellikode - Civil Station Road under MLA Road scheme.
     - First phase from Chulliyodu Bridge to Pallimalakunnu Road completed with 12m ROW;
     - Second phase from Pallimalakunnu Road to Mavoor Road - LA completed with 12m ROW and Road formation to start; and
     - Third phase from Chulliyodu Bridge to Civil Station (Wynadu Road) - LA in progress with 12m ROW and Road formation to start.

3) Proposal to Widen the Meenchanda - Mankavu section of Mini Bypass;
   - Proposal to widen the carriageway under Phase 1.

4) Widening of Karaparamba-Kunduparamba Road along the canal to two-lane road. Land acquisition completed and work in progress; and

5) Improvement to part of Coastal Road as Model Road with the financial support of GoK, Tourism Department.

b) Kozhikode Development Authority & Kozhikode Corporation

- Commissioner Office Jn - Stadium Junction section of Pavamani Road
  - Widened to four-lane with improvement to junctions.
- Palayam - Poonthanam Junction section of M.M. Ali road
  - Widened to three-lane with footpath.

9.5.3 Urban Travel Demand and Traffic Characteristics

Link Volume. CES Study (1992) had projected the average daily traffic for few major roads in the central city for the year 2001, and this varied from 33,000 vehicles per day at Mankavu-Arayidathupalam section of Minibypass to 11,400 vehicles per day on Francis road. NATPAC Study (2000) reveals that peak hour traffic at selected inner and intermediate city road sections varied between 2,000 PCU and 10,000 PCU as given in **Table 9-10** below.

[12] Junction count data available in 'Traffic Improvement Schemes for Kozhikode City'-Draft Final Report, (2000), NATPAC is used.

Table 9-10: Peak Hour Traffic at Selected Locations

Sl. No.	Section	Peak Hour Traffic (PCU)[13] - 2000
1	Mavoor Road (Wynad road Jn-Rajaji road Jn.)	3,186
2	Mavoor Road (Arayidathupalam to Medical College direction)	1,997
3	Wnad road from Mavoor road junction (one way)	3,856
4	Rajaji road from Mavoor road junction	3,713
5	Meenchanda-Mankavu section of Mini Bypass	4,827
6	Eranjipalam-Karaparamba section of Mini Bypass	2,131
7	Meenchanda-Kallayi section of NH 17	6,550
8	Meenchanda-Feroke section of NH 17	9,657
9	Mankavu-Francis road section	3,546

Source: Traffic Improvement Schemes for Kozhikode City - Draft Final Report (2000), NATPAC.

The projected average annual daily traffic (AADT) on a small number of main road sections for the year 2004 indicate that traffic in the range of about 20,000 to 52,000 passenger car units (PCU) in the inner city road sections, 32,000 to 42,000 PCU for intermediate city road sections and in the range of 5,000 to 14,000 PCU on roads in the periphery of the city (Table 9-11). This high traffic volume exerts pressure on the existing narrow urban roads, causing frequent congestion and accidents.

Table 9-11: Projected Peak Hour Traffic Distribution at Selected Locations

Sl No	Name of the Road Stretch	Peak Hour Volume (PCU/hr) 2004*	Estimated AADT in PCU-2004**	Projected AADT in PCU-2009***	Projected AADT in PCU-2014
1	**Outer City Sections**				
1.1	Vellayil ROB - Christian College Section	1,432	14,320	19,163	25,645
1.2	Puthiyangadi-Kakkodi Road	547	5,470	7,320	9,796
1.3	Mankavu - Kottuli road	853	8,530	11,415	15,276
2	**Intermediate City Sections**				
2.1	Medical College - Arayadathupalam	3,242	32,420	43,385	58,059
2.2	Eranjipalam - Arayadathupalam	4,183	41,830	55,978	74,911
2.3	Mankavu - Arayadathupalam	3,494	34,940	46,758	62,572
3	**Inner City Sections**				
3.1	Pavamani Road	2,015	20,150	26,965	36,086
3.2	Francis Road – Mini Bypass	2,677	26,770	35,824	47,941
3.3	New Bus stand - Arayadathupalam	5,192	51,920	69,481	92,981

*-Primary survey under ADB PPTA, 2004; **-Estimated with 10% as peak hour factor; ***-Projected with 6% annual growth rate.

The primary survey carried out at eleven selected road sections in September 2004 indicates that seven sections have exceeded their maximum capacity, as given in **Table 9-12**, and need widening.

[13] In order to assess traffic flows and patterns, a common unit called the passenger car unit (PCU) is followed in India. The PCU is a unit, which represents equivalent space occupied by a particular vehicle type in the traffic stream, corresponding to its average speed. The car is considered a representative vehicle and its PCU is assumed as unity. The PCU is used to determine the traffic intensity of different roads with different composition of vehicle types; the traffic capacity of different road types; and the utilization level of a particular road to define congestion levels. Further details are provided in Volume 6 – Technical.

Table 9-12: Capacity Utilization of Selected road Sections

Sl No	Name of the Road Stretch	Average Carriageway Width (m)	Peak Hour Volume (PCU/hr) 2004	Capacity* (PCU/hr)	V/C Ratio[14] 2004	Projected V/C Ratio 2014
1	Pavamani Road	5.50	2,015	800	2.52	4.51
2	Mankavu - Kottuli road	5.50 to 7.0	853	800	1.07	1.91
3	Vellayil ROB - Christian College Sec	6.6 to 7.7	1,432	2,143	0.67	1.20
4	Puthiyangadi-Kakkodi Road	5 to 6.5	547	800	0.68	1.22
5	Mankavu Jail Road	7.3 to 10	2,713	2,143	1.27	2.27
6	Francis Road – Mini Bypass	7.3 to 10	2,677	2,143	1.25	2.24
7	Butt Road	4.1 to 6.7	642	400	1.61	2.87
8	New Bus stand - Arayadathupalam	14	5,192	5,143	1.01	1.81
9	Medical College – Arayadathupalam	14	3,242	5,143	0.63	1.13
10	Eranjipalam - Arayadathupalam	15	4,183	4,286	0.98	1.75
11	Mankavu - Arayadathupalam	10	3,494	2,143	1.63	2.92

Source: Primary survey under ADB PPTA (2004).

Radial Roads. Of the existing radial roads, four roads are on major corridors with high inter-city vehicular traffic entering/leaving the city and they include:

a) Kannur road (NH 17);
b) Feroke road (NH 17);
c) Wynad road (NH 208); and
d) Mavoor road.

Central City Roads. The major problem encountered in Kozhikode city is the organic development of the central area, with the concentration of urban activities. Hence telescopic pattern of increasing traffic towards the central area is maintained. CES Study (1992) had established that nearly 46% of the traffic on city roads interacts with the central area. This has reflected in the high traffic volume on the central city roads, which are narrow. All radial roads, and a few arterial roads, emerge from this region carry considerable through traffic. All these cause high traffic volume on the narrow central city roads and thus most of these roads have already exceeded their maximum capacity. This warrants area specific traffic management measures of low cost nature, as road widening would involve excessive displacements and cost.

Junctions. Road widths in the inner and intermediate city areas are generally narrow and experience heavy traffic flow. This results in frequent traffic congestion and problem for turning traffic at junctions. Of the ten major junctions where turning traffic data is available for the year 2000, seven junctions, mostly on Mini Bypass and Mavoor Road, have peak hour volume of more than 4,000 PCUs and projected to cross 9,000 PCUs by the year 2014 (**Table 9-13**). Most of the junctions need redesign and signalization. Accident statistics show that the junctions are potential accident locations. Absence of adequate pedestrian facilities, locations of bus stops and IPT parking close to junctions, absence of adequate turning radius, encroachment, etc., are the few major problems at junctions.

[14] The Volume/Capacity (V/C) Ratio indicates the congestion levels on a particular road. The Indian Road Congress (IRC) specifies a design service volume (DSV) for each road type therefore indicating a level of service. The utilization of a particular road is then derived using the V/C Ratio where 'V' indicates the observed traffic volume on the identified road type and 'C' indicating the DSV or the Maximum Volume on the identified road type. Further details are available in Volume 6 – Technical.

Table 9-13: Peak Hour Traffic at Selected Major Junctions

Sl. No.	Junction Name	Peak Hour	Peak Hour Junction Traffic (PCU) - 2000**	Projected Peak Hour Junction Traffic (PCU)*		
				2004	2009	2014
1	Indira Gandhi Road Junction	9.30-10.30 AM	5,642	7,123	9,532	12,756
2	Rajaji Road Junction on Mavoor Road	4.30-5.30 PM	5,866	7,406	9,910	13,262
3	Pottammel Junction on Mavoor Road	8.45-9.45 AM	2,078	2,623	3,511	4,698
4	Chevayoor Junction	8.45-9.45 AM	4,674	5,901	7,897	10,567
5	Medical College Junction	9.00-10.00 AM	1,608	2,030	2,717	3,636
6	Meenchanda Bypass Junction	5.00-6.00 PM	10,165	12,833	17,174	22,982
7	Mankavu Junction	5.30-6.30 PM	8,220	10,378	13,888	18,585
8	Arayidathupalam Junction	9.15-10.15 AM	4,496	5,676	7,596	10,165
9	Eranjipalam Junction	9.00-10.00 AM	4,064	5,131	6,866	9,188
10	Karaparamba Junction	8.45-9.45 AM	2,254	2,846	3,808	5,096

*-Projected with 6% annual growth rate.

**-Source: Traffic Improvement Schemes for Kozhikode City, Draft Final Report (2000), NATPAC.

The survey carried out in 2004 at two junctions revealed peak-hour traffic flows in the range of 6,800 to 8,000 PCUs, which reflects the traffic intensity at other major junctions on the arterial roads justifying the need for improvements to minimize the junction related traffic problems.

Table 9-14: Peak-Hour Turning Traffic at Selected Junctions

Sl No	Junction Name	Peak-hour	Peak-hour traffic volume	
			No. of vehicles	PCU*
1	Eranjipalam Junction	03.15-4.15 PM	5,310	6,831
2	Arayidathupalam Junction	08.15-09.15 AM	5,093	8,200
3	Indira Gandhi Junction	10.00-11.00 AM	4,970	7,177

* - PCU conversion is as per IRC: 106-1990 (Guidelines for capacity of Urban Roads in Plain areas)
Source: Primary survey under ADB PPTA, (2004).

Parking. Palayam, urban section of NH17, Mavoor Road, Rajaji Road, Francis Road, Railway Station Road, M.M.Ali Road, Mananchira, Wynad Road, Gandhi Road and Pavamani Road are the major parking demand corridors in the central city area. Retail shopping and wholesale markets generate more demand for on-street parking for passenger and goods vehicle in the market areas. The non-availability off-street parking in the central city area, where parking demand is heavy, results in on-street parking on the narrow roads. This reduces the road space causing frequent traffic hold-ups.

Pedestrian Facilities. Apart from all the major road corridors in the inner and intermediate city area, locations with commercial, hospital and educational activities were found with heavy pedestrian traffic for parallel and crossing movement. Outer city road sections were also found with considerable pedestrian traffic, particularly during the peak hours. The critical sections with heavy pedestrian traffic include roads in the central city like M.M. Ali Road, Railway Station Road, NH 17, Mavoor Road, Oyitti Road and other roads leading from Palayam area. Roads in intermediate and outer city areas were also observed to have heavy pedestrian traffic. Nearly 900 pedestrian counts were observed at Francis Road-Mini Bypass section during the peak hour in the survey carried out in 2004.

Except in a few sections, most of the roads do not have footpath facilities and the pedestrians have to negotiate with fast moving traffic resulting in a high accident risk.

Table 9-15: Mid-Block Pedestrian Count at Selected Locations

Sl No	Section Name	Peak Hour	Peak hour Pedestrian Counts
1	Vellayil ROB - Christian College Section	5.30-6.30 PM	690
2	Francis Road - Mini Bypass	3.30-4.30 PM	884
3	Mankavu - Kottuli road	5.45-6.45 PM	440
4	Mankavu Jail Road	8.00-9.00 AM	521
5	Pavamani Road	8.00-9.00 AM	479
6	Puthiyangadi-Kakkodi Road	8.45-9.45 AM	271

Source: Primary Survey under ADB PPTA, 2004.

9.5.4 Road Safety

In 2003, Kozhikode district had 207,117 registered motor vehicles, of which the majority was in the city region. This suggests that on average, there are 70 motor vehicles for every 1,000 persons, which is less than the state average of 78 motor vehicles per 1,000 persons. During the period 1991-2001, the average growth of vehicle population was 12% but with a decreasing trend during 2001-03 (10%)[15]. Growth of motor vehicles and its pressure on the road network is found to be significant, resulting in over utilization of road network in the region with frequent traffic related problems like congestion and accidents. Available statistics indicate that road accidents are a major concern in Kozhikode District with 5% average annual growth rate during 2001-03 (**Table 9-16**).

Table 9-16: Growth of Traffic Accidents in Kozhikode District

Sl. No.	Year	No. of Accidents	Annual Growth (%)	No. of Persons Injured	Annual Growth (%)	No. of Persons Killed	Annual Growth (%)
1	2000-01	3,196	-	4316	-	214	-
2	2001-02	3,369	5.41	4297	-0.44	251	17.29
3	2002-03	3,521	4.51	4114	-4.26	236	-5.98
AACGR (%)							
1	2001-03		4.96%		-2.37%		5.01%

Source: Economic Review 2002 and 2003, State Planning Board, Govt. of Kerala.

9.5.5 Existing Street Lighting

In general, urban roads are provided with street lights of different categories. Kozhikode MC is maintaining the street lights through Kerala State Electricity Board (KSEB). Of the 14,855 lights[16] available in MC, 6,908 are bulbs (46.5%), 5,341 tube lights (36%), 2,589 SVL (17.4%) and 15 MVL (0.1%) which on average provides 49m between posts. The road inventory survey conducted by the PPTA at selected roads revealed that the roads are adequately lit with tubes (44%) and MVL/SVL (48%). Average distance between lamp posts on major roads was found to be 44 m. Of the streetlights surveyed, 4.3% were found not working due to reasons like delay in maintenance.

[15] Compiled from Economic Review 2002 and 2003, State Planning Board, Govt. of Kerala.
[16] Data provided by Kozhikode Corporation.

Table 9-17: Details of Street Lights Availability at Selected Road Sections

Sl. No.	Road Section	Length (km)	Number of lights				Avg. space between street lights (m)	Lights not working on survey day	
			Bulbs	Tubes	MVL/ SVL	Total		No.	%
1	Beach road to Mini Bypass via Vellayil ROB	3.1	20	43	25	88	35.23	9	10.23
2	Mankavu - Nellikode road via Govindapuram	2.5	7	24	35	66	37.88	0	0.00
3	Mini Bypass form West Hill to Meenchanda	11.1	20	82	156	258	43.02	11	4.26
4	Puthiyangadi-Kakkodi-Thannerpanthal road	5.4	0	71	15	86	62.79	1	1.16
5	Francis road/Kallai road junction to Mini Bypass	3.5	8	51	25	84	41.67	1	1.19
6	Pavamani road	0.5	0	2	6	8	62.50	0	0.00
7	Jail road from Poonthanam junction to Mini Bypass	0.6	1	2	9	12	50.00	0	0.00
8	Oyitti road (ROB to Town Hall)	0.6	0	0	12	12	50.00	3	25.00
9	Butt Road	0.6	0	13	3	16	37.50	0	0.00
10	Eranjipalam-civil Station road	0.8	0	3	19	22	36.36	4	18.18
11	Fourth Gate road	0.6	0	1	15	16	37.50	0	0.00
	Total	**29.3**	**56**	**292**	**320**	**668**	**43.86**	**29**	**4.34**

Source: Primary Survey under ADB PPTA, 2004.

9.5.6 Existing Access to Public Transport

a) Rail Transport. Kozhikode Junction is the major rail station and the rail line divides the city into two parts by passing through the city center. Four rail over bridges (ROB) provide uninterrupted access between the two parts of the city. Level crossings at Bhatt Road, IVth Gate, Mittai Street and Payyanaikkal, located on major roads, affect the road traffic due to their frequent gate closures. Construction of ROBs at these level crossings will help to increase the traffic level on east-west corridors. Primary survey (2004) under the PPTA has revealed that traffic at Butt road level crossing has exceeded the minimum traffic requirement for constructing ROB (0.1 million train vehicle unit). This underlines the fact that most of the level crossings in the city need ROBs.

b) Bus Transport. The private sector operates the city bus services and inter-city services are provided by Kerala State Road Transport Corporation (KSRTC) and private bus operators.

- Two private bus terminals at Palayam and at Mavoor road;
- One KSRTC bus terminal at Mavoor road; and
- Existing routing pattern of city buses create serious traffic problems in the central city area.

Major issues include: bus stops with poor design and locations; inadequate terminals for private buses; location of bus terminal in the congested central city area and inadequate coverage of public transport services due to poor/narrow roads resulting in concentration on major corridors.

c) Intermediate Public Transport (IPT). Auto-rickshaw is the popular IPT mode and this along with vans and taxies playing a dominant role in meeting a part of the public transport demand.

d) Air Transport. Kozhikode has an international airport at Karipur, about 25 km away. During the year 2002-2003, 7,458 flights were operated from this airport of which 44% were international

flights. Little more than 0.3 million-air passengers boarded or alighted at this airport[17]. The increasing air traffic put more pressure on the city road network from/to airport for mode change.

e) Water Transport. No IWT system within the city.

9.5.7 Roads and Transportation Scheme Selection

From the CRNP, a long list of priority schemes was identified. The long list was then screened to select schemes that could satisfy the Project objectives and comply with ADB funding requirements and guidelines. During the screening process, committed road network improvement projects by various agencies were reviewed, incorporated in the CRNP and excluded from the proposals undertaken by KSUDP. The proposals finalized for KSUDP were screened based on (i) total transport improvement of the city; and (ii) minimal/negligible environmental and social impacts. Apart from the network justification, traffic-based need analysis was carried out for the identified proposals. Results of the need analysis, taking into consideration the projected volume-capacity ratio and required lanes for the years 2009 and 2014 for all five cities, are presented in **Volume 6 – Technical Analysis, Section E;** the figures justify the need for carrying out improvements to the identified road sections. The road and urban transport proposals identified under KSUDP will therefore form a part of the total city network requirement, for achieving the desired traffic flows and service levels.

Based on city priorities and capacity for implementation within the project timeframe appropriate improvements are proposed with minimum social and environment impact. The proposed sub-project component schemes listed in **Table 9-18** are summarized in **Chapter 10**.

Table 9-18: List of Urban Transport Proposals for Kozhikode City

Sl. No.	Road Name	Activity / Justification	Length (Km)
A	**UPGRADING OF PRIORITY ROADS**		
1	Mini Bypass from Meenchanda to West Hill		
1.1	Arayidathupalam - Eranjipalam	It is part of the Mini bypass with heavy traffic and also required land for widening is available. It is part of the proposal in the Master Plan.	3.00
2	Jail Road from Poonthanam to Mini Bypass.		
2.1	Poonthanam Jn - Jail	It is the main road with bus route linking Palayam and Mini bypass passing through the demand corridor. It is a master plan proposal	0.40
2.2	Jail - Mini Bypass		0.20
3	Oyitti Road (ROB to Town Hall along the rail line)		
3.1	Railway station Jn - Level cross	Main road with bus route linking Railway Station to Town Hall, serving SM Street and the surrounding commercial area. It is a master plan proposal.	0.30
3.2	Level cross - Town Hall Road		0.50
		Total	**4.40**
B.	**NEW INFRASTRUCTURE**		
1.	Flyover at Arayidathupalam on Mavoor Road	To resolve heavy traffic congestion. To be constructed within the available 4-lane road right of way. The 2-lane flyover will cross the Conolly Canal with the required minimum height clearance and sufficient space for parallel service slip roads on both sides without land acquisition or resettlement problems.	0.6

[17] Economic Review, 2002, State Planning Board, Govt. of Kerala

Sl. No.	Road Name	Activity / Justification	Length (Km)
2.	GL off-street Parking Facilities. Located near Palayam Subway on 14 cents of Corporation land.	To reduce on-street parking on the narrow roads of Palayam area to ease traffic congestion.	
3.	Street lighting on major roads in the City, identified by Kozhikode Corporation	To improve traffic safety and public security at night	58.00
4.	Providing Footpaths with guard rail & Drains		
4.1	Francis Road	These central city roads are found with concentrated retail and wholesale commercial activities and so heavy pedestrian traffic. Improvement of pedestrian facilities will help to reduce the accident risk by segregating the pedestrians and vehicular traffic.	1.50
4.2	Big Bazar Road-Palayam Road-MM Ali Road		3.00
4.3	Railway Station link Road		0.50
4.4	Red Cross Road		1.50
4.5	Gandhi Road-Malabar Christian College junction road		2.00
4.6	Pavamani Road		0.60
4.7	Mavoor Road		1.00
4.8	Kannur Road (NH 17) from Francis Road junction to City limit		7.00
4.9	Waynad Road (NH 212) from LIC Office junction upto Malaparamba		4.50
4.10	Rajaji Road		1.50
4.11	SM Street		0.60
4.12	Court Road upto Radha Theatre		1.00
4.13	Road between SM street and GH Road		0.50
4.14	Cherooty road		2.00
4.15	Road parallel to railway line between Bazar road and PT Usha road		2.00
4.16	PT Usha road upto Moonnalukkal junction		1.50
		Total	**30.70**
C	**JUNCTION IMPROVEMENTS**		
1	Pottammal Junction	These are the critical junctions on the arterial roads with heavy turning traffic, cause considerable time loss to the commuters. Improvement to these junctions will help to reduce the junction related problems. Also these junctions were identified for improvement in NATPAC Study.	
2	IG Office Jn- Nadakkavu		
3	West hill Chungam Junction		
4	Poonthanam Jn.		
5	Rajaji road Jn.		
6	Medical College Jn.		
7	Eranjipalan Jn.		
8	Police Commissioner Office Jn.		
9	Pushpa Jn.		
10	BEM Jn. (SBI)		
11	Stadium Jn.		
12	Head Post Office Jn.		
13	Railway Station Jn.		

10. THE PROPOSED SUB-PROJECT

10.1 Project Purpose

The purpose of the Project is to improve the urban environment and living conditions, with particular attention to the urban poor, in the five municipal corporations.

The Sub-Project has thus been designed with city components grouped into three broad, mutually interactive and supporting categories, further elaborated in the sections below.

- Part A: Urban Infrastructure Improvement;
- Part B: Urban Management and Institutional Development; and
- Part C: Implementation Assistance.

10.2 Part A: Urban Infrastructure Improvement

The process leading to the selection and formulation of the main physical infrastructure project components is described in **Volume 1**, **Chapters 7** and **8** plus the technical analysis presented in **Chapter 9** above and **Volume 6 – Technical Analysis**. A review of priority needs in the project cities against the main project objectives has resulted in a concentration on environmental infrastructure components for improvements in: water supply; sewerage and sanitation; storm water drainage; solid waste management; and, urban roads and transportation. A summary description of the sub-project components is given in the following sections.

10.2.1 Water Supply Component

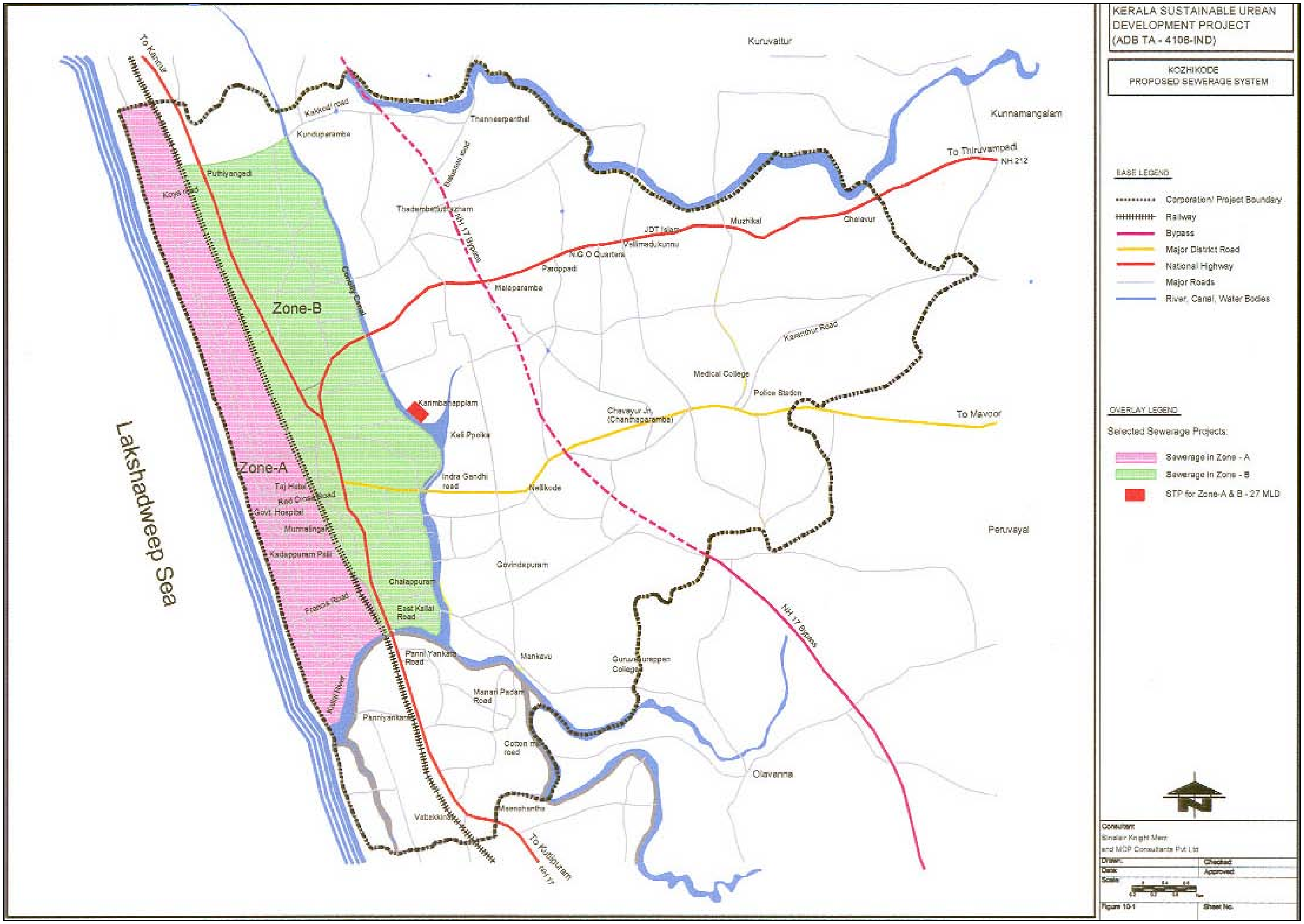
There is no water supply component for Kozhikode. Funding for improving this sector is currently being provided under JBIC assistance.

10.2.2 Sewerage and Sanitation Component

Kozhikode Municipal Corporation will require collecting and treating 90 MLD of sewage discharged from a population of approximately 510,000 by 2041 contemplating a sewerage system with an average per capita water supply of 200 lpcd. The proposed component under KSUDP, contributes in achieving the target through extension of the sewerage networks, construction of a STP, procurement of sewer cleaning equipments, in order to collect and treat approximately27 MLD of sewage from 145,000 users in the high density urban areas of Kozhikode Municipal Corporation. In addition, sanitation improvements in non-sewered areas are proposed through on-site sanitation systems and de-sludging of existing septic tanks, benefiting a total population of 260,000.

Based on city priorities and capacity for implementation within the project timeframe the following sub-project component is proposed. Funds are also allocated in Part B – Urban Management and Institutional Development, under the poverty alleviation component, for community infrastructure, such as on-plot sanitation and community sanitation facilities for poor communities. The proposed sewerage system is indicated in **Figure 10-1**.

Total component beneficiaries at EOP (2011) will be 403,800 of which 29,100 are poor.


KERALA SUSTAINABLE URBAN DEVELOPMENT PROJECT (ADB TA - 4106-IND)
KOZHIKODE
PROPOSED SEWERAGE SYSTEM
BASE LEGEND
Corporation/ Project Boundary
Railway
Bypass
Major District Road
National Highway
Major Roads
River, Canal, Water Bodies
OVERLAY LEGEND
Selected Sewerage Projects:
Sewerage in Zone - A
Sewerage in Zone - B
STP for Zone-A & B - 27 MLD
Lakshadweep Sea
Zone-A
Zone-B
Kuruvattur
Kunnamangalam
To Thiruvampadi
NH 212
To Kannur
To Mavoor
Medical College
Police Station
Peruvayal
Olavanna
To Kadalundi
Consultant:
Figure 10-1
Sheet No.

Sub Component 2a: Rehabilitation of the Existing Sewerage System - (Zone A)

- Conditional survey and rehabilitation of 17 km existing sewers (area 8.2 sq. km);
- Completion of 45 km sewer lines (250-600 mm RCC) with 14,000 house connections serving 70,000 population; and
- Construction of 3 nos. sewage pumping stations; installation of pumps (180 HP); laying of pressure mains (300 mm CI- 8 km); Installation of DG sets (50 KVA).

Sub Component 2b: Extension of the sewerage in North & Central MC Area - (Zone B)

- Laying of sewer lines (250-600 mm RCC-60 km) with 15,000 house connections serving 75,000 population; and
- Construction of 3 nos. sewage pumping stations; installation of pumps (170HP) and laying of pressure mains (250-350 mm CI- 4 km); installation of DG sets (60KVA).

Sub Component 2c: Construction of 27 MLD STP at Karimbanapalam for Zones A & B

- Construction of 27 MLD STP based on FAB technology utilizing land under KWA. The treated effluent from the STP shall be discharged into the Conolly Canal. Details of the STP site plan are indicated in **Figure 10-2**.

Sub Component 2d: Facilities for Non-Sewered Areas

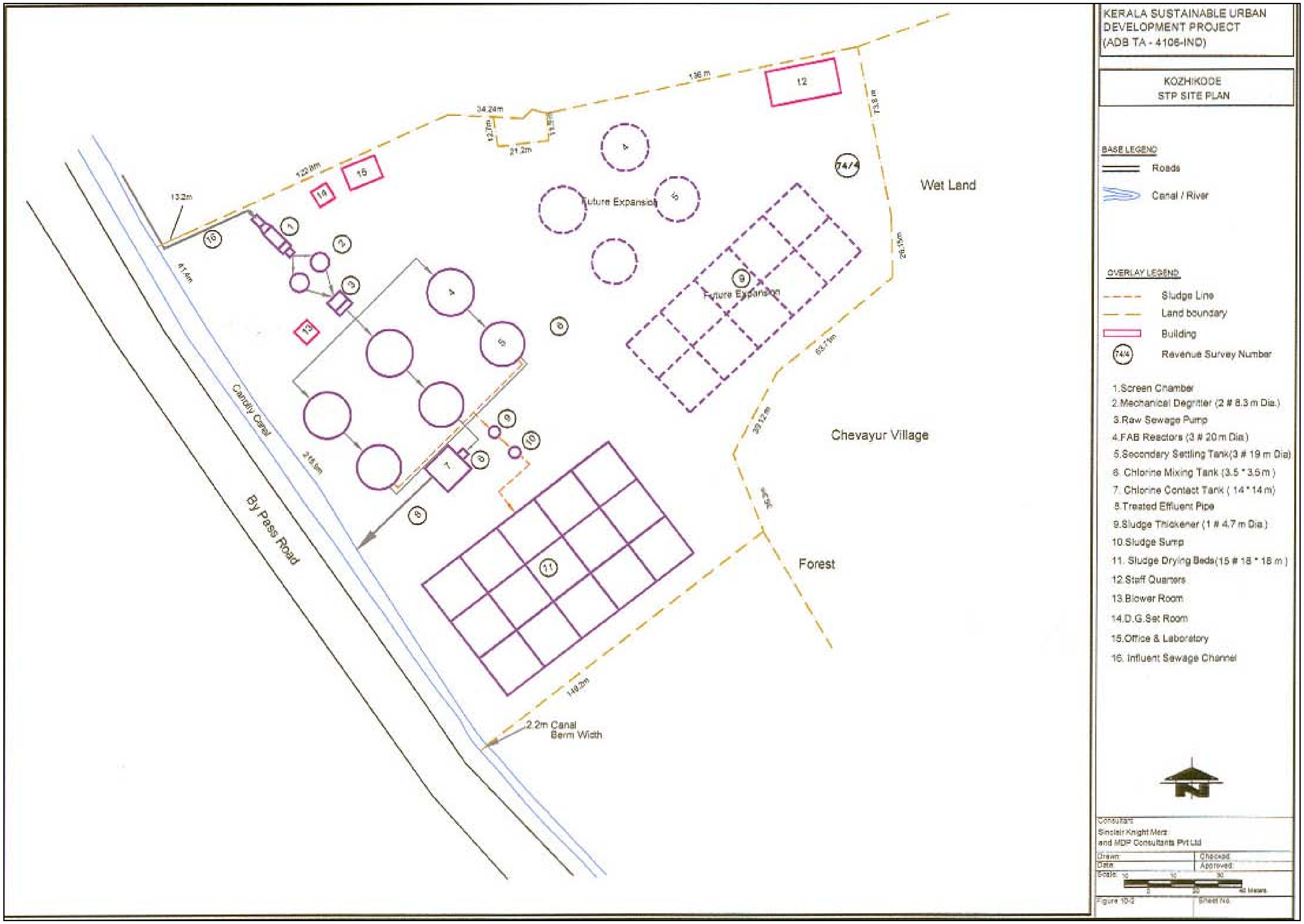
- The non-sewered areas have substantial number of septic tanks, which are not regularly desludged. Five vacuum suction machines will be procured to improve this service benefiting a population of 244,300. The proposed 27 MLD STP will have provisions to store, further digest and dewater the septic tank sludge collected from the above areas; and
- Provision of 1,400 household twin pit pour-flush latrines and 25 community sanitation blocks (included under poverty alleviation component).

10.2.3 Urban Drainage Component

Kozhikode receives an average annual rainfall of 3000 mm. Thrissur Municipal Corporation will require maintaining 250 km of its drainage system with 52 km of road side drains. The proposed component under KSUDP, contributes in mitigating the localized flooding during Monsoons in affected parts of the city through rehabilitation of the existing drains, construction of new drains, covering of drains in order to effectively dispose off the storm water in the urban areas. To achieve this, topographical surveys and preparation of 1m contour maps is essentially proposed to prepare a detailed drainage master plan taking into consideration the rainfall and other topographical factors.

The following sub-components have been chosen based on implementation within the project timeframe and conforming to ADB's Environmental and Social Guidelines. Urban drainage proposals are indicated in **Figure 10-3**.

Total component beneficiaries at EOP (2011) will be 122,000 of which 20,400 are poor.


KERALA SUSTAINABLE URBAN DEVELOPMENT PROJECT (ADB TA - 4106-IND)
KOZHIKODE
STP SITE PLAN
BASE LEGEND
Roads
Canal / River
OVERLAY LEGEND
Sludge Line
Land boundary
Building
74/4
Revenue Survey Number
1.Screen Chamber
2.Mechanical Degritter (2 # 8.3 m Dia.)
3.Raw Sewage Pump
4.FAB Reactors (3 # 20 m Dia.)
5.Secondary Settling Tank(3 # 19 m Dia)
6. Chlorine Mixing Tank (3.5 * 3.5 m)
7. Chlorine Contact Tank (14 * 14 m)
8.Treated Effluent Pipe
9.Sludge Thickener (1 # 4.7 m Dia.)
10.Sludge Sump
11. Sludge Drying Beds(15 # 18 * 18 m)
12.Staff Quarters
13.Blower Room
14.D.G.Set Room
15.Office & Laboratory
16. Influent Sewage Channel
Consultant
Sinclair Knight Merz
and MDP Consultants Pvt Ltd
Drawn:
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Date:
Approved:
Scale:
40 Meters
Figure 10-2
Sheet No.
Wet Land
Chevayur Village
Forest
Future Expansion
Canolly Canal
By Pass Road
2.2m Canal
Berm Width
136 m
34.24m
21.2m
12.7m
122.8m
13.2m
41.4m
215.9m
149.2m
73.8 m
26.15m
63.71m
39.12m

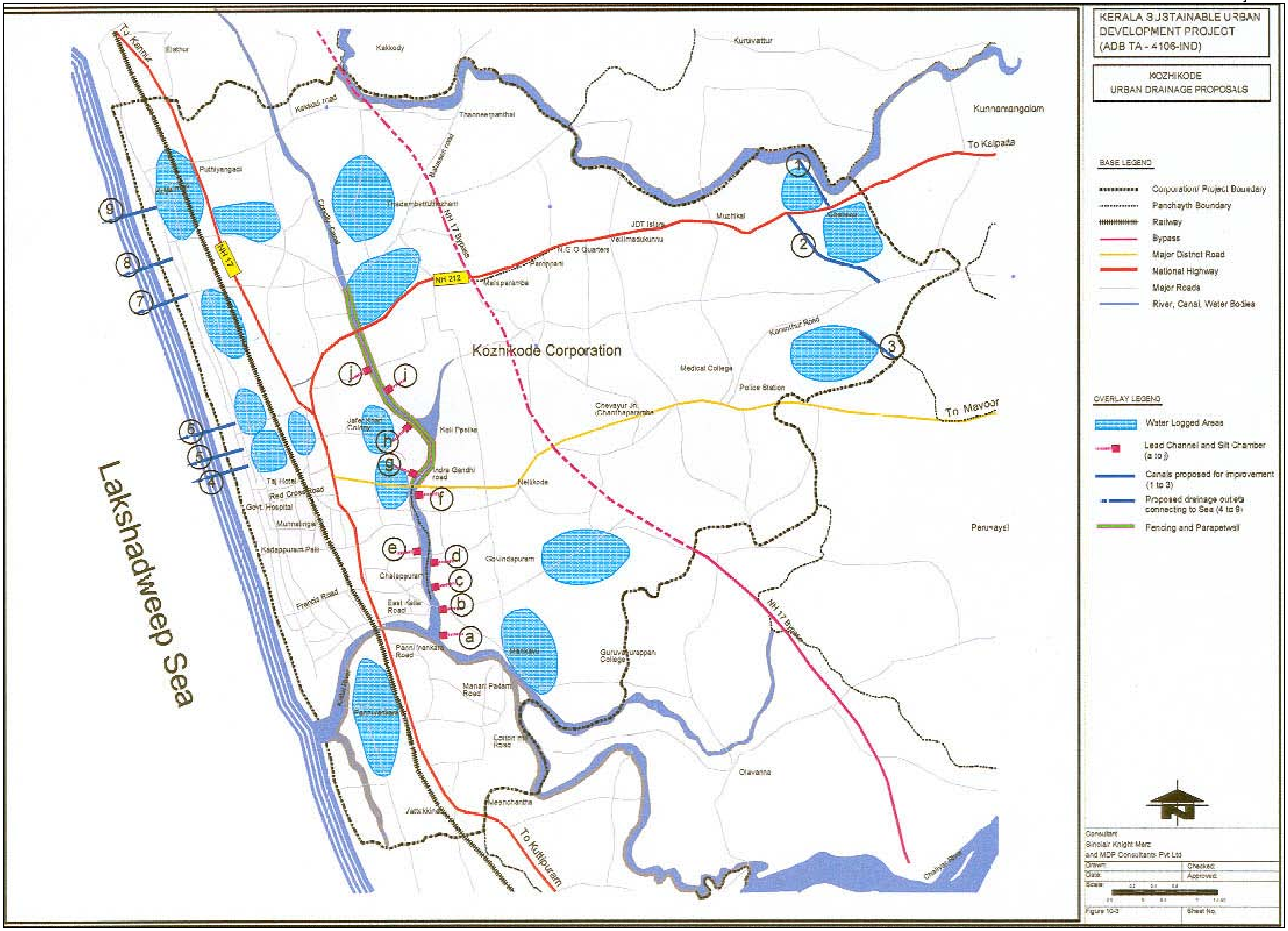
KERALA SUSTAINABLE URBAN DEVELOPMENT PROJECT (ADB TA - 4106-IND)
KOZHIKODE
URBAN DRAINAGE PROPOSALS
BASE LEGEND
Corporation/ Project Boundary
Panchayth Boundary
Railway
Bypass
Major District Road
National Highway
Major Roads
River, Canal, Water Bodies
OVERLAY LEGEND
Water Logged Areas
Lead Channel and Silt Chamber (a to j)
Canals proposed for improvement (1 to 3)
Proposed drainage outlets connecting to Sea (4 to 9)
Fencing and Parapetwall
Kozhikode Corporation
Lakshadweep Sea
Kunnamangalam
To Kalpatta
To Mavoor
Peruvayal
Olavanna
Medical College
Police Station
To Kannur
To Kuttipuram
NH 17
NH 212
NH 17 Bypass
Kakkody
Kuruvattur
Thanneerpanthal
Puthiyangadi
Muzhikal
Chevayur Jn.
Nellikode
Govindapuram
Chalappuram
Meenchantha
Vattakkinar
Consultant:
Sinclair Knight Merz and MDP Consultants Pvt Ltd
Drawn:
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Figure 10-2
Sheet No.

Sub-Component 3a: Detail Study and Preparation of Drainage Master Plan (included under Implementation Assistance);

Sub-Component 3b: Improvement of Secondary Drains and Inlets to Elathur-Kallai Canal;

Sub-Component 3c: Development of Drainage Channels at Wards 15 and 17;

Sub-Component 3d: Construction of Drainage Outlets Connecting the Sea;

Sub-Component 3e: Construction of Culverts at Kuzhippavayal and Varuthichery Vayal;

Sub-Component 3f: Construction of Parapet Wall and Fencing to EK Canal;

Sub-Component 3g: Improvement of Other Secondary Drains.

10.2.4 Solid Waste Management Component

Kozhikode Municipal Corporation will require collecting, processing and disposing 55,000 MT of yearly solid waste generated from a population of approximately 490,000 by 2031 assuming an average per capita waste generation of about 250 gm per person in 2031. The proposed component under KSUDP, contributes in achieving the target through proper collection, transportation with additional equipments, construction of sanitary landfill facility, in order to collect and process approximately 46,000 MT of solid waste from 470,000 users in the urban areas of Municipal Corporation in the year 2021.

The following sub-components have been chosen based on implementation within the project timeframe and conforming to ADB's Environmental and Social Guidelines. Targets are to collect 100% of the waste from both high-density and low-density areas as the public health risks increases due to inadequate waste collection. The solid waste disposal and landfill site plan is indicated in **Figure 10-4**.

Total component beneficiaries at EOP (2011) will be 434,100 of which 40,900 are poor.

Sub-Component 4a: Street Cleansing

- Supply of brooms, 6-bin containerized wheelbarrows, metal trays, shovels, etc.

Sub-Component 4b: Primary collection and storage

- Purchase of 79 small (0.5 m3) and 53 medium (1.0 m3) and 57 dumper placer (3.0 m3) containers together with 29 auto pickups for primary collection of waste.

Sub-Component 4c: Waste transportation

- Purchase of a fleet of appropriate transportation vehicles for final disposal: 9 dumper placer trucks and 2 refuse collectors.

Sub-Component 4d: Waste treatment and disposal

- Civil works and mechanical equipment for the development of the sanitary landfill site.

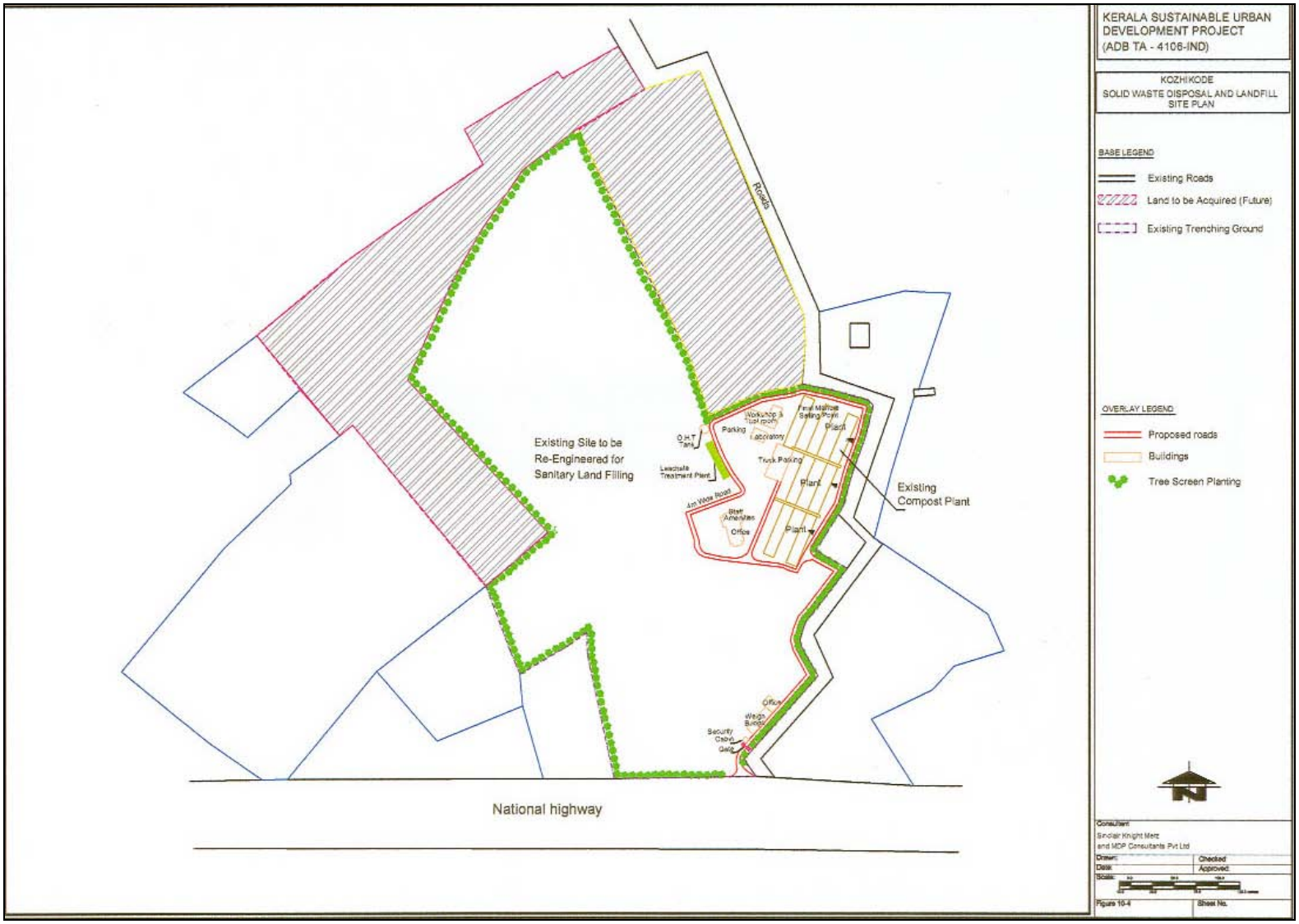
KERALA SUSTAINABLE URBAN DEVELOPMENT PROJECT
(ADB TA - 4106-IND)
KOZHIKODE
SOLID WASTE DISPOSAL AND LANDFILL SITE PLAN
BASE LEGEND
Existing Roads
Land to be Acquired (Future)
Existing Trenching Ground
OVERLAY LEGEND
Proposed roads
Buildings
Tree Screen Planting
Roads
Existing Site to be Re-Engineered for Sanitary Land Filling
Existing Compost Plant
Parking
Laboratory
Truck Parking
Plant
Office
Security Cabin
Gate
National highway
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Figure 10-4
Sheet No.

10.2.5 Roads and Transportation Component

Roads and urban transport proposals are based on a Conceptual Road Network Plan (CRNP) prepared for the city, which are based on previous comprehensive traffic and transport schemes. The CRNP also drew from inputs based on discussions with officials from the municipal corporation, Development Authority, Town Planning Department, Public Works Department and the Transportation Advisor to Government of Kerala (GoK), Prof. Dr. NS Srinivasan. The CRNP also takes into consideration the existing network, directions of likely development, Master Plan/Traffic Study proposals and stakeholder suggestions. Urban roads and transport proposals are indicated in **Figure 10-5**.

Total component beneficiaries at EOP (2011) will be 142,300 of which 15,700 are poor.

Sub-Component 5a: Road Upgrading

- Upgrading / improvement to two lane road - 1.1 km length;
- Upgrading / improvement to intermediate lane road - 0.3 km length; and
- Upgrading / improvement to four-lane road - 3.0 km length.

Sub-Component 5b: Improvements to Public Safety and Road Junctions

- Improvement with covered drain, footpath, guard rail, bus bay etc., – 35 km length; and
- Improvement to critical junctions - 13 Nos.

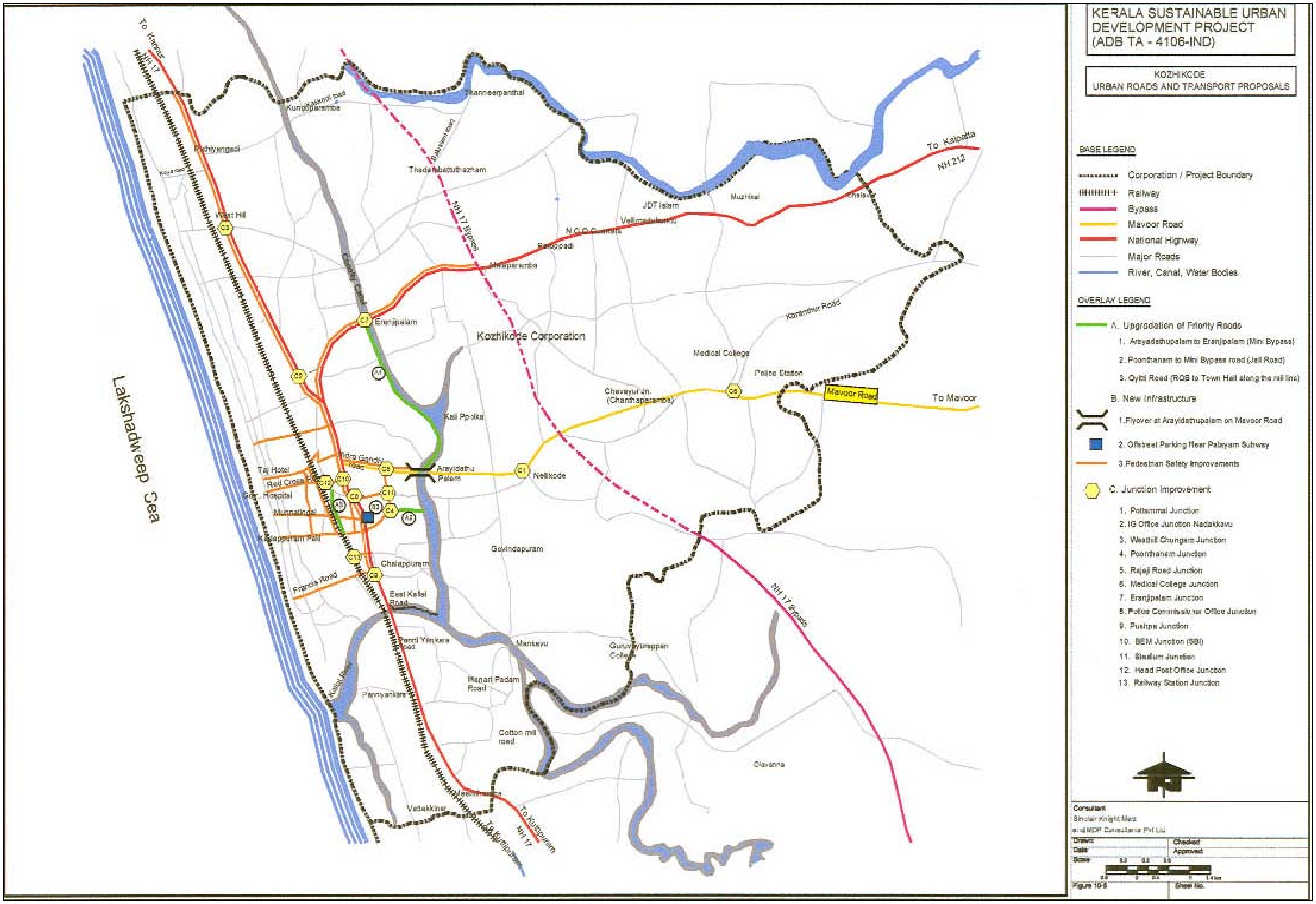
Sub-Component 5c: New Infrastructure

- Construction of flyover at Arayidathupalam on Mavoor Road;
- Provision of ground level off-street parking facilities; and
- Provision of street lighting - 58 km length.

10.3 Part B: Urban Management and Institutional Development

While KSUDP will ensure infrastructure provision in the five municipal corporations, for long-term sustainability of the assets created and for effective management of urban basic services, it is imperative to address key management issues. Infrastructure creation under KSUDP will be implemented through the Project Management Office (PMO) at the state-level in association with Project Implementation Units (PIUs) at each corporation; Kudumbashree will advise and monitor poverty alleviation components in the city corporations. The urban management component under KSUDP is related to institutionalizing a system to address the municipal corporations' ability to sustain service provision and the LSGD's ability to oversee service delivery by LSGIs. In summary, the urban management and institutional development under KSUDP will address:

- Capacity building of the Local Self Government Department and the Directorate of Urban Affairs regarding internal systems and procedures and ULB performance monitoring;
- Capacity building of the five Project municipal corporations comprising urban planning, asset inventorization, accounting and financial management;
- Municipal staff training on project development, design and implementation – this shall apply to the five municipal corporations and 53 municipalities; and
- Community development and participation including poverty alleviation tracking.


KERALA SUSTAINABLE URBAN DEVELOPMENT PROJECT (ADB TA - 4106-IND)
KOZHIKODE
URBAN ROADS AND TRANSPORT PROPOSALS
BASE LEGEND
Corporation / Project Boundary
Railway
Bypass
Mavoor Road
National Highway
Major Roads
River, Canal, Water Bodies
OVERLAY LEGEND
A. Upgradation of Priority Roads
1. Arayadathupalam to Eranjipalam (Mini Bypass)
2. Poonthanam to Mini Bypass road (Jail Road)
3. Oyitti Road (ROB to Town Hall along the rail line)
B. New Infrastructure
1. Flyover at Arayidathupalam on Mavoor Road
2. Offstreet Parking Near Palayam Subway
3. Pedestrian Safety Improvements
C. Junction Improvement
1. Pottammal Junction
2. IG Office Junction-Nadakkavu
3. Westhill Chungam Junction
4. Poonthanam Junction
5. Rajaji Road Junction
6. Medical College Junction
7. Eranjipalam Junction
8. Police Commissioner Office Junction
9. Pushpa Junction
10. BEM Junction (SBI)
11. Stadium Junction
12. Head Post Office Junction
13. Railway Station Junction
Lakshadweep Sea
Kozhikode Corporation
To Kalpetta
NH 212
To Mavoor
Mavoor Road
NH 17 Bypass
Medical College
Police Station
Eranjipalam
Nellikode
Govindapuram
Chalappuram
Mankavu
Olavanna
Consultant
Figure 10-5
Sheet No.

From the urban management perspective, KSUDP will complement the activities envisaged under the ADB aided Modernizing Government Program (MGP). Urban management and Poverty Alleviation activities under KSUDP would address select initiatives in MGP's **Theme V on Effective, Efficient and Accessible Local Self Government** and shall include:

- *Five-Year Planning Framework.* Asset management plans, community rehabilitation plans for the physically and mentally challenged, and spatial plan with focus on connectivity.
- *Local Economic Development.* Identification of micro-enterprise opportunities for the poor.
- *Strengthen Local Self Governments.* New office management systems, procurement manuals, public works manual, IT plan, budgeting, accounting and resource mobilization.

10.3.1 State Level Institutional Development

The current role of the LSGD is primarily related to policy formulation and administrative control of all agencies within its purview; the DUA shares this responsibility and facilitates in tracking Plan fund flows / devolution and human resource / personnel management. However, in order to enhance the role of the LSGD and DUA in urban management, the outcomes of capacity building assistance *activities* comprise (i) comparative performance assessment / municipal database institutionalized at the DUA and maintained by the DUA for ready reckoning by the State in policy matters; (ii) database on the ULBs' human resources/personnel; (iii) preparation of the budget manual; (iv) State Policy on environmental sanitation infrastructure cost recovery; and (v) State Policy/Guideline on financing patterns for infrastructure projects.

10.3.2 Municipal Corporation Institutional Development

The capacity building assistance to the five municipal corporations is aimed at addressing the planning, core service delivery, institutional development and financial management improvements. Key outputs of the capacity building assistance comprise (i) Geographical Information System (GIS) based maps – for detailed engineering designs (following topographic surveys) and property mapping; (ii) database on municipal assets and properties (property tax mapping) – property tax assessments and existing service utility lines; (iii) financial management reforms through property tax rationalization and accounting reforms; (iv) undertaking other e-governance initiatives; and (iv) developing performance based contracts for procurement, infrastructure creation and service provision.

10.3.3 Municipal Staff Training

Under KSUDP, the objective of the training support is to address three key elements comprising effective planning and infrastructure provision, core service delivery and asset management, and prudent financial management. The training assistance shall address the following aspects (i) sensitization / orientation training; (ii) conceptual training; and (iii) implementation training. It is envisaged that this training and capacity building program will target the five Municipal Corporations and 53 Municipalities. KILA will impart training to guide staff in appreciating project structuring and feasibility analysis; this activity will run parallel with the works of the Design and Supervision Consultant (DSC) in the five Corporations to help staff contribute in the works of the DSC. Preliminary sessions of the implementation training will commence before construction contracts are awarded; main sessions on physical and financial monitoring will commence once the contractor is appointed for project implementation.

10.3.4 Poverty Alleviation

Under KSUDP, the objective of capacity building for poverty alleviation initiatives is to ensure that the Project benefits reach the poorest of poor and that all stakeholders involved in the Project are well informed regarding the activities and process to achieve Project activities. A key component for successful implementation of poverty alleviation initiatives is the constitution of a *Civil Society Organization (CSO)*, which is expected to identify requirement of the poor and vulnerable, and facilitate Project implementation. The CSO will essentially comprise city-level stakeholders including but not limited to the Municipal Corporation, business groups, and resident welfare associations, NGOs, CBOs, CDS and Kudumbashree. Training of CSO members, UPA staff at MC, Kudumbashree and CDS members is therefore imperative and may be carried out through identified training institutes. While a training needs assessment is a requisite for identifying areas of capacity building, the following is an indicative list

- Community Infrastructure Fund (CIF). These activities may include (i) planning and identification of community infrastructure needs; (ii) operational and maintenance issues relating to infrastructure provision; and (iii) awareness regarding women empowerment, environmental health and diseases, and education.
- Poverty Social Fund (PSF). These activities may include (i) conceptual clarity for scaling-up livelihood initiatives through livelihood development strategies; (ii) facilitating confederation of Self Help Groups to graduate into Micro Finance Institutions (MFI); and (iii) focus on business development initiatives for micro enterprises.
- Strategic Programs. These may include (i) project development programs with specific reference to CIF and PSF utilization; (ii) CSO networking and resource convergence; and (iii) creating strategy mechanism for CSO to run programs under health, sanitation and income generation.

10.4 Part C: Implementation Assistance

The Project Management Office (PMO) based in the state Local Self Government Department (LSGD) and the Project Implementation Units (PIU) based in the 5 Project cities will implement KSUDP. A Project Management Consultant (PMC) group comprising international and domestic firms will be located in Thiruvananthapuram to assist the PMO in project management and two domestic Design and Supervision Consultant (DSC) firms will be provided to assist each PIU in the project cities. A domestic Public Relation Consultant (PRC) firm will be employed by the PMO to make the public aware of the short-term inconveniences and long-term benefits of the project. A domestic Benefit Monitoring and Evaluation Consultant (BMEC) firm will be required to help the PMO in generating baseline data, which will be monitored to assess impact of the Project. The PMO, with assistance from the PIUs, will identify and recruit NGOs in each Project city primarily for assisting in the poverty alleviation planning process through community participation, the public awareness campaigns and project benefit monitoring and evaluation; the NGOs may also assist with any rehabilitation and resettlement activities. **Chapter 11** provides further details on implementation.

11. CITY SUB-PROJECT IMPLEMENTATION

11.1 Executing and Implementing Agencies

11.1.1 Executing Agency

The Local Self Government (LSG) Department of the state government would be the Executing Agency (EA) of the project and will be responsible for overall strategic guidance, technical supervision, execution of the project, and ensuring compliance with the loan covenants. A state-level Project Management Office (PMO), led by a full-time Project Director executes the project; he/she will have no other duties within the LSG or elsewhere. The Project Director, supported by the PMO and consultants, will: (i) coordinate all activities under the Project; (ii) will be responsible for overall project implementation, monitoring, and supervision; and (iii) will directly report to the Secretary, LSG (Urban) Department. A state-level Empowered Committee (EC) will be set-up with full powers to decide on matters related to the project. The Project Director would be the member secretary; the members of the committee include the Chief Secretary (chairperson), Secretaries of Planning, Finance, Local Self Government, Water Resource (or represented by MD, KWA and Chief Engineer, Minor Irrigation) and Public Works. The Director, Kudumbashree will also form a part of the EC. Other relevant officials may be invited as necessary. Once the project is made effective, the EC will meet regularly to review project performance and decide on major issues, such as counterpart funding, implementation bottlenecks, land disputes, special procurement, policy reforms, etc.

A Tender Approval Committee (TAC) comprising Secretary, LSG (U), Secretary, Finance, and PD, KSUDP will approve all tenders related to KSUDP implementation; the EC will delegate powers related to tender approvals to the TAC. The TAC will take decisions related to all tenders under KSUDP.

11.1.2 Implementing Agencies

Given the multiplicity of functions and the overlap in service provision, identifying the implementing agency is critical for smooth operations. The Municipal Corporations will be the implementing agencies conforming to GoK's policy of decentralizing planning and service delivery. A city-level Steering Committee (SC) in each project city would be constituted for overcoming any bottlenecks in project progress. The SC would constitute the District Collector, Mayor, Corporation Secretary, representatives of State-level departments in the city (Public Works Department, Electricity Board, Kerala Water Authority, Pollution Control Board, etc.), and representatives of chamber of commerce, industry and NGOs. Besides reviewing project progress, the SC also sorts out local issues and provides guidance on policy matters. The members of the Civil Society Organization (CSO) will jointly discuss and prepare poverty alleviation projects, which will be approved by the City-level Steering Committee. Kudumbashree will continue to play an active role in advising and monitoring activities facilitating poverty alleviation.

11.2 Project Management

11.2.1 Project Management Office

The PMO is responsible for (i) appointing project management consultants, detailed design and construction supervision consultants, benefit monitoring and evaluation (BME) consultants, public relations and community awareness consultants, and NGOs; (ii) approving the design of the investment components in consultation with the project cities; (iii) pre-qualifying contractors; (iv) implementing public relations and community awareness programs; (v) preparing standard bid documents; (vi) monitoring the tendering process and guiding the project cities in bid evaluation and preparing bid evaluation reports for approval by ADB; (vii) procuring equipment at the state-level; (viii) coordinating with ADB on matters related to disbursements; (ix) conducting the training and capacity building programs; (x) providing support under the institutional development assistance; and (xi) maintaining project documents and submitting timely reports (including monthly project performance reports, quarterly progress reports, BME reports) to ADB. The PMO is headed by the Project Director and supported by deputies, based on the project size. The PMO is staffed with senior level technical, financial, social, capacity building/management and procurement officers to manage all technical and procurement and loan account administration. An accounting and administrative unit manages procurement and loan account administration. The EC will authorize the Deputy Project Director, Technical, to provide technical sanctions to all works under KSUDP after carrying out suitable proof-checking of designs.

11.2.2 Project Implementation Units

A PIU will be established within each Municipal Corporation. The responsibilities of the PIU include: (i) carrying out detailed surveys, investigations and engineering designs of individual city components; (ii) tendering, evaluating bids and awarding works, contract administration, supervision and quality control; (iii) measuring works carried out by the contractors and certifying payments; (iv) conducting public awareness campaigns and participation programs, (v) carrying out the Benefit Monitoring and Evaluation (BME) studies; (vi) carrying out environmental assessments; (vii) ensuring project city compliance with loan covenants; and (viii) preparing monthly reports. The Design Supervision Consultant (DSC) supports the PIU in all the aforesaid activities. A Project Manager will head the PIU and will be supported by sector specialists in environmental and civil engineering, as appropriate. The PIU will also comprise staff involved in procurement, accounts and community development. Staff deputed from the Revenue Department shall handle all land acquisition and resettlement and rehabilitation issues. The Project Manager at the PIU will report to the Secretary, Kozhikode Municipal Corporation, and the Project Director at the PMO. All administrative and project co-ordination related issues will be handled by the Secretary. The Secretary will also be authorized to release payments to contractors based on the approval/certification of the Project Manager, PIU, and subject to fund release by the PMO. The Secretary shall interface with the Municipal Corporation Council and KSUDP regarding Project progress.

11.2.3 Project Management and Design Consulting Services

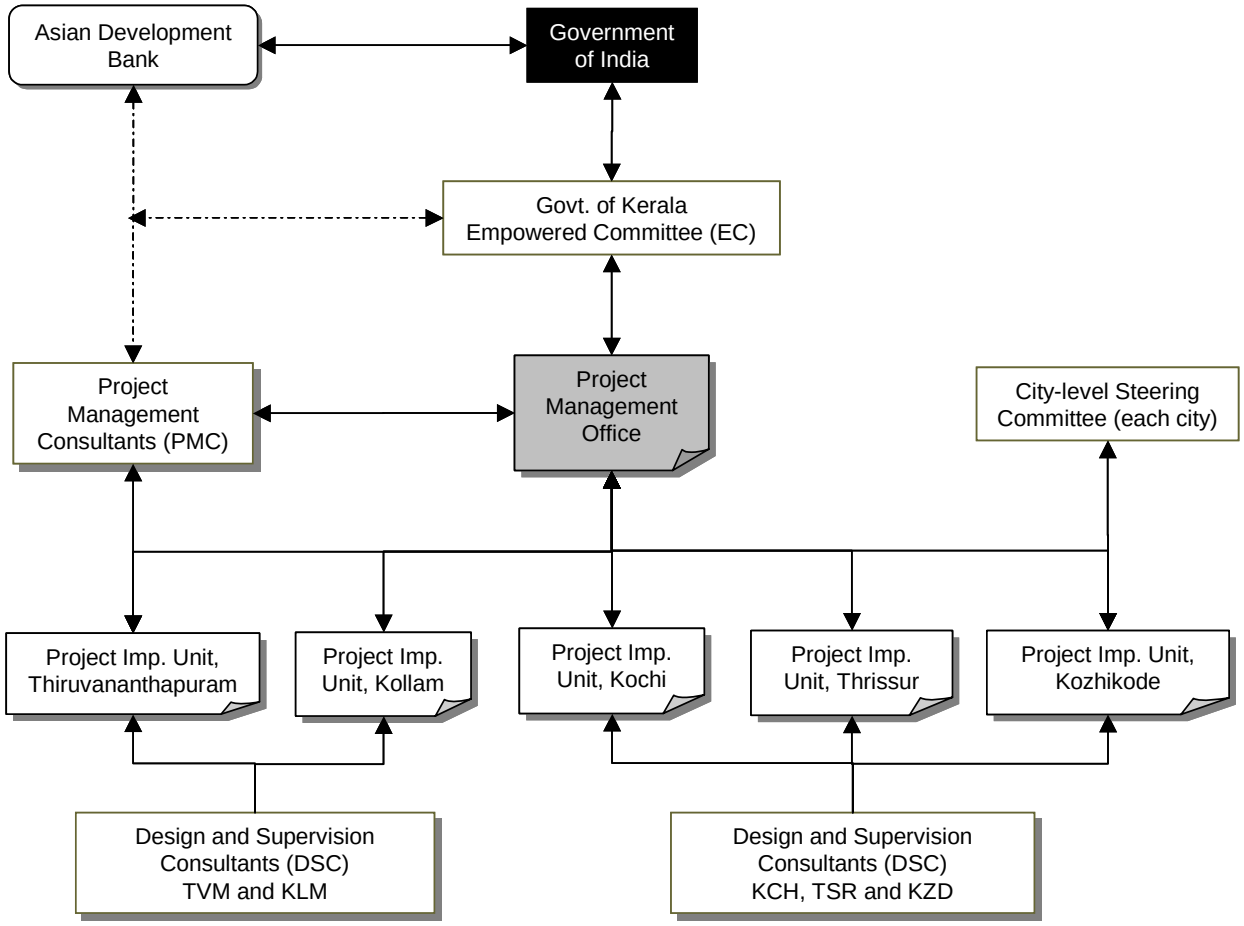
Consulting services are required for project management, engineering design, construction supervision, procurement of goods and services, public relations and awareness, and BME. Consultants would be selected and engaged in accordance with ADB’s Guidelines on the Use of

Consultants and other arrangements satisfactory to ADB for selecting and engaging domestic consultants.

- Project Management Consultant (PMC). A Project Management Consultant group comprising international and domestic firms will assist the PMO in project management activities including reviewing engineering designs, procurement, and implementation. The PMC also assists the Project Management Office (PMO) and the Project Implementation Units (PIUs) in project formulations, management, monitoring and evaluation, financial and environmental management aspects, public relations and awareness, training and capacity building, and institutional development / strengthening.
- Design and Supervision Consultant (DSC). The main objectives of the DSC is to update maps and plans, undertake survey, investigations and prepare detailed designs of various project components for each project city, prepare technical specifications and contract documents, assist in construction supervision and quality control, and undertake works measurement. Two DSCs will support PIUs in the five Corporations; one for the southern region covering Thiruvananthapuram and Kollam and the other for the northern region covering Kochi, Thrissur and Kozhikode.
- Public Relations Consultant (PRC). A domestic Public Relations Consultant firm appointed will facilitate public relation and awareness programs (PRAP) on project related issues. The Information, Education and Communication (IEC) materials developed by the PRC is utilized in public awareness campaigns.
- Benefit Monitoring & Evaluation Consultants (BMEC). A domestic Benefit Monitoring & Evaluation (BME) consulting firm recruited by the PMO will identify and evaluate broad macroeconomic, socio-economic and environmental impact of the Project and ensure that project facilities are managed efficiently and the benefits of the project reach the target groups. For this purpose, the BME consultants will liaise closely with the PMO, PMC and DSCs to measure the benefit resulting from the Project, and facilitate the PMO in correcting any problems or issues arising from the feedback provided.
- Non-Governmental Organizations (NGOs). NGOs recruited in each project city will assist in public awareness campaigns and benefit monitoring and evaluation studies. NGOs will also form a part of the CSO to identify and help implement poverty alleviation components. NGOs generally have experience in community mobilization, training, information dissemination, communication and media development covering the fields of municipal service provision, socio-economic surveys, environmental health, income generation, education, gender and resettlement.

Figure 11-1 indicates the proposed project management structure.

Figure 11-1: KSUDP – Proposed Project Management Structure



11.3 Procurement and Disbursement Procedure

11.3.1 Procurement of Goods and Works

Goods, works, and services financed by ADB will be procured in accordance with ADB's Guidelines for Procurement. Procurement will generally be carried out by the PIUs under the guidance of the PMO, except for equipment and vehicles common to all cities, which will be directly procured by the PMO. Equipment and selected materials will be acquired using international competitive bidding (ICB), international shopping (IS), and local competitive bidding (LCB) procedures as appropriate. To the extent possible, goods to be procured will be grouped into packages larger than $500,000 to be suitable for ICB procedures. Miscellaneous goods for immediate use that cannot be grouped into a larger contract and that cost less than $500,000 per contract will be procured through IS or LCB procedures. Off-the-shelf items and standardized products costing $100,000 or less will be procured following the State's applicable procurement procedures acceptable to ADB.

Given the Project areas' geographic location and the nature of works, civil works contracts valued at less than $5 million each would not be attractive to international bidders, and therefore will be carried out using LCB procedures acceptable to ADB. Some civil works such as road improvements, sewage treatment plants, pumping stations, and solid waste management sanitary landfill disposal sites will be undertaken on a turnkey basis. Where the cost, insurance, and freight or ex-factory cost of goods and supplies for permanent works of one package is estimated to equal or exceed 60%, such procurement package should not be treated as a civil works package. Equipment, materials or civil works costing $100,000 or less including for use by community organizations or NGOs for the slum improvement and poverty alleviation activities related to Community Infrastructure Fund (CIF) and Poverty Social Fund (PSF) will be procured following the State's applicable procurement procedures acceptable to ADB.

11.3.2 Disbursement Procedures

The loan proceeds will be disbursed in accordance with ADB's Loan Disbursement Handbook and Interim Guidelines for Disbursement Operations, LIBOR-Based Loan Products. An imprest account will be established at the Reserve Bank of India and to expedite implementation of the Project through the timely release of loan proceeds. It is proposed that a second-generation imprest account (SGIA) will be opened immediately, in compliance of the State Government, with prescribed procedures as agreed-upon by the Government of India (the Borrower) and ADB. Under the SGIA, the controller of aid accounts and audit (CAAA) will pass on the rupee equivalent of ADB's imprest advance to the EA through the budgetary mechanism. The EA will maintain the advance in a separate commercial bank account and withdraw from it only the eligible portion of expenditure. The SGIA would be managed, replenished, and liquidated in accordance with the Loan Disbursement Handbook and the detailed arrangements agreed to by the Borrower and ADB. The initial amount to be deposited in the imprest account will not exceed the lesser of the equivalent of six months expenditures or 10% of loan amount. The initial and subsequent amounts to be deposited in the SGIA will be determined by ADB in consultation with the Borrower.

11.4 Procurement Packages and Implementation

11.4.1 Procurement Packages

The sub-project components will be implemented in a number of separate packages, which are summarized in **Table 11-1** with further details provided in **Annex A**.

Table 11-1: Proposed Contract Packages - Kozhikode

Package Code	Package Name	Estimated Base Cost US$ Mill	Completion Time (Months)	Type of Contract
Water Supply Improvement				
	Not included in KSUDP – under JBIC funding	-	-	-
Sewerage & Sanitation Improvement				
KOZ-SS-01	Rehabilitation and extension of sewerage in North & Central MC Area	7.40	42	LCB Item Rate
KOZ-SS-02	Construction of 27 MLD STP at Karimbanapalam (Lot 4 of Single Package)	(2.69)	24	ICB Turn Key
KOZ-SS-03	Sewer House Connections	3.33	24	LCB Item Rate
EQU-SS-01	Supply of Sanitation Maintenance Equipment (Part of single procurement package covering all project cities to be organized through the PMO)	(0.29)	12	ICB Item Rate
Urban Drainage Improvement				
KOZ-DR-01	City Wide drainage rehabilitation and expansion	6.83	36	ICB Item Rate
Solid Waste Management Improvement				
KOZ-SW-01	Sanitary landfill site development	1.23	18	LCB Turn Key
KOZ-SW-02	Procurement waste collection and transportation equipment	0.57	12	LCB Item Rate
Roads and Transportation Improvement				
KOZ-RT-01	Upgrading and improvement of priority roads	5.92	42	LCB Item Rate
KOZ-RT-02	Flyover at Arayidathupalam	2.52	24	LCB Turn Key

11.4.2 Implementation Schedule

Beginning loan effectiveness from September 2005, the Project will be implemented over five years. Prior to this, LSGD with the assistance of the bridging TA consultants will carry out pre-investment / advance actions to avoid delays that would occur if such actions are taken after the loan effectiveness. In the first six months after loan effectiveness, the project implementation assistance consultant teams (PMC and DSCs) will be mobilized at the PMO and PIUs and will establish project guidelines and procedures. Detailed design for the infrastructure improvement investments will occur in the first twelve months of the Project following which construction packages will be tendered and awarded. Construction of urban facilities will commence 12 months from project mobilization. The capacity building program under the Project will be conducted mainly in the first three years. The implementation schedule is given in **Annex B**.

11.5 Reports, Accounting and Auditing Requirement

11.5.1 Reporting Requirement

The Government of Kerala will provide ADB with quarterly progress reports on Project implementation. The PMO will be responsible for obtaining and consolidating relevant information from the respective PIUs. The progress reports will describe physical progress, details of any modification required to the project implementation schedule, problems encountered, use of Community Infrastructure Fund and Poverty Social Fund, and an outline of the work for the next quarter. The report will also provide summary financial accounts of the Project: expenditure during the quarter, year-to-date expenditure during the quarter, year-to-date expenditure, and expenditure to date. The progress report is an executive summary of the detailed reports; with format and content permitting ADB staff to readily capture key information for inputting into the project performance report (PPR).

11.5.2 Accounting

The PMO and the PIUs will establish and maintain separate accounts and records adequate to identify the incomes and expenditures related to the Project. They will be assisted by an adequate number of suitably qualified accounting staff including an accounts officer.

11.5.3 Auditing

Detailed consolidated annual project accounts, as maintained by the PMO, will be audited by independent auditors acceptable to ADB and will be submitted to ADB within 9 months of the close of the fiscal year. The annual audit report will include the audit of the imprest account, SGIA, and SOE procedure, and a separate audit opinion on the use of the SGIA and SOE procedures. LSGD and the five project city corporations will be made aware of ADB's policy on delayed submission, and the requirements for satisfactory and acceptable quality of the audited accounts.

11.6 Project Review

Project performance will be reviewed in a three-tier system. First, the PMC will review progress on each component and the performance of each city PIU. Monthly performance reports will be prepared for each project city by the DSC and submitted to the PMO. The EC will conduct the second tier review during its quarterly meetings. The monthly project performance reviews and major policy issues will be reviewed and actions to be taken by the respective authorities will be recorded. The third tier review will be conducted by ADB every 6 months, with the ADB Review Mission visiting project cities, to discuss major issues with LSGD and the project city corporations and forward their opinion for action at the state government level.

The project review will be supplemented by a formal comprehensive midterm review with the participation of senior Central Government and State officials as well as ADB staff — when detailed design is completed and major contracts have been awarded and started. Following the review, corrective measures, as appropriate, will be introduced to remedy any identified weaknesses.

11.7 Project Performance Monitoring System

The Project Performance Monitoring System (PPMS) forms an essential part of Project Implementation and is a systematic set of procedures aimed at monitoring Project progress. The Project performance is measured through a set of defined indicators, which assist in evaluating the Project's achievement in terms of the goals, purpose and outputs established in the Draft Project Framework. The responsibility for ensuring that the project performance monitoring system (PPMS) is established and undertaken rests with the PMO. PPMS indicators broadly cover (i) physical progress of infrastructure works; (ii) institutional development and capacity building; and (iii) impact assessment. Further details on PPMS are provided in **Volume 1 – Main Report**.

11.8 Long-Term Sustainability

In the decentralized perspective and in line with GoK's Urban Policy and Action Plan, 2002, it is proposed that a City Planning and Engineering Department in the Municipal Corporation will be best equipped to carry out future project development, implementation and asset management. The Project Implementation Unit proposed for KSUDP implementation will draw staff from various State Line Departments. Through the Project period and with adequate training/capacity building initiatives, it is envisaged that the PIU staff will be well equipped to oversee long-term asset creation and service provision in the sectors of water supply, sewerage, urban drainage, solid waste management, and urban roads and traffic management.

The KM Act, 1994, provides the legislative framework for ULBs to undertake urban planning and takeover water supply and sewerage assets within its jurisdiction. Based on policy directives under GoK's Urban Policy and Action Plan, 2002, and State Finance Commission recommendations, it is proposed to merge the PIU with the Corporation's Engineering Department. The strengthened department will oversee spatial planning, infrastructure development and construction, and solid waste management. This arrangement will ensure long-term sustainability of KSUDP and provide for complete decentralization of infrastructure provision and urban basic service delivery.

12. COST ESTIMATES AND FINANCING PLAN

12.1 Cost Estimates

The list of subproject components was agreed upon with the Executive Agency (EA) and the Kozhikode Municipal Corporation (MC). This agreement was based on various criteria and priority needs. Improvement of the urban infrastructure is the top priority of the MC.

The total cost of the subproject, including physical and price contingencies, is estimated at Rs.1,983.3 million (about US $39.1 million). The foreign exchange portion of the subproject cost is estimated at Rs.561 million (about US $11 million or 28% of total subproject cost) with the balance representing the local cost portion. The local cost component is high as most of the equipment and construction materials are indigenously produced and are readily available. **Table 12-1** summarizes the cost estimates. Detailed cost estimates are presented in **Annex C**.

Table 12-1: Summary of Subproject Cost Estimate

Components	(Rupees Million)			(US$ Million)			% Base Costs
	Local	Foreign	Total	Local	Foreign	Total	
Part A - Urban Infrastructure Improvement							
Sewerage & Sanitation	538.0	74.3	612.3	12.3	1.7	14.0	42.7
Urban Drainage	223.6	74.5	298.0	5.1	1.7	6.8	20.8
Solid Waste Management	64.6	14.1	78.7	1.5	0.3	1.8	5.5
Roads & Transportation	129.8	239.3	369.1	3.0	5.5	8.5	25.8
Total - Part A	**955.9**	**402.2**	**1358.1**	**21.9**	**9.2**	**31.1**	94.8
Part B – Urban Management & Institutional Development							
Institutional Development	10.3	0.0	10.3	0.2	0.0	0.2	0.7
Total - Part B	**10.3**	**0.0**	**10.3**	**0.2**	**0.0**	**0.2**	0.7
Part C - Subproject Implementation Assistance							
Design and Construction Supervision Consultants	48.8	0.5	49.4	1.1	0.0	1.1	3.4
Incremental Administration (at PIU)	15.5	0.0	15.5	0.4	0.0	0.4	1.1
Total - Part C	**64.3**	**0.5**	**64.8**	**1.5**	**0.0**	**1.5**	4.5
Total Base Costs (A+B+C)	**1030.5**	**402.7**	**1433.2**	**23.6**	**9.2**	**32.9**	**100.0**
Physical Contingencies	73.6	29.4	103.0	1.7	0.7	2.4	7.2
Price Contingencies	318.1	128.9	447.1	2.7	1.1	3.8	11.7
Total Subproject Costs	**1422.2**	**561.0**	**1983.3**	**28.1**	**11.0**	**39.1**	118.8

a) At November 2004 prices

b) Physical contingencies are 7.5% on civil works and 5% on others, represent about 7% of the base cost.

c) Price contingencies are provided at 2.4% for foreign exchange and 6% for local currency costs.

d) Includes taxes and duties estimated at US$2.8 million (7.1% of Project Cost).

e) Totals may not add due to rounding.

12.2 Financing Plan

The borrower of the ADB loan will be the GoI. In accordance with the new procedure (under finalization), it is assumed that the GoI will on-lend the proceeds of the ADB loan to GoK in local currency. The loan portion will carry interest at the same rate as ADB is charging GoI, (the current on-lending rate has been assumed on this basis pending finalization of the same at GoI) with similar repayment terms as between the ADB and GoI, i.e. 25 years, including a five-year grace period.

Under the Government's new sub-lending procedure, GoK would further sub-lend the proceeds of the GoI assistance to the Project MCs in the form of loan. This loan portion would carry interest at the same GoI on-lending rate with similar repayment terms as between the GoI and GoK. In such a case, GoK would pass on to the MCs an amount equivalent to US $29.5 million (about Rs.1,388 million). It is assumed that the remaining 30% (about Rs.595 million) would be contributed by the GoK and MCs from its own resources in equal proportions. **Table 12-2** summarizes the city level financing plan if the new sub-lending procedure is used. At city level, the new sub-lending procedure translates to a 70-15-15 (loan-grant-equity) financing mix.

Table 12-2: City Level Financing Plan (Rs. Million)

Particulars	Local	Foreign	Total	Percent
ADB Loan (70%)	827.23	561.05	1388.28	70.0%
Grant to MC (50% of 30%)-Equity	297.49		297.49	15.0%
MC Contribution - Equity	297.49		297.49	15.0%
Total	**1422.21**	**561.05**	**1983.26**	**100.0%**

13. FINANCIAL ANALYSIS

13.1 General

Detailed financial analyses were conducted to examine the financial viability of the revenue generating subprojects. The analyses were undertaken in accordance with ADB's *Framework for the Economic and Financial Appraisal of Urban Development Sector Projects*. Financial Internal Rates of Return and Average Incremental Financial Costs were calculated and sensitivity analyses were carried out for each subproject. The proposed tariff levels were assessed to ascertain their affordability to the beneficiaries, in particular the low-income group and poor households, i.e. those below the poverty line. Financial projections for the MC were also performed to determine the financial capability of the MC to implement and operate the subprojects on a sustainable basis.

13.2 Assumptions Used in Financial Projections

Institutional Arrangement. Water and sewerage are currently the responsibility of the Kerala Water Authority (KWA) while the Kerala Municipalities (KM) Act 1994 and the Decentralization of Powers Act 2000 empower the urban local body (ULB) to undertake future water and sewerage service provision. GoK's Minor Irrigation Department maintains primary drainage channels / canals while the ULB maintains secondary / link drains and roadside drains. Based on the ownership of roads, the State Public Works Department or the ULB maintain their respective stretches. Solid waste management is carried out by the ULB.

Although the KSUDP subprojects will be implemented through the MC PIU, the institutional arrangements used for the financial projections and analysis of the subprojects are based on the proposal as outlined in **Volume 7, Chapter 5**. These are:

Sub-Project Components	Proposed Responsibility
a. Water Supply 1. Under JBIC	Kerala Water Authority
b. Sewerage & Sanitation 1. Rehabilitation of 17 km existing sewers and completion of zone. 8.2 sq. km area – approx. 70,000 persons; 2. Extension of sewerage in North west side for 100,330 population; 3. Construction of 30 Mld STP; 4. Supply of sanitation and sewer maintenance equipment.	Municipal Corporation
c. Urban Drainage 1. Secondary drains and inlets to Elathur-Kallai (EK) Canal; 2. Construction of wall and fencing to EK Canal from Karaparamba Bridge to Arayadathpalam; 3. Construction of Culverts at Kuzhippavayal and Varuthichery Vayal; 4. Construction of drainage outlets to the sea.	Municipal Corporation
1. Drainage improvements in Wards 15 and 17.	Municipal Corporation

Sub-Project Components	Proposed Responsibility
d. Solid Waste Management 1. Collection & transportation equipment; 2. Development of sanitary land fill site.	Municipal Corporation
e. Urban Roads / Transport 1. Upgrading of 1 road (3 km); 2. Flyover at Arayidathupalam on Mavoor Road.	Municipal Corporation
1. Upgrading of 2 roads (1.4 km); 2. Street lighting improvements for 58km. of major roads; 3. Footpaths & safety improvements.	Municipal Corporation

As discussed in Volume 7, Chapter 5, the transfer of responsibility for water distribution within the MC jurisdiction to the MC in the medium term is based on the proposed road map for a decentralized service provision of water and sanitation. KWA, however, will continue to be responsible for bulk water supply (headworks, water treatment and transmission). For purposes of the financial projections, therefore, it is assumed that in the case of water supply, the responsibility for rehabilitated/ improved water supply systems will continue to be with KWA until agreement is made for transfer to the MC. Corresponding to this, Water Supply has been segregated from the MC's revenues & expenditures while analyzing the overall financial position and capabilities of the MC. Investments in other components have been considered as part of the future responsibility of the MC. During the project implementation period until the actual transfer of responsibility, KSUDP and KWA will build the capacity of MC staff in sewerage asset planning and management. Additionally, KWA in coordination with the MC will identify and map the existing sewerage assets (non-operating) within the MC jurisdiction area, conduct asset condition survey and valuation for the transfer of the assets to the MC.

Financial projections performed for the MCs, reflecting the proposed institutional arrangements discussed in the preceding paragraphs, consist of projected revenue receipts and revenue expenditures during the assumed implementation period (FY 2005-06 to FY 2010-11) plus 10 years after project completion. The projected revenue receipts include all receipts from own source tax income like property and entertainment taxes and own source non-tax income like direct user charges and income from municipal properties; and all revenue transfers from the State Government in the form of assigned and shared taxes and grants-in-aid. The projected revenue expenditures include all recurrent expenditures, including those of the subprojects, to be met from revenue receipts. The financial projections also include the MC's assumed equity contribution to be met from its own resources in accordance with the financing plan.

Property Tax. The assumptions used for the projection of property tax income include: i) the number of taxable properties will increase by 1.0% annually; b) in FY 2005-06 and every 10 years thereafter, property survey will be undertaken resulting to an increase in number of properties by 5% for those years; iii) revision of annual rental value (ARV), which has been long overdue as mandated by law, will increase ARV by 60% to take effect in FY 2007-08; iii) the revision of ARV every 4 years in accordance with the law will be implemented and ARV will increase by at least 20%; iv) overall collection efficiency at about 80% will be achieved gradually with improved systems and procedures by FY 2007-08 and sustained over the forecast period.

Other Own Source Income. Profession tax, entertainment tax, other municipal taxes, receipts from municipal properties, license fees and other miscellaneous own source income are projected to increase equivalent to the assumed inflation rate of 6% over the forecast period.

State Government Revenue Transfers. Assigned and shared taxes and grants-in-aid are estimated to increase at 6% over the forecast period. Starting FY 2011-12, the initial year of KSUDP loan repayment, additional grants shall be provided equivalent to the portion of debt service repayments.

Revenue Expenditures. Projected salaries, establishment costs, operation and maintenance costs of existing municipal services and facilities are based on actual and budgeted financial data. These existing costs are estimated to increase equivalent to the assumed inflation rate of 6% over the forecast period. The operation and maintenance costs for the new works are based on engineering estimates taking into account the size of the treatment facilities, length of the pipe network, roads and drains maintained, volume of water produced and wastewater treated, volume of solid wastes collected and disposed, and number of population served. Operation and maintenance unit costs for the new works are estimated to increase equivalent to the assumed inflation rate of 6% over the forecast period.

13.3 Cost Recovery

Water Supply. Although water supply is not a subproject in Kozhikode under KSUDP, a discussion of cost recovery assumptions on water supply in the MC is essential as it has a direct relation on the future cost recovery of the sewerage subproject proposed under KSUDP.

The existing KWA tariff came into effect on 1st April 1999 but has not been revised since. Under the existing tariff, KWA operation is highly subsidized by the State Government. The revenues collected from water sales represent only about 53% of operation and maintenance cost. KWA had requested the State Government in January 2000 to increase the water tariff effective 1st April 2000 and to allow KWA to revise the water tariff from time to time corresponding to the increase in power tariff. The State Government is yet to take a decision on this request.

As part of the Financial Improvement Action Plan (FIAP), it is proposed that KWA's request for a 50% tariff increase be approved by the State Government with effect in 2006. Another increase of 50% is proposed in the financial year 2009-10, before the last year of project implementation. Thereafter, it is proposed that tariffs should increase regularly every 3 years by at least 22% (3% above the compounded growth of assumed inflation). It is envisaged that the periodic tariff increases coupled with the reduction in NRW through KSUDP will gradually eliminate State operating subsidies on full implementation of the project.

A policy should be agreed to increase the provision of direct house connections in place of providing public standposts. This action would reduce the burden of the ULBs for the payment of standposts by increasing consumers directly connected into the water tariff net. The current connection fee is assumed to remain the same to make it affordable and encourage shift to house connection.

In the medium term, it is assumed that the MC will continue not to collect any charges from street tap users for practical and affordability considerations; the low-income group and poor households being

the major users of street taps. The MC, however, will institute control measures for the use of street taps to avoid wastage.

Sewerage. Presently, KWA does not impose monthly user charge for customers with sewer connections. However, it collects connection fee at the rate of 10% of estimated cost or a minimum of Rs.500 for domestic, Rs.1,000 for non-domestic and Rs.2,500 for industrial. Like water supply, sewerage operation is subsidized by the State Government.

As part of the FIAP, it is proposed that at the start of FY 2009-10 a monthly sewerage charge will be collected from customers with sewer connections. For the new sewerage systems which will be operated by the MC, it is proposed that there will be a fixed monthly sewerage surcharge. Assuming 135 lpcd water supply and average household size of 5 this sewerage surcharge would be Rs.90 per month per connection until end of project. Thereafter, it is proposed that the sewerage surcharge should increase regularly every 3 years by at least 22% (3% above the compounded growth of assumed inflation). When water distribution responsibility is transferred from KWA to the MC, it is proposed that a 40% sewerage surcharge be included in the MC water bill.

With this surcharge of 40% on prevailing water tariff, it is envisaged that there will be full recovery of O & M cost thus requiring no State support in the form of operating subsidies post project implementation. The Project includes sewer house connections as part of the sewerage component to ensure connection and utilization of the new investment. The current fee for future connections (post project) is assumed to remain the same to make it affordable and encourage connection to the system.

Solid Waste. At present, no fees are collected by the MC from residents in whose areas the MC is collecting solid waste. With low service coverage by the MC, households in areas not served by the MC spend about Rs.30 a month for the collection and disposal of their wastes by private groups or they dump their waste in nearby open areas or burn them on their premises.

With the proposed subprojects, it is envisaged that service coverage will cover the whole MC area. However, the subproject will not be sustainable without the collection of minimal user charge. As part of the FIAP, it is proposed therefore that a solid waste fee of Rs.30 per month for domestic, Rs.150 for shops, restaurants etc. and Rs.300 per month for large establishments like hospitals, hotels etc. be collected starting FY 2006-07. It is projected that the fee will increase every 3 years by 20% to achieve sustainability.

13.4 Financial Internal Rate of Return

The financial viability of a subproject is assessed by comparing the subproject's Financial Internal Rate of Return (FIRR) with the Financial Opportunity Cost of Capital (FOCC). As proxy for the FOCC, the Weighted Average Cost of Capital (WACC) of the subprojects in real terms is used. FIRR is the discount rate that equalizes the present values of costs and revenues over the subproject life while the WACC represents the cost incurred by the MC to implement the subprojects.

The WACC of the subprojects is 4% (real terms). The calculation of the WACC is shown in the table that follows.

Table 13-1: Weighted Average Cost of Capital (Sub-Loan Option)

Particulars	Grant	Equity	Total
Weight (%)	70.00%	30.00%	100.0%
Nominal Cost (%)	0.00%	10.00%	
Tax Rate (%)	0.00%	0.00%	
Tax Adjusted Nominal Cost (%)	0.00%	10.00%	
Inflation Rate (%)	6.00%	6.00%	
Real Cost (%)	0.00%	3.77%	
Minimum Rate Test (%)	4.00%	4.00%	
Weighted Component of WACC (%)	2.80%	1.20%	
Weighted Average Cost of Capital (Real)			4.00%

FIRR was calculated for each of the revenue generating subprojects, i.e. sewerage and solid waste management. The assumptions and approach used in the calculation of the FIRR include: i) all revenues and costs are stated at constant November 2004 prices; ii) all revenues and costs are calculated on an incremental basis, i.e. difference between "with project" and "without project" situations; iii) subproject capital expenditures are recognized at the time they are incurred; and iv) equipment replacement costs have been included every 10 years for sewerage and every 5 years for solid waste management.

Sensitivity analyses were also carried out to determine the possible effects of adverse changes on the subprojects. The adverse changes are: (i) 10% increase in capital costs; (ii) 10% increase in O&M costs; (iii) 10% decrease in revenues; and (iv) one year delay in benefits.

The results of the FIRR calculation and sensitivity analyses are summarized in the table below. The details of the calculation and analyses are in **Annex E**.

Table 13-2: Summary of Financial Evaluation

Component	NPV @ 4% Rs. Million	FIRR, SI & SV	Base Case	Capital Costs + 10%	O&M Costs + 10%	Revenues - 10%	Benefits Delay by One Year
Sewerage	(549.84)	FIRR (%)	(7.8)%	(8.3)%	(9.5)%	(10.2)%	(8.5)%
		SI					
		SV (%)					
Solid Waste	53.18	FIRR (%)	8.4%	7.0%	7.0%	5.4%	6.1%
		SI		2.04	2.04	5.74	
		SV (%)		48.9%	49.0%	17.4%	

NPV = Net Present Value

SI = Sensitivity Indicator (ratio of percentage change in NPV to the percentage change in a variable)

SV = Switching Value (percentage change in a variable required for the NPV to become zero)

The solid waste management subproject is financially viable with a FIRR higher than the WACC. The sewerage subproject, however, has negative FIRR due to high investment costs and low sewerage charge.

Sensitivity tests indicate that the subprojects' viability is most sensitive to decrease in revenues. Periodic revisions of user charges as described in the cost recovery proposals are therefore very vital to the subprojects' financial viability.

13.5 Average Incremental Financial Cost and Subsidy

In setting the tariff, the appropriate target level to achieve subproject financial adequacy and sustainability is the long run marginal (LRM) cost which includes both the incremental investment and O&M costs. The Average Incremental Financial Cost (AIFC) is regarded as an approximation of the LRM cost. The AIFC for each subproject was calculated by dividing the present value of the incremental subproject costs streams (capital and O&M) by the present value of the incremental quantity streams (volume of wastewater flow in the case of sewerage and metric tons of garbage collected and disposed in the case of solid waste management). The costs and quantity streams were both discounted at the WACC of 4%.

The following table summarizes the calculation of the AIFC, its relation with the average tariff and the resultant financial subsidy.

Table 13-3: Average Incremental Financial Cost

Particulars	Sewerage	Solid Waste
PV of Project Costs @ 4% (Rs. Million)	985.30	324.1
PV of Project Revenues @ 4% (Rs. Million)	489.83	377.2
PV of Quantity* @ 4%	87.90	357173.6
AIFC**	11.21	907.3
AIFC (Rs./KL) - O & M	4.72	
Average Tariff**	5.57	1056.2
Financial Surplus (Subsidy)**	-5.64	148.89
AIFC Recovery (%)	49.7%	116.4%

* Million kiloliter for sewerage; metric ton for solid waste

** Rs./KL for sewerage; Rs./MT for solid waste

The above table shows that the average tariff for solid waste management subproject could cover fully all its incremental investment and O&M costs with its average tariff higher than its AIFC. But for the sewerage subproject, its average tariff could not cover fully all its costs.

Table 13-4: Subsidy Analysis

Particulars	Industrial	Commercial	Domestic	Standpost
Sewerage				
Average Water Tariff (Rs./KL)*	16.60	15.49	7.49	0.00
Average Sewerage Tariff (Rs./KL)	6.64	6.20	3.00	0.00
AIFC (Rs./KL)	11.21	11.21	11.21	0.00
Financial Surplus (Subsidy) (Rs./KL)	-4.57	-5.01	-8.21	0.00
AIFC Recovery (%)	59.2%	55.3%	26.7%	0.00
Average O&M Cost (Rs./KL)	4.72	4.72	4.72	0.00
O&M Cost Recovery (%)	140.5%	131.2%	63.5%	0.00

* Assumed same as in Thrissur; water is not a KSUDP subproject in the MC

The above analysis indicates that sewerage O&M costs for domestic customers with sewer connections are subsidized. This subsidy is a result of the low maximum rate set by the State Government for sewerage charge to encourage connection to the system and attain its environmental objectives.

13.6 Beneficiary Affordability

Willingness to Pay (Survey Results). For survey purposes, the households were categorized into 6 income groups as explained in detail in Chapter 3 (Socio-Economic Profile). The 6 household categories are: High Income Group (HIG), Middle Income Group (MIG), Low Income Group (LIG), Upp11er crest of the Poor (UP), Just above Vulnerable (JV) and Most Vulnerable (MV). The composition of the population by income group[18] is as follows: HIG (6%), MIG (36%), LIG (49%), UP (5%), JV (2%) and MV (2%).

The results of the survey did not specify an amount that each group is willing to pay for improved water supply and sanitation services. The survey however indicated a low willingness to pay among the poor and a bit higher willingness to pay from the non-poor for obvious financial reason. The low willingness to pay for improved services among the poor is largely due to: (i) relative satisfaction with the present water supply and sanitation services; (ii) use of water from street tap, which is the major source of water among the poor, is currently free of charge; and (iii) respondents' view that government has the responsibility to provide the services to its residents.

Affordability Analysis. An analysis was undertaken to determine if the beneficiaries, in particular the LIG and poor households, could afford the proposed tariff charges. The generally accepted guideline is that the combined charges for water supply and sanitation should not exceed 5% of household income. The average household income gathered in the socio-economic survey (September 2004) and the assumed water usage in 2010 were used in the analysis. The analysis tested the projected tariffs that would prevail in 2010, increased twice after 2004 (by 50% in 2006, 50% in 2009-10 and 22% in every three years thereafter).

Table 13-5: Household Affordability Analysis

Income Group	HH Mean Income*	Water Usage in 2010 **	Water Charge*** in 2010 at 2004 Price		Sewerage Charge in 2010 at 2004 Price		Solid Waste Fee in 2010 at 2004 Price	
	Rs./Mo.	KL/Mo.	Rs./Mo.	% of Income	Rs./Mo.	% of Income	Rs./Mo.	% of Income
HIG	24,315	40	215	0.9%	86	0.4%	27	0.1%
MIG	5,475	30	133	2.4%	53	1.0%	27	0.5%
LIG	3,195	20	83	2.6%	33	1.0%	27	0.8%
UP	3,430	16	63	1.8%	25	0.7%	27	0.8%
JV	1,510	13	48	3.2%	19	1.3%	27	1.8%
MV	2,613	10	33	1.3%	13	0.5%	27	1.0%

* Source: September 2004 survey

**Assumed same consumption pattern as in Thrissur; water is not a KSUDP subproject in the MC

*** Assumed same as in Thrissur

[18] Source: State Planning Board "Economic Review 2002"

The results of the analysis show that the proposed tariff charges are within the 5% affordability limit. If the poor households (MV, JV and UP) would want to continue sourcing their water from the street tap, their monthly charges would even be less since water from street tap would remain to be provided free of charge. No affordability problems therefore are foreseen for the proposed tariff charges.

13.7 Project Sustainability

Solid waste management is a revenue generating subproject whose operation and maintenance costs could be fully covered with user charges. Its average tariff, which is affordable, is higher than its AIFC which indicates financial sustainability. The user charge, however, would have to be revised periodically as discussed in our cost recovery proposals to ensure financial sustainability. In the case of the sewerage subproject, sewerage charges would be adequate to cover the full O&M cost of operations. For the non-revenue generating subprojects, their respective O&M costs would be covered fully through the MC's budget. The cash flow statements of the MC from FY 2005-06 to 2020-21 detailing the subprojects' revenues, O&M cost and operating subsidy are presented in **Annex E**.

The revenue enhancement measures outlined in Chapter 6 (Municipal Finance) and the cost recovery proposals described earlier for revenue generating subprojects will ensure sustainability of the proposed subprojects. Periodic adjustments of own source revenue such as property tax, license fees and direct user charges are vital for the sustainability of the subprojects. The State Government must allow the MC to revise local taxes, fees and charges regularly in accordance with prescribed procedures and within limits set by law to make the MC less reliant on State subsidies. A Financial Improvement Action Plan in **Annex D** outlines the actions and steps during the implementation and post-implementation periods to ensure the sustainability of the subprojects' operation by the MC.

The following table summarizes the results of the financial projections for the MC from FY 2011-12 to 2016-17, the critical years when the MC starts repaying the KSUDP loan obligation. The detailed financial statements are presented in **Annex C**.

Table 13-6: Summary of Projected Financial Position

Particulars	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Revenue Receipts	651.1	693.2	720.1	748.7	830.0	876.1
Revenue Expenditures	352.8	372.1	363.2	384.9	407.8	432.1
Revenue Surplus Before Debt Service	298.3	321.1	356.9	363.8	422.2	443.9
Debt Service	148.3	144.4	140.4	136.5	132.5	128.6
Revenue Surplus After Debt Service	150.0	176.8	216.5	227.4	289.7	315.4
Cumulative Revenue Surplus	1,694.9	1,871.7	2,088.2	2,315.6	2,605.2	2,920.6
Debt Service Ratio	2.0	2.2	2.5	2.7	3.2	3.5

The results of the financial projections show that the MC could generate sufficient revenues to meet full O&M costs and debt service obligations over the forecast period. The MC has a healthy financial position that could sustain the operation of its subprojects over their economic lives. The annual DSCRs exceed 1.3 throughout the projected period.

14. SUB-PROJECT RISKS AND ASSUMPTIONS

Every project has its risks, and these can be much greater and numerous with a multi-city, multi-sector project involving a multitude of stakeholders and responsible authorities. However, early acknowledgement of the potential risks will help in mitigating or even eliminating the problems that they may cause during project implementation and beyond. The potential risks and assumptions come in a number of different categories and are classified below for better appreciation.

14.1 Physical Component Risks

- Land transfers and affected person (AP) compensation agreed and completed before scheduled construction;
- Temporary relocation of street vendor and hawkers likely during civil works construction; adequate provision for compensation to be allocated in the Project;
- Different sector contract conflicts to be avoided through careful contract management and supervision. Tender and contract documents to clearly specify contractor responsibilities;
- Environmental clearances completed before scheduled construction;
- Environmental pollution and nuisance to the public to be minimized during construction through diligent site supervision and monitoring. Tender and contract documents to clearly specify contractor responsibilities;
- Contractors perform competently, to time and budget; and
- Municipal Corporation (MC) may not have the resources or skills to manage the operation of the new facilities (mainly STP and sanitary landfill sites) in an environmentally sound way.

14.2 Policy Risks

- State and local governments' commitment to necessary decentralization reforms in urban planning and management to provide improved services;
- GoK continues to provide adequate guidance and capacity building to support the devolution process of decision making and financial independence of the urban local bodies;
- Transfer of water supply and sewerage assets to local self governments not matched by re-structuring and adequate staffing of City Planning and Engineering Departments; and
- Political acceptance of required changes in tariffs, taxes, and rates.

14.3 Institutional Risks

- GoK and MCs to ensure that PIUs are fully staffed and capable of undertaking duties prior to and during project implementation;
- To maintain effective management during project implementation the project leadership at municipal corporation level should remain constant, for at least the first 3 years;
- Delays will occur unless there is timely recruitment and satisfactory performance of Design and Supervision consultants;

- Project ownership will suffer unless there is effective consultation with stakeholders and others government agencies;
- Public awareness and community mobilization programs must be effective for getting the participation of local stakeholders into implementation of the institutional development program;
- Adequate training opportunities for elected officials and municipal staff must be available;
- Implementing agencies must be amenable to capacity building; and
- There should be no legal obstacles to poor-settlement upgrading.

14.4 Social Risks

- Adequate training facilities and technical support system must be available to help Municipal Corporation in implementing poverty alleviation activities;
- Mayors must actively support the initiatives under the poverty alleviation component;
- Poor communities must be willing and able to participate in city management and project planning activities;
- Investment provided by the Project should be converged with other programs to target the urban poor more effectively and for maximum benefit;
- Improved services will only benefit the urban poor and vulnerable groups if included in the physical design and if any financial cost recovery is affordable; and
- Project funds must not be diverted from the social programs to pay for loan charges.

14.5 Financial Risks

- Financial Improvement Action Plan not implemented to scale or schedule necessary for sustained operation and maintenance;
- Willingness of beneficiaries to pay for proper management, maintenance and operation of infrastructure facilities;
- Tariffs for services not set at appropriate levels or collected efficiently; and
- Un-timely provision of counterpart funds.

14.6 Economic Risks

- Overrun of project construction costs due to delays;
- Indirect economic costs are significant, e.g. negative environmental impacts on agricultural or fisheries production, net loss of income due to shutdown of street vendors/hawkers;
- Underachievement of project outputs, i.e. population coverage of improved services is below target or infrastructure improvements not as effective as planned;
- Effective demand for the services provided by the improved infrastructure is less than projected due to lack of consumer affordability or willingness to accept change; and
- Operation and maintenance of the infrastructure and equipment provided by the Project are not funded and/or carried out at levels sufficient to sustain project benefits.