CHAPTER - 20
SPECIAL CONCERN AREAS

Planning an area should be done by taking into account areas of special concern in economic, social and physical aspects. Kollam is one of the districts with least concentration of scheduled caste and scheduled tribe population i.e. only 8.02% of total population of KLMC area belongs to scheduled caste and scheduled tribe community (Deduced from Census 2011). In KLMC area untouchability in its evil form does not exist anywhere and most of the people in SC/ST category have acquired safe shelter, drinking water, sanitation etc. 43% of total population remain as BPL (Below Poverty Line) as per Anganwadi Survey, 2019. Most of the corporation area lying along the coastal zones makes it prone to natural hazards which is another special area of concern. In this chapter areas of social backwardness, SC/ST Population study and analysis of their living Conditions, poverty level studies, and other vulnerable groups in corporation limits is explained.

20.1 SOCIAL BACKWARDNESS

Social backwardness of the KLMC area is analyzed on the basis of SC/ST population concentration, BPL households, etc. In the last 20 years, the status of SC & ST population has improved a lot in terms of education, employment and in their living standards, but still some families are in underdeveloped areas lacking basic amenities.

20.1.1 SC/ST Population

According to Census 2011, SC/ ST population constitutes nearly 8.02% of the total population in the KLMC of which SC population is 30241 (7.8%), and that of ST population is 909(0.23%). The details of SC/ST population in the KLMC area is shown in table 20.1.

20.1.2 SC Population

SC population of KLMC area is 9.2% of total SC Population of Kollam District as given in table 20.2. The highest SC

Kollam Municipal Corporation	SC Population	ST Population
Total	30241	909

Source: Deduced from Census 2011

Table 20.1 SC/ST population of KLMC area

population in the district is concentrated on Paravoor, Kottarakkara and Punalur areas among the LSGI's.

	Male	Female	Total
SC Population in Kollam District 2011	157801	170462	328263

(Source: Deduced from Census 2011)

Table 20.2 SC population in Kollam district

When compared to the SC population of KLMC for the census years 2001& 2011 as given in table 20.3, it is observed that SC population has decreased to about 4.7% from the period 1991-2001 to 2001-2011, which is mainly due to better awareness of family planning among SC people. Both female and male populations have shown decreasing trends during the same period.

	Male	Female	Total
SC Population Kollam Corp. 2001	15598	16159	**31757**
SC Population Kollam Corp. 2011	14736	15505	**30241**

(Source: Deduced from Census 2011)

Table 20.3 Comparison of SC population of census years

The zone-wise distribution of SC Population from the SC development office data 2019 is given in table 20.4.

Corporation Zones	SC Population
Sakthikulangara	2146
Thrikadavoor	1655
Kollam	4044
Kilikollur	2724
Vadekkevila	1744
Eravipuram	1259
Total	**13572**

(Source: SC Development Office, Kollam Corp.)

Table 20.4 Zonal distribution of SC population

According to SC Development Office data, the total SC Population in KLMC area is 13572 in which Kollam Main Zone has the highest SC (35% of total SC population in KLMC area). Even Though, Thrikkadavoor Zone has the least SC Population (11%), Anchalumoodu ward in that zone has the highest SC (807) population & Thamarakulam ward in Kollam Zone has least SC Population (341).

Landless and Houseless SC families

As per the data obtained from SC Development Office in 2019, about 1025 SC families (31%) in the corporation area have neither land nor houses. Due to financial constraints i.e. low-income jobs, unawareness of government schemes etc. they are not capable of owning a piece of land/ house. As the cost of land is increasing now-a-days, it is practically impossible to buy a piece of land for their rehabilitation. Table 20.5 gives the

details of landless families in the KLMC area.

Zone	Landless & Houseless Families	Houseless Families
SAKTHIKULANGARA	139	188
THRIKADAVOOR	156	201
KOLLAM	358	503
KILIKOLLUR	157	297
VADEKKEVILA	95	129
ERAVIPURAM	120	169
TOTAL	**1025**	**1487**

(Source: SC Development Office, Kollam Corp.)

Table 20.5 Zonal distribution of landless and houseless families

Also, 1487 SC homeless families (46%) are there in the KLMC area. Due to financial instability, they are not able to build houses in their own land. But in the present condition, due to a large number of government schemes such as life mission, PMAY, there is a good progress in providing houses to the houseless population. In KLMC area about 1459 houses are listed under PMAY scheme. The housing condition of SC families, those who own houses, is also not that satisfactory. Out of the total number of 3277, 279 existing houses cannot be renovated to make it as liveable, but 242 houses which are not suitable for living as such can be renovated and used. 521 houses are not yet completed as of 2019.

Sanitation

96% of SC families have usable toilets in the KLMC area. However, there are 29 families without any toilet facilities which has to be considered as it is the basic amenity needed in one's life. Also, unusable toilets of 125 families need to be made usable on an urgent basis. The details of sanitation facilities of SC families in Kollam Municipal Corporation area is given in table 20.6.

Electrification Status

There are no un-electrified SC houses in KLMC area.

Zones	Families with toilets			Families without toilet
	Usable	Unusable	Total	
SAKTHIKULANGARA	498	25	523	7
THRIKADAVOOR	401	11	412	3
KOLLAM	876	38	914	11
KILIKOLLUR	621	24	645	3
VADEKKEVILA	273	10	283	2
ERAVIPURAM	404	17	421	3
Total	**3073**	**125**	**3198**	**29**

(Source: SC Development Office, Kollam Corp.)

Table 20.6 Sanitation facilities among SC families in KLMC area

Literacy Level

Literacy rate of SC/ST population all over Kerala is increasing nowadays, from the SC development office survey 2019, it is found that 1222 SC people i.e. only 4% of SC population is illiterate in corporation areas of which 62% are females. The literacy level is shown in table 20.7. To achieve 100% literacy rate in KLMC, focus is to be given to literate SC people. Presence of illiteracy further deepens the vulnerability as the chance of exploitation is more.

Name of LSG	Illiterate Population		
	Male	Female	Total
Kollam Corporation	462	760	1222

(Source: SC Development Office, Kollam Corp.)

Table 20.7 Literacy level among SC/ST population

Physically and mentally challenged SC people

The details of physically and mentally challenged people among SC Population is given in table 20.8. 119 SC people in the corporation area are physically and mentally challenged. Many projects are initiated for improving the life standards of these families.

	Physically and Mentally Challenged Population		
Kollam Corporation	Male	Female	Total
	67	52	119

(Source: SC Development Office, Kollam Corp.)

Table 20.8 Physically and mentally challenged SC people

20.2 BPL HOUSEHOLDS IN KLMC AREA

Below Poverty Line (BPL) is an economic benchmark and poverty threshold used by the Government of India to indicate economic backwardness and to identify individuals and households in need of government assistance and Kerala is one of the states which has formulated its own criteria. In Kerala nine parameters are taken for assessing BPL status. Families which lack access to four or more parameters are classified as BPL. The parameters are shown in table 20.9.

Sl No	BPL Parameters
1	No Land or < 5 cents of land.
2	No house or dilapidated house.
3	No sanitation latrine.
4	Family without colour television.
5	No regular employed person in the family.
6	No access to safe drinking water.
7	Women headed HH or presence of widows or divorcee.
8	SC & ST.
9	Mentally retarded or disabled member in the family.

Table 20.9 BPL Parameters

About 43% of total households in the KLMC area. It is clear from table 20.10 that, maximum number of BPL families are in Kollam zone of the corporation (12786) followed by Killikolloor zone (6506). The ward-wise distribution of BPL families is shown in figure 20.1. Uliyakovil east of Kollam zone has the highest number of BPL families among the divisions since mostly are engaged in the agricultural activities.

20.3 SUB-STANDARD COLONIES IN KLMC AREA

In KLMC area, there are 113 colonies and the total households are 1839 (table 20.11 and Figure 20.2) i.e. about 58% of SC families live in colonies. Most of the colonies are concentrated on the eastern outskirts of the KLMC area. Their major employment is in the agricultural sector. Most of the colonies are located in the Kilikolloor zone of KLMC.

20.4 WOMEN WELFARE AND EMPOWERMENT

20.4.1 Anganwadis

A total of 292 Aganwadis are there in the corporation area with a strength of 3120 students. There are very few Anganwadis (around 11) which have child friendly furniture. Due to insufficient availability of land,

Zones of KMC	Ward No	Ward Name	No. of BPL Families
Sakthikulangara	1	MARUTHADI	787
	2	SAKTHIKULANGARA	525
	3	MEENATHUCHERI	633
	4	KAVANAD	745
	5	VALIKEEZHU	819
	54	ALATTUKAVU	937
	55	KANNIMEL	986
Total in Sakthikulangara Zone			**5432**
Kollam	6	KUREEPUZHA WEST	773
	12	THEVALLY	529
	13	VADAKKUMBHAGAM	529
	14	ASRAMAM	573
	15	ULIYAKOVIL	755
	16	ULIYAKOVIL EAST	1296
	17	KADAPPAKADA	395
	42	MUNDAKKAL	711
	43	PATTATHANAM	387
	44	CANTONMENT	681
	45	UDAYAMARTHANDAPURAM	574
	46	THAMARAKULAM	448
	47	PALLITHOTTAM	878
	48	PORT	942
	49	KACHERY	826
	50	KAIKULANGARA	701
	51	THANGASSERY	675
	52	THIRUMULLAVARAM	653
	53	MULANKADAKAM	460
Total in Kollam Zone			**12786**
Killikollor	18	KOICKAL	771
	19	KALUMTHAZHAM	795
	20	MANGAD	592
	21	ARUNOOTTIMANGALAM	798
	22	CHATHINAMKULAM	1224
	23	KARIKODU	959
	24	COLLEGE DIVISION	793
	25	PALKULANGARA	574
Total in Killikollor Zone			**6506**
Vadekkevila	26	AMMANADA	287
	27	VADAKKEVILA	613
	28	PALLIMUKKU	588
	29	AYATHIL	514
	30	KILIKOLLOOR	671
	31	PUNTHALATHAZHAM	707
	32	PALATHARA	546
Total in Vadekkevila Zone			**4528**
Eravipuram	33	MANAKKADU	602
	34	KOLLORVILA	752
	35	KAYYALAKKAL	899
	36	VALATHUNGAL	638
	37	AAKKOLIL	927
	38	THEKUMBHAGAM	536
	39	ERAVIPURAM	607
	40	BHARANIKAVU	607
	41	THEKKAVILA	995
Total in Eravipuram Zone			**5961**
Thrikkadavoor	7	KUREEPUZHA	1163
	8	NEERAVIL	749
	9	ANCHALUMOOD	600
	10	KADAVOOR	890
	11	MATHILIL	637
Total in Thrikkadavoor Zone			**4039**
Total BPL Families in KMC			**39252**

Source: BPL Anganwadi Survey, 2019

Table 20.10 BPL families in KLMC area

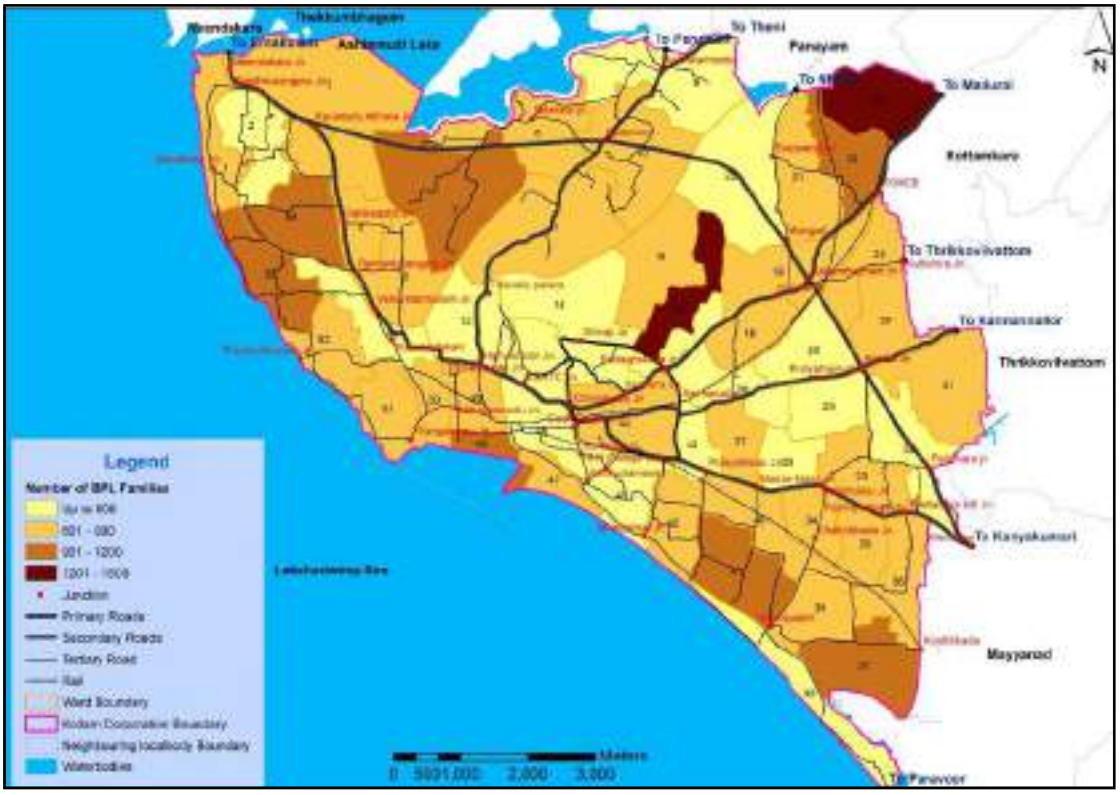
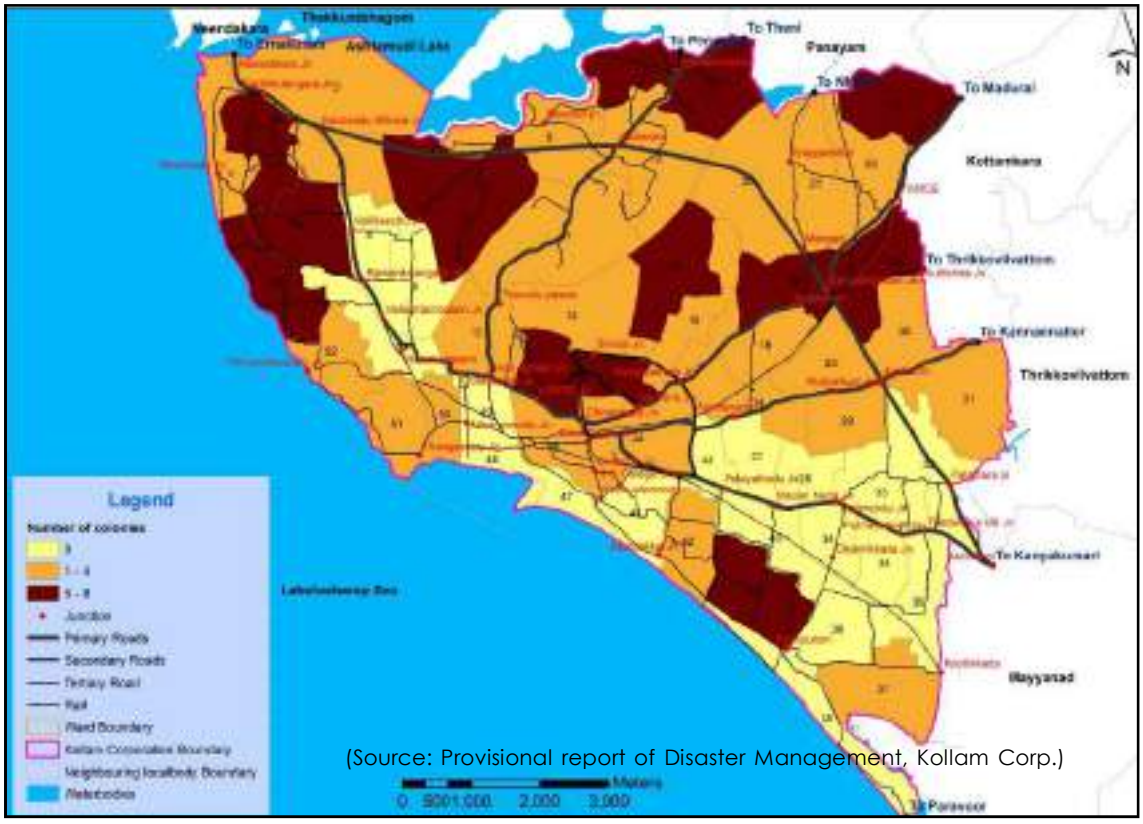


Figure 20.1 Distribution of BPL families in KLMC area



(Source: Provisional report of Disaster Management, Kollam Corp.)

Figure 20.2 Sub-standard colonies distribution

Zone	No. of Colonies	No. of families in Colony
SAKTHIKULANGARA	22	319
THRIKADAVOOR	20	219
KOLLAM	27	575
KILIKOLLUR	28	423
VADEKKEVILA	8	118
ERAVIPURAM	8	185
TOTAL	**113**	**1839**

(Source: Provisional report of Disaster Management, KLMC.2020)

Table 20.11 Zonal distribution of Sub-standard colonies in KLMC area

around 20 of them only had outdoor playing facilities. Their major source of water availability was from municipal connections through taps and mostly all of the anganwadis had sufficient water availability and well-established toilet facilities. The only major concern for them was the waste disposal arrangement which was lacking in almost all of the Aganwadis (Source: Anganwadi Survey, 2019).

20.4.2 Kudumbasree Details

There are 1779 numbers of Kudumbasree units in the town with 30865 members. In KLMC area, it is divided into two Community Development Society (CDS) i.e., Kollam CDS and Kollam East CDS.

In KLMC area, Kudumbasree has Balasabha groups consisting of 1513 members. There are also 72 micro enterprises groups of Kudumbasree in the planning area in which each group has 3 to 5 members. Major activities of this group are tailoring, family stores, stationery stores, business, bakery, catering, flour mill, pickle units, readymade shops etc. Some members under Kudumbasree are involved in the waste collection and land modification sectors. KLMC CDS in connection with Kollam District Mission made an initiative to undertake the charge of air conditioned waiting halls for passengers at Kollam Junction Railway Station in the month of April 2017. Now the A/C waiting hall is functioning with two reception staff and two cleaning staff. Under the supervision of Kollam Kudumbasree District Mission, Kudumbashree undertook the vehicle parking facility at Kollam Junction railway station.

20.5 INFERENCE

From the analysis of special concern areas, it is found that the KLMC area consists of economically backward people, physically and mentally challenged populations which need special attention found mostly on the outskirts of KLMC area. To achieve our planning goal, betterment of these vulnerable groups needs to be considered.

CHAPTER - 21
ENVIRONMENT

Environment is the most salient but silent feature which directly and indirectly influences all other sectors. For an environment friendly village, it is imperative that it address environmental concerns, which have deep and long-standing influence on its people and land. Environment fatigue is a natural corollary to bad environment management caused by environmental degradation and biodiversity loss by developmental activities across the world. The unplanned developmental activities and apathetic policies that lack ecological sensitivity relegated KLMC to the status of an environmentally endangered place. Protection, conservation and sustainable environmental practices are the essential functions of a desirable integrated urban approach towards sustainable development. This chapter deals with different aspects of environmental sensitive areas and the developmental issues in planning area.

21.1 ENVIRONMENTALLY SENSITIVE AREAS

The Environmentally sensitive areas in KLMC include Ashtamudi Lake, other water bodies, low lying / paddy areas and wetlands, sacred grooves, coastal areas etc.

21.1.1 Ashtamudi Lake

Ashtamudi Lake is the second largest estuary of Kerala which extends 51.8 km² as shown in figure 21.1. It is an estuarine ecosystem, internationally listed as Ramsar site no. 1204. The lake is palm shaped with 8 prominent arms that spreads in KLMC and Grama Panchayats of Perinad, Panayam, Thrikkaruva, Kundara, Thekkumbhagam, East Kallada, Mundrothuruth and Neendakara

Ashtamudi Lake hosts a unique diversity of mangrove species with diverse flora and fauna. The area habours 15 species of true mangroves, 22 species of mangroves associated, 122 species of plants, 34 species of edible fishes and about 62 species of birds. The estuarine ecosystem supports

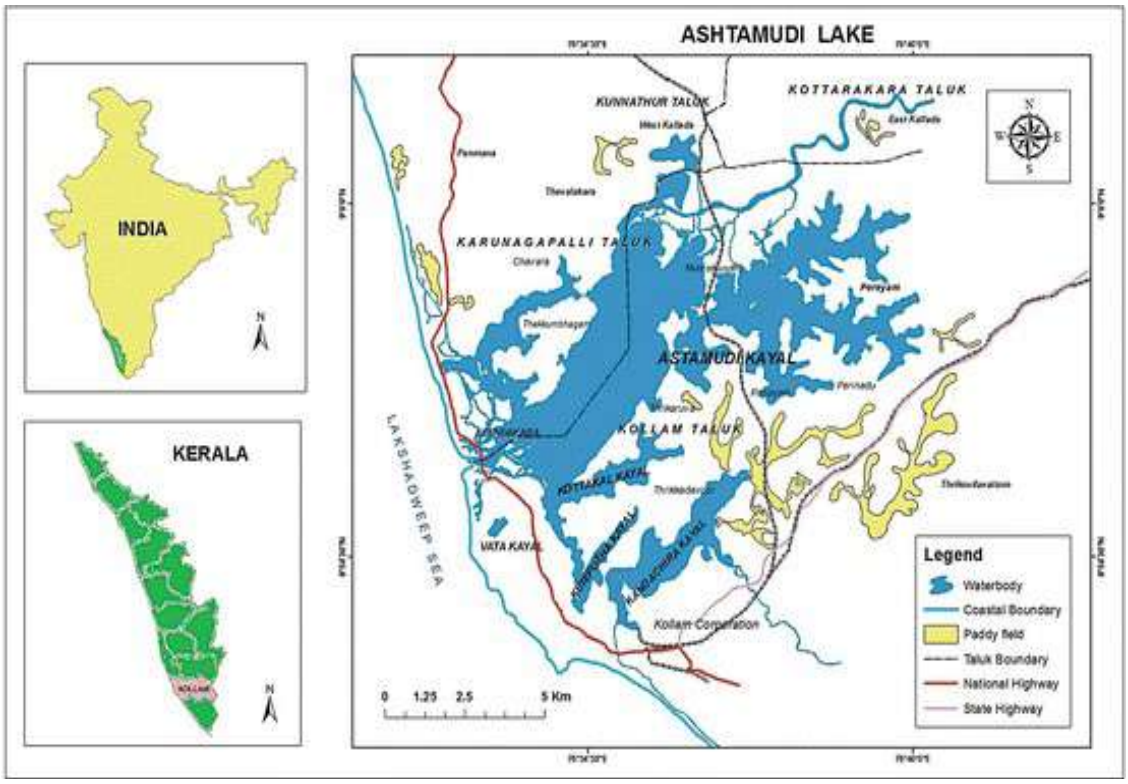


Figure 21.1Ashtamudi Lake

some endangered species like Syzygium travancorium which is listed as critically endangered in International Union for Conservation of Nature (IUCN) red list. Ashtamudi Lake is one of the most environmentally sensitive areas of the district.

The Islands in the lake where mangroves are present, are now under private ownership having an extent of 16 hectares. These mangroves create the most beautiful mangrove forest of the state. As per the data from the report prepared by Forest Department in 2019,the Mangrove areas in KLMC is about 10.74 hectare and is concentrated along Ashtamudi Lake as shown in figure 21.2.



Figure 21.2 Mangrove areas of Asramam, Kollam

Within the boundary of KLMC, the lake covers about 8.48 sq. km according to primary survey. The Aqua Bio Reserve Zone suggested in the Integrated District Development Plan lies partly in KLMC area as shown in Figure 21.3. No activity that affects the eco system is to be permitted in this zone. Ashtamudi wetland also has social and cultural importance. It provides livelihood for thousands of people by coir manufacturing, fishing, inland water transport etc. About 40 crores worth of oyster per annum is obtained from this lake. Cultural activities like Presidents Trophy boat race, movement of Kettukuthira in association with temple festivals are also performed in Ashtamudi Lake. In short, Ashtamudi lake can be considered as an internationally high valued and sensitive eco system.

21.1.2 Other Water Bodies

There are a large number of natural ponds, streams and other water bodies covering an area of 1.06 sq.km within KLMC as shown in figure 21.4. Most prominent water bodies within KLMC area are:

- Vattakayal and Kattakayal
- Kollam Thodu
- Kilikolloor Thodu

Among these, Vattakayal plays an important role in creating habitat

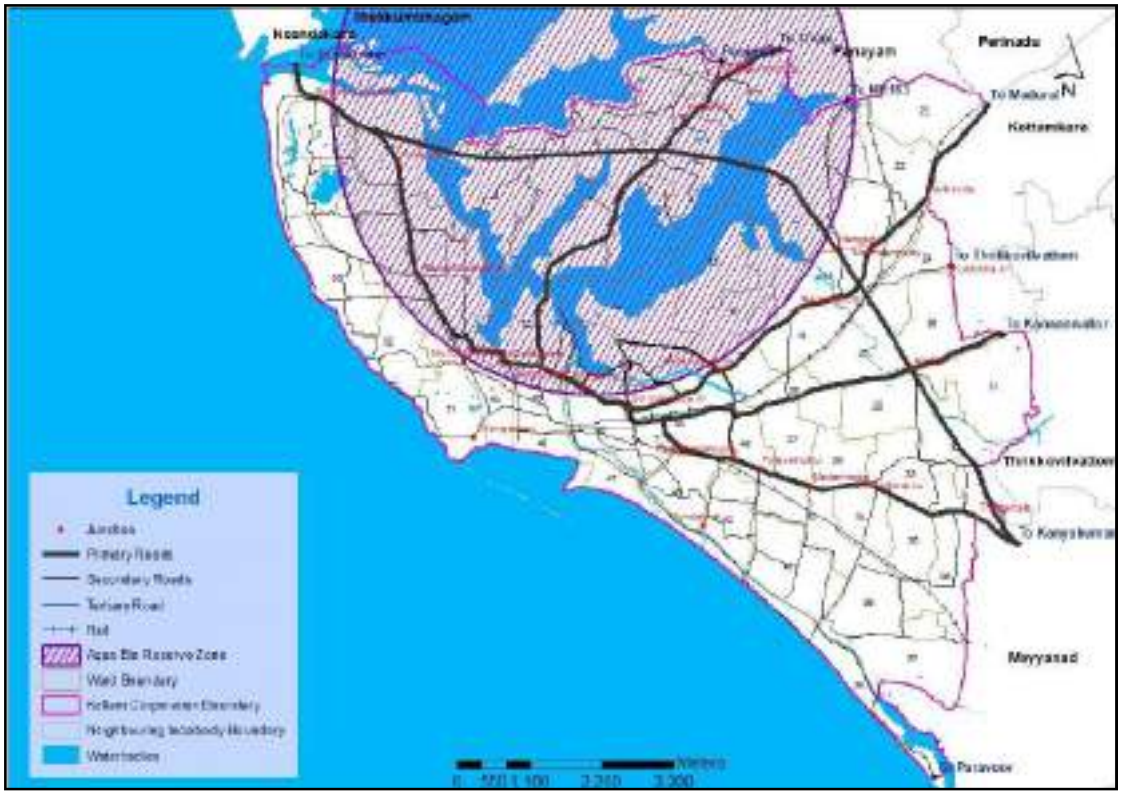


Figure 21.3 Bio reserve zone within KLMC

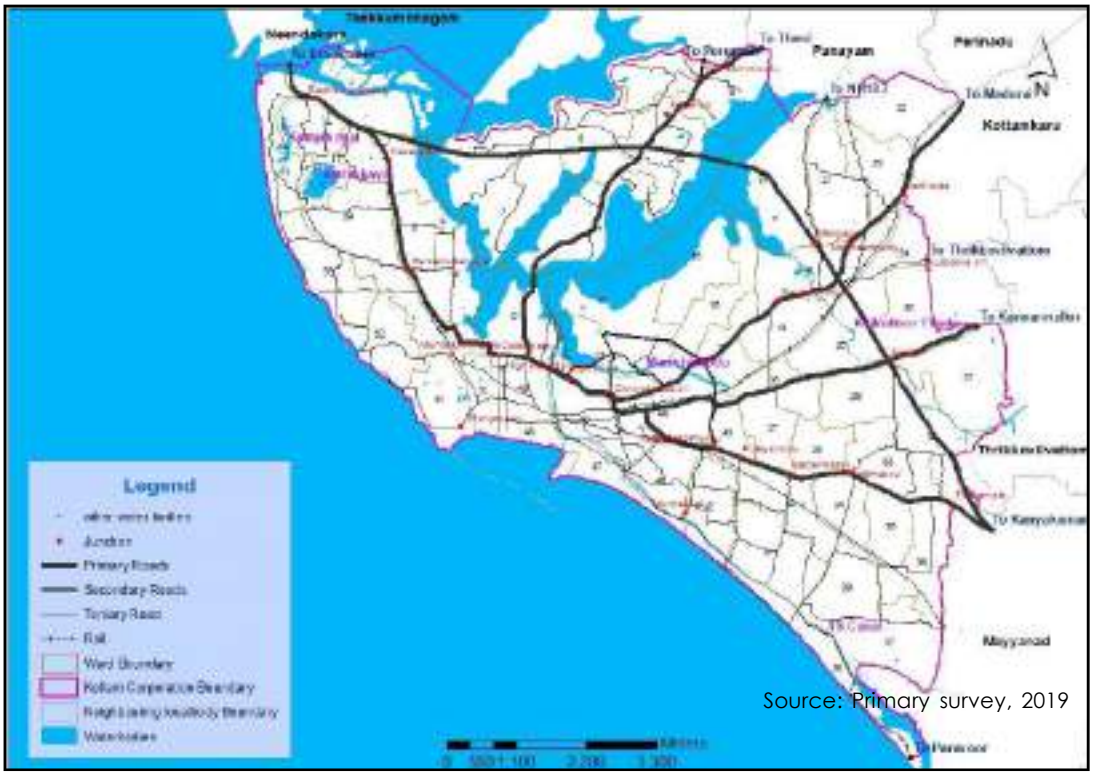


Figure 21.4 Other water bodies such as Vattakayal, Kollam Thodu, Kilikolloor Thodu in KLMC

for many migratory birds and mangrove associates. The extent of Vattakayal is about 19.126 hectare. The presence of coconut lagoons around these areas makes it aesthetically beautiful and acts as a breathing place for the locality. The Katta kayal was acting as a link between Vatta kayal and Ashtamudi lake. However 2 km long Katta kayal was encroached at many places and hence this area undergoes flooding in rainy season. Kollam Thodu which was very active in transporting goods through water is now under renovation. Even after taking initiatives from the side of KLMC and other concerned departments, dumping of waste and encroachment of Kollam Thodu is still remains in many reaches. Kilikollur Thodu connecting Ashtamudi lake to the north and Palathara chira to the east is an important natural stream which collect storm water from the eastern portion of planning area

These water bodies also help in recharging the groundwater reserve.

21.1.3 Low Lying Lands

Another important environmentally sensitive area is low lying area including paddy land and marshy lands. Paddy areas and wetlands within KLMC area are 116.71 hectare

and 25.218 hectare respectively as shown in figure 21.5. These areas absorb flood water and replenish the groundwater reserve. Among marshy lands, the area adjacent to Kandachira Kayal is highly sensitive and rice cultivation was active about 25 years back in this area where a number of migratory birds found their destination. Now this area is kept idle and used for dumping of solid waste.

21.1.4 Sacred Groves

Sacred groves are sanctified patches of forests protected by the strength of religious beliefs as abode of Gods and Goddesses, which represent community conserved bio diversity area with varied degree of ecological and socio-cultural dimensions. Within KLMC area a number of such sacred grooves are available as shown in figure 21.6, of which sacred groves at Eravipuram, Mundakkal and Ayathil are considerably large in size. The list of sacred groves is given in table 21.1

21.1.5 Coastal Areas

The western boundary of KLMC area is bound by the Arabian Sea for a length of 17.2km. As per 2011 CRZ notification, area up to 500 m from High Tide Line (HTL) on the landward side in case of sea front and 100 m along tidal influenced water bodies or width of the creeks which one is less is

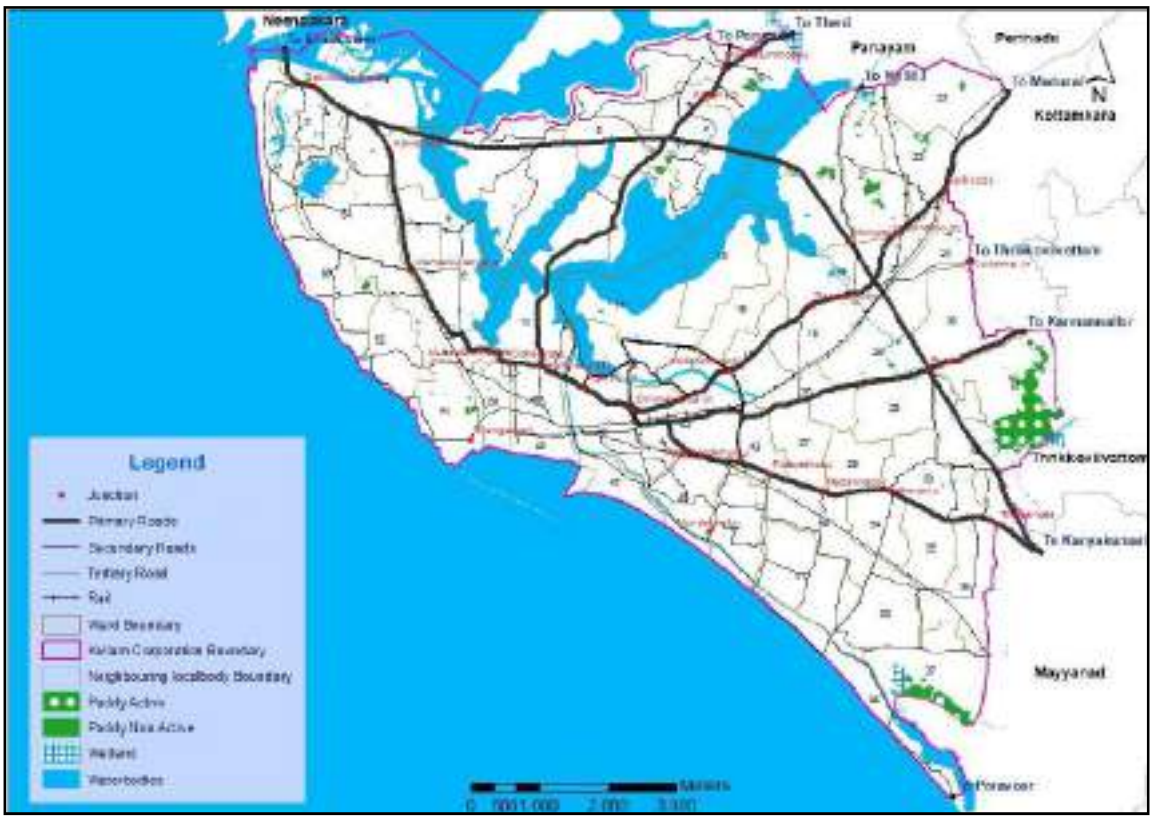


Figure 21.5 Low-lying areas within KLMC

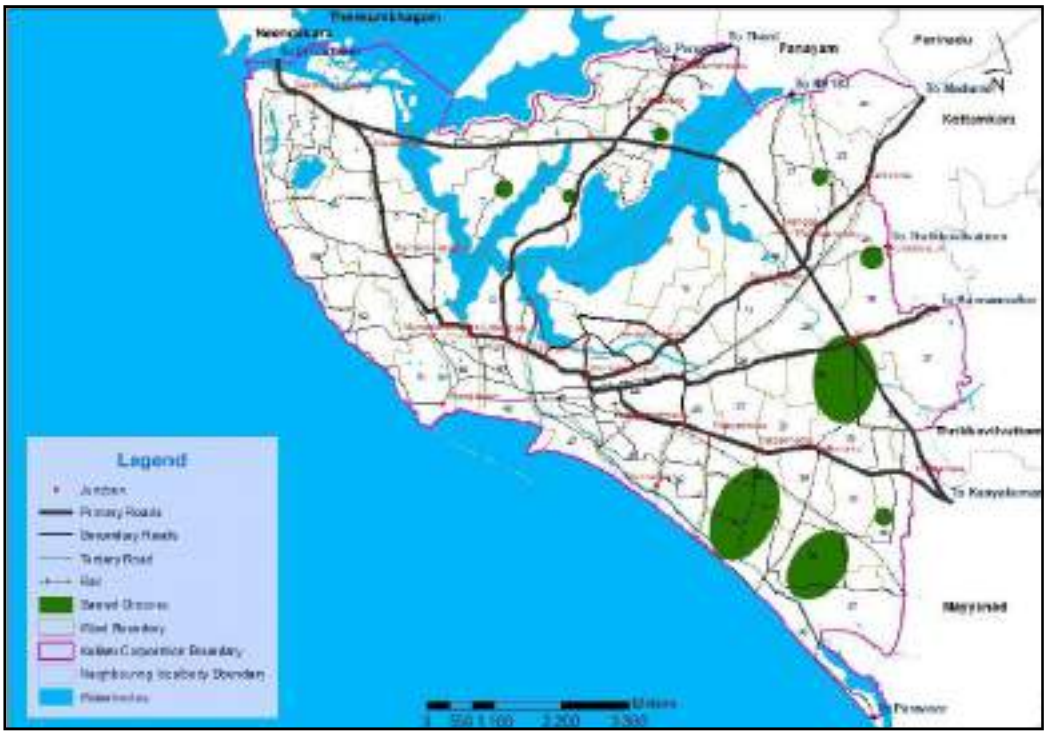


Figure 21.6 Sacred groves within KLMC

Name of Sacred Groves	Area (m^2)
Karalathu Bhagawati Temple	2
Kayikkarakavu	21
Venkenkara Sree Durga Devi Temple	11
Thadikkakavu Nagaraja Temple	39
Kalariyil Balabhadra Devi Temple	10
Mukkodathu Sarppakavu	32
Perumath Sarppakavu	32
Valathungal Sarppakavu	39
Karicheri Sarppakvu	36
Palathara Sree Durga Bhagavathi Kavu	32
Appooppan Kavu	30
Mundakkal Kavu	41

(Source: Forest Department Report, 2019)

Table 21.1 List of sacred groves in KLMC area

earmarked as Coastal Regulation Zone (CRZ). Most of the fishermen villages are located in CRZ. As per the Coastal Zone Management Plan, 2018, the entire CRZ in Kollam Municipal Corporation is CRZ– II except for ecologically sensitive are like mangroves grown area earmarked under CRZ-I as shown in figure 21.7.

21.2 DEVELOPMENTAL ISSUES

21.2.1 Problems facing by Ashtamudi Wetland

Ashtamudi Wetland, the high valued and highly sensitive ecosystem is struggling for existence due to the following issues:

i) Encroachment

As per the available old survey

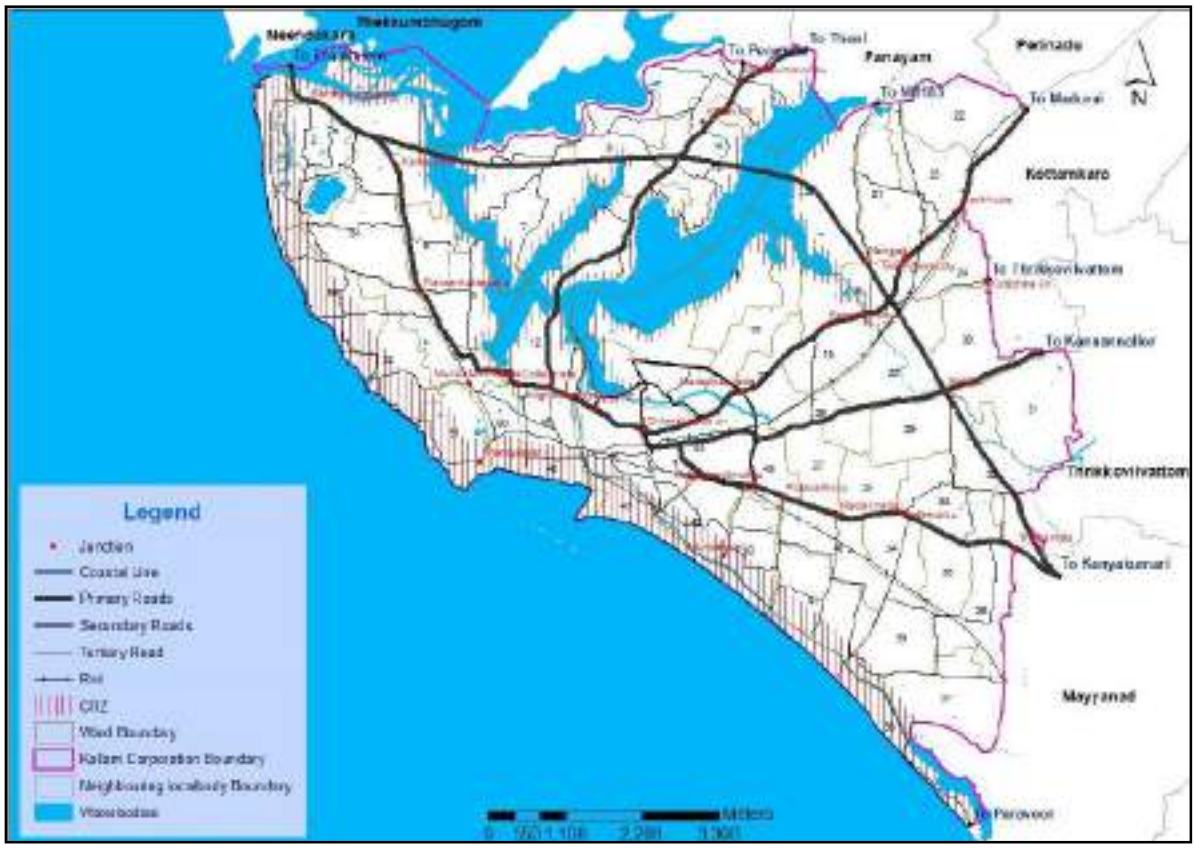


Figure 21.7 Coastal Areas under CRZ in KLMC area

records, Ashtamudi lake was occupying a total area of 61.4 sq.km. But the extent was reduced to 51.8 sq.km. As per the earlier survey records (Land use survey conducted by T&C Department 2005), the total extend of Ashtamudi in KLMC area was 8.766 sq.km, but as per the land use map prepared after primary survey in 2020, the extend of Ashtamudi Lake was only 8.48 sq.km. The remaining portion of Ashtamudi is encroached.

ii) Prevention of spawning of fish

Another serious issue is the local method of illegal and destructive fishing employed called 'Thoppumpadalum'. This method involves dumping large quantities of fresh branches of trees into a big area along the banks of the lake. The branches act as artificial mangrove forest and attract fishes for spawning. Due to this process both the depth and width of the lake is shrinking alarmingly. As the banks are protected with laterite stone and granite walls after destroying natural vegetation including mangroves the spawning of fish is affected considerably . Many species of fish found in the kayal in the past are no longer available.

iii) Pollution

Some of the available studies on the pollution threat of Ashtamudi Lake are:

A. 'Ashtamudi Management Plan' prepared in the year 2007 by the joint effort of CESS and ASR Ltd, New Zealand with financial assistance from the Asia Development Assistance facility, Ministry of foreign affairs and Trade Government of New Zealand may be considered as the first initiative in this direction. As per this study the major inputs of pollution to the Ashtamudi estuary are:

- Domestic and municipal sewage.
- Drainage from the industrial area to the eastern lake.
- Waste disposal from port and fishing harbor activities.
- Coir retting and processing.
- Salt water wastes from aquaculture ponds.
- Heavy metals accumulated in organic rich clay sediments of eastern and southern lakes.
- Leachates through T.S Canal.

B. Study conducted on the water quality of Ashtamudi estuary titled as "Studies on the water quality in the surroundings of Kureepuzha solid waste dumping site in Kollam district, South India", (undertaken by the Department of Environmental Sciences, University of Kerala and P.G Department of Zoology, Fatima Matha National College Kollam).The study analyzed the physio-chemical and biological characteristics of Ashtamudi Lake near Kureepuzha Chandi depot and observed that the lake water is highly contaminated mainly due to the leachate from the Kureepuzha waste dumping yard. Hence in future water pollution due to the waste treatment system at Kureepuzha will be a severe issue unless structural measures are taken for arresting the flow of leachate into the lake.

C. Kerala State Pollution Control Board, in its report in 2018 included monthly monitoring of water quality at lake station which is located near the confluence point in Arabian Sea near Neendakara Fishing Harbour. The data is shown in table 21.2 and 21.3. While comparing the data with that recorded in 2013, it is observed that fecal coliforms, which indicates presence of human excreta is drastically reduced (from 600 to 210 CFU/100ml) and total coliform have also reduced from 1200 CFU/100ml to 580 CFU/100ml.This indicates that the effort of Local Government together with people's interventions have

	pH	DO	BOD	NO_3	Total Coliform	Fecal Coliform
Units		mg/l	mg/l	mg/l	CFU/ 100ml	CFU/ 100 ml
Maximum	7.8	6.6	2.4	1.8	580	210
Minimum	6.8	5.4	1.2	0.92	210	110
Mean	7.20	6.0	1.7	1.20	408	162
Standard deviation	0.33	0.4	0.4	0.30	119	32

Source: Modification strategy of the Settlement Pattern in the Context of Mega Flood 2018

Table 21.2 Water quality parameters, 2018

	pH	DO	BOD	NO_3	Total Coliform	Fecal Coliform
Units		mg/l	mg/l	mg/l	CFU/ 100 ml	CFU/ 100 ml
Maximum	7.9	6.3	2.8	3.8	1200	600
Minimum	6.8	4.2	1.2	0.84	180	60
Mean	7.37	5.0	2.35	2.23	698	298
Standard deviation	0.36	0.63	0.32	0.9	266	142

Source: Kerala State Pollution Control Board, 2013 report

Table 21.3 Water quality parameters, 2013

materialized in reducing bacterial contamination of the lake. Mean value of dissolved oxygen also increased considerably and mean value of BOD was also reduced from 2.35mg/l to 1.70 mg/l. This shows that discharge of industrial effluent to the lake has been reduced. When compared to the standards as shown in table 21.4, it can be concluded that the lake water can be used for various types of recreation purpose in the near future. If the effort in reducing pollution is continued, the water quality will improve further so that it can increase the fish wealth.

From the pollution studies in Kollam District in the preparation of IDDP, it was found that the maximum number of industries, hospitals and commercial establishments, creating land, water and air pollution were concentrated in this area. However now industrial waste is reduced considerably and the hospital bio-



Drainage pipe to Ashtamudi Lake (near KSRTC Bus Stand)

Dissolved Oxygen	4 mg/l or more desirable
pH	5 to 9 tolerance most fish 6.5 to 8.2 best fishing waters
BOD (5 day, 20° C)	1 to 2 mg/l Very Clean 3 to 5 mg/l Moderate Clean Over 5 mg/l Serious Pollution
Fecal Coliform (Colonies/100 ml)	Less than 20 colonies/100ml desirable 200/100 ml Max. for direct contact recreational use

Table 21.4 Stream water quality standards (CPCB)

waste is now collected by an agency called IMAGE. Now dumping of solid waste especially plastic from residential and commercial establishments and liquid waste through the outlets provided by private holdings and evacuation of liquid waste through tanker lories are found as serious issues that contaminate the Lake water

iv) Destruction of Mangrove Area

One major bio agency to prevent water pollution in Ashtamudi Lake is the mangrove forest. As per the data from Forest Department (2019) the Mangrove areas in KLMC is about 10.74 hectare and is concentrated along Ashtamudi Lake. As per Economic review 2007, mangroves area of Kollam District has reduced to 15 ha from 58 ha. As most of the mangrove area is concentrated along Ashtamudi lake it can be inferred that mangrove forest areas are rapidly vanishing from the site due to human interventions. This is to be considered as one of the serious development problem.

21.2.2 Air and Noise Pollution

Air Pollution

Air quality of residential areas in Kadappakkada is studied (Source: KSPCB, Kadappakkada - Ambient air quality data, 2018) and are shown in figure 21.8.

On comparing the annual average air quality values at Kadappakada with the ambient air quality Limits, (figure 21.9) the air pollution is within safe limits.

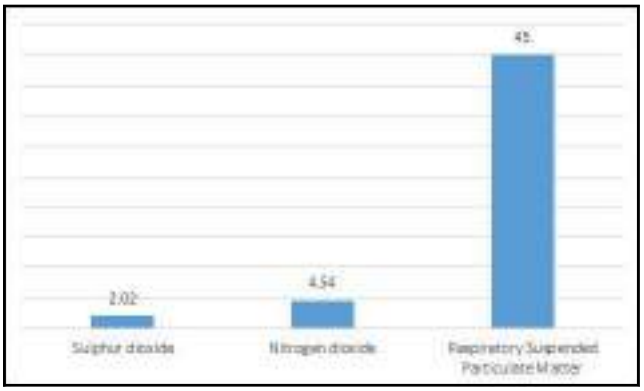


Figure 21.8 Annual average air quality values at Kadappakkada

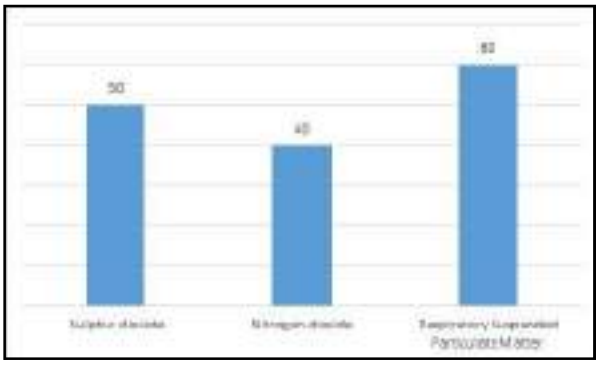


Figure 21.9 Ambient air quality limit

Also from trend analysis (figure 21.10) it is seen that air pollution has decreased,and quantity of sulphur dioxide and nitrogen dioxide in the atmosphere have decreased considerably compared to previous years and the values are found well within safe limits.

Noise Pollution

Noise pollution from industries and vehicles is also a serious concern in the environmental sector.

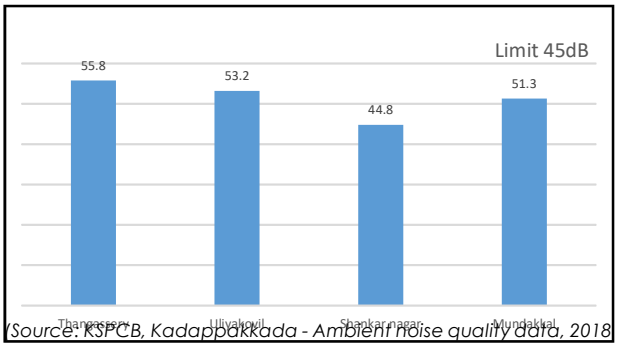
The noise level in residential and commercial areas are given in figure 21.11& 21.12 and that in some of the sensitive areas in KLMC are shown in figure 21.13 & 21.14. From the figures it is clear that noise levels in all these locations are higher than the permissible limits given in table 21.5.



Figure 21.10 Ambient air quality trend analysis at Kadappakkada station point, 2010-2018

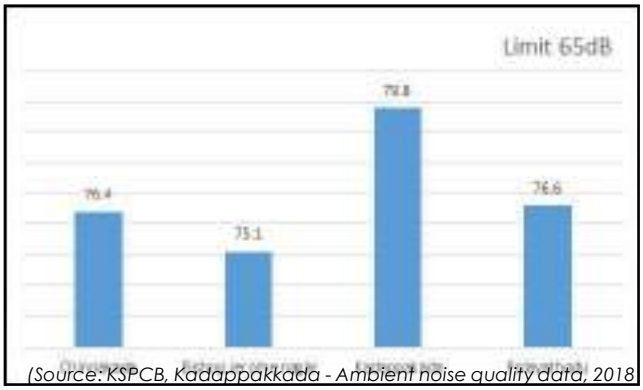
21.2.3 Solid Waste dumping

Accumulation of solid waste along the sides of roads and other open areas is a major issue. A number of unauthorized slaughter houses, poultry



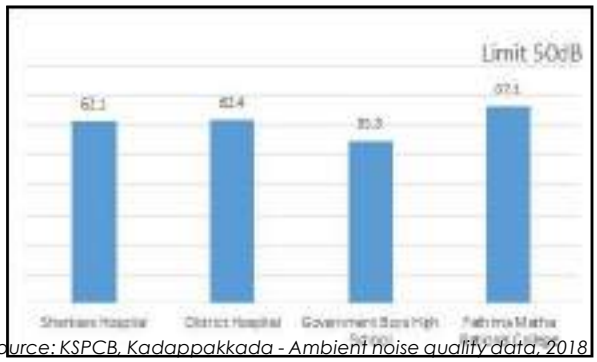
(Source: KSPCB, Kadappakkada - Ambient noise quality data, 2018

Figure 21.11Noise level over selected residential areas



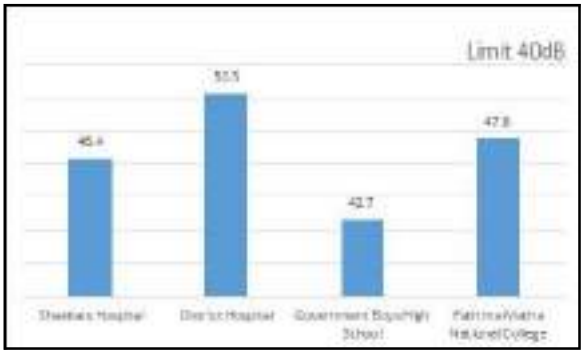
(Source: KSPCB, Kadappakkada - Ambient noise quality data, 2018

Figure 21.12 Noise level over selected commercial areas



(Source: KSPCB, Kadappakkada - Ambient noise quality data, 2018

Figure 21.13 Noise level over selected areas noise level over (day time)



(Source: KSPCB, Kadappakkada - Ambient noise quality data, 2018

Figure 21.14 selected areas (night time)

Code	Day Time/dB	Night Time/dB
A. Industrial Area	75	70
B. Commercial Area	65	55
C. Residential Area	55	45
D. Silence Zone	50	40

(Source: Central Pollution Control Board)

Table 21.5 Noise standard limits

farms and fish farms are dumping waste along road sides and drains creating air and water pollution.

21.2.3 Reclamation of Paddy Area

Another important issue is the reclamation of paddy areas. Most of the paddy areas are kept fallow for years and reclaimed for building construction despite the rules and regulations framed for conserving paddy areas. Considering the environmental impact on paddy reclamation such as water logging, lowering of ground water level etc, the existing paddy area needs to be conserved.

21.2.4 Marine Water Pollution

The main problem associated with coastal areas is the marine water pollution due to oil spillage and dumping of solid waste especially plastic.

21.2.5 Sea Erosion in Coastal areas

Sea Erosion is a major environmental issue that affects large number of house holds in the planning area. KLMC area in its 17.2 km stretch coastal area consists of 6000 working fishermen, facing threat to their livelihood due to sea erosion. On 4th June 2012, 30 houses were damaged due to severe sea erosion at Kulathupadam, Thanni and Kakkathoppu areas in Eravipuram and 20 families (50 persons) were rehabilitated by opening temporary relief camps. Figure 21.15 shows the spatial representation of corporation area which is prone to sea erosion.

21.2.6 Flood

KLMC area lies in the low land of Kollam District. Hence, water from mid, mid-up and highland accumulates in the KLMC area. The flooding occurs as a result of silting of Ashtamudi Lake, rivers and other water bodies. The primary cause of flooding in the corporation area is intense rainfall resulting in water logging due to poor

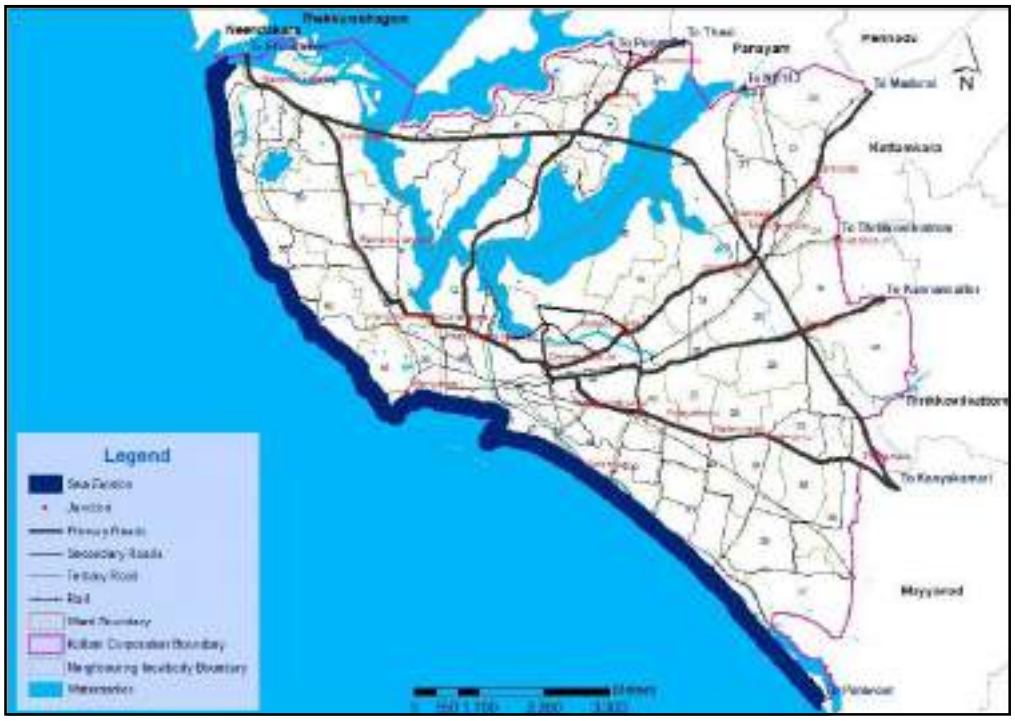


Figure 21.15 Spatial representation of KLMC regions vulnerable to sea erosion

maintenance of drainage channels in the corporation area. The figure 21.16 shows the flood level in corporation area during the 2018 flood.

21.2.7 Degradation of sacred groves

Many of the sacred groves within the planning area are undergoing degradation. Among the

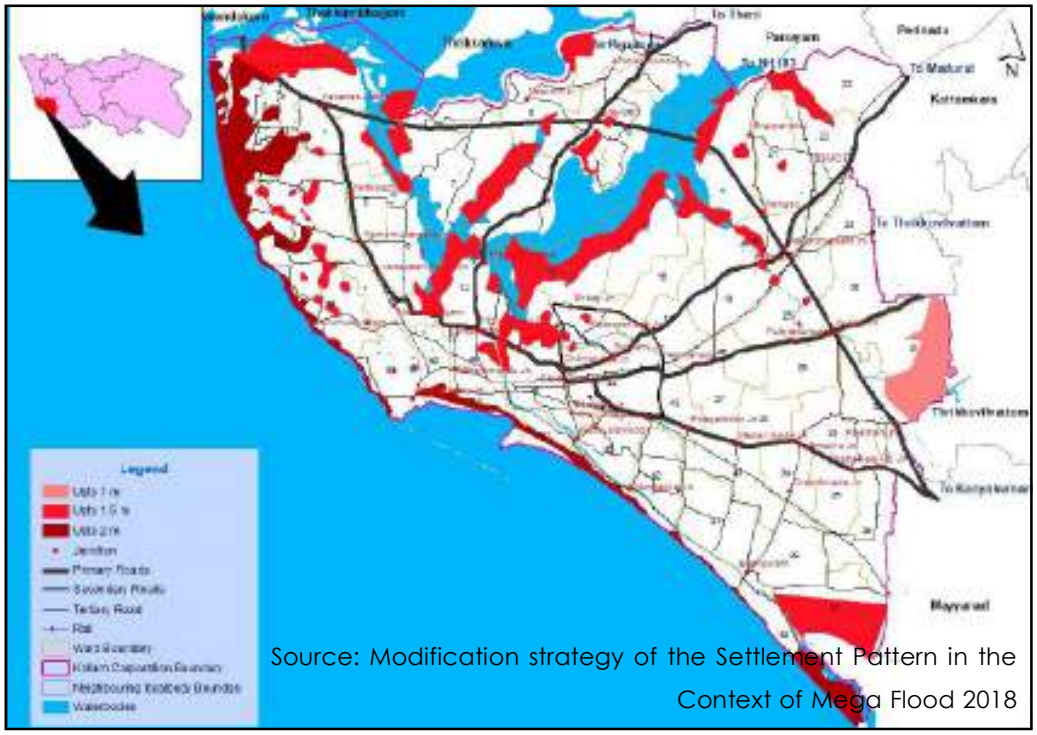


Figure 21.16 Flood level in KLMC area 2018

various threats faced by sacred groves dumping of solid waste materials, trespassing, illegal activities were predominant.

21.3 INFERENCE

- Kollam Municipal Corporation is rich with environmentally sensitive areas like the internationally acclaimed Ramsar site Ashtamudi Lake, other prominent water bodies, low lying paddy and wetlands, sacred grooves, mangrove forest and vast coastal areas.
- Ashtamudi Wetland, the highly valued and highly sensitive ecosystem is struggling for existence due to issues like encroachment, reclamation and pollution.
- Mangrove forest areas are rapidly vanishing from the site due to human interventions.
- Discharge of industrial effluent to the Lake and bacterial contamination has reduced to a large extent. However issue of dumping of plastic waste and discharging liquid waste directly from private holdings and commercial establishments near the bank and emptying ceptage directly to the Lake using tanker lorries are found as the main reasons for deteriorating water quality of the Lake.
- Air quality standards at KLMC area are within safe limits. However noise pollutions exceeded the permissible limit.
- Accumulation of solid waste along the side of roads and other open areas.
- Reclamation of paddy area within KLMC area, marine water pollution, sea erosion, flood, degradation of sacred groves are also found as other important issues affecting environmental balance of planning area.

CHAPTER - 22
DISASTER MANAGMENT

A Disaster is a result of natural or man-made causes that leads to sudden disruption of normal life, causing severe disturbances to people, objects and environment, resulting in loss of life, property and health of the population .As per DM Act-2005, Disaster Management means a continuous and integrated process of planning, organising, coordinating and implementing measures which are necessary or expedient for (i) prevention of danger or threat of any disaster; (ii)mitigation or reduction of risk of any disaster or its severity or its consequences; (iii) capacity building; (iv) preparedness to deal with any disaster; (v) prompt response to any threatening disaster situation or disaster;(vi) assessing the severity or magnitude of effects of any disaster; (vii) evacuation, rescue and relief; (viii)rehabilitation and reconstruction. The following chapter analyzes the hazard history, disaster risks, vulnerability, challenges etc. of the KLMC area.

22.1 DISASTER MANAGEMENT

Kollam District is frequently ravaged by the disastrous consequences of sea erosion, cyclone, floods and drought Corona Virus outbreak at present is considered as an ever experienced disaster. Other relatively less frequent but significant phenomena capable of causing disastrous consequences are earthquakes, lightning, pest attack, chemical transportation and storage related accidents.

The traditional model to disaster management tends to regard it as combination of a number of phased sequences of action or a continuum as indicated in figure 22.1 The EOC(Emergency Operations Center) utilizes Information and



Figure 22.1 Flow of early warning system

Communication Technology (ICT) tools and various other modes available for transmission of early warning to the vulnerable groups and also activates the responders.

The main objectives & Disaster management plan are:

- To identify hazards that the district is vulnerable to and quantify the potential population exposed to such hazards
- To lay down guidelines at district level for disaster risk reduction.
- To proactively utilize print, audio, visual and social media for disaster risk reduction
- To constantly highlight the importance of disaster risk reduction perspective in the future development goals of the district
- To strengthen the network of emergency operations centers in the Districts to function effectively as the technical and scientific backbone of disaster risk reduction.
- To set up scientifically proven hazard early warning systems and monitoring systems
- To periodically improve and update the Emergency Supports Functions Plan and Standard Operating Procedures for ensuring structured and systematic response to disasters
- To implement mitigation activities
- To coordinate and implement long term disaster rehabilitation activities

22.2 VULNERABILITY FACTORS TO DISASTERS

Topographical Factors

While considering the topographical factors of KLMC, the presence of Arabian Sea in the western part makes the area vulnerable to disasters like sea erosion, tsunami, etc. As KLMC lies in the lowlands of Kerala, the accumulation of water from the midlands and hilly areas of the state leads to flooding and waterlogging during extreme rainfall.

Demographic factors

The high population density is another reason for the vulnerability of people living in the corporation (5408 persons per sq.km). As per the socio-economic survey 2020, 31.2 % of total population is above 60 years old, 35% of total population is below 15 years old and 1% percent of total population is differently abled persons. So, there should be an organized plan for the rescue and rehabilitation of these people in case of a disaster occurrence.

Infrastructures and Accessibility

Considering the infrastructural facilities, the Kollam municipal corporation has about 59 hospitals, and 20 auditoriums, 192 number of educational buildings that can be used for rehabilitation of people. The road conditions within the corporation area are satisfactory which gives good connectivity. Hence, as far as infrastructure is concerned it is not increasing the vulnerability. However, the number of ambulances, ventilator facilities etc. are not sufficient to provide relief to the affected people. Another important infrastructure is the drainage system.It is found that failures of drainage systems leads to urban flooding in the planning area, thereby promoting all possible impacts of flood which includes spreading of diseases, loss of life, distruction of goods and services etc.

Climatic Change and Global warming

Global warming, climate change and landuse pattern are inter related to each others. One of the major impacts of global warming within the planning area is the sea level rise (SLR). Vulnerability to sea level rise would be of alarming to the majority coastal communities which live on sandy coasts. In addition to that, back water banks, islands and filtration ponds/paddy fields are other sections of the coastal zone which are highly susceptible to sea level rise. According to the report released by inter-governmental panel on climate change (IPCC) in 2021, the sea level will increase by 0.11m, and the sea will engulf shores. By 2130, many of the coastal places, within the country will be submerged. From this study, it can be concluded that, in future, the sea level will rise even higher. The existing shores will be washed away by the sea and sedimentation of sand will happen in some parts. Such changes and the resulting disaster will change the habitat of human and other organisms.

Temperature

The Corporation has a tropical humid climate with an oppressive summer and plentiful seasonal rainfall. The hottest period of the year is from March to the end of May. In April and May, the heat is relieved by thunder showers. With the arrival of the South-West monsoon by about the end of May, temperature decreases. Generally, during the monsoon time the weather is pleasant. Dry weather prevails from December to February

and the nights will be colder during this period. The temperature in the coastal region is somewhat less than that in the interior. Coolness in the coastal region is due to the effect of sea breeze.

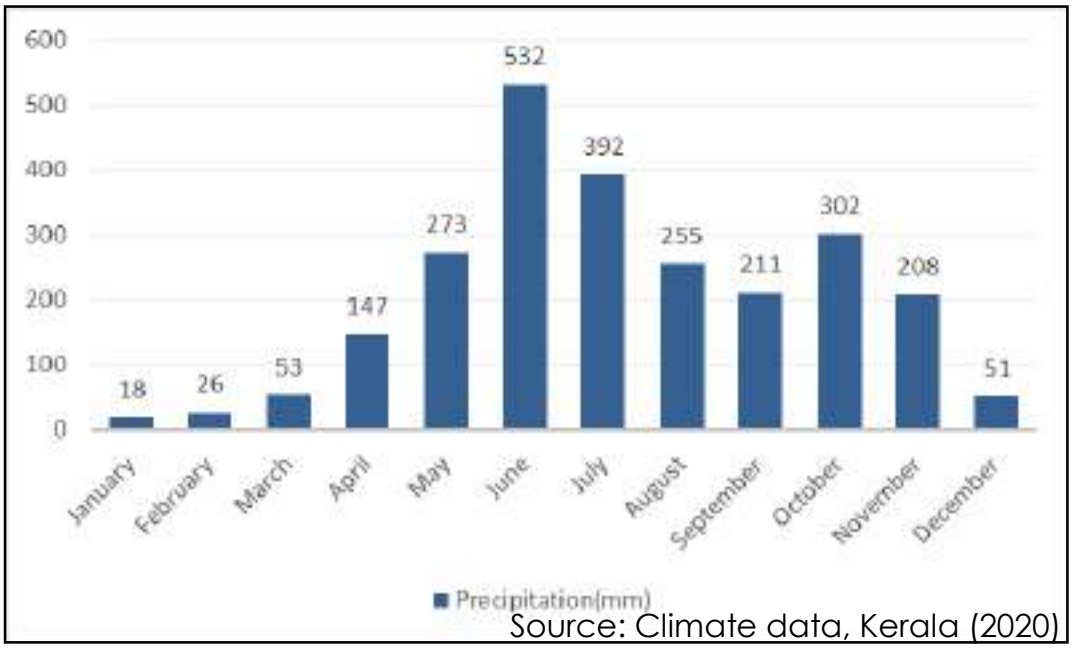
As a result of high temperature, rainfalls with heavy thundering and lightning has occurred in the corporation area as shown in figure 22.2. Also, nowadays, sunrays attack is found as very common in the planning area.

Rainfall

The South-West monsoon or Edavappathy starts towards the end of May or the beginning of June heralded by thunderstorms. June is the month with the highest rainfall. Nowadays, heavy rainfall occurs in July and August for the past 4 years. The North-East monsoon occurs from october to november. The rest of the year is generally dry. Due to heavy rainfalls coupled with lack of proper drainage facility increases the vulnerability of flooding in the planning area. The difference in precipitation between the driest month and the wettest month is 514 mm. The annual rainfall is 2468 mm. Figure 22.3 gives the details of monthly rainfall of Kollam district.



Figure 22.2 Impact of lightening in KLMCarea



Source: Climate data, Kerala (2020)

Figure 22.3 Monthly variation of rainfall in Kollam District

22.3 HAZARD PROFILE OF KLMC AREA

The geographical location and urbanization of KLMC when considered, the disaster risks involved are anthropogenic/technologically triggered, geological, biological, naturally triggered weather related. It can be countered only through an organized management plan and actions. The major disasters in the past years as per disaster management plan 2019 report are listed in Table 22.1. There was a tsunami on 26th December 2004, the Ockhi cyclone on 30th November 2017, and the floods in 2018 and 2019. Covid-19 pandemic is another major disaster recently affected in KLMC and is still continuing. These disasters made a change to the existing development ideology, towards eco-restoration and sustainability.

Hazard Mapping is done to gather the knowledge about hazards to eliminate or reduce the risks of accidents and injuries for the upcoming years. Knowing the seasonal patterns of Hazards allows the Hazard risk management team to analyze the disaster that could occur simultaneously so that minimum time can be allotted to those that are not likely to occur at the same moment. In KLMC area, flood and coastal erosion has frequently occurred in the months of July, August for the last 3 years, hazard seasonality mapping of KLMC area is given in Table 22.2.

SL No.	Disaster occurred	Ward No.	Ward Name	Impact
1	Flood	5,6,10,12,19, 26,29,31,49, 54	Vallikeezhu, Kureepuzha, Kadavoor, Thevally, Kallumthazham, Ammanada, Kilikolloor, Punthalathazham, Kacheri, Alattukavu	726 houses affected
2	Covid-19	All Wards (1 to 55)	All Wards	32586 people affected & 391 deaths (As on 07.06.21)
3	Sea Erosion	1,2,38,39,47, 48,50,51,52	Maruthadi, Sakthikulangara, Eravipuram,Thekkumbhagam, Pallithottam, Port,Thangassery, Thirumullavaram	1950 houses affected
4	Cyclone (Ockhi)	1,2,38,47,51	Maruthadi, Sakthikulangara, Thekkumbhagam, Pallithottam, Thangassery	Rehabiltated 82 families.
5	Tsunami	1,2,38,47,5 0,51	Maruthadi, Sakthikulangara, Thekkumbhagam, Pallithottam, Kaikulangara, Thangassery	1500 houses affected

Source: KLMC Disaster Management 2019 Provisional Report

Table 22.1 Disaster prone areas within KLMC area

Flood

The flooding in KLMC occurs as a result of silting up of Ashtamudi Lake, and other water bodies and development take place in fragile land. The primary cause of flooding in any area is intense rainfall resulting in water logging due to inadequate maintenance and management of drainage channels. Improper construction of pavements, buildings, roads, other impervious structures, reclamation of paddy/low lying areas for construction activities, choking of drainage etc are factors that aggravate the magnitude of floods.



Source: District Disaster Management Plan Kollam 2015

Table 22.2 Hazard seasonality mapping

Floods occurred on the banks of Ashtamudi lake, Vattakayal, Eravipuram kayal and Paddy fields of Karikkuzhivayal, Mundakkal as shown in figure 22.4.



Flood 2018 in Eravipuram Zone

SPONGE CITY CONCEPT

In order to prevent the urban flooding, sponge city concept should be practised which uses natural ways for soak up storm water and slow down flow. The main objectives of the sponge city concept entail "restoring" the city's capacity to absorb, infiltrate, store, purify drain and manage rain water and "regulating" the water cycle as much as possible to mimic the natural hydrological cycle. So, a sponge city is a city that has the capacity to mainstream urban flood risk management into its urban planning policies and designs. A

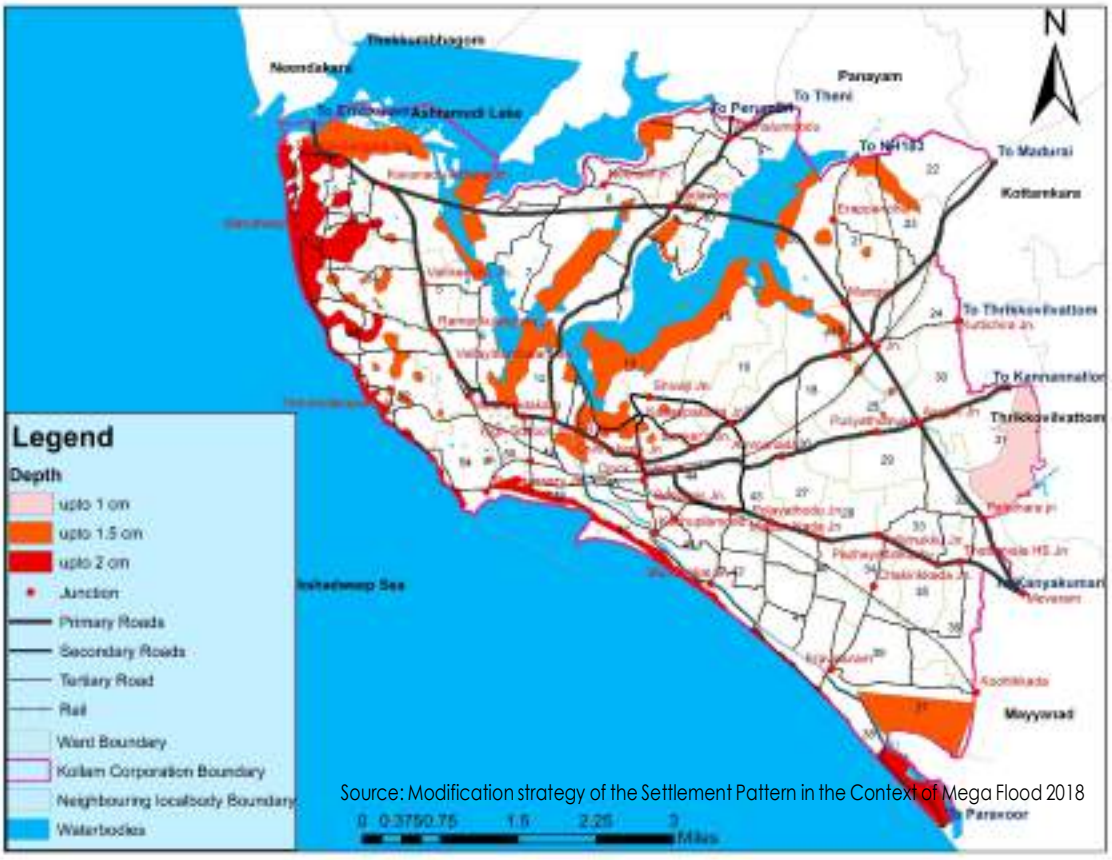


Figure 22.4 Flood level in KLMC area 2018

sponge city will not only be able to deal with " too much water" but also reuse rainwater to help to mitigate the impacts of " droughts". In short the anticipated benefits of sponge city includes reduction of the economic losses (due to flooding) and an enhancement of the livability. Hence conservation of paddy/low lying areas, agriculture land, water bodies, mangroves, sacred groves etc are essential to maintain the city as a sponge city.

Covid-19

Covid-19 is a biological disaster due to the outbreak of a virus called novel corona in 2020. It is a pandemic that affected the whole world, claimed within Kollam Municipal Corporation as on 07/06/2021 are as follows. Total reported cases in corporation area is 32586 while in district it is 218617 and only 28473 got recovered in KLMC area from this pandemic in present situation. 391 deaths are also reported within KLMC. About 846 Clinical Commissioning Groups (CCGs) are functioning in the Corporation area. COVID care centers have been established in all districts with a view to accommodate people who have been advised home isolation but have no residence in Kerala (eg.: Tourists, people in transit etc.) and to accommodate those persons in home isolation who not following the home isolation guidelines. Strategies for



Covid-19 Kiosks and manual tests for Covid-19

preventing transmission of the disease include maintaining overall good personal hygiene, washing hands, social distancing, avoiding touching the eyes, nose, or mouth with unwashed hands and coughing or sneezing into a tissue, and putting the tissue directly into a waste container.

Coastal Erosion

Coastal erosion is a recurring phenomenon that is of grave concern especially in the segments with high density. KLMC in its 17.2 km stretch



Figure 22.5 Corporation regions prone to coastal erosion

coastal area consisting of 2 fishing harbours, 9 fishing villages and 12 fish landings is highly prone to erosion as shown in Figure 22.5 About 6000 working fishermen engaged in fishing sectors from these 9 fishing villages. Coastal erosion is a threat to the livelihood of these people.One of the most apparent losses of property is the damages that come about to the dwelling spaces of the fisher population. Every year hundreds of houses are damaged due to the fury of the sea. Almost all fisher families prefer to live along the coast and very few of them tend to have landed property or houses further inland.



Coastal erosion in Eravipuram area

On 4th June 2012, 30 houses were damaged due to severe sea erosion at Kulathupadam, Thanni and Kakkathoppu areas in Eravipuram and 20 families (50 persons) were rehabilitated by opening a temporary relief camp at CVM LP School at Thanni.

Cyclone

The recent cyclone occurred is Ockhi on November 26th, 2017. The impact of this cyclone was mainly on the coastal region as indicated in Figure 22.6. Wind was blowing at a speed of 26 km/hr. Heavy rainfall continued till Dec 3, 2017. Sea erosion due to Ockhi intensified along coastal regions of Kollam, Eravipuram, Kakkathope, and Mundakkal papanasam areas in KLMC. 81 families were rehabilitated in relief camps. Coastal region and the harbours including Neendakara and Vaddy assured compensation for the victims from Dist. collector. 13 fishermen rescued were given treatment at Neendakara hospital and district hospital in Kollam (Source: Deduced from The Hindu Newspaper, 2018).

Tsunami huge sea waves advanced to land ward side due to cyclone is another important hazard by which

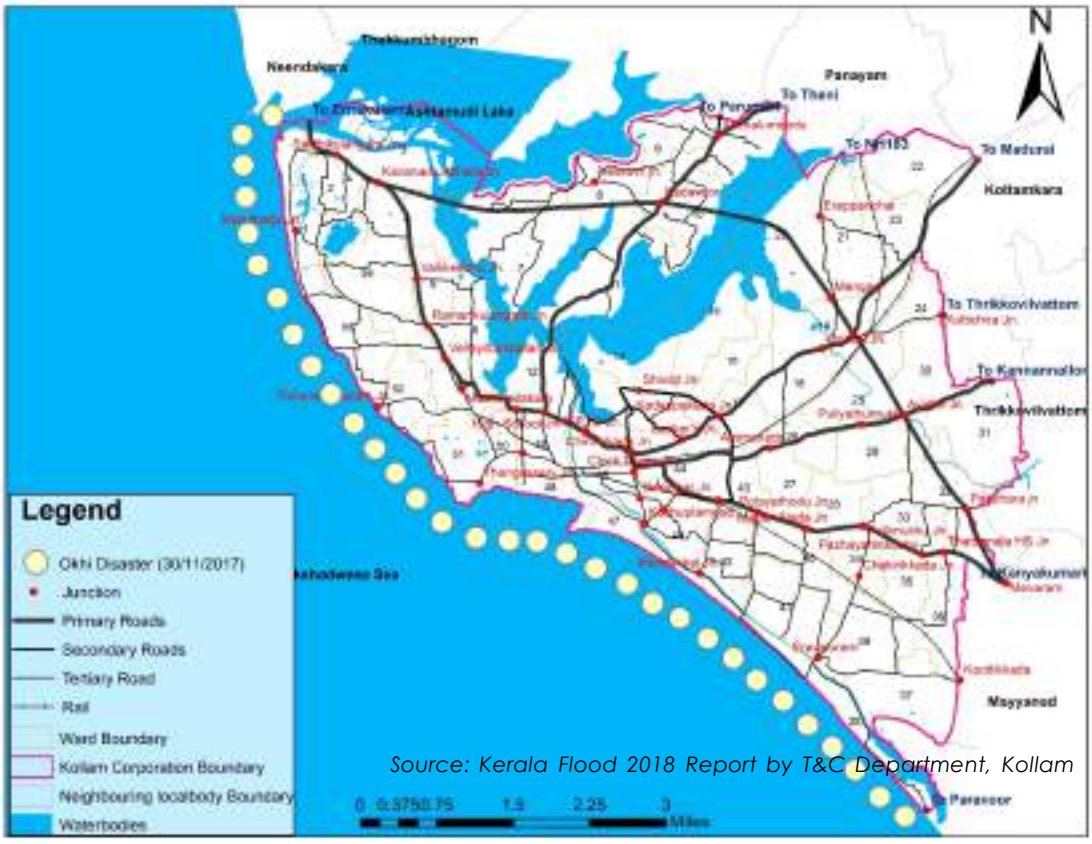


Figure 22.6 Map Showing Okhi affected regions in KLMC area

occurance of casuality is high.

Areas with vegetation will obstruct the free flow of water. Hence those areas are less vulnerable to tsunamis. The landsuse along the coastal area is thickly built up with mixed vegetation. The entire coastal area of KLMC i.e. from Sakthikulangara to Eravipuram as in figure 22.7 was severely affected by past tsunamis.

Area with high risk of hazard while considering multiple hazard is identified by overlaying hazard map of sea errosion, flood, ockhi and cylone/ tsunami. The multiple hazard vulnerable area identified within the KLMC area is shown in figure 22.8. From the analysis of the figure, it is observed that Maruthadi, Sakthikulangara, Thekkumbhagam, Pallithottam, Port, Kaikulangara and Kannimel divisions are highly vulnerable to multiple hazard such as cyclone, tsunami, coastal erosion and flood.

22.4 DISASTER MANAGEMENT PLAN FOR KLMC AREA

22.4.1 Disaster Preparedness, Mitigation and Prevention Methods

District Disaster Management Authority, (Kollam) is an institution

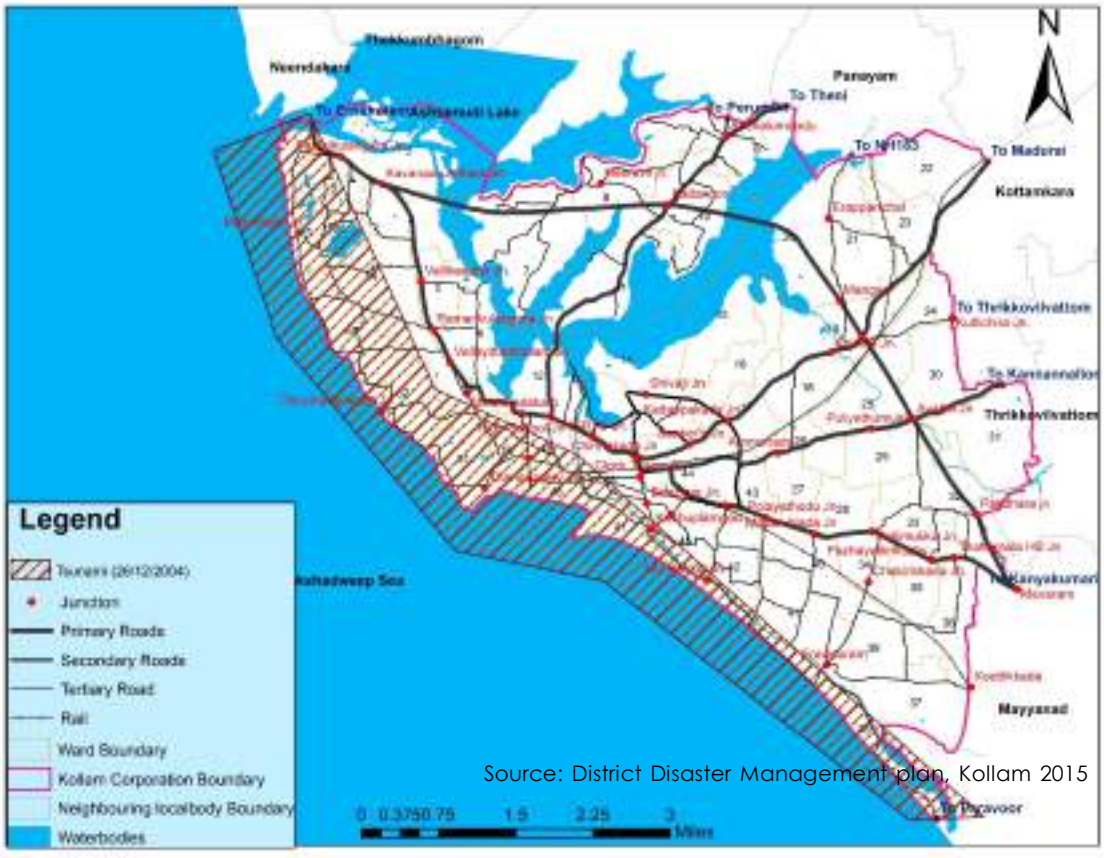


Figure 22.7 Tsunami affected KLMC areas



Figure 22.8 Map showing multiple hazard vulnerable area in KLMC

constituted as per the National Disaster Management Act, 2005 at the District level to ensure effective management and response to any disaster and also to ensure disaster preparedness. Preparedness measures are of two types' viz. Structural and non-structural. Structural measures mean capital investment in physical constructions on development works. In this aspect continuous efforts are made by various agencies for preventing sea erosion by constructing 'pulimuttu'/ 'groynes' in many places. Non-structural measures mean awareness, education, Policies, techno legal systems and practices, training, capacity development etc. Disaster management plan covers various measures for disaster preparedness by various departments like Revenue, Police, Irrigation, Health, Agriculture departments. District disaster management cell under the leadership of the District Magistrate/ Collector co-ordinate all the activities. Surkashaayanam conducted in 2012 was the first of its kind of event to set goals to work for achieving comprehensive disaster risk reduction in the State. The major ongoing initiatives as part of disaster prevention

and mitigation in the district are:

1. Information Technology and Communication Systems of SEOC
   SEOC offers integrated data visualization, real-time collaboration and deep analytics that will help agencies to prepare for problems, coordinate and manage response efforts and enhance efficiency of services. This intelligent response-based system will provide scientific and integrated decision support to the District Collectors in preparing and responding to various calamities in the State.
2. Coastal hazard monitoring system
   The instrumentation has an onshore video camera and electronic display board for ocean state display. The camera telecasts information in a 24 x 7 manner to NCESS. The data is used to validate the ocean state predictions issued by INCOIS. Eventually, the system is expected to be scaled up to SEOC for continued monitoring of wave activity along the coastal areas of each district in the State.
3. Disaster Management Training & Information Materials: Training to stakeholders in disaster management is imparted through the Disaster Management Centre at Institute of Land and Disaster Management and the Civil Defense Institute. The Authority has published information brochures of Landslides, Lightning, Coastal Erosion, Fire Safety, Floods, Drought, Sun Burn, Cyclones, Earthquake, Chemical Accidents, Drowning and Family Disaster Management Preparedness and has circulated widely.
4. VHF Radio network for Disaster Management With the financial assistance of the UNDP and the Tsunami Rehabilitation Programme, the Dept. of Revenue and Disaster Management established a VHF radio network in the state.Lack of trained technical human resources in the Land Revenue Department for continued maintenance and operations.Some of this equipment is presently under repair and steps have been initiated to operationalize them.
5. Drought preparedness: Kerala state experienced a severe drought during the period from August 2012 to May 2013, but it did not affect Kollam district largely. This forced districts to meticulously plan for drought risk reduction. Four

successful schemes supported by KSDMA are highlighted for replication state wide, they being:

- Mazhapolima: Community based roof-rainwater harvesting and open well recharge project in Thrissur.
- Jalavarshini: For structural mitigation of selected ponds in the State.
- Minor check dams with local materials: Retention of water and recharge of surrounding open wells.
- Water Kiosks- Kannur: A large 5000 to 10,000 liters of PVC water tank located on a pedestal in a public area with a tap attached to it.

6. Flood risk reduction

- Paddy lands and wetlands are flood buffers and their protection will ensure reduction of flood magnitude
- Conservation of ponds & open wells and rainwater harvesting in slopes less than 20° will ensure reduced magnitude of floods

7. Covid-19 Mitigation methods

The system used to contain and stop the spread of the COVID-19 pandemic in Kollam and other districts were people who found to have come in contact with those that tested positive had to undergo a fourteen-day quarantine. Daily monitoring by health staff either through phone calls or in-person took place during the length of the isolation. For those that showed symptoms, separate ambulances and isolation wards, designed explicitly for the people suffering from the virus, were made available. Individuals that fell under the radar of positive cases had their contacts traced and followed up. This resource-intensive process began in January 2020.The Covid-19 vaccine was launched on 16th January, 2021. The first group includes healthcare and frontline workers. The second Age Appropriate category to receive Covid-19 vaccine is persons over 60 years of age, persons between 45 and 59 years with comorbid conditions which started from March 1st 2021 and general public over 45 years of age which started on April 1st 2021. 18-44 group vaccination started on 1st May 2021.

22.4.2 Disaster Response and Relief

- Response is triggered when an authenticated early warning or information on occurrence of disaster is received at the DEOC or SEOC.
- On receipt of alert/early warning or information about onset of disaster, District Collector access to disaster

site through various means of Communication

- Early warnings issued by competent agencies will be verified and cross checked against past history of occurrence by SEOC before issuing it to the media for public dissemination.
- It will be the responsibility of the DEOCs to communicate emergency and disaster information via telephone, FAX, SMS or email to SEOC so as to trigger interdepartmental coordination and inform and avail the services.
- When local resources prove to be inadequate during emergency operations, requests for assistance will be made to the State and the State shall seek the assistance of Departments, Institutions or Organizations under Government of India.
- The KLMC area fishermen had a vital role to play in the rescue operations. The fishermen who had no formal training in saving lives or disaster management took it upon themselves to rescue people in Pathanamthitta and other districts, reaching remote corners where even the NDRF and Navy boats could not reach. They brought thousands to safety while also providing food and essential supplies to people stranded in their homes.



Fishermen from Vaddy set-out for rescue mission to Pathanamthitta

- Disaster occurrence could result in disruption of government functions and, therefore, all levels of local government and their departments should develop and maintain procedures to ensure continuity of Government functions.

22.4.3 Disaster relief and Compensation

Based on various damage and needs assessments, relief packages were planned for affected populations like Ration kits during Covid-19 pandemic and starting Community Kitchens which provide foods at low rate etc.

22.4.4 Rehabilitation and Reconstruction

Rehabilitation and reconstruction are primarily carried out by KLMC. Rehabilitation in terms of Socio-cultural, Psychological, Economic, Environmental damages were also carried out during Flood 2018.

Corporation Zones	100% Damaged	60% to 74% Damaged	30% to 59% Damaged	16% to 29% Damaged	Less than 15% damaged
Sakthikulangara	1	-	-	14	29
Thrikkadavoor	1	-	1	6	9
Kollam	1	3	3	7	27
Killikolloor	1	-	3	14	30
Vadekkevila	1	-	-	7	35
Eravipuram	2	-	3	18	56
Total	7	3	10	66	186

Source: Deduced from Kollam Municipal Corporation Website

Table 22.3 Damage level of houses in different zones of KLMC area

From table 22.3 we can conclude that during the flood of 2018, about 265 buildings partially damaged and 7 buildings completely damaged, were reconstructed by providing compensations in terms of money by the Government and reconstruction of buildings by NGOs.

The highest number of families about 258 families got affected in Eravipuram zone of corporation area, they were shifted to nearest campsite i.e. in schools located nearby as listed in table 22.4. Reconstruction involves short term reconstruction strategy like repair, restoration and strengthening of affected structures, long term

Area	Camps	Family	Male	Female	Child	Total
Sakthikulangara	Govt. HSS Valikeezhu St. Joseph's LPS Kavanadu	129	169	207	118	494
Thrikkadavur	Govt. UPS Kureeppuzha	55	34	68	32	134
Kilikollur	Kozhikal School Kollam	69	76	97	26	199
Mangad	MSM HSS Chathinamkulam	53	12	50	22	84
Vadakkevila	Vimala Hridaya Girls HSS Kollam	59	47	71	52	170
Eravipuram	Govt. Boys HS Valathungal St. Joseph's School Eravipuram	258	448	426	36	1168

Source: Modification strategy of the Settlement Pattern in the Context of Mega Flood 2018

Table 22.4 Table showing the number of persons affected in flood 2018

strategy includes reconstruction and relocation.

22.5 INFERENCE

- Impact of global warming as sea level rise (SLR) would be felt by the majority of the coastal community in the planning area.
- Proper development and design controls need to be framed for flood prone areas to mitigate future risks. Floods are usually followed by epidemics. An increased amount of stagnant water increases the risk of mosquito- and waterborne diseases and a speedy response is crucial to prevent the spread of diseases like dengue in wards like Kaikulangara, port etc.
- Generally disasters are followed by breakdown of communication lines and disruption of essential services. Therefore, the key communication centres should be protected from natural disasters i.e. flood, fire and earthquake etc should be taken up on top most priority.
- Lack of coordination between various stake holders and absence of advance disaster management plan.
- Flooding of the urban core can be prevented by implementing the sponge city concept and ensuring proper drainage networks being maintained timely.

Maruthadi, Sakthikulangara, Thekkumbhagam, Pallithottam, Port, Kaikulangara and Kannimel divisions are highly vulnerable to multiple hazards.

CHAPTER - 23
GOVERNANCE

Governance plays an important role in planning implementation, monitoring and evaluation of development plans. In this chapter the present scenario of governance in KLMC with respect to functional organization setup, mobilization and utilization of resources, efficiency in the delivery of services, participation and co-ordination aspects, available mechanism to ensure accountability and transparency and the issues associated with governance are analyzed.

23.1 ORGANIZATION SETUP

As per the Kerala Municipal Act of 1994 following18 functions are assigned to any urban local body

- Regulation of land use and construction of buildings
- Roads and bridges
- Sanitation and Solid Waste Management
- Slum improvement/up gradation
- Urban poverty alleviation
- Provision of urban amenities such as parks and playgrounds
- Promotion of cultural, educational, and aesthetic aspects
- Burial grounds and crematoria
- Cattle pounds
- Public health - Sewerage, water supply
- Registration of births and deaths
- Public conveniences including street lighting, parking lots, etc.
- Regulation of slaughterhouses
- Spatial planning (urban and socio-economic planning)
- Urban forestry
- Fire fighting
- Education
- Safeguarding the interests of weaker sections

The way in which these functions are carried out by KLMC decides what kind of governance is prevailing there. KLMC have deliberative and executive wing just like any other ULB's in Kerala.The deliberative wing of corporation comprises of the council, standing committees and Mayor. Executive wing headed by the secretary carries out resolutions of the council,reports complaints to the council etc.

23.1.1 Deliberative Wing

Under deliberative wing, standing committees, steering committee and ward committees are functioning. Thedeliberative wing consists of elected representatives and nominated representatives. Mayor who is elected from the councilors, chairs the council meetings and in his/ her absence,Deputy Mayor presides the council meeting and he will be the chairman of finance standing committee.

Standing Committees

The functions of standing committees are given below:

1.Finance

Utilization of budget, grants timely assessment and collection of tax, fee,rents etc are the responsibility of finance standing committee.

2. Development

Development standing committee deals with dairy development,co-operation,small scale industries,with functional finance and preparation of development plans.

3. Welfare

Social welfare, Povertyallivation SC/ST development,Public Distribution System, Fishing, House building etc. are the main functions of Welfare standing committee.

4. Health

This standing committee deals with all matters related to health

5. Public works

All works related to public works and housing are dealt with this standing committee.

6. Town Planning

Town planning standing committee deals with the matters of town planning including regularization of building construction, environment, urban beautification, promotion of art and culture and preservation of monuments, places of buildings having archeological importance heritage value and natural beauty.

7. Tax appeals

Disposal of appeals on taxation is assigned to this committee.

8. Education and Sports

This standing committee deals with all matters related to education sector, sports and games

9. Steering Committee

The steering committee consisting of Mayor, Deputy Mayor and chairpersons of the standing committee co-ordinate and monitor the functions of all standing committees.

10. Ward committee

Ward committee is constituted with ward councilor as a chairperson and members drawn from NGOs, resident's association, institutions etc. The main function of ward committee is to disseminate information at ward level about the development and welfare activities decided at the council level. Prioritization of ward level work is the responsibility of ward committee.

23.1.2 Executive wing

Under the executive wing following service departments are functioning.

1. General administration
2. Accounts
3. Engineering
4. Revenue
5. Health
6. Council department

The departmental staff pattern is shown in Table 23.1

In additions to these departments there are seven Zonal offices to manage decentralized functions of corporation.The zonal offices are:

1. Kollam (Central Zone –1, Central Zone –2)
2. Kilikolloor
3. Sakthikulangara
4. Vadakkevila
5. Eravipuram
6. Thrikkadavoor

Central zone 1 and 2 are functioning within main corporation office to cater services to the most vibrant area in the CBD.All other zonal offices are located in such a way that people can avail services close to their residences as shown in figure 23.1.

The organization structure of KLMC is shown in Figure 23. 2

Department	Regular		Contingent	
	Sanctioned	Filed	Sanctioned	Filed
General Administration Department	34	34		
Revenue Department	67	67		
Accounts Department	6	6		
Engineering Department	61	61		
Health Department	105	105	298	298
Council Department	6	6		
Total	279	279	298	298

source: Kollam municipal corporation 2019

Table: 23.1 Staffing pattern of KLMC



Figure 23.1. Zonal offices in KLMC area

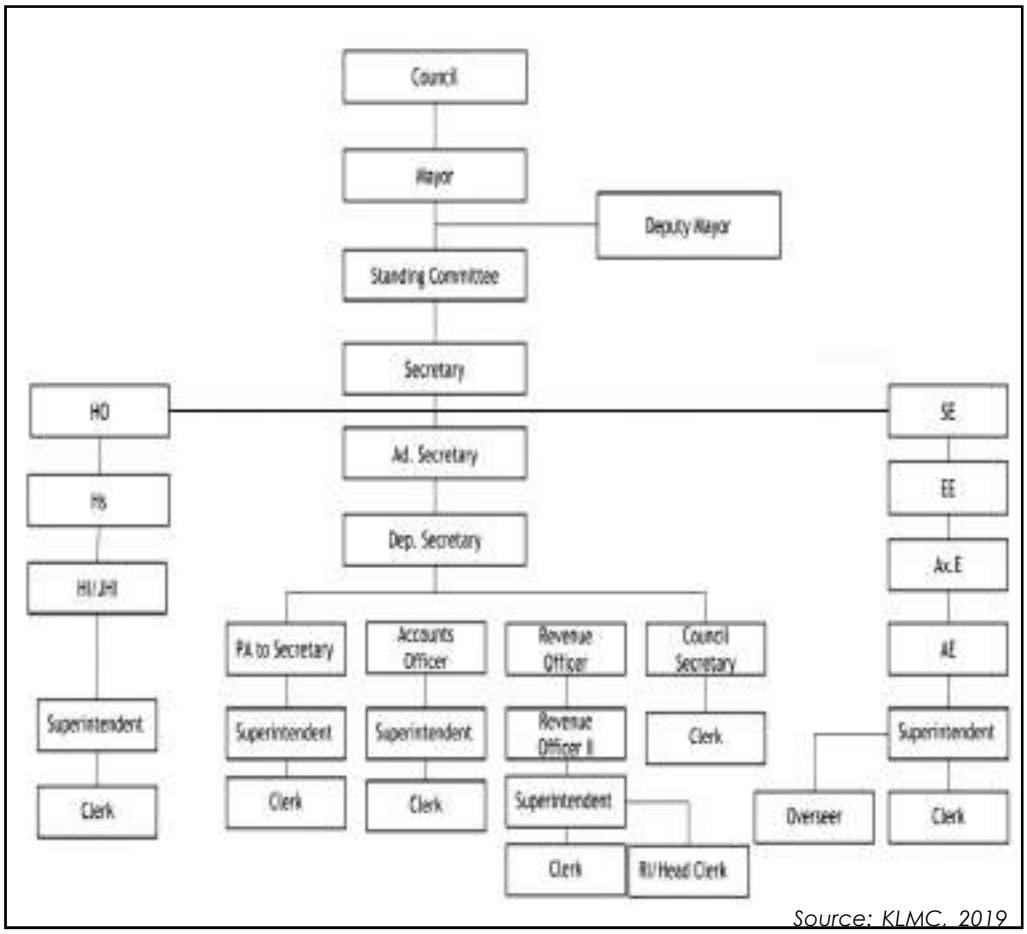


Figure .23.2 Flowchart showing the organization structure of KLMC

23.2 MOBILIZATION AND UTILIZATION OF RESOURCES

Obligatory as well as discretionary functions of KLMC can be performed through resource mobilization. Following are the main sources of income to KLMC:

1. Own source of income which includes taxes, duties, cess, surcharge, fees, income from municipal properties etc.
2. Assigned revenues and compensation.
3. Grants released by the Government for the implementation of various Projects, Schemes and Programmes.

The income and expenditure statement for the last three consecutive financial years of KLMC is shown in table 23.2. The total revenue receipt for the financial year 2018-19 is Rs. 3,059,657,653 of which nearly 10% of receipt is from central government grants. Own source of income contributes nearly 71% of total receipts. Assigned /shared tax is found as marginal. The temporal changes in various sources of income, total receipts and expenditure are shown figure 23.3. From the figure, it is clear that the total revenue of KLMC shows increasing trend. However, income from non taxes is showing decreasing trend.

From the analysis of resource mobilization, it can be observed that the ability of KLMC to mobilize fund is constantly increasing.

23.3 EFFICIENCY IN DELIVERY OF SERVICES

Besides KLMC various government departments and institutions and various type of missions are responsible for implementation of projects in the planning area.

Like any other ULB's in India, essential municipal services such as water supply, Sewage, Solid waste management, road and drainage, waterways, town planning etc. need to be improved further. It is expected that by implementing AMRUT as well as Smart City schemes efficiency in service delivery can be increased.

23.4 PARTICIPATION AND CO-ORDINATION

The success of decentralization depends on People's participation. Only through participation, public need can be assessed. Hence adequate measures to increase the level of participation is required.

Lack of co-ordination between different departments and institution

Sl.No	Particulars	2016-17	2017-18	2018-2019
A	Revenue Income			
1	Income from Taxes	21,85,43,918	19,53,89,712	46,22,22,987
2	Income from Non-Taxes	13,52,29,275	9,06,26,563	12,3940,615
3	Income from Ass.Revenue	102,97,88,934	211,31,01,271	216,70,99,745
	Total Revenue Income	138,35,62,127	239,91,17,546	275,32,63,347
B	Capital Income			
4	Grants and Loans	21,01,88,872	20,60,83,916	30,63,94,306
	Total Income	159,37,50,999	260,52,01,462	305,96,57,653
C	Revenue Expenditure			
5	General, Establishment& other Revenue Expenditure	35,86,01,946	37,62,70,524	38,06,41,124
6	O&M of sanitation including SWM	107,63,20,501	17,28,35,4054	172,54,21,439
	Total Revenue Expenditure	143,49,22,447	210,46,24,578	210,60,62,563
D	Capital Expenditure	21,01,88,872	20,60,83,916	3,06,39,406
	Total Capital Expenditure	21,01,88,872	20,60,83,916	30,63,94,306
	Total Expenditure	164,51,11,319	231,07,08,494	241,24,56,869
	Revenue Surplus/Deficit Capital Surplus/Deficit	1,56,20,691	27,29,62,995	65,69,72,795
	Overall Surplus/Deficit	1,56,20,691	27,29,62,995	65,69,72,795

Source: Kollam Municipal corporation2019

Table 23.2 Total receipts and expenditure statement of KLMC

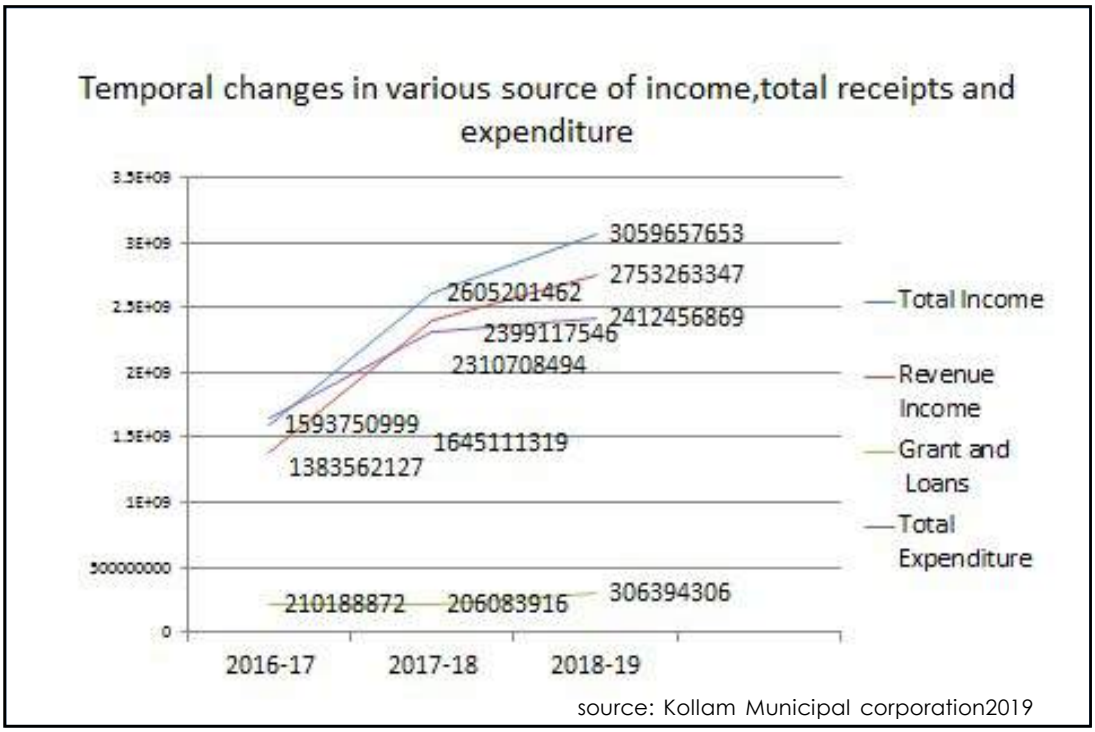


Figure 23.3 The temporal changes in various sources

seriously affect the service delivery in KLMC like all other LSGs. The priorities of different departments will be different. Hence the common goal of overall development of the area is not fulfilled. Hence mechanism to ensure inter departmental co-ordination is very much essential for making the city governance more effective.

23.5 ACCOUNTABILITY AND TRANSPARENCY

Accountability is defined as the state or responsibility of being required to give an explanation for one's action or inaction while transparency implies the provision of relevant and reliable information to all. The purpose of accountability and transparency is to create virtues in public governance and to reduce corruption. The elected council and various institutions have accountability to the people on one hand and to the State and Central government on the other with respect toutilization offunds, implementation of policies and for creation of enabling environment for furthering decentralization. Lack of accountability of LSGs and institutions affects timely delivery of services thereby affecting governance. Also transparency is a must for eliminating corruption. In order to ensure accountability and transparency a series of mechanism have developed and incorporated in the decentralization process. Ward sabhas, Citizen's Charter, Participatory Peoples Planning approach, bringing ITES in all section etc. are some of the important mechanism that enabled in KLMC to ensure both accountability and transparency. However, the function of these mechanism is not full-fledged to ensure accountability and transparency.

23.6 ISSUES

1. Lack of proper monitoring and co-ordination mechanism among institutions.
2. Absence of full-fledged system to ensure accountability and transparency in all the activities of municipal administration .
3. Level of public participation in developmental activities need to be increased.

CHAPTER - 24
REVIEW OF DETAILED TOWN PLANNING SCHEMES

Kollam Municipal Corporation (KLMC) area consists of 4 numbers of Detailed Town Planning (DTP) Schemes prepared by the Department of Town and Country Planning and sanctioned during 1988-1999. They are:

1. Detailed Town Planning Scheme for the road from Taluk office junction to Civil station junction
2. DTP Scheme for the area between Kunjammapalam and District Hospital
3. Detailed Town planning Scheme for Kadappakada and Surroundings
4. DTP Scheme for the area between DSP office junction and PWD junction

The locations of the sanctioned DTP Schemes are shown in figure 24.1

All the above schemes were sanctioned during late 20th Century elapsing more than 30 years after sanctioning. Normally Master plans and DTP Schemes are prepared with a horizon period of 15-20 years so as to review the plans to incorporate the changes that might have occurred in the planning area. Though the revised

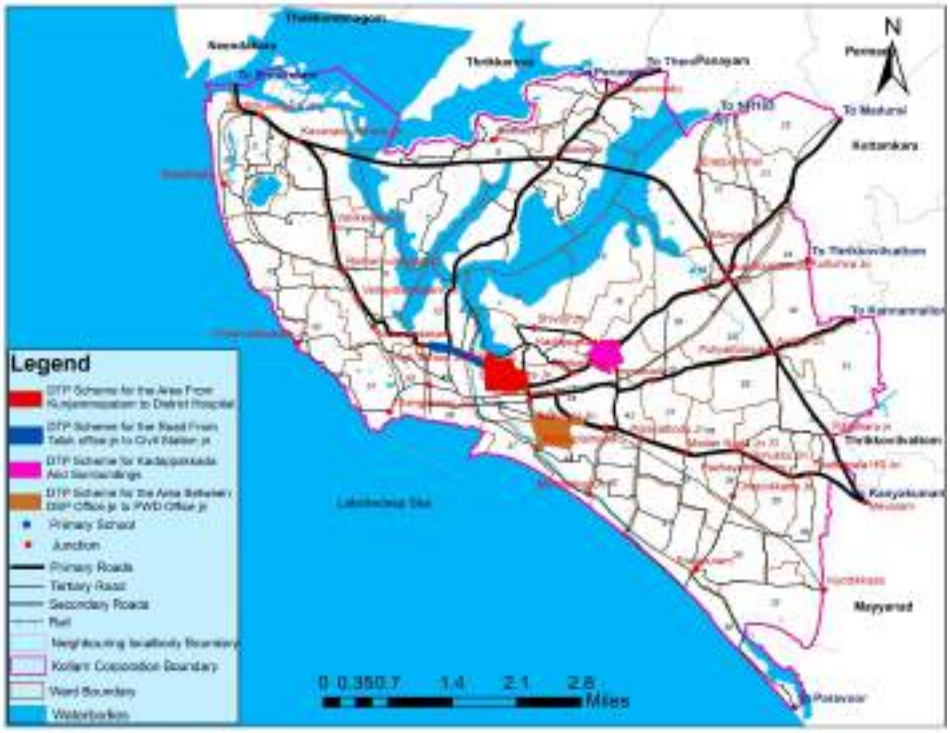


Figure 24.1 Locations of sanctioned DTP schemes within KLMC area

Master Plan encompassing the sanctioned DTP Schemes was sanctioned in the year 2010 the implementation of the proposals in line with the changes in development scenario could not be initiated in the area covered by the DTP Schemes because the provisions of sanctioned DTP Schemes prevail over the sanctioned Master Plan as per Kerala Town and Country Planning Act (T&CP Act). This has resulted in many developmental issues and disputes which eventually need the review of the sanctioned DTP Schemes in the planning area. As per section 50(1) of the amendment of the KT&CP Act review and revocation of sanctioned DTP Schemes can be done through subsequent Master Plan. Hence this chapter focus on review of each sanctioned DTP Scheme which is found obsolete or almost fulfilled with respect to its original objectives and proposals and how far they are achieved while comparing the present development that have taken place in the scheme area so as to arrive at a conclusion on whether the scheme need to be revoked or not. As per the recommendation of the Special Committee and council, all DTP schemes except DTP scheme for the area between DSP office junction and PWD junction are to be reviewed and revoked .

24.1 REVIEW OF DTP SCHEMES

24.1.1 DTP Scheme for Road from Taluk office junction to civil station junction

The road stretch from Taluk office junction to civil station junction is in the central area of Kollam with lot of traffic issues due to the ribbon development along its sides with major institutions like Taluk office, High school, Civil station, Boat jetty and Bus stand etc and also due to narrow bridge known as Iron bridge across TS canal. The scheme area consists of about 1 km of road stretch and a buffer of about 50 meter on either side of the road accounting a total area of 11.4 hectares as shown in figure 24.2. The survey numbers of Kollam West village alone are included in this scheme. This scheme was sanctioned in the year 1998 vide government order G.O. (MS) No. 83/88/dt.04.7.1988. The main objectives of this scheme were optimum utilization of available land, improvement of traffic flow in the stretch of road from Taluk office junction to civil station junction and to control the developments on either side of this stretch in a planned manner.



Figure 24.2 DTP Scheme for Road from Taluk office junction to civil station junction

The proposals for achieving the above objectives were;-

1. Improvement of road stretch by widening the ROW to about 21m.
2. Acquisition of land for developing commercial complexes
3. To promote industrial activities reservation of land for Industrial use on either side of TS canal on the eastern side of road
4. Mixed land use zoning for promoting multiple uses.

The main objective of the scheme was to improve the traffic flow in the stretch of road from Taluk office junction to civil station junction by widening the road to 21 m. This objective could be achieved partially as the road is not widened to 21 m in many stretches. The existing width of road is varying from 14m to 25m. At the same time in the sanctioned Master Plan the proposed road width of this stretch is 25 m. While overlaying the two road proposals in the DTP Scheme & Master plan, it is noticed that if the reservation provided in the Sanctioned Master Plan is implemented the objective of improving the traffic flow can be achieved through Master Plan itself. Hence as far as road widening is concerned even if the Scheme is revoked the objective of improving

the traffic flow can be materialized by keeping the same road widening proposal as in the sanctioned master plan is retained in the GIS based masterplan.

The other objective of controlling the development along the sides of road was almost achieved except at places marked in figure 24.3. At location marked as 1 opposite to Taluk office, though reservation was made for commercial use for the entire plot in the sanctioned scheme residential development took place for a small parcel of land. However majority of the area is developed as commercial zone. Hence it can be considered that developments have taken place as per the scheme provision except certain minor changes.

Even though reservation was made for industrial use at locations marked as 2 and 3 in figure 24.3 industrial development did not materialise in both locations. Instead residential activities in plot 2 and commercial and recreational activities in plot 3 were developed due to so many reasons. Due to the publication of CRZ notifications subsequent to sanctioning of the scheme, no new industries are allowed near TS canal. Also during the past 3 decades industrial activities were not flourished in and around the city as visualised at the time of sanctioning the plan. But more commercial activities were developed. Globalisation and liberalisation have transformed the State of Kerala as a consumer state rather than promoting production activities. The shift in the behaviour of state is the main reason for declining of industrial activities. In the DTP scheme the area earmarked as "Land to be acquired for commercial complexes" demarcated as 4 in figure 24.3, are not yet acquired and these areas are developed as Commercial zone in conformity with nearby developments (24.4). Acquisition proposals are not easy to implement due to paucity of funds and other social issues of rehabilitation. Also if the acquisition is not proceeded within a reasonable time, it is considered as violation of Article 300 A of the constitution by the judiciary at several times.

All other proposals for planned development along the side of road are found to be implemented as proposed in the sanctioned DTP scheme. Considering the development trends and potential of

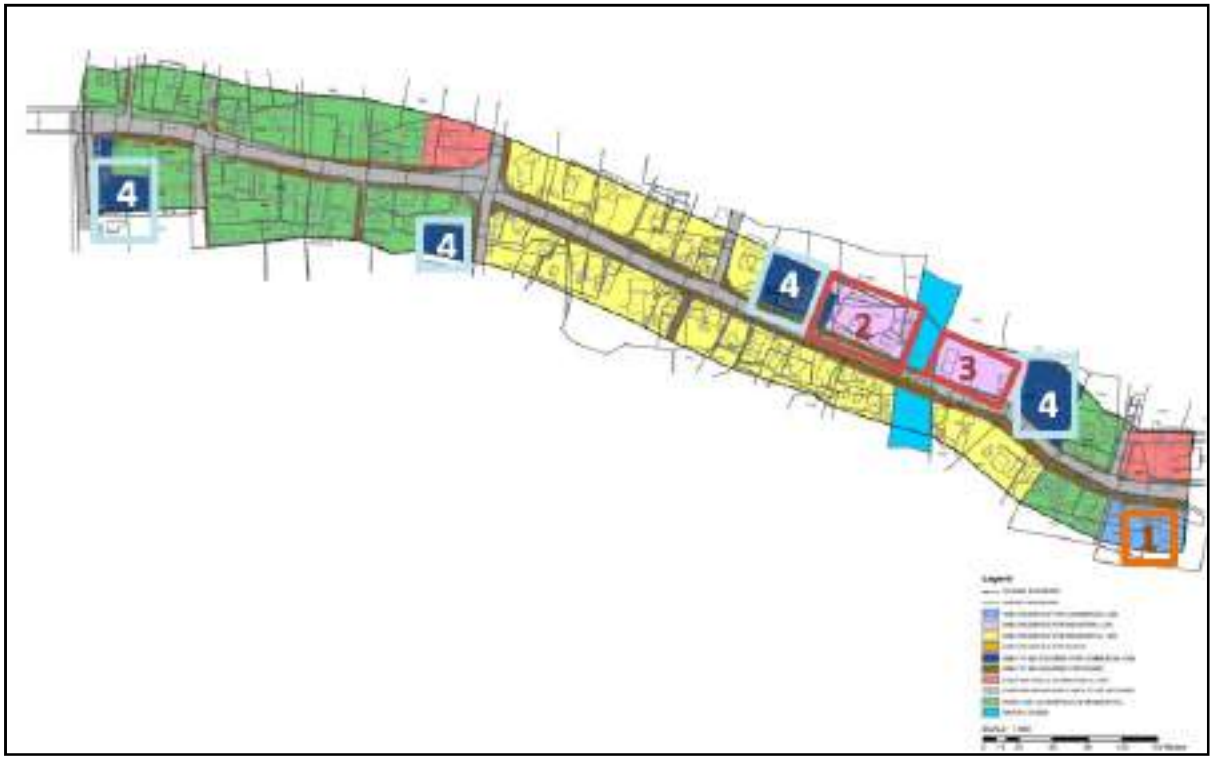


Figure 24.3 Location of unaccomplished regulation/acquisition proposal

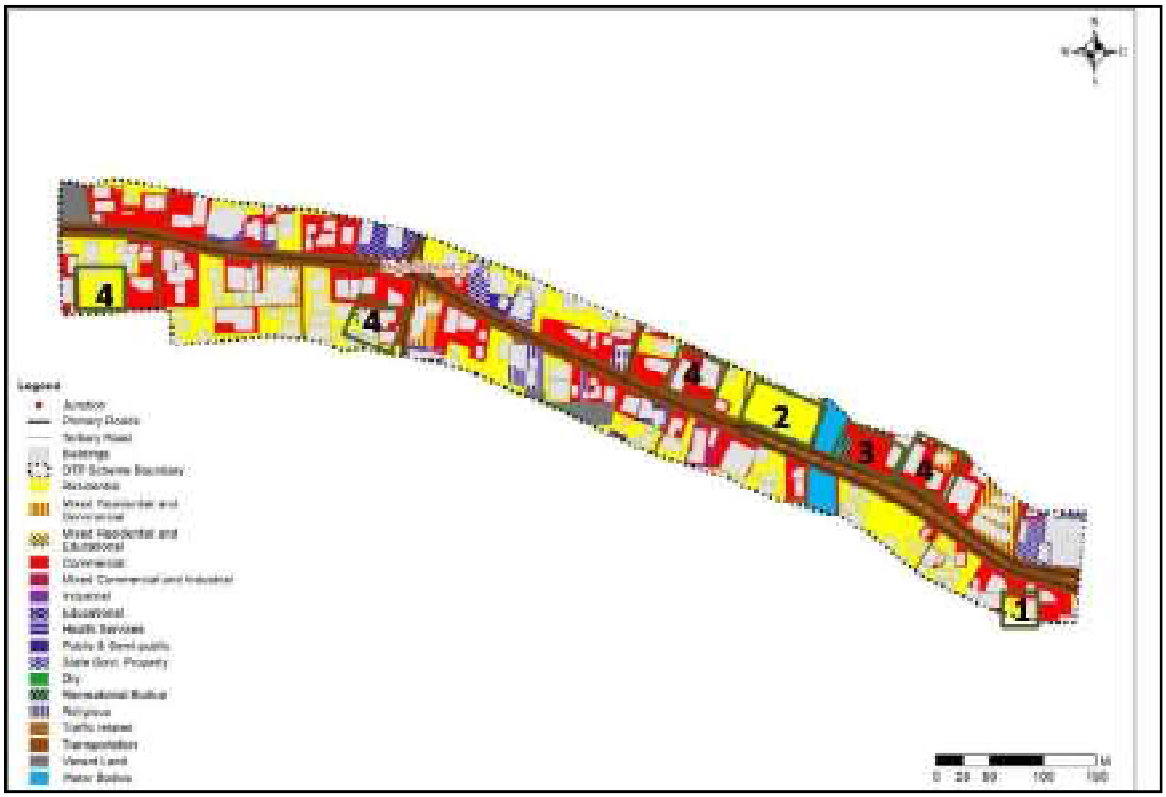


Figure 24.4 Existing landuse map for Road from Taluk office junction to civil station junction under GIS based AMRUT scheme

the central area, mixed land use is proposed in the sanctioned Master Plan for areas along both sides of road for a depth of about 200 metres. From the analysis of present development and the original proposal in the DTP Scheme it can be concluded that if land use zoning for promoting commercial and other urban activities, is proposed as per the current demand and by retaining the road widening proposal in the sanctioned the basic objective of the DTP scheme can be achieved.

24.1.1.1 Scheme Revocation

By incorporating the road widening proposals of sanctioned masterplan and adopting urban landuse along the sides of roads as per current development trend, the DTP Scheme for the road from Taluk office junction to Civil station junction shall stand revoked as provided under section 50(1) of the KT&CP Act, 2016; once the Master Plan is sanctioned under section 36 of the KT&CP Act, 2016.

24.1.2 Detailed Town planning Scheme for the area between Kunjammapalam and District Hospital

The area between Kunjammapalam and District Hospital being the central core of the town, most of the trading and important activities are concentrated in this area. The scheme area having an extent of 40.80 hectares was considered for this DTP scheme. (figure 24.5) The survey numbers of Kollam village alone are included in this scheme. This scheme was sanctioned in the year 1989 vide G.O. (MS) No. 15/89/dt.28.02.1989. The main objective of this scheme is the optimum utilization of available vacant lands and to develop roads and junctions in a planned manner, considering the concentration of activities in this area.

The major proposals for achieving the above objectives were:

1. Improvement of Post Office junction
2. Widening of major roads
3. Development of Vacant lands
4. Reorganisation of KSRTC Bus station area
5. Development of old railway line land.

The objectives of this scheme was almost achieved except at places marked in figure 24.6 In the case of optimum utilization of available vacant lands by developing commercial uses, residential uses and for the expansion of existing KSRTC bus station, the area marked as 'Land to be acquired for KSRTC Bus stand'



Figure 24.5 DTP Scheme for the area between Kunjammapalam and District Hospital

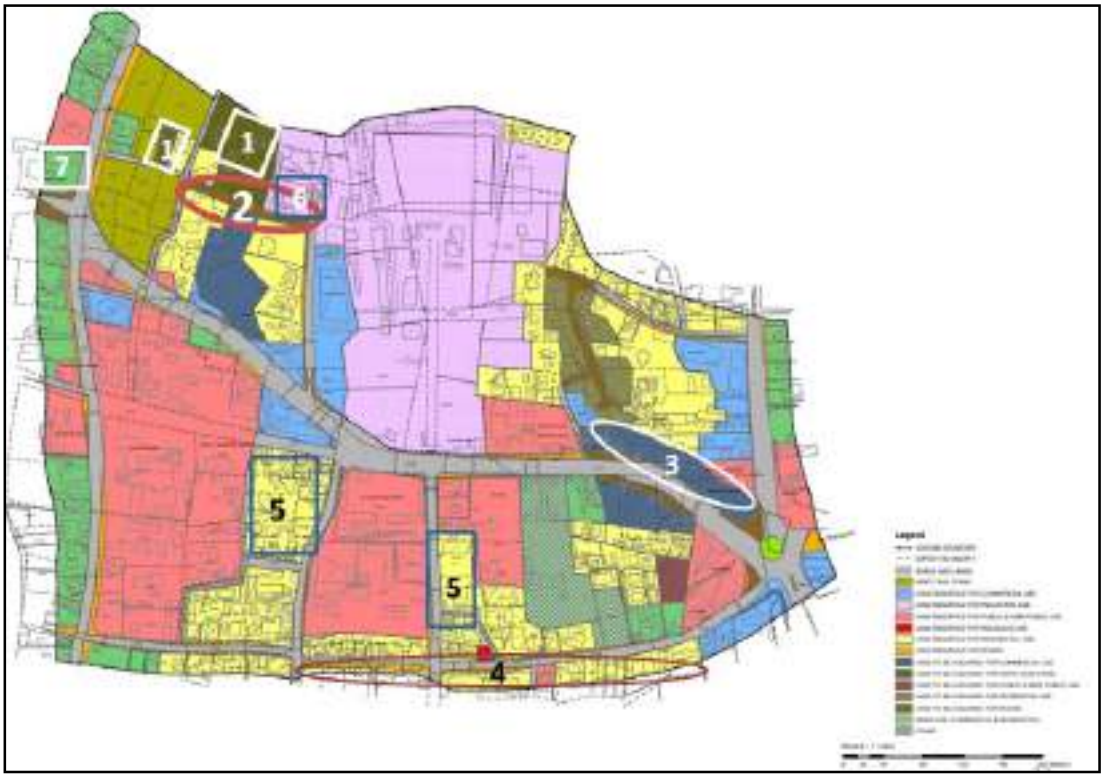


Figure 24.6 Location of unaccomplished regulation/acquisition proposal

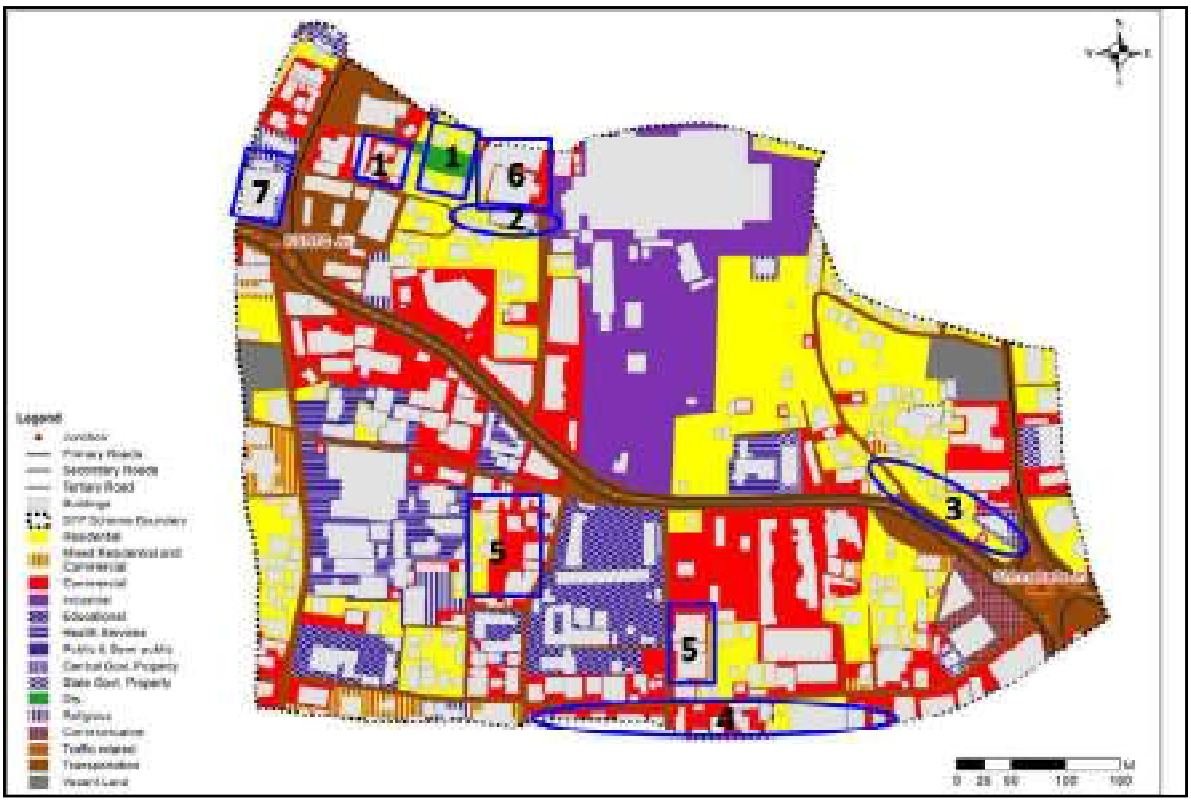


Figure 24.7 Existing landuse map for the area between Kunjammapalam and District Hospital under GIS based AMRUT scheme

demarcated as 1 in figure 24.6 is not yet acquired and these area developed as residential zone in conformity with nearby developments (figure 24.7). Since the proposed acquisition is not materialized proposed road from KSRTC bus station to Poyilakada industrial unit marked as 2 in figure 24.6 is not secured the original need. Similarly, the old railway line land 'To be acquired for commercial use marked as 3 in figure 24.6 is not yet acquired and this area developed as residential area at present, but as per Sanctioned Master Plan, this area is demarcated as mixed zone. Also as it is in the heart of the city there is enough potential for the development of urban land use in this area. Since acquisition proposals are not easy to implement at present due to various social & financial issues of rehabilitation and also the acquisition is not proceeded within a reasonable time, it is viewed as violation of Article 300 A of the constitution by the judiciary at several times.

In the case of development of road stretches and junctions in a planned manner as envisaged in the DTP scheme, Vadayattukotta road stretch marked as 4 in figure 24.6,

being the core area it is now completely developed as commercial area, though reservation was made for residential use. In sanctioned Master Plan also it is designated as existing commercial zone. The areas marked as 5 in figure 24.6, developed as commercial along the road sides and remaining area as residential, though reservation was made for residential use in DTP scheme. Hence it may considered that these areas are also have demand in urban landuses.

At location marked as 6 in figure 24.6 opposite to Indian coffee house, though reservation was made for Industrial use for the entire plot in the sanctioned scheme, public use owned by the state government took place for a small parcel of land, which is considerably negligible. However majority of the area is developed as Industrial zone, hence it can be considered that zoning of this area is achieved. In the DTP scheme, Taluk office area marked as 7 in figure 24.6, is demarcated as mixed use. However, it is in Public & Semi-public use, so this area is to be earmarked as Public & Semi-public use in subsequent Town Panning Scheme. One of the road widening proposals in the scheme was the stretch of road from Taluk office junction to District hospital road by 15m. The existing width of road is varying from 6.50m to 7.50m. At the same time in the published Greater Kollam Development Plan GKDP, by considering the special importance of the road, proposed road width of this stretch is 21m. So even if the scheme is revoked, the above road widening proposal can be materialized by retaining the same road widening proposal as in the published (GKDP). As the civil supplies building in the DTP scheme got demolished, it is vacant land at present which can be effectively utilized for promoting commercial activities as in the surrounding areas.

Considering all the above, the major objectives of this scheme were achieved except the above mentioned areas. From the analysis of present development and the original proposal in the DTP Scheme it can be concluded that if land use zoning in the sanctioned masterplan and road widening proposal for the above mentioned stretch as in the published master plan are to be adopted to promote more developmental activities in the GIS based Master Plan so that the remaining objectives of the scheme can also be achieved.

24.1.2.1Scheme Revocation

By incorporating the above mentioned proposals in this report, the DTP Scheme for the area between Kunjammapalam and District Hospital shall stand revoked as provided under section 50(1) of the KT&CP Act, 2016; once the Master Plan is sanctioned under section 36 of the KT&CP Act, 2016.

24.1.3 Detailed Town planning Schemes for Kadappakada and Surroundings

Kadappakada and its surrounding area being a sub centre in draft Development Plan for Quilon, was considered for a DTP scheme encompassing an area of 26 Hectares. (24.8) The survey numbers of then Kollam village alone are included in this scheme. This scheme was sanctioned in the year 1990 vide G.O. (MS) No. 184/90/dt.15.11.1990. The main objective of this scheme was the improvement of the road network system, formation of road links for the development of Kadappakada and surrounding area and landuse regulations.

The major proposals for achieving the above objectives were:

1. To develop Kadappakada as a local shopping centre
2. Widening of Kollam-Schencotta road to 25 m as a radial road

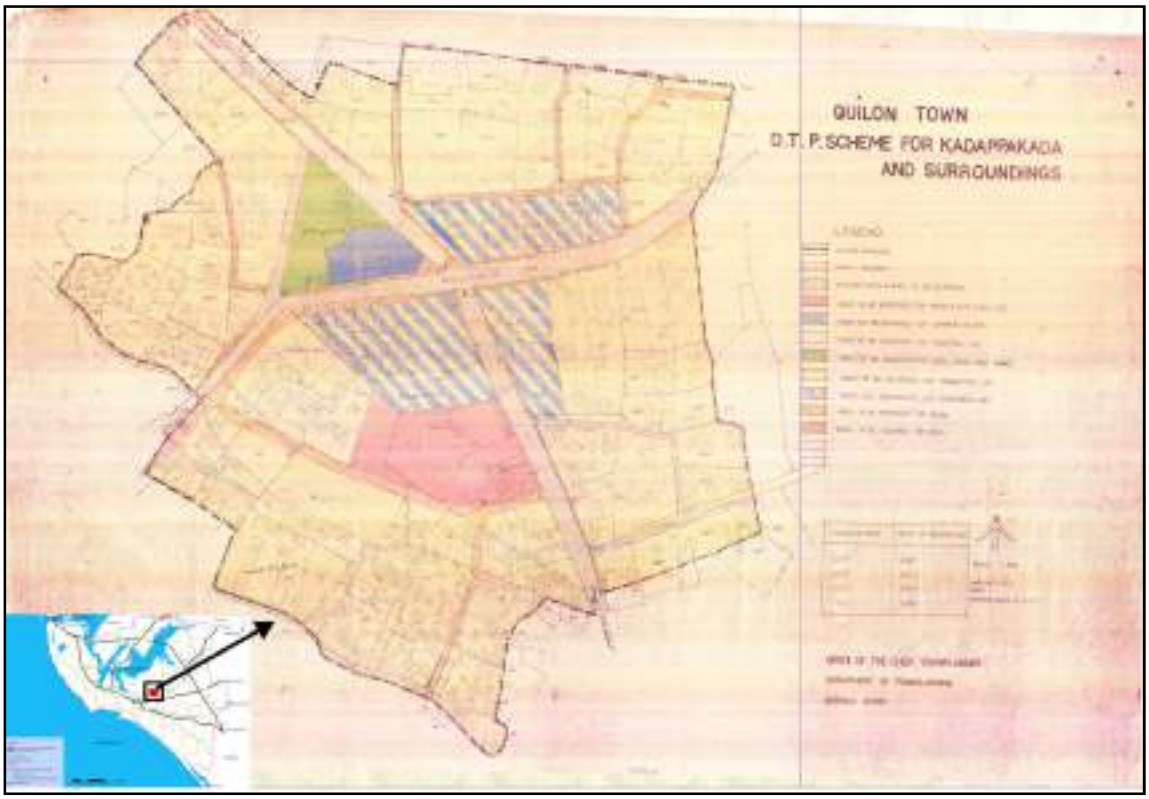


Figure 24.8 DTP Scheme for Kadappakkada and surroundings

3. To develop an inner ring road connecting Taluk office junction to Burial ground via Asramam and Kadappakada to a width of 20m.

The objectives of this scheme was almost achieved except at places marked in figure 24.9. One of the major objectives i.e. the formation of road links for the development of area has achieved except in 2 areas: For the portion marked as 1 in figure 24.9 , the proposed road connecting NH744 and Kadappakada- Kappalandimukku road has not been developed, to the alignment specified in this DTP scheme.Instead many residential buildings were constructed along the proposed alignment. Hence the Special Committee after conducting field visit have decided not to retain the proposal further. In the case of portion marked as 2 in figure 24.9, the proposed road of DTP scheme has not been achieved at all, but instead a road parallel to it has developed, marked as 2 in figure 24.9, so it can be considered as an alternative to the proposal. For the portion marked 3, 4, 5 & 6 in figure 24.9 were now developed with non-residential activities such as

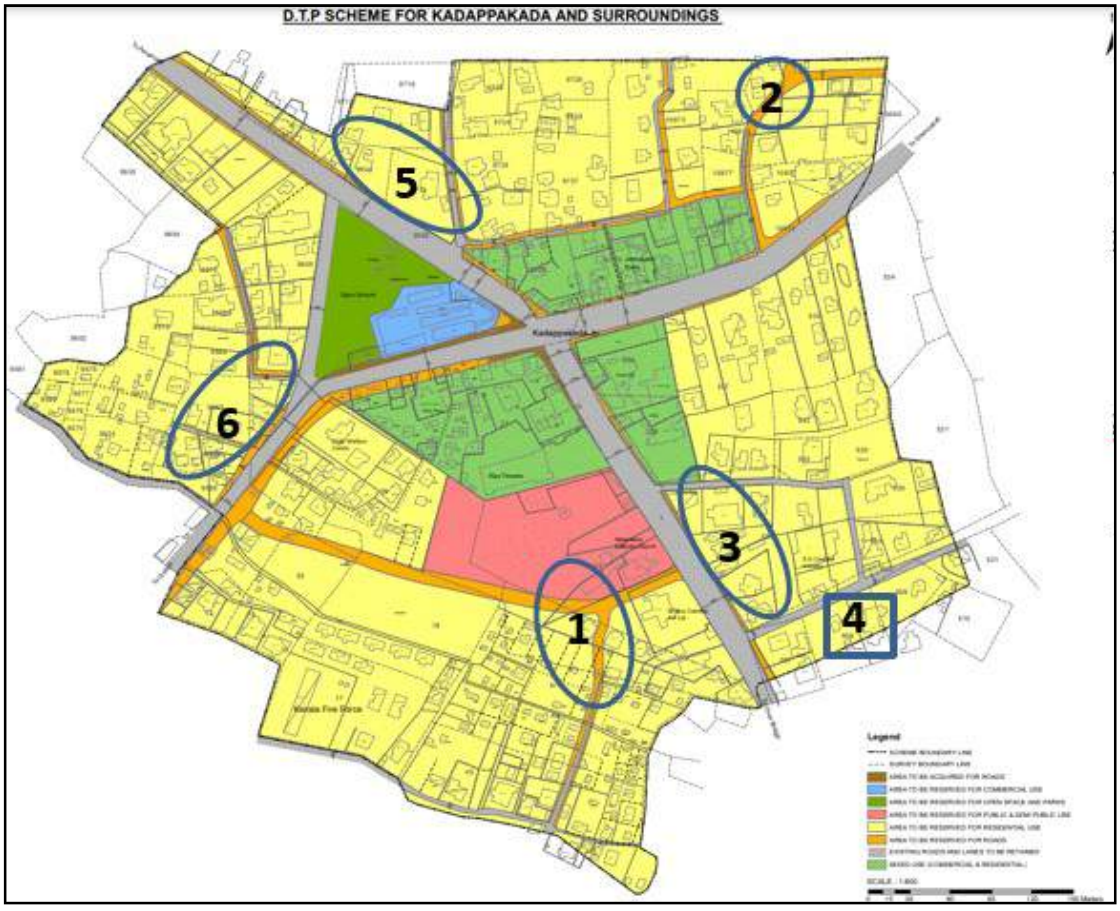


Figure 24.9 Location of unaccomplished regulation/acquisition proposal

mixed residential, commercial and recreational, industrial and health services (figure 24.10). As a part of developing, a local shopping centre mixed use(residential & commercial use) is proposed in all the plots near the junction and residential land use adjust to this zone. Commercial developments have expanded even to the proposed residential area. Hence it may be concluded that the objective of developing a local shopping centre at Kadappakada is achieved.

The major proposal of road widening, NH744 (Kollam-Schencotta road) in the DTP scheme is not achieved fully as it is not widened to 25 m in any of the stretches. However the road has widened to 16m - 22.20m. At the same time in the sanctioned Master Plan the proposed road width of this stretch is 25 m. It is further noticed that if the reservation provided in the Sanctioned Master Plan is implemented the proposed width can be achieved through the Master Plan itself. The proposal for inner ring road connecting Taluk office junction to Burial ground via Asramam and Kadappakada to a width of 20m proposed in DTP scheme, has already developed to a width of 18m in this scheme area. Also the proposed width

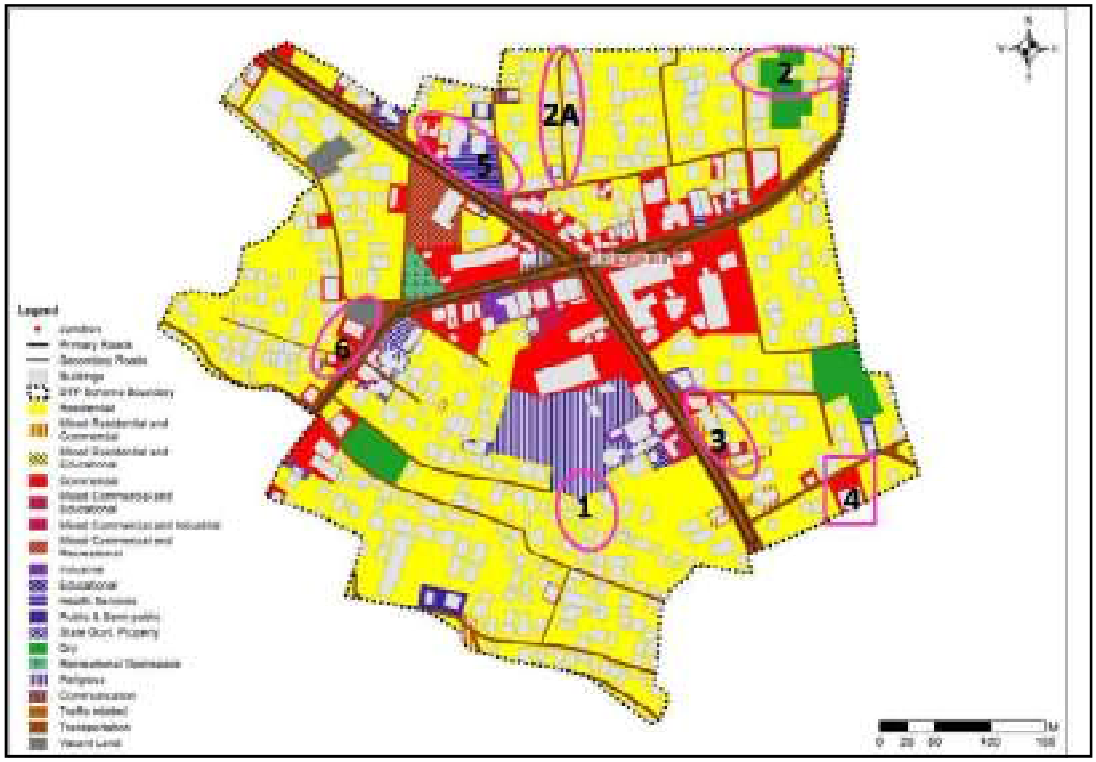


Figure 24.10 Existing landuse map for Kadappakkada and Surroundings under GIS based AMRUT scheme

of this road stretch in the Sanctioned Master Plan is 20 m. However additional land required near Kadappakkada junction as shown in DTP scheme need to be retained in the Master Plan for easy turning of vehicle towards Chinnakkada. Hence as far as widening of this road is concerned even if the Scheme is revoked the objective of road widening can be materialized by retaining the widening proposal in the sanctioned Master Plan with extra widening at Kadappakkada junction as proposed in DTP Scheme "Land to be acquired for roads" can be changed to land to be reserved for junction improvement and is shown in figure 24.10. Details of junction widening at Kadappakkada is shown in the module map 1 enclosed with this report.

24.1.3.1 Scheme Revocation

By incorporating the above mentioned proposals, the DTP Scheme for Kadappakada and Surroundings shall stand revoked as provided under section 50(1) of the KT&CP Act, 2016; once the Master Plan is sanctioned under section 36 of the KT&CP Act, 2016.

CHAPTER - 25
SUMMARY AND FINDINGS

This chapter summarizes findings and conclusions obtained or arrived from the analysis of settlement such as landuse, population, occupation structure etc and development sectors including physical, social and environment sectors which determines the sustainability of planning area. Imporatant finding from the Integrated District Development Plan (IDDP) relevant for the planning area are also included. Summary of finding are grouped under findings from IDDP, settlement characteristics and from development sectors.

25.1FINDINGS FROM IDDP

1. The planning area falls mainly within Multi Functional Zone and Aqua Bio Reserve Zones of the district and marginally within Special Development Zone.
2. The planning area is designated as the first order settlement
3. The first order commercial node (Chinnakada Jn) of the district is within the planning area.
4. Considering the important role in the development of the district this area is to be developed as the District Centre with all higher order facilities with various opportunities for economic and employment generation easily accessible to all the people of district.
5. As planning area falls within highly environment sensitive Aqua Bio Reserve Zone and Multi Functional Zone activities which adversely affect the ecological balance of water bodies are to be prohibited in this zone.
6. Development activities such as tourism, fishing, protection activities for aqua resources, promotion of traditional industries like cashew, coir etc. found suitable for the planning area as per IDDP.
7. Among the primary road proposed in IDDP NH 66, NH 744, Kollam – Kannanalloor – Bharanikavu -Adoor provides intra and inter regional connectivity to the planning area.

25.2 FINDINGS FROM THE ANALYSIS OF SETTLEMENT

1. The total population of the KLMC shows a decreasing trend for the census period 2001 to 2011 and constitutes 14.7% of the total population of the district.
2. The growth rate of KLMC is decreased to -2.94% in 2011. While Kochi, Kozhikode and Thiruvananthapuram show high growth rate comparing to KLMC, it is assumed that growth potential of the planning area might have reduced.
3. Though population of Kollam is very low comparing to other corporation under AMRUT, gross population density in KLMC is very high. Hence the pressure on land while developing the city will be higher than other Municipal Corporations.
4. The number of workers is gradually increasing, but the share of main workers is reducing. This shows the need of providing more employment opportunities in KLMC for improving quality of life of people.
5. Even though WPR of KLMC has increased from 28% to 34.67% from 1981-2011 there by increasing the job opportunities, the level of increase is quite lower that of preferred WPR of 40%.
6. Commercial land use is increased and is concentrated at the core of the city, Pallimukku and along the bypass road at Ayathil, Kallumthazham, Kadavoor and Sakthikulangara.
7. From the analysis of landuse, it is observed that urban land use other than residential is very low about (18%) comparing to non-urban landuse (about 27%). Also 13.22% of the total geographical area is covered by environmentally sensitive water bodies such as Ashtamudi Kayal, Vattakayal and Kattakayaletc. Hence to perform the assigned role of planning area as a District Centre and Ist order commercial node with Multi Functional areas, present land use pattern need to be changed.
8. As ecologically sensitive areas like water bodies of international importance, Asramam Bio Diversity Heritage Area are situated in the middle of the city centre, the challenge is to maintain a balance between high level urban activities and conservation of the ecosystem.

9. While analysing the concentration pattern of various landuses it is observed that residential land use is concentrated outside the city centre and other landuse is concentrated at the core of the city, Pallimukku and along the bypass road at Ayathil, Kallumthazham, Kadavoor and Sakthikulangara. Industrial landuse area is decreased from 2011 and is concentrated in the core area, Sakthikulangara and eastern portion of KLMC. Agricultural landuse area is also found concentrated to the outskirts of the planning area.

25.3 FINDINGS FROM THE ANALYSIS OF DEVELOPMENT SECTORS

1. Chinnakada and surrounding area still remains as District Centre and 1st order commercial node of the district. Considering the commercial facility available in Sakthikulangara,Anchalummoodu, Pallimukku are found as Ist order nodes in the planning area. Absence of parking facilities, even in district centre and commercial nodes and non availability of drinking water, sanitation facility, waste management in market areas are the main issues associated with commercial sector.
2. Planning area is blessed with large extent of coastal line (46.48% of coastal line of Kollam District) and Ashtamudi Lake and hence fishing sector has very good potential.
3. Fisheries sector provides 54 % of total fish production of the district.
4. Kollam district ranked 1st in marine fish landings with 3,11,896 tonnes of fish landings, which was also 1st in ranking during 2017-2018 period with 1,66,839 tonnes of fish landings
5. The largest single employment provider in the planning area is fisheries sector (32%).
6. Fisheries sector is facing lots of issues such as depletion of fishery resources, non utilization of inland fishering, absence of common facility for export, inadequate facilities for value addition etc.
7. The share of land use for the industrial activities in the KLMC area is 0.77 Km^2 of total geographical area (1.1 % of Total land use area) which is very small when compared with the suggested industrial land use (8-10%) for a medium town as per

UDPFI guidelines. However the share of industrial land use within KLMC area is more when compared with district. (0.33%)

8. The planning area consists of varieties of tourist attractions like beaches, backwaters, heritage centers etc. and hence the area has got high potential for tourism development.
9. Kollam district as a whole has less number of both domestic and foreign tourist arrivals as compared to other tourism potential districts even though variety of tourism products are available within the district especially within the planning area.
10. The length of stay of tourist is less due to the absence of facilities. Also tourism products are not promoted as part of intra and inter tourism circuits and hence the length of stay is very less.
11. The dumping of big boulders (tetrapod's) to protect coastal area and limited space are the main problems associated with Thirumullavaram beach which is considered as the safest beach in Kollam.
12. Due to the absence of proper access it is difficult to reach Ashtamudi Lake, hence the tourism potential is not utilized effectively.
13. Presence of large number of Kuttivalas erected at various locations in Ashtamudi kayal prevents the tourist boats, from going closer to the fisherman villages.
14. Water pollution is one of the major issues of Ashtamudi kayal along the side of KLMC .
15. Due to pollution in TS canal the water sports complex constructed near TS canal at Kollam beach is inactive.
16. Industrial sector is the second largest single employment provider in planning area.
17. Traditional industries and MSME are the main employment generators in industrial sector.
18. Lack of innovations to congregate the emerging demands and ineptitude to update systematic and scientific development programmes for developing traditional industries, non-availability of land for expanding industrial estate, lack of permanent exhibition cum marketing centre for small scale industrial products, delay in revival of Parvathy mill are found as some of the main issues in industrial sector.

19. Considering the area and production of various crops peripheral areas especially Thrikkadavoor, Kilikolloor, Vadakkevila and Eravipuram zones are found as agriculture potential area. The significance of agricultural sector is marginal in providing employment though agriculture land use area is very significant and area under cultivation of crops has increased. Also towards attaining the status of a sponge city agriculture area need to be mainatained.
20. Even though area under paddy cultivation is very small in most of the zones in the planning area, conservation of paddy area is required for ground water recharging and to act as collection basin at the time of flood in addition to contributing towards food security. The paddy and low laying land are the key elements in marinating the city as a sponge city.
21. Increased Growth rate of livestock population is observed in KLMC with less concentration in the core area compared to the other parts of the planning area. Even though there is adequate milk production in the planning area, meat production is not meeting the requirements of KLMC area. Non availability of authorized slaughter houses is found as main issue in animal husbandry sector. Since agricultural area is significant in the out skirts of planning area, animal husbandary activities can be promoted in the out skirts of planning area.
22. Share of landuse for transportation is only 5.56% of the total land use area which is very low when compared with planning standards (12% to 14%) as per UDPFI guidelines.
23. There are four classification of roads, i.e. Primary, Secondary, Tertiary and Local roads. The road network system within the planning area is like a grid-iron pattern with limited linkages between radial roads, towards outer periphery.
24. Following are the major issues in transportation sector.

- Narrow roads in central part of the city
- High traffic volume and low capacity of roads
- Unorganised on-street parking in the absence of parking lots
- Encroachment of right of way

- Uncontrolled pedestrian traffic
- Underutilization of foot over-bridges already completed
- Delay due to level crossings in CBD area
- Location of intercity – Bus stand attracts more traffic to the city
- centre thereby creating traffic congestion.
- Un organised goods traffic through trucks and their loading/unloading problems within the central area
- Absence of NMT facilities and full-fledged public transportation system.
- Issues identified from the analysis of different modes of transport needs to be addressed and suitable proposals are to be implemented in a time bound manner.

25. National Waterway No 3 passing the planning area can be integrated to road transport so that passenger and goods traffic volume are reduced in roads. Waterway can also acts regional connectivity.
26. The issues identified from the analysis of IWT are given below:

- Pollution and encroachment of waterways
- Under-utilisation of Inland waterways
- Lack of connection between Kollam Thodu and port
- Lack of integration with other modes of transportation.
- If the IWT is developed and properly linked with other modes of transport, this can act as a potential link between city and other means of importance.
- It also has got very good potential in promoting tourism development of the planning area.

27. Kollam port, a key infrastructure in the development of the planning area, has no rail and inland waterway connectivity.
28. Due to the peculiar alignment, Thiruvananthapuram-Ernakulam line creates traffic problems due to the large number of railway crossings in the planning area. As the railway goods yard is also located in the city centre it increases traffic congestion in the core area. Block signalling system is followed in Kollam junction thereby causing excessive delay.Capacity of railway station building has already exceeded. Hence railway station is overcrowded at peak hours and many of the facilities required for passengers are absent.

29. Though there are 113 substandard housing colonies, there is no slum area in the planning area. In substandard housing colonies the major requirement are adequate supply of good quality water, sanitation facilities and drainage facilities.
30. Grade B & Grade C category houses need to consider as priority for improving infrastructural facility.
31. Uncovered service areas in primary school education sector and low rate of literacy rate when compared with other AMRUT cities need to be addressed.
32. Even though sufficient number of educational institutions with teachers is available in the planning area except for some of the professional institutions, there is not much facility to convert education into Knowledge Economy within the planning area.
33. Issues such as shortage of class rooms, lack of toilet facilities, drinking water facilities, dilapidated buildings, lack of public gathering places and play grounds were solved due to the intervention of government during the past 10 years. However lab with internet facilities are not available in 58 nos.of schools. Also waste management facilities are not available in 6 primary schools, 6 High schools and 10 HSS. Another important issue is that extra-curricular activities in 59 primary schools and 4 HSS are absent.
34. Health care institutions are available within a distance of 10 Km to all people in the planning area. However Primary health centers are inadequate and not available within a distance of 2 Km.
35. The infant mortality rate (1.53) is very low as compared with other districts. It indicates better health and socio-economic standards present in Kollam District. Higher order health facilities in planning area is considered as the main reason behind the achievement.
36. Maximum cases of Dengue and Malaria are reported from KLMC, disease occurrences are high, and this is mainly due to the environment degradation taken place in this area.
37. Low bed strength and doctor-patient ratio , poor maintenance of hospital buildings, absence of own waste management systems are some of the major issues in health sector.

38. Present distribution system of electrical energy is found satisfactory.The possibility of extracting power from the non-conventional energy sources need to be explored further.
39. Water demand of KLMC is about 92 MLD, but the existing system is able to supply only about 32 MLD . If proposed Njankadavu scheme is implemented fully, the demand can be met with.
40. Shallow wells are the major sources of water for more than 60% of the householods in KLMC, but water from open wells and tube wells is untreated. Hence, water-borne diseases are frequent especially during monsoon season.
41. Lack of assurance on the quality of water supplied by KWA and low frequency of water prevent households from shifting to piped water supply from private wells.
42. Existing water supply system was commissioned in 1960 and the network is in a dilapidated condition. Hence contamination of water due to leakage in pipes and the resultant infiltration of storm water and ground water frequently during the monsoon season along with frequent interruption of supply experiences in many places.
43. Though rain water is the cheapest source of drinking water if harvested properly, this source is not yet tapped to meet the drinking water demand.
44. Existing land at Kureepuzha is the only space for centralised processing and safe disposal of solid waste in the planning area.Bio Mining of accumulated solid waste in Kureepuzha chandi depo is not yet finished. Previously dumped solid waste now seen like a vegetation hill. Bio Mining and segregation of these waste need to be completed urgently so that issues like pollution of Ashtamudi and public protest against implementing further treatment facilities including sewage treatment plant can be solved.
45. Waste dumping into Ashtamudi lake and other inland water bodies, along the road sides and vacant land creates land and water pollution besides spoiling the aesthetics of city, spreading of diseases, creating stray dog issues and creating eyesore to the tourists.

46. Monetary value of waste is not recognised by the people as there is no model project for converting waste to energy there by generating money. It is expected that the implementation of Waste to Energy Project at Kureepuzha can trigger change in the mind set of people that waste can create only public nuisance.

47. Though Haritha Karma Sena is functioning in all wards waste generated at source is not fully collected as many households and commercial establishments are reluctant to segregate, store and hand over the waste to Haritha Karma Sena. Instead this waste is either burn or deposited along road side, water bodies or at vacant land.

48. Absence of Sewage Treatment Plant (STP) is the main reason for contamination of water body since no other practical alternative is available in nearby area for sewage treatment. The de-sludging is very important for septic tanks of residents, commercial establishment and public utility buildings etc. Current practice of emptying and dumping septic tank waste in to open places will lead to intense health issues to public.

49. Availability of land at Kureeppuzha Chandi depo can be considered as the main potential for Liquid Waste Management as land availability is very crucial in developing Sewage Treatment Plant.

50. Lack of well connected drainage network, improper maintenance of drains, dumping of solid waste causes water logging.

51. Conversion of paddy, wet land, low lying areas etc. for construction activities without planning for surface drainage causes water logging. This prevent the city to act as a sponge city where maximum percolation of storm water is allowed by means of vegetation and other methods.

52. Recreational facilities within the planning area include Parks and open spaces, play grounds and water bodies constituting 14.1% of total area. Considering the available Sea coast also as recreational area the space available for recreation is sufficient comparing to planning standard.

53. Though sufficient means of recreation including natural and manmade are in place within the

planning area following problems are associated with these facilities.

- Improper maintenance
- Congested roads to parks and beaches.
- Absence of access to many parts of Ashtamudi lake.
- Proper parking spaces are not available during season times.
- Pollution of beaches, backwaters,Kollam Thodu and other water bodies.
- As the civic amenities and recreation facilities are concentrated in the core area of the city, traffic congestion reduces productive man hours.
- Neighbourhood and sector level parks and open space are absent in the north – eastern part of the public KLMC area.

54. Public crematorium is not available in the north- eastern part of the KLMC area.
55. Even though residential, commercial and institutional developments are shifting towards north – east part of the planning area police stations are concentrated along coastal belt. Hence enforcement of law and order in these areas found difficult.
56. Natural heritage such as mangrove forest, Scared Groves etc. are struggling for existence due to various issues such as encroachment, pollution and deliberate attempt of construction activities by government agencies.
57. Important issues with heritage sites are:

- Landscaping of precincts are not properly maintaining, Continuation of adaptive reuse is not done. Lack of proper policy environment to develop and conserve historical precincts. Absence of a defined architectural language after reconstruction around the historical religious structures.

58. Considering the number of SC families, BPL families and substandard housing areas, Kollam Kilikolloor, Eravipuram and Sakthikulangara zone is identified as special concern areas
59. Though 96% of SC families in the planning area have usable toilet features 4 % of families are not provided with toilets or with usable toilets.
60. Even though women empowerment has enough potential in the planning area due to the presence of large number of Kudumbasree

units, their activities are limited to common activities like tailoring, food processing and other small units. There is a need of transforming the potential of Kudumbasree into a vibrant group of investors by providing infrastructure, skill upgradation and providing technical support.

61. Though discharge of industrial effluent to the lake and bacterial contamination have reduced to a large extent in Ashtamudi lake, issue of dumping of solid waste still exists as a major threat to the environment.
62. Impact of global warming as sea level rise (SLR) would be felt by the majority of the coastal community in the planning area.
63. The concept of sponge city is the need of hour as far as repeated flooding is concerned. Towards this all the available water bodies paddys and low lying areas, mangroves, sacred groves etc need to be conserved.
64. Proper development and design controls need to be framed for flood prone areas to mitigate future risks. Floods are usually followed by epidemics. An increased amount of stagnant water increases the risk of mosquito and waterborne diseases and a speedy response is crucial to prevent the spread of diseases like dengue in wards like Kaikulangara, port etc.
65. Generally disasters are followed by breakdown of communication lines and disruption of essential services. Therefore, the key communication centres should be protected from natural disasters i.e. flood, fire and earthquake etc.
66. Lack of co ordination between various stake holders and absence of advance disaster management plan.
67. Maruthadi, Sakthikulangara, Thekkumbhagom, Pallithottam, Port, Kaikkulangara, Kannimel are found as highly vulnerable areas under treat of multiple hazards like sea erosion, Ockhi, Tsunami and flood.
68. Out of four sanctioned DTP schemes in KLMC, three DTP Schemes, viz DTP scheme for "The Road from Taluk Office Junction to Civil Station Junction, DTP Scheme for the area between Kunjammappalam and District Hospital", DTP scheme for "Kadappakkada and Surroundings" are reviewed and found that

either majority of objectives of these scheme are achieved or the proposals are not feasible in the current development scenario. Hence the council as per the recommendations of Special Committee decided to revoke these schemes. As the objectives of the DTP scheme for the area between DSP office junction and PWD Junction are not fully achieved, a detailed study should be conducted to evaluate the importance of these objectives by considering the development trends and potential capability of the scheme area in the presence scenario. Hence the existing DTP scheme for the area between DSP Office junction and PWD junction need to be followed until the major objectives are achieved or it is revoked by a new DTP scheme.

CHAPTER - 26
DEVELOPMENT GOALS AND OBJECTIVES

In the previous chapter, the summary of findings of various analysis carried out were presented. These findings enlists various problems and potentials associated with settlement as a whole and development sectors. The ultimate aim of preparation of a Master Plan is to frame a development vision to move the city forward after assessing current issues and suggests specific proposals for achieving the vision. The first stage of envisioning process is to formulate the development goals and objectives to utilize the available potentials or resources to the extent possible so that the existing problems can be addressed and also the projected requirements for the development of people can be achieved. The development goals indicate the desired target and objectives are the specific ways by which these targets could be achieved. This chapter explains the goals and objectives formulated for the overall development of the planning area.

26.1 DEVELOPMENT GOALS

As per the development concept of Integrated District Development Plan, all kinds of higher order facilities are to be provided in the planning area as KLMC is the Ist order settlement in the district. Hence physical and functional linkages are to be strengthened for providing better service to the people. For this necessary infrastructure, higher order service facilities, recreation facilities etc. are to be made available in the planning area. At the same time the city is to be made easily accessible to all walks of people. Hence the prime goal is **"To develop the area as an easily accessible District level service centre with adequate infrastructure and higher order facilities".**

Kollam town was identified as one of the oldest towns with rich history and cultural values. The remains of these can be seen in many places as monuments and heritage precincts. In order to transfer the rich heritage to the new generation, suitable measures are to be taken for the conservation of these areas.

The first Biodiversity Heritage Site (BHS) in Kerala is at Asramam. The mangrove spread and Ashtamudi Lake come under this heritage site. Ashtamudi Lake is listed as one of the water bodies of National importance (Ramsar site). Agricultural activities are increasing in the planning area and active paddy cultivation is observed at the eastern outskirts of city centre. Animal husbandry activities are also taking place at considerable level. So existing homestead cultivation and animal husbandry activities are to be retained. Towards achieving sustainability, city is to be developed as 'Sponge City'. Environmentally sensitive areas consisting of water bodies paddy and low lying aeas,mangroves sacred groves etc. need to be conserved at any cost as these elements act as sponges in holding storm water for maintaining the city as a Sponge City.

Considering the above **"To conserve environmentally sensitive areas with a view to preserve the ecosystem for achieving sustainable development and transforming the city as Sponge City while its rich heritage is transferred to the coming generations without diluting its value"** is identified as another goal for the overall development of the planning area.

Major portion of KLMC is designated as Multi-Functional Zone as per IDDP where variety of opportunities for the growth of people is expected. From the analysis of existing production sectors of the area, sectors playing key role in the economic development of the area are found as trade and commerce fisheries, tourism and industries. Also Kollam being the part of Thiruvananthapuram – Kollam Knowledge Corridor, declared by the state government, Knowledge Economy is also considered as an important aspect of development.

Planning for any area is carried out for the enhancement of quality of life of people. Those who live without satisfying their basic need are to be considered as priority groups and planning interventions are to be made for the upliftment of these groups. Hence **"To enhance the quality of life of people in the planning area in general giving special attention to the priority groups"** is taken as another important development goal.

The goals formulated for future development of the planning area as explained above are listed below.

- **To develop the area into a district-level Service Centre with sufficient infrastructure facilities.**
- **"To accelerate the economic development of the area by promoting key production sectors such as trade and commerce, tourism, fisheries and industries besides focusing on Knowledge Economy"**
- **"To enhance the quality of life of people in the planning area in general giving special attention to the priority groups"**

26.2 OBJECTIVES

- The objectives formulated to achieve the goal "**to develop the area into a district-level Service Centre with sufficient infrastructure facilities"are:**

· To unclog the activities of core area by developing new service centres.

· To provide better transportation network by introducing integrated transport system utilizing the potentials of all the modes of transport available within the planning area.

· To strengthen the potential of Kollam port.

· To provide adequate infrastructure such as water supply, solid waste, sewage and septage disposal facilities, drainage and power.

· To provide higher order health, educational, recreational and other civic amenities to the required level.

· For the goal of **"To conserve environmentally sensitive areas with a view to preserve the ecosystem for achieving sustainable development and transforming the city as Sponge City while its rich heritage is transferred to the coming generations without diluting its value".** following objectives are formulated.

· To prepare an action plan for reducing pollution, encroachment and reclamation of Ashtamudi lake, Vattakayal, Kattakayal and other water bodies and implement the plan with people's participation.

· To conserve paddy and low lying areas, mangrove, sacred groves and marshy land.

· To conserve the heritage precincts according to their level of importance.

· To encourage people by giving technical support to cultivate within the limited area available and also to promote animal

husbandry activities whereever possible.

"To accelerate the economic development of the area by promoting key production sectors such as trade and commerce, tourism, fisheries and industries besides focusing on Knowledge Economy" following objectives are proposed .

- To provide sub centres with higher order facilities.
- To project Kollam as a tourism destination of Kerala.
- To strengthen beach tourism activities.
- To connect road and waterway to port for boosting trade and commerce.
- To develop backwater tourism.
- To provide adequate tourism infrastructure including development of cruise terminal in Kollam port.
- To make the existing tourism products more attractive.
- To maintain a conducive environment for sustaining fish wealth.
- To increase the earnings from fisheries sector.
- To promote export of fisheries products
- To revive the traditional industries.
- To strengthen the marketing network of MSMEs.
- To provide support facilities to promote Knowledge Economy.
- To strengthen the communication link between KLMC and prposed Thiruvananthapuram - Kollam Knowledge corridor.
- In connection with the goal **"To enhance the quality of life of people in the planning area in general giving special attention to the priority groups"** objectives set are:
- To ensure equitable distribution of basic facilities to all sections of people.
- To strengthen the governing system by effectively implementing the projects and programmes for the upliftment of priority groups.
- To prepare a detailed disaster management planso that most vulnerable people are protected from natural and manmade hazards.

CHAPTER - 27
CONCEPT

Envisioning for the future development is an important stage of preparation of the Master Plan. The concept of key development sectors based on the present spatial structure and the goals and objectives formulated after conducting detailed analysis of settlement characteristics and development sectors forms the basis of development concept. The development concept is arrived by overlaying the concepts of key aspects of development on existing spatial structure. While analysing the present scenario of development sectors and settlement aspects, it is observed that the development concept formulated for Greater Kollam Development Plan in 2012 is found valid till date. Hence the basic development concept is retained and necessary changes as per current development trend are incorporated in the concept. The key developmental aspects identified through detailed analysis are transportation, commercial development, fisheries, industries and knowledge economy, density pattern, tourism, recreation facilities and environment. In this chapter development concept on each key aspect and the overall concept with vision statement is described.

27.1 TRANSPORTATION

As Kollam city is envisaged as a Multi Functional area providing all sorts of higher order services and commercial facilities to the whole district, a well-developed transportation network with adequate road capacity and grade separated intersections, over bridges or under passes at railway crossings whereever possible permitting continuous movement of vehicles and passengers and also with adequate inter modal integration and connectivity to Kollam port and tourism centres is the concept of transportation of area. The concept on transportation network is illustrated in figure 27.1. As per the concept 21 m wide road from Kottiyam junction to Karunagappally junction proposed in IDDP will act as the Bypass of Kollam district. The road network for the planning area is visualized as a radial - ring pattern with connecting links in between.The concept on

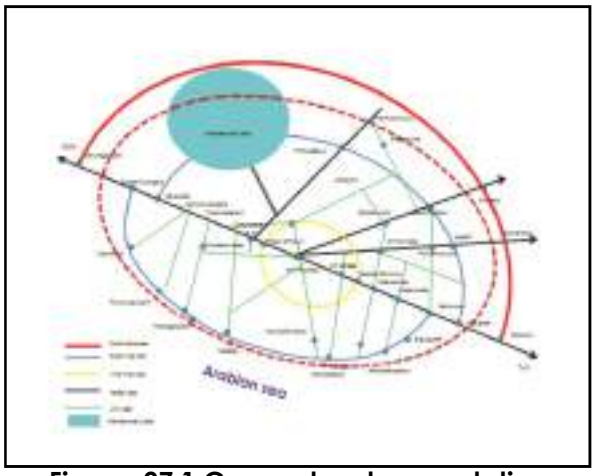


Figure: 27.1 Concept on transportation network

transportation network is transferred on land and the proposed transportation network is shown in figure 27.2. NH 66 bypass is considered as part of outer ring road, the remaining part being Pallimukku - Vadi - Sakthikulangara road. This stretch includes part of coastal road. The outer ring road can act as the main arterial road connecting the tourist destination of Ashtamudi Lake and the beaches. NMT can be promoted along the side of this road. The outer ring road segregates through traffic from city traffic thereby reduces the traffic conjunction at city centre. The inner ring road passes through the immediate periphery of city centre. The main function of this road system is to facilitate the people for availing district level facilities. This road connects important public and



Figure 27.2. Proposed transportation network

commercial facilities. NH-66, NH-744, NH-183, Kollam - Kannanalloor road forms the radial network. Radial road system ensures connectivity between district centre and other developed settlements. Connecting links between, National water way, radial roads and ring roads are also visualized in the concept on transportation. Rail and water way connectivity to Kollam port is also conceptualized. As future Kollam district bypass is not touching the planning area, it is not shown in the proposed transportation network.

1. Outer Ring Roads

Outer ring road includes the following road sections.

- Mevaram - Ayathil - Kallumthazham - Kadavoor - Kavanad
- Kavanad - Sakthikulangara - Vadi - Eravipuram - Pallimukku - Mevaram

2. Inner Ring Road

Inner ring road consists of the following road sections.

- Kappalandimukku - Kadappakada - Asramam - Taluk office junction.
- Taluk office junction - Civil station - Mulankadakam - Vadi - DSP office - Kappalandimukku.

3. Radial Roads

- NH 66, Kollam - Thiruvananthapuram
- NH 66, Kollam - Alappuzha
- NH 744, Kollam - Shencotta road
- NH 183, Kollam H.S junction - Kundara road
- Kollam railway station - Kannanalloor road

4. Link roads

Link roads connecting ring roads and radial roads to ensure transportation facilities to all parts of planning area are also included in the concept.

27.2.COMMERCIAL DEVELOPMENT

Concept on commercial development was formulated in GKDP with a view to decentralize the commercial activities. This concept in general is followed in this plan also, thus a well defined hiearchy of commercial nodes is envisaged in the planning area comprising District centre, Sub centres, Zonal centres and Local centres. Chinnakada will continue as the one and only District centre. It is expected that within the next 20 years the district centre will grow further so that Chinnakada, Kapalandimukku, Kadappakkada and H.S junction area (including collectorate junction) will

merge together. The existing commercial nodes at Kadavoor, Kallumthazham and Pallimukku have the potential for further development, if the proposed outer ring road is well connected to the radial roads through service roads. Also while analysing the development trend of key sectors in planning area, it is understood that fisheries sector is the largest employment provider of the area and export potential is not fully utilized due to the lack of infrastructure. Hence Sakthikulangara area is visualised as a fisheries hub of the district. In order to provide higher order facilities to the proposed fisheries hub the subcentre previously envisaged at Kavanad is proposed at Sakthikulangara, where the fishing harbours are nearby. In addition to this, Ayathil Junction, due to the development of so many higher order hospitals and other institutions is transforming as a commercial centre. Hence Ayathil Junction is also anticipated as a subcentre. These nodes are to be developed with higher order Industrial/commercial facilities in addition to residential activities so that these nodes will act as sub centres. Among the above district sub centres, presently Kallumthazham junction is not fully developed. Once developed, Moonamkutty will be a part of this node. When Sakthikulangara is developed to a sub centre, the existing second order node Kavanad can act as a zonal centre catering western portion of Kadavoor and area around Kavanad junction. The other potential commercial nodes that can be developed as zonal centres are Ramankulangara, Anchalumoodu, Kuttichira, Polayathodu and Eravipuram. Among the above, presently Eravipuram junction is an under developed commercial node. However when the outer ring road becomes functional, this junction can act a zonal centre due to better connectivity to other surrounding settlements. Local centres are also anticipated for catering to various neighborhoods in the planning area. The concept on future commercial development, ie the proposed hierarchy of nodes is depicted in figure 27.3.

27.3. FISHERIES

The concept on fisheries sector in the GKDP was to develop a self contained activity area for fisheries within the planning area utilizing the available potentials such as fish landings centers, harbours, Port etc.



Figure 27.3. Concept on commercial development

can be promoted. Also Ashtamudi lake and surrounding area is to be developed as in land fisheries promotion zone. This will boost the economic developme-nt of planning area as well as the district. The concept on development of fisheries sector is shown in figure 27.4.

The same concept is followed in this plan also. The exclusive activity area will act as the fisheries hub of the district. Area near Neendakara - Sakthikulangara harbour is ideal for development of such a fisheries hub in the planning area. This area need to be provided with adequate infrastructure required for grading, preserving, value addition and export of finished products. Along with the exclusive activity area, the coastal area along the side of Lakshadweep Sea is conceptualised as fisheries promotion zone where fish related house hold industries

27.4. INDUSTRIAL DEVELOPMENT & KNOWLEDGE ECONOMY

While analysing the development trend of industrial sector, it is observed that large and medium industries are not developing in the planning area. Instead MSME sector is developing. Hence, reservation of additional area over and above the



Figure 27.4 Concept on fisheries development

existing industrial area only for industrial development will prevent optimum utilisation of land, which is considered as the most scares resource as far as the per capita availability of land in the planning area is concerned. However, provision for large scale investment including large and medium industries is also envisaged by providing industrial promotion zone . In this zone commercial and industrial developments are to be promoted. The concept on future industrial development is to reserve existing industrial areas as dedicated area for industrial use while promoting household nano enterprise throughout the developable areas and other non-nuisance service/engineering industries, small industries fisheries related industries in pre-assigned areas. These pre-assigned areas are decided based on the existing spatial structure, future development potential and reservation for industrial development in earlier plans. These areas for industrial development include industrial estate at Mundakkal, area near Kallumthazham junction and Bypass areas.

Knowledge Economy is considered as one of the potential economic sectors for the future in view of the development of Thiruvananthapuram- Kollam Knowledge Corridor. The planning area has to perform key role in providing higher order residential, recreation, and commercial facilities in addition to act as an extension of Knowledge Corridor. Considering the scope of developing proper connectivity to the Techno park at Kundara, the area adjacent to the industrial area at Mundakkal is visualised as Knowledge Economy Promotion Zone in the development concept. The concept on industrial development and knowledge economy is illustrated in figure 27.5.



Figure 27.5 Concept on industrial development

27.5. DENSITY DISTRIBUTION

From the analysis of change in population density in the old municipal area and the surrounding area, it is found that the density just outside the core area is increasing. Hence high density outside the city centre periphery is visualised. Also for conserving greeneries, paddy and water body, low density zone is proposed in the concept of future density distribution. The concept on future density distribution is shown in figure 27.6.

27.6. TOURISM DEVELOPMENT

Analysis on tourism sector reveals that Ashtamudi Kayal is highly potential for promoting tourism activities. At the same time this Kayal is listed as Ramsar site. Hence Ashtamudi and surrounding areas including (Asramam BHSA) is viewed as an international eco-tourism centre with adequate attention given for conservation of the ecosystem. In addition to this Kollam beach along with other beaches, Children's Park, TS Canal etc., are considered as passive tourism centres of the district. However Thangassery area and area between Anandavalleeswaram – Vadi due to the presence of so many heritage precincts is visualised as heritage tourism zone. Other tourism products such as Adventure Park etc. are considered as the associated tourism products. Development of tourism infrastructure will be a priority area. District level Tourism Hub envisaged in IDDP at Vellimon area in Perinad G.P need to be implemented for boosting up the tourism activities all over the district. At the same time a Tourism Facilitation Centre is visualised in Kadavoor area which can provide necessary facilities to the tourists Local Tourism Circuit (LTC) connecting all the

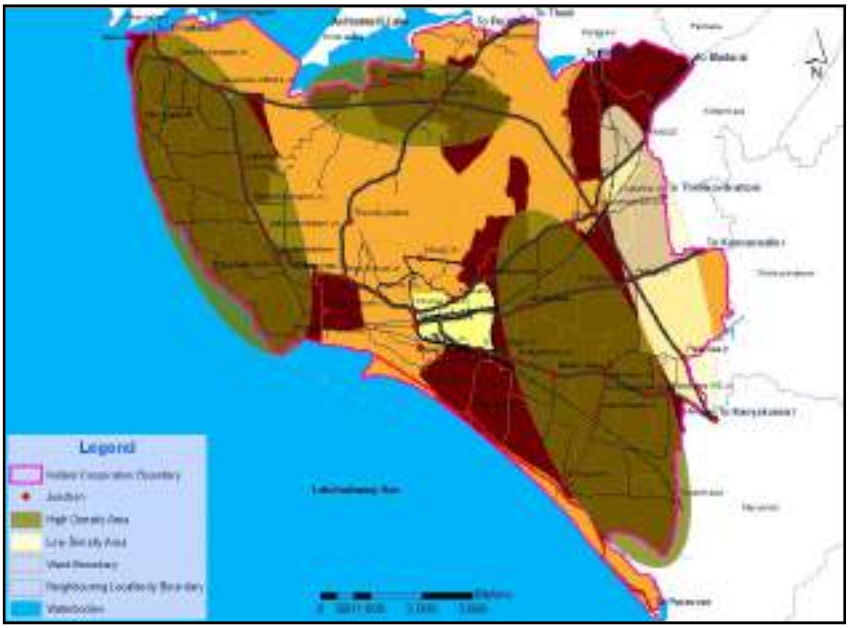


Figure 27.6 Concept on future density distribution

attractions within the area and integrating the LTC to other tourist attractions inside and outside the district are including in the concept. The concept on tourism is illustrated in figure 27.7.

27.7. CONCEPT ON FUTURE RECREATION CENTRES

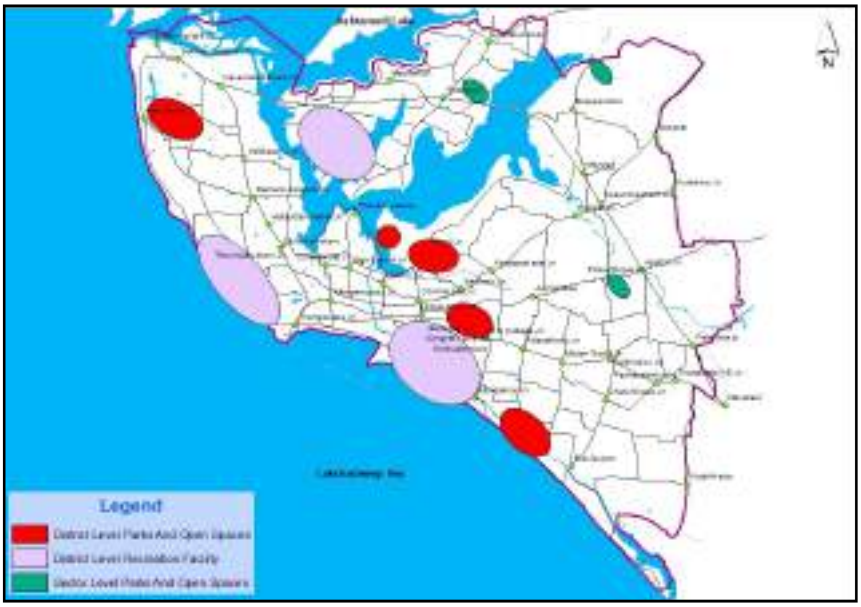
The concept on recreation facilities is that the planning area should serve for the recreation demand of the entire district. Besides the tourism centres, district level and sector level parks and open spaces are envisaged to provide higher order recreation facilities. District level parks and open spaces include Tanni beach, Peeranky maidan, and Asramam maidan along with children park and adventure park. Vattakayal and surrounding area is considered as district level sensitive open space with restricted developmental activities. The sector level recreation facilities and local level facilities are to be provided in such a way that the facilities are equally accessible to all. Such recreational facilities can be provided in low density area. The concept on recreation facilities is depicted in figure 27.8.

27.8 ENVIRONMENTAL CONSERVATION

As the status of environmental sector remains the same for the last 10 years, the concept on environmental conservation in GKDP is retained as such. The concept on conservation of the environmentally sensitive area is to allocate the future activities in the sensitive areas judiciously so that the permissible activities do not impact adversely on the overall environmental balance and also to encourage the participation of local people and NGOs in the conservation efforts. To transform the city as a sponge city in view of climate change all the



Figure 27.7 Concept on future tourism developments



- Intensive residential activity area
- Fisheries promotion area
- Industrial promotion area
- Low intensity residential activity area

Figure 27.8 Concept on recreation facilities

low lying areas need to be conserved. The concept on environmentally sensitive areas is shown in figure 27.9.

27.9. DEVELOPMENT CONCEPT AND VISION STATEMENT

The development concept for the planning area is formulated by physically overlaying all the above concepts on the existing spatial structure as shown in figure 27.10. As per the development concept (figure 27.11), the developable areas are classified as 5 major activity areas other than specific zones of development.

They are:

- Multifunctional area

27.9.1. Multi Functional Area

In this area, all the major commercial activities along with other urban activities such as industries, public and semi-public, residential activities are expected. Future higher order commercial facilities are to be established in this area.



Figure 27.9 The environmentally sensitive areas

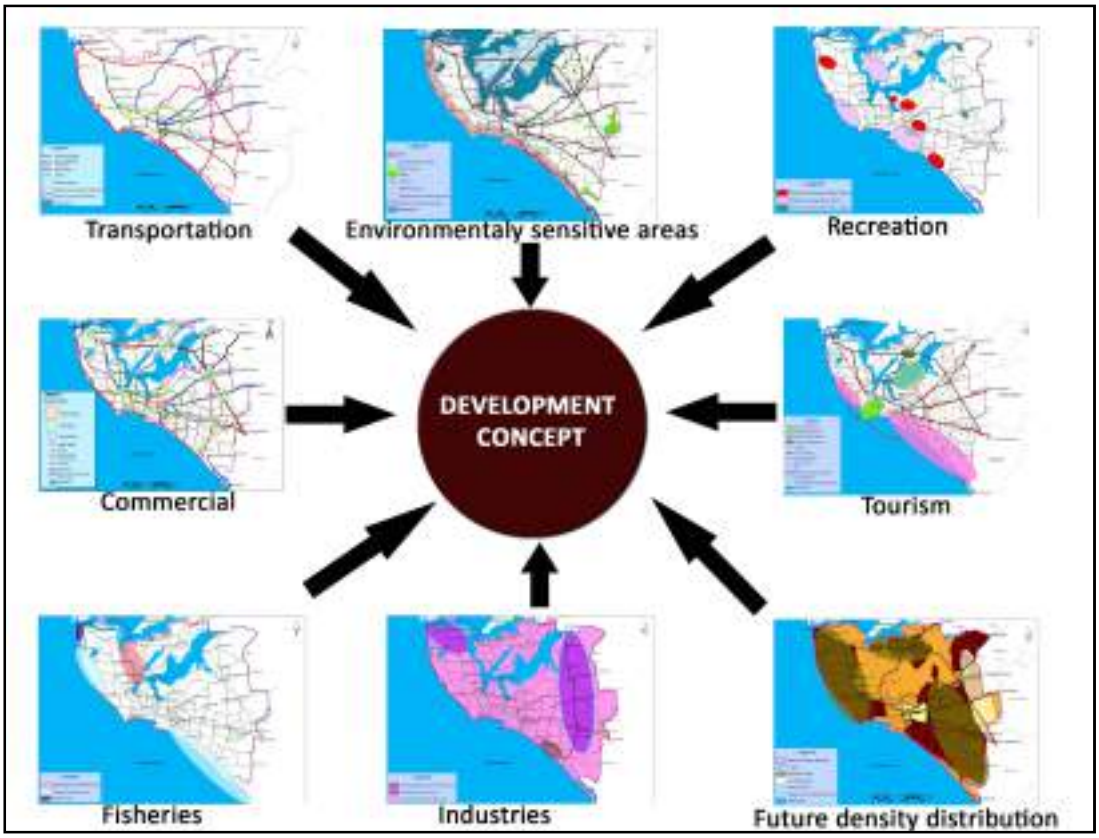


Figure 27.10. Evolving development concept

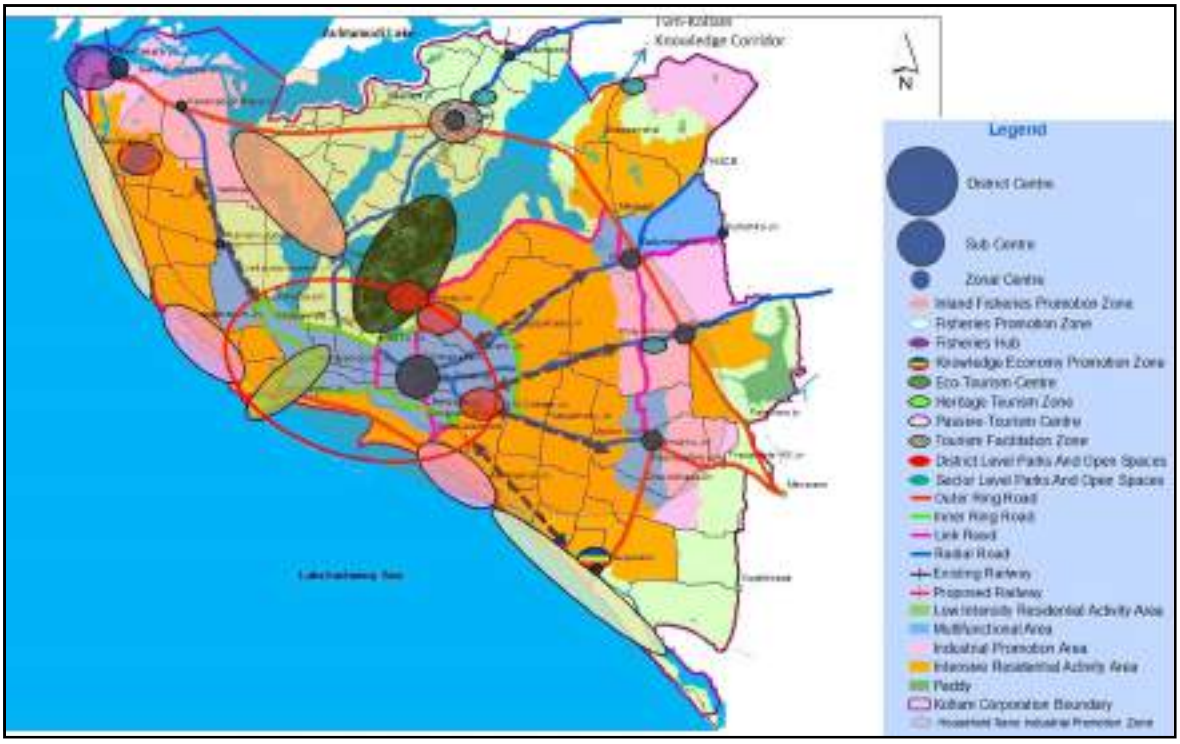


Figure 27.11 Development concept of the planning area

27.9.2. Intensive Rresidential Activity Area

High density areas are suggested to the immediate periphery of core area. Population addition due to induced growth rate and floating population can be accommodated in this area.

27.9.3. Industrial Promotion Area

The areas where existing industrial activities are concentrated at present and the areas with potential for industrial development in future are included in this area. Same time commercial activities can also be promoted in this area.

27.9.4. Low Intensity Residential Activity Area

Kadavoor area of KLMC is fully confined in Aqua-Bio reserve zone of the district. Hence introduction of vibrant urban activities in this area will adversely impact the environmental balance. Areas along the side of Ashtamudi Lake other than area near Kadavoor junction, Eastern outskirts of corporation area where major area of paddy land and dry agriculture area available, is included in this activity area. Hence this area is to be maintained as a greenery area. For this the existing agricultural activities are to be continued along with residential activities at normal level.

In addition to the above activity areas, the development concept includes, future transportation network, hierarchy of nodes, recreation facilities and environmentally sensitive areas.

VISION STATEMENT

The development vision containing all the above aspects of development is stated below.

"To transform Kollam City as a District Level Facility Centre with all sorts of higher order public facilities and required infrastructure and a Vibrant Multifunctional Zone of the district enhancing economic development by promoting key production sectors such as trade and commerce, fisheries, tourism, industries and knowledge economy while ensuring equity and maintaining environmental balance so that quality of life of people is ensured".

CHAPTER - 28
POLICIES AND STRATEGIES

In order to guide the development as per the development concept, the decision maker has to adopt suitable policies and strategies to achieve the goals and objectives. In this chapter the general policy statement for the overall development of planning area and sector level policies and strategies for important sectors are suggested.

28.1. GENERAL POLICY STATEMENT

The general policy for the overall development of the planning area based on the development goals is stated as follows.

"To develop the area as a model district centre through the provision of adequate infrastructure, enhancing economic development by promoting key production sectors and knowledge economy, while ensuring equity and maintaining environmental balance by conserving environmentally sensitive areas, so that quality of life of people is enhanced".

28.2. SECTOR LEVEL POLICIES AND STRATEGIES

28.2.1. Fisheries Policy

"To make the planning areas as the largest stake holder of Marine Export Zone in Kollam District and also to maintain the status of the sector as the 'largest single employment provider' in the planning area while conserving fisheries resources and enhancing quality of life of fishermen community."

Strategies

- Development of exclusive area at Shaktikulangara for fisheries related export activities with all sorts of infrastructure.
- Development of Kollam port and other Infrastructure such as fish landing centres at Thangassery and along the side of Ashtamudi 'Lake, seed production centres etc.
- Conservation of fisheries resources by pollution control environmental conservation through strict enforcement of marine fisheries laws and strategies by providing conducive environment for safe breading of fishes.

- To provide technical support by training and support services for value addition of fish so as to increase the income and thereby enhancing socio-economic conditions of coastal fishing communities.

28.2.2. Industries Policy

"To convert the planning area as a destination for small scale, cashew, traditional and other service industries and household nano industries utilizing the potentials of the District centre such as higher order market centres, large number of consumers, better connectivity to other markets centres, port etc." and also to promote knowledge economy.

Strategies

- To modernize traditional industries by implementing new technologies and diversification of products.Strategies
- To strengthen marketing by providing infrastructure and network and also to impart marketing through training.
- Develop mutually beneficial link between other sectors such as fisheries, tourism etc. while conserving the environment.
- By conducting short term courses through District Industries Centre to create skilled workers.
- To revive and diversify closed and defunctioning enterprises.
- To transform the institutions as source of knowledge economy and to provide facilities for generating knowledge economy.

28.2.3. Tourism Policy

"To promote a mix of eco-tourism and passive tourism, cultural and heritage tourism within the limit of carrying capacity ensuring environmental balance, participating and empowering local community for maintaining the tourism product and common infrastructure thereby enhancing the quality of life of the people and also to create higher order infrastructure with the help of private investors".

Strategies

- Developing eco-tourism activities along the side of Ashtamudi lake and other water bodies.
- Developing beach tourism at Thirumullavaram, Mundakkal, Thanni beach in addition to maintaining the existing beaches.

- Promoting cultural and heritage tourism by utilising all the available resources.
- Promotion of tourism activities and developing adequate infrastructure with private participation.
- Increase the length of stay of tourist by offering tourism packages.
- Adopting suitable marketing facilities to promote Kollam as a tourist destination.

28.2.4. Commercial sector Policy

"To develop Chinnakada and surroundings as the first order commercial centre and to have a well-defined hierarchy of commercial activities in the planning area so that balanced development is achieved."

Strategies

- To develop new higher order commercial centres at nodes having growth potential with adequate infrastructure.
- To develop the existing commercial centres by providing adequate facilities to the public.
- To maintain clean and pleasing environment in the commercial centres by ensuring proper waste management system and by improving the aesthetics of built form.
- To maintain commercial value of old settlements without changing the character of the area.

28.2.5. Agriculture and animal husbandry Policy

"To promote urban agriculture and animal husbandry activities to the extent possible for employment generation and to conserve paddy lands with a view to enhance the environmental quality and to hold surface runoff effectively to transform the city as a sponge city".

Strategies

- To maintain active paddy cultivation in the existing paddy fields by providing technical and financial assistance.
- To enforce legal tools for preventing paddy and wetland conversion.
- To develop mini dairy farms in the planning area.
- To promote homestead cultivation and urban agriculture activities.

28.2.6. Infrastructure Policy

"To provide adequate physical, social and economic infrastructure so as to develop the areas as the district level service centre."

Strategies

- To establish better traffic and transportation network by widening existing roads/ establishing new links and providing grade separated intersections, adequate parking, pedestrian crossing facilities, introducing efficient public transport system and by integrating all modes of transport.
- To provide adequate drinking water supply by improving the existing schemes and identifying new sources and implementing suitable treatment and distribution systems.
- To provide sanitation facilities for all and also to dispose sewage safely from environmentally fragile areas.
- To provide an effective waste management system for the entire planning area.
- To promote non - conventional energy sources especially energy from Bio-waste.
- To strengthen public health care institutions and to provide basic health care facilities by starting new PHC's and sub centres.
- To provide higher order district level recreation facilities by maintaining the existing parks and open spaces with proper access and creating suitable ambience for recreation while satisfying the recreation demand of neighbourhood and sectors.
- To provide other urban amenities such as public crematorium, convention centres, community hall, old age homes, crush etc.

28.2.7. Social Welfare Policy

"To enhance the quality of life of people who need special concern by providing basic infrastructure and sustainable lively hood opportunities, disaster mitigation management and by ensuring social security."

Strategies

- To provide adequate basic infrastructure facilities to socially and economically weaker sections of the society.
- To create additional employment opportunities for economically backward people.
- To strengthen police department so as to prevent harassment against women and child.
- To provide special assistant for disabled person.

- To generate massive awareness about the causes and remedies of child abuse.
- To strengthen the community itself to act as the medium for tackling antisocial activities such as suicides, dowry, female feticide and other crimes.
- To strengthen Anganwadies to act as the basic institution for maintaining physical and mental health of mother, child and adolescent girls.
- To prepare disaster management plan.

28.2.8. Environment and heritage Policy

"To sustain environmentally sensitive areas and heritage centres by establishing positive linkages between developmental activities, environmental and heritage sector and also through deliberate conservation mechanism with the participation of local community."

Strategies

- To adopt suitable activity pattern and land use for ensuring sustainability to the environmentally sensitive areas and heritage centres.
- Strict enforcement of environmental protection acts and CRZ norms.
- To create strong awareness among the local people about the importance of environmental conservation with the help of NGO's and senior citizens and to identify, implement and monitor those project and programmes for environmental conservation.
- To monitor the level of pollution through a continuous monitoring mechanism with the help of educational institution and suitable remedial measures are to be implemented so as to maintain the pollution within the permissible limit.

CHAPTER - 29
PROJECTIONS

The development plan is prepared to allocate the resources optimally so as to meet the requirement of the future population in a sustainable manner and also to enhance the quality of life of people.Projection is important since it helps to make decisions about the future.In this chapter, the population and occupation structure is projected based on the development concept evolved for the planning area.

29.1 POPULATION PROJECTION

Population projections can be used as a tool to provide information on possible scenarios of future population and, namely, to support decision-making processes in diverse socio-economic areas such as, higher education institutional network planning, both in public and private sectors. Population projection is used to gauge future demand for food, water, energy, and services, and to forecast future demographic characteristics. Users of population projection need to understand the reliability and the limitations of projection series. Population projection is done by using the following four methods calculated in Table 29.1, Table 29.2, Table 29.3 and Table 29.4 and average is taken as the projected population for the horizon years.

1.Arithmetic method

Year	Population	Increase in population
1971	290074	
1981	348452	58378
1991	381872	33420
2001	399701	17829
2011	387942	-11759
	Total	97868
	Average	24467

Table 29.1 Population projection of KLMC using arithmetic method

$$P_n = P_o + n\ X_{avg}$$

P2021=387942+24467=412409

P2031=412409+24467=4368760

P2041=436876+24467=461343

2.Geometric Increase Method

P2021=387942 x 1.08 =418977

P2031=418977x 1.08=452496

Year	Population	Increase in population	r (Growth rate)
1971	290074		
1981	348452	58378	1.2
1991	381872	33420	1.1
2001	399701	17829	1.05
2011	387942	-11759	0.97
	Average	24467	1.08

Table 29.2 Population projection of KLMCusing geometric increase method

P2041=452496x 1.08=488695

3. Incremental increase method

P2021=387942+(24467+-23379x1) =389030

P2031=387942 +(24467+ -23379x2) =365651

Year	Population	Increase in population	Incremental increase
1971	290074		
1981	348452	58378	
1991	381872	33420	-24958
2001	399701	17829	-15591
2011	387942	-11759	-29588
	Average	24467	-23379

Table 29.3 Population projection of KLMC using incremental increase method

P2041=387942+(24467+ -23379x3) =342272

4. Decreasing Rate Method

By assuming the change in the ratio during 2001-2011 will be same the value as that during 2011-2021,2021-2031,2031-2041 growth rate is calculated and then the projected population for succeeding decades are calculated.

$P_n=P_o$ + (Average increase+Incremental increasex no.of decade)

Year	Population	Growth rate	Increase in %
1971	290074		
1981	348452	20	
1991	381872	9.5	-10.51
2001	399701	4.6	-4.93
2011	387942	-2.94	-7.6
Average		7.852	-7.68
Year		**Net Increase in Population**	
2021		7.852-(-7.68)= 15.53	
2031		15.53-(-7.68)= 23.21	
2041		23.21-(-7.68)= 30.89	

Table 29.4 Population projection of KLMC using decreasing rate method

P2021=387942+(387942x 15.53/100) =448189

P2031=395235+(395235 x 23.21/100) =552214

P2041=390492+(390492 x 30.89/100) =722793

29.1.1Projected Population for the years 2021, 2031, 2041

Based on the assumption that the growth rate given in Table 29.4 will continue upto 2041, the population is projected for KLMC area. Average of the projected population of different methods is taken as the perspective population for the census year's upto 2041 is shown in Table 29.5.

As per the projection, by 2041 the total expected population of KLMC area is 5,03,775 showing an overall growth of 29.85% from 2011 population. Projected population of KLMC for coming decades is shown in figure.29.1 and growth rate of projected population is shown in figure 29.2.

From the figures we can see that the population is decreasing in 2011. But in projection it shows an increasing trend. Growth rate is also decreasing in 2011, then increasing in 2021, 2031 and in 2041.

29.2 PROJECTION OF WPR

As per the 2011 census WPR of KLMC is 34.67. The average WPR targeted for the district by 2021 as per

Sl.No	Method	Population in 2021	Population in 2031	Population in 2041
1	**Arithmetic Method**	412409	436876	461343
2	**GEOMETRIC INCREASE METHOD**	418977	452496	488695
3	**INCREMENTAL INCREASE METHOD**	389030	365651	342272
4	**Decreasing Rate Method**	448189	552214	722793
	Average Population	**417151**	**451809**	**503775**

Table 29.5 Perspective population for census years in KLMC area

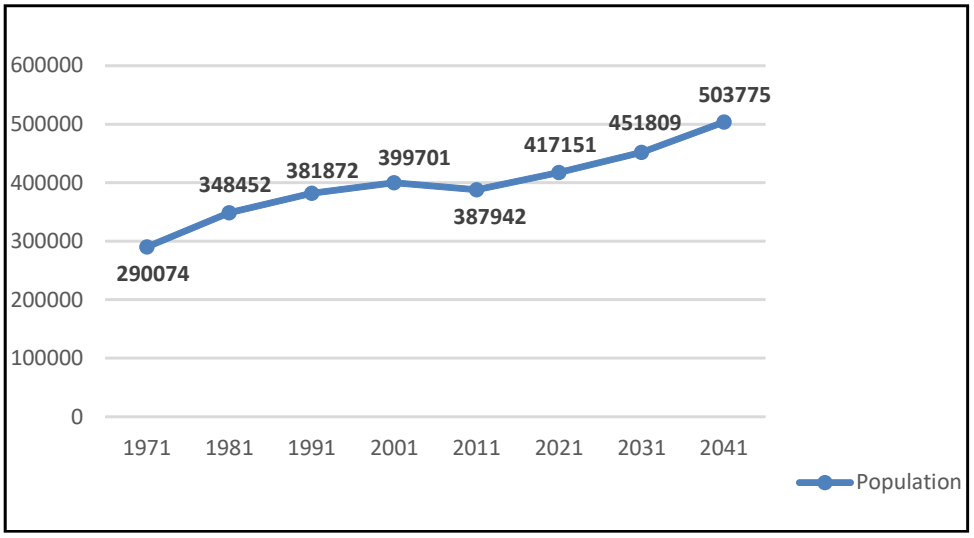


Figure 29.1 Projected Population of KLMC for the census years till 2041

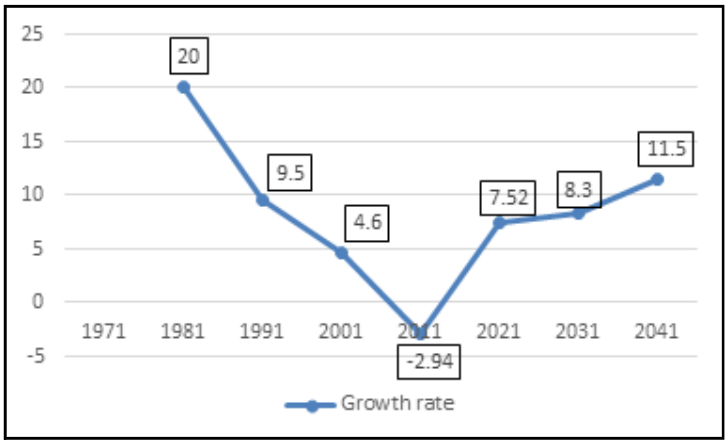


Figure 29.2 Projected growth rate for KLMC till 2041

29.2.1 Projection of Workers

Number of workers in 2021=35**x**417151/100 =146003

Number of workers in 2031=36 x451809/100 =162651

Number of workers in 2041=37x503775/100=186396

IDDP is 36%. As KLMC area is proposed as a vibrant area with increased job opportunities and aim for the involvement of local community in the conservation of environmental fragile areas, number of other workers is expected to be increased. Hence, we can conclude that the WPR of KLMC is expected to increase to 37% in 2041.The anticipated changes in the occupational structure is shown in Fig 29.3.

Decadal variation of total number of workers is shown in Figure.29.4.

The share of main workers to total workers in KMC area as per 2011 census is 85.17% and for the year 2001 was 85.9%. By creating more employment opportunities it is expected that the share of marginal workers can be reduced atleast to that prevailed in 2001. Hence the total number of main workers in KLMC area

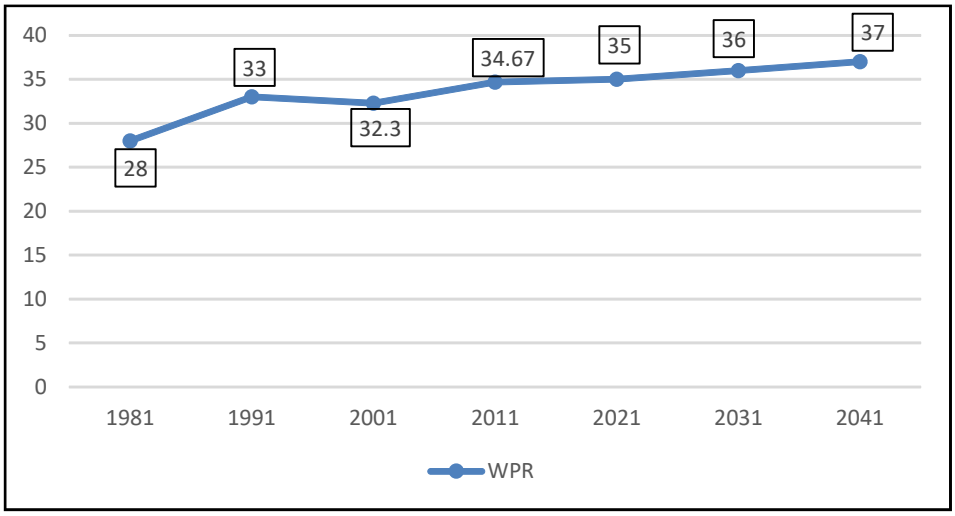


Figure 29.3 Projection of WPR in KLMC area

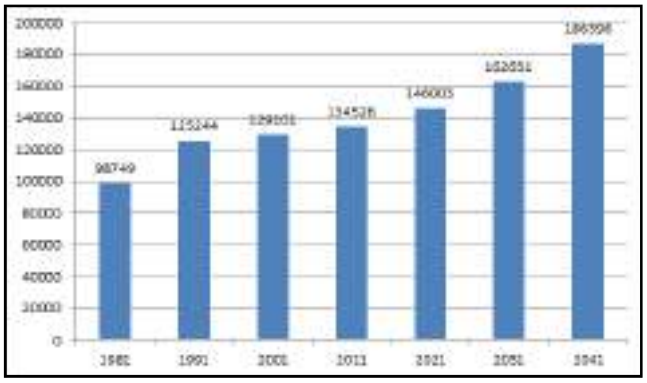


Figure: 29.4 Projected workers in KLMC area

by 2041 as per projection is 186396 as shown in figure 29.4.

29.2.2 Expected Change in Occupation Structure

As per the occupation structure of KLMC area for 2011, 95.93% of workers are in other workers category. According to the development concept intensive residential activity is proposed in major portion of KLMC. Hence the area available for agriculture activity will get reduced. It is expected that the number of cultivators and agricultural laboures will remain the same and the number of House Hold industry workers is expected to increase in the planning area by 50%. Change in the occupational structure is shown in Table 29.6.

From this projected figure of workers we can expect the generation of about 51870 additional job opportunities in coming decades within the planning area out of which 50387 jobs are to be generated from sectors other than agriculture and household industry. As per the development concept major contributors in this regard are industrial, fisheries, trade and commerce, tourism sectors and knowledge economy.

	2011		2041	
	No	%	No	%
Cultivators	513	0.38	513	0.27
Agriculture labours	1999	1.49	1999	1.07
Household industrial workers	2966	2.20	4449	2.39
Others	129048	95.93	179435	96.26
Total	**134526**	**100**	**186396**	**100**

Table 29.6 Change in occupational structure

CHAPTER - 30
PROPOSED LANDUSE PLAN

In the previous chapter, the population and occupation structure are projected for the horizon period. In order to accommodate the projected population and to generate employment as projected, the requirement of land for various uses is to be determined and located spatially as per the development concept. In this chapter the proposed landuse pattern for the horizon period is arrived at and presented.

30.1.PROPOSED LANDUSE PATTERN

The land uses proposed in line with the development concept are as follows.

1. High Density Residential Zone
2. Commercial Zone
3. Industrial Zone
4. Industrial Estate Zone
5. Mixed Commercial and Educational Zone
6. Mixed Commercial and Industrial Zone
7. Mixed Commercial and Recreational Zone
8. Mixed Residential and Agriculture Zone
9. Mixed Residential and Commercial Zone
10. Mixed Residential and Commercial and Institutional Zone
11. Mixed Residential and Household Industry Zone
12. Mixed Residential and Educational Zone
13. Public & Semi Public- Others Zone
14. Public & Semi Public -Government Owned Zone
15. Recreational- Built Up Zone
16. Recreational- Openspace Zone
17. Transportation Zone
18. Conservation Zone
19. Water Bodies
20. Buffer Water Body Zone
21. Eco Sensitive Areas
22. Heritage Zone - I
23. Heritage Zone - II
24. Waste Management Zone
25. Religious Zone

30.1.1. High Density Residential Zone

High intensive residential activity such as flats/ apartments including housing for migrated people and for floating populations are to be promoted in this zone. The area between CBD and outer periphery

and areas along the bank of Ashtamudi lake are designated as high density residential zone.

30.1.2. Commercial Zone

As per URDPFI guidelines, for large cities the commercial land requirement varies from 0.2 to 0.6 ha/ 1000 persons. Since the planning area has to hold a population above 3 lakh, the land required for commercial activities may be taken as 0.30 ha/ 1000 population. Hence for a population of 387942, total commercial land requirement is worked out as 116.38 ha, say 117 ha. Also for a district centre the commercial area required is at the rate of 880 sq.m/1000 population as per URDPFI guidelines. Since the planning area has to be developed as a district centre, it has to serve the entire population of the District which comes to about 30 lakh by the end of 2041. Taking into account this population, the commercial area required may be worked out as 880/1000 x 30,00,000/ 1000 = 264 ha.

To meet the future demand additional commercial areas are proposed at Andamukkam area. Also demand of commercial area can be met units by providing mixed use zones where higher order commercial activities are also permitted.

30.1.3 Industrial Zone

Industrial sector is found as one of the key sectors as far as the socio-economic development of the planning area is concerned. Based on the development concept, the land reserved for major industries and minor industries in the revised development plan is reduced and re-zoned as industrial and small industrial zones in this development plan.

30.1.4 Industrial Estate Zone

In this zone the land is reserved especially for large scale industrial activities. The area designated for industrial estate includes the existing industrial estates/ areas.

30.1.5. Mixed Commercial and Educational Zone

The existing commercial and residential areas together with Educational areas that have high potential for educational activities provide the required land for mixed commercial educational activities the zone is earn mrked mainly around Karicode junction where large numbers of education institution along with residential and commercial activities are concentrated.

30.1.6. Mixed Commercial and Industrial Zone

The existing commercial areas together with mixed residential use

areas that have high potential for industries are designated as mixed commercial industrial zone. The industrial areas are at Sakthikulangara and Kallumthazham.

30.1.7.Mixed Commercial and Recreational Zone

The existing commercial areas together with mixed residential use areas that have high potential of recreational activities by using the scope of tourism potential of Ashtamudi lake are suggested as mixed commercial and recreational zone. Thrikkadavoor area is mainly included in this zone.

30.1.8. Mixed Residential and Agriculture Zone

The existing residential areas together with mixed dry agricultural use areas are demarcated as mixed residential and agricultural zone. This will also reduce the chance of destruction of Ashtamudi lake due to other non- urban land uses as it is proposed along the banks of Ashtamudi lake

30.1.9. Mixed Residential and Commercial Zone

The existing residential areas together with mixed commercial use areas are suggested as mixed residential and commercial zone. Mainly areas around Ayathil and Pallimukku junctions are proposed as residential and commercial zones.

30.1.10. Mixed Residential and Commercial and Institutional Zone

The existing residential areas together with mixed commercial use areas which also have institutional potentials are proposed as mixed residential and commercial and institutional zone. The core area of the city is included in this zone.

30.1.11. Mixed Residential and Household Industry Zone

The existing residential areas that have the potential for household industrial activities are designated as mixed residential and household industrial zones. Coastal areas are proposed as a mixed residential household industrial zone because it has the potential to develop more household industries related to fisheries sector. Thirkadavoor area is another main area that comes under this zone as it will promote the traditional industries like coir, handloom etc. In view of tourism development in this area.

30.1.12. Mixed Residential and Educational Zone

This zone is suggested for providing support facilities to the

proposed Thiruvananthapuram-Kollam knowledge corridor and act as an extension of the corridor utilizing the higher order recreation/tourism/ educational/commercial facilities in KLMC there by promoting knowledge economy with in the planning area. The existing residential areas together with proposed industrial area near Eravipuram Junction is designated as mixed residential and educational zone.

30.1.13. Public & Semi Public - Others Zone

In the proposed landuse plan no additional land for public and semi public use is earmarked. Specific requirements of land for any public/ semi public use will be met at the time of project implementation by locating within other permissible zones. Priority is to be given for accommodating additional facilities like new buildings for hospitals, schools, community halls etc. in the existing public and semi public zones by utilizing the land optimally.

30.1.14. Public & Semi Public - Government Owned Zone

In this category the government owned buildings for public utilities are included.

30.1.15. Recreational - Built up Zone

The recreational building (built up) categories come under this zone.

30.1.16. Recreational - Openspace Zone

This zone includes area used for tourism activities like beaches, parks and open spaces. Generally the areas of recreational activities which are not in built up category come under this zone.

30.1.17. Transportation Zone

Area used for roads, railway lines, bus stands, parking bays, harbour etc form part of landuse under the transportation zone. The total extent of land under the transportation zone is estimated as 417 ha. Hence the share of transport landuse in the proposed landuse plan is 5.91 % of gross area.

30.1.18. Conservation Zone

This zone includes acive paddy areas and other low lying areas which can act as water holding and recharging areas required for transforming the city as a Sponge City.

30.1.19. Water bodies

Water bodies include Ashtamudi Lake, Vattakayal, canals and other natural streams and ponds. All the existing water bodies are to be conserved.

30.1.20. Buffer Water Body Zone

Area provided as a buffer to Vattakayal and Kattakayal for a depth of 25m is included in this zone.

30.1.21. Eco-Sensitive Areas

Environmentally sensitive areas includes mangrove areas, sacred grooves Asramam BHSA

30.1.22. Heritage Zone -I

Structures having heritage value and contigeous area within heritage value from Collectorate and freedom park at vadi is included in this zone.

30.1.23. Heritage Zone -II

Structures having heritage and contigeous area encompassing dutch fort, light house, Backing ham Canal etc at Thankasseri are included in this zone

30.1.24. Waste Management Zone

The existing area designated from waste management at Kureepuzha is designated as Waste Management Zone.

30.1.25. Religious Zone

The cultural affluence is represented by religious zones. The religious property worth more than 75 cents comes under the religious zone.

30.2.PROPOSED LANDUSE MAP

The area break up of each of the above landuse zones are given in figure 30.1 and table 30.1 respectively. While comparing the existing landuse and proposed and landuse it is found that more land is reserved for urban activities such as commercial, transportation and mixed use without compromising the residential demand so that the planning area can be developed as a District Level Service Centre. Thus through an optimum allocation of available land for various developmental activities, it is expected that the planning area will develop in an orderly manner and will boost the future development of the district. The proposed landuse map is shown in figure 30.2

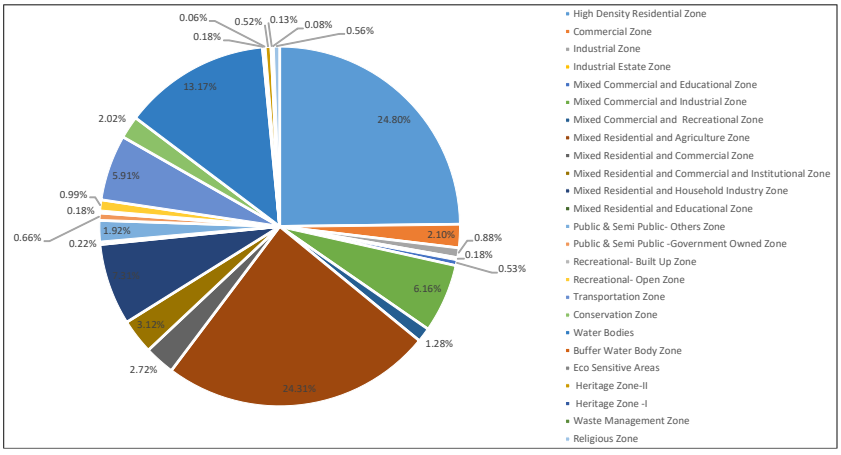


Figure 30.1 Proposed landuse break up

Sl. No	Land Use	Area (sqkm)	Percentage (%)
1	High Density Residential Zone	17.79	24.80
2	Commercial Zone	1.51	2.10
3	Industrial Zone	0.63	0.88
4	Industrial Estate Zone	0.13	0.18
5	Mixed Commercial and Educational Zone	0.38	0.53
6	Mixed Commercial and Industrial Zone	4.42	6.16
7	Mixed Commercial and Recreational Zone	0.92	1.28
8	Mixed Residential and Agriculture Zone	17.44	24.31
9	Mixed Residential and Commercial Zone	1.95	2.72
10	Mixed Residential and Commercial and Institutional Zone	2.24	3.12
11	Mixed Residential and Household Industry Zone	5.24	7.31
12	Mixed Residential and Educational Zone	0.16	0.22
13	Public & Semi Public- Others Zone	1.38	1.92
14	Public & Semi Public -Government Owned Zone	0.47	0.66
15	Recreational- Built Up Zone	0.13	0.18
16	Recreational- Openspace Zone	0.71	0.99
17	Transportation Zone	4.24	5.91
18	Conservation Zone	1.45	2.02
19	Water Bodies	9.45	13.17
20	Buffer Water Body Zone	0.13	0.18
21	Eco Sensitive Areas	0.04	0.06
22	Heritage Zone-II	0.37	0.52
23	Heritage Zone -I	0.09	0.13
24	Waste Management Zone	0.06	0.08
25	Religious Zone	0.4	0.56
	Total	71.73	100

Table 30.1 Proposed landuse break up

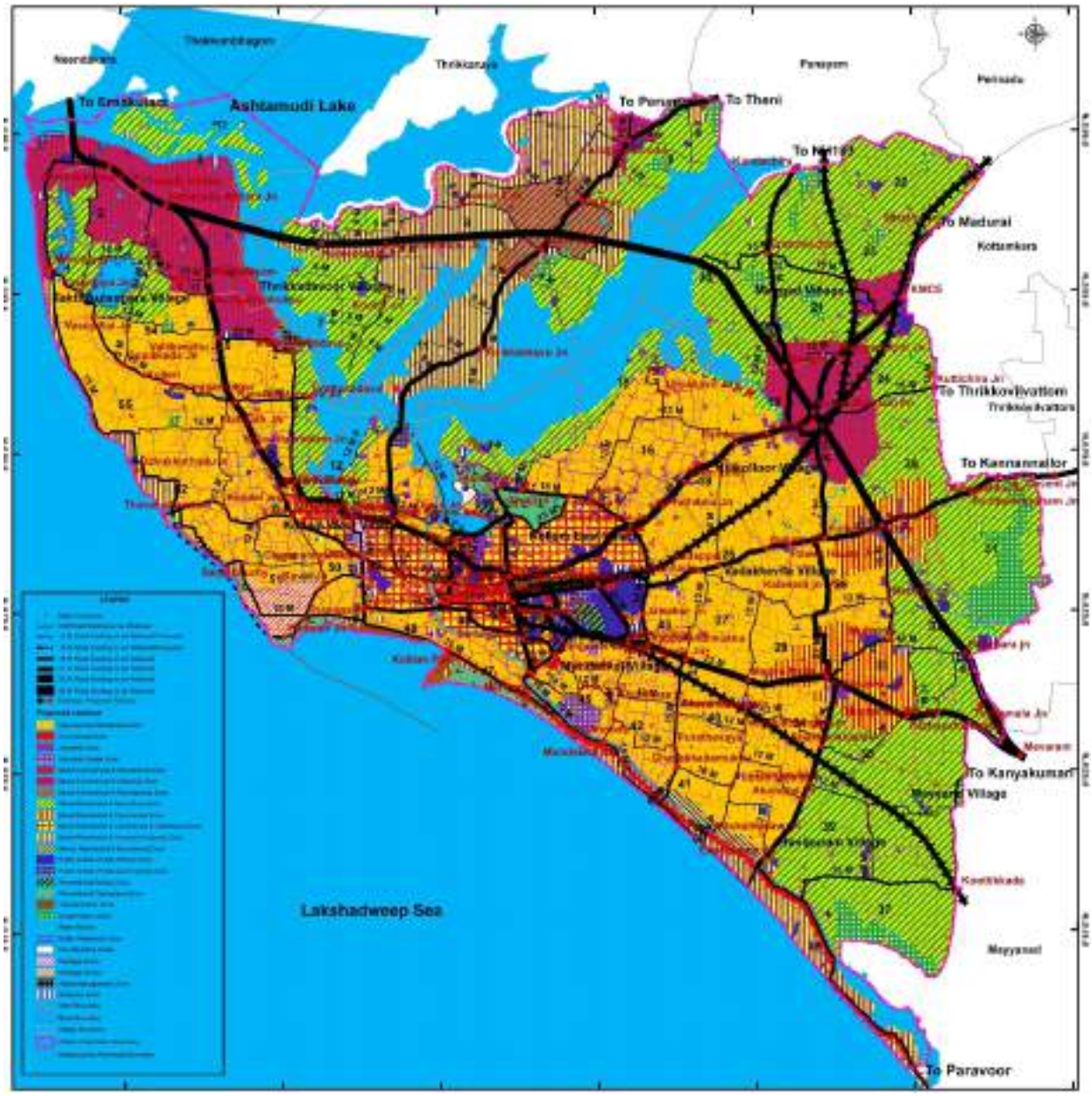


Figure 30.2 Proposed landuse map of planning area

CHAPTER - 31
TRAFFIC AND TRANSPORTATION PLAN

Transportation sector plays a vital role in developing the area as visualised. In this chapter the traffic and transportation plan for developing a good network with roads of increased capacity, pedestrian and parking facilities, railways and waterways in line with the development concept is presented. Moreover, concepts such as Bus Rapid Transit System (BRTS)and Non Motorised Transport (NMT) are included to increase the efficiency of public transport system and for reducing carbon emission.

31.1ROAD NETWORK

31.1.1Proposal for Road widening/ constructing new roads

A. Outer ring road

NH-Bypass between Mevaram and Kallumthazham

The proposed Right of Way (RoW)for this stretch of road is 45 m, consisting of 4 lane traffic with service lanes. At present two lanes are constructed and the land is acquired for full width of road. The suggestion is to develop the road fully by 2031.

NH-Bypass between Kallumthazham and Kavanad Altharamoodu.

The Right of way of this stretch is 45m. The proposal is to convert this 2 lane into 4 lane and also providing service roads at inter sections by 2031.

Road from Kavanad Altharamoodu to Sakthikulangara Jn

This part of the outer ring road forms part of the radial road (NH 66 from Kollam to Alappuzha). The RoW proposed is 25 m.

Road from Sakthikulangara Jn - Eravipuram via Thangassery, Kollam port

This road stretch forms part of the coastal road proposed in IDDP. This area is occupied mostly by fishermen. The entire length of the coastal area could be connected to the town by the coastal road. The transportation of sea food and raw products will become quicker and easier once this road is completely developed. The proposed width of the coastal road was 15m in the sanctioned Master Plan. Now the state government is implementing the proposal of coastal highway for which

initial activities of preparation of detailed alignment, publication of 6 (1) notification for land acquisition has already started. The RoW varies depending upon site condition as per the proposal. However, the average RoW proposed is 14m. Hence the proposed width of 15m in the sanctioned Master Plan is decided to retain in this Master Plan also. The alignment will be that of the state highway.

Road from Eravipuram –Pallimukku

This stretch of outer ring road is also forms part of the road connecting the Knowledge Economy zone visualised in the development concept and the proposed Thiruvananthapuram - Kollam Knowledge corridor. The right of way proposed is 21 M.

Road from Pallimukku - Mevaram

This stretch of road is part of radial road (NH 66 from Kollam to Thiruvananthapuram). The proposed RoW is 25 m.

B. Inner ring road

1. Road from Kappalandimukku - Taluk Office junction via Asramam

The RoW proposed for this stretch is 21 M. Majority for this stretch is already constructed. But the portion from Kappalandimukku to Kadapakada junction needs to be widened. The widening proposal for this stretch was 20 M in the Sanctioned Master plan. However, considering the importance and for ensuring continuity of Ashramam link road, it is proposed to increase the RoW to 21 M.

2. Road from Taluk Office junction - Mulamkadakam via Civil station

This stretch forms part of the radial road from Kollam to Alappuzha. The proposed RoW for this stretch is 25 M.

3. Road from Mulankadakam to DSP Office via Thekkecutchery, Vady, Soochikkaranmukku,Pandakasala, Tamarakkulam, PWD Office jn and Congress Bhavan

The RoW proposed for this road is 18 m.

4. DSP Office (Fly over Jn) - Kappalandimukku

This stretch forms part of the radial road from Kollam to Thiruvananthapuram. The proposed RoW is 25 M.

The proposed road width of these ring roads are tabulated in table 31.1

Sl No.	Name Of Road	Proposed Road Width
A	**Outer Ring Road**	
1	NH-Bypass between Mevaram and Kallumthazham	45m
2	NH-Bypass between Kallumthazham and KavanadAlthara Jn.	45m
3	Road from KavanadAlthara Jn. to SakthikulangaraJn	25m
4	Road from SakthikulangaraJn- Eravipuram via Thangassery, Kollam Port	15m
5	Eravipuram – Pallimukku	21m
6	Road from Pallimukku - Mevaram	25m
B	**Inner Ring Road**	
1	Road from Kappalandimukku - Taluk Office junction via Ashramam	21m
2	Road from Taluk Office junction - Mulamkadakam via Civil station	25m
3	Road from Mulankadakom to DSP Office Thekkecutchery,Vady,Soochikkaranmukku, Pandakasala, Tamarakkulam, PWD Office jn and Congress Bhavan	18m
4	DSP Office (Fly over Jn) - Kappalandimukku	25m

Table 31.1 Proposed ring roads

C. Radial Roads

1.NH66- Kollam (Chinnakkada) - Thiruvananthapuram

The existing Kollam-Thiruvananthapuram road, being the major road connecting the town and the State Capital, the widening proposal for this road is retained as 25m and is extended up to the Railway Station.

2. NH 66- Kollam (Chinnakada) - Alappuzha

The proposal is to widen the road to 25 M.

3. NH 744 - Kollam (Chinnakkada) - Schenkottah road

This road is an inter-state road via Punalur Town connecting the Tamil Nadu State at commercial and tourist centres like Tirunelveli and Shencotta. This road is proposed to be widened to 25m.

4. High School junction - Kundara (Kollam Theni Highway)

As per the sanctioned plan the proposal was for 20 M road widening. However, considering the importance of this road as an arterial road, the suggested right of way is 21 M.

5. Kollam Railway Station - Kannanalloor

The existing Kollam-Kannanalloor road considering the importance of this road which further joins the Q.S. road at Kundara, this road is proposed to be widened to 21 M.

All these radial roads are interconnected with the inner ring roads. The traffic collected and carried by these roads is distributed first on the outer ring road and finally over the inner ring road. Thus the radial and ring roads together distribute the entire traffic of the town evenly. The proposed road width of these roads are tabulated in table 31.2.

D. Link Roads

1. Taluk Office junction to Inner ring road near Sudhi theatre via district hospital

This link is proposed to reduce the pressure on inner ring road and also to provide easy movement in the City Centre. The right of way proposed is 21 M.

2. SBI Junction - Andamukkam via Kumar theatre

This road is proposed as an important link between NH 66, proposed bus stand, proposed multi-level parking facility and commercial centre at Andamukkom. The proposed right of way is 21 M.

3. Clock Tower Junction -Outer ring road via Kochupilamoodu

The right of way proposed in the sanctioned plan is proposed to increase from 20 M to 21 M considering the importance of this road for the development of tourism sector.

4.Congress Bhavan to Kochupilamoodu

Right of way proposed for this road is 18 M.

5. Chinnakkada Round to Asramam area

Ashramam area is considered as the district level parks and open spaces. The road from Asramam to MG Park via Chinnakada forms an important link between two important

Sl No.	Name Of Road	Proposed Road Width
1	NH66- Kollam (Chinnakkada) - Thiruvananthapuram	25m
2	NH 66- Kollam (Chinnakada) - Alappuzha	25m
3	NH 744 - Kollam (Chinnakkada) - Kottarakkara road	25m
4	High School junction - Kundara road	21m
5	Kollam railway station - Kannanalloor road	21m

Table 31.2 Proposed radial roads

higher order recreation centres. Hence to provide a 4 lane road in between this stretch of road is also proposed to be widened to 21 M.

6.Extension of Ashramam link road from KSRTC bus stand to Thoppil Kadavu

Construction of a road from KSRTC bus stand to Thoppil kadav is partially implemented up to Olayil Kadavu. It is understood that the proposal is to link between KSRTC bus stand to Olayikadavu then further to Thoppilkadavu. Except for a small stretch near KSRTC bus stand, the road is proposed as flyover to traverse over Ashtamudi Lake. The 2.75 km long, 12m wide road is proposed to ease the traffic along the 1.6 km stretch of existing road connecting Thoppil Kadavu Junction to KSRTC bus stand. The special committee after gathering wide range of opinion about the present proposal has decided to propose the alignment on land from Kollam Milma diary to Thoppilkadavu, as the present proposal is destroying the heavenly beauty of the Lake and there is every chance of further encroachment of Ashtamudi lake due to the silting of clay in between the pillars of flyover and the banks, while retaining the alignment up to Milma diary same as that of current proposal. The RoW is 12m.

7. Pallimukku – Thannikkamukk via Puliyathumukk, Koickal and Mangad

This road is proposed to provide a link between the radial roads NH66-Kollam (Chinnakkada) - Thiruvananthapuram and Kollam railway station - Kannanalloor road. This road also forms part of the road connecting the Knowledge Economy zone visualised in the development concept and the proposed Thiruvananthapuram - Kollam Knowledge corridor. The right of way proposed is 21 M.

8. Mangad-Shivaji Jn

(Asramam – Mangad Link Road)

This link road retained in the revised Development Plan from Mangadu near NH-66 bypass to Shivaji junction at Ashramam which includes existing road stretch to be widened and new stretch to be developed is proposed to retain in this Master Plan also considering the importance of this link. It can provide an effective link between outer and inner ring roads and also supports the tourism development based on Ashtamudi Kayal. The right of way proposed is 12 M.

9. Kallumthazham to Thaha junction via Kuttichira junction

This road is proposed to provide transportation facilities to the people in the southern part of Kottamkara Grama Panchayat. This road provides a link between two radial roads, viz NH 744 and Railway station - Kannanalloor roads. The proposed right of way is 15 M.

10. TKMCE - Mangalathu via Kuttichira

The proposal for widening the existing road from TKMCE junction to Mangalathu junction to 12 M in the sanctioned Development Plan is retained for ensuring effective link between radial roads via NH 744 and Kollam railway station - Kannanalloor road.

11. Kadavoor - Anchalumoodu junction via Neeravil junction

This road is proposed to provide a parallel link between Kadavoor and Anchalumoodu junction to the radial road (HS junction - Kundara) and also to facilitate tourism development. The proposed RoW of the road is 12 M.

12. Anchalumoodu - Perumon

Considering the importance of the higher order educational institution

Sl No.	Name of Roads	Proposed Road Width
1	Taluk Office junction to Inner ring road near Sudhi theatre via district hospital	21m
2	SBI Junction - Andamukkam via Kumar theatre	21m
3	Clock tower junction -Outer ring road via Kochupilamoodu	21m
4	Congress Bhavan to Kochupilamoodu	18m
5	Chinnakkada Round to Asramam area	21m
6	Extension of Ashramam link road from KSRTC bus stand to ThoppilKadavu (Phase-3 extension up to OlayilKadavu)	12m
7	**Pallimukku – Thannikkamukk via Puliyathumukk, Koickal and Mangad**	21m
8	Mangad-Shivaji Jn (Asramam- Mangad link road)	12m
9	Kallumthazham to Thaha junction via Kuttichira junction	15m
10	TKMCE - Mangalathu via Kuttichira	12m
11	Kadavoor - Anchalumoodu junction via Neeravil junction	12m
12	Anchalumoodu - Perumon	15m
13	Vaddy junction - Kollam port	18m
14	Road between NH-744 near TKMCE Jn to NH-66 bypass via Erappanchal	15m
15	**Thekkecutchery-Civil Station**	15m

Table 31.3 Major proposed link roads

i.e. engineering college at Perumon, the existing road from Anchalumoodu - Perumon is proposed to be widened to 15 M.

13. Vaddy junction - Kollam port

The proposal forms part of the King's way of Venad heritage zone. The proposed right of way is 18 M.

14. Road between NH-744 near TKMCE Jn to NH-66 bypass via Erappanchal

The proposed right of way is 15 M.

15. Thekkecutchery-Civil Station.

The proposal forms part of the King's way of Venad heritage zone. The proposed right of way is 15 M. As per the sanctioned Master Plan the proposal was 18 m. If the same width is retained in this stretch some of the heritage buildings in the proposed Venad Heritage Zone will be affected. Other important link roads with proposed right of way are shown in table 31.4.

In addition to the above roads , local roads of right of way 8 M are also proposed in Thrikkadavoor Area.

Detailed schemes for finalising the alignment of new roads area to be prepared immediately to facilitate effective control on further development by the respective authorities

31.1.2 Proposals for Junction Improvements

1.Multi way Grade Separated intersection for Chinnakada Junction.

The maximum volume that can be effectively handled by a roundabout is 3000 vehicles/hr. In the case of Chinnakada the peak hour traffic volume is about 9521 PCU/hr which is about triple the handling capacity. Hence it is high time to introduce grade separated intersections at Chinnakada junction where at present a roundabout with traffic signalling is provided. The proposal is to construct a multi way grade separated intersection at Chinnakada round.

2. Underpass at Taluk Office junction

The Traffic volume at Taluk office junction has increased beyond its handling capacity which is very much evident from the traffic congestion experienced during peak hours. Hence an underpass is proposed at this junction to merge the traffic from Ashramam link road to the inner ring road.

3.Underpass at Railway crossing in YMCA road

Maximum traffic delay is seen in this railway crossing. Once the proposal for a new bus stand is

Sl. No.	Name of Road	Proposed Right of Way
1	Ayathil – Pallimukku Via Mulluvila	15 M
2	Polayathodu- Kachikadavu – Coastal road	
3	Altharamoodu – Thankasseri	
4	Mundalumoodu- Thirumullavaram	
5	Ramankulangara – Maruthady	
6	Vallikkeezhu – Mammoottil Kadavu	
7	Ramankulangara – Erattukadavu	
8	Mammoottil Kadavu – Nellimukku	
9	Chinnakkada- Thekkekacheri (Vadayattukotta road) (Except for Chinnakkada- Hospital road for which proposed width is 12 m)	
10	Andamukkam – Maharani Market (Payikkada Road)	
11	High School Junction – Kotamukku	
12	Thattamala - Coastal Road via Koottikkada	
13	Ammannada - Medayilmukku Via Kalavedi Junction	12 M
14	Madannad – Kalavedi Junction	
15	Palathara – Thattamala H.S Junction	
16	Mulluvila – Pazhayattinkuzhy	
17	Anchukallummoodu - Kaval Junction	
18	Ottakkal Moodu – Sarpakuzhy	
19	Vishnathukavu - Cheemaramukku	
20	Ramankulagnara – Konnelmukku	
21	Elangathu Junction – Ozhukkuthodu	
22	Gopikkada – Cheppallimukku	
23	Vallikeezhu – Vasupillai Junction	
24	Maniyathu Junction - Sooranthodu	
25	Karangiya Junction - Mariyalayam	
26	S.N. College – Mundakkal	
27	Congress Bhavan – Mundakkal	
28	Kochuplamoodu – Thumbara	
29	Thumbara – Amruthakulam	
30	Pulimoodu – Puthennada Via Chayakkadamukku	
31	Amruthakulam- Vayalilkulangara	
32	Madannada- Attukal Kadavu- Coastal road	
33	Bharanikavu – Pazhayattinkuzhy via Chakarikada	
34	Vayalikulangara – Alumoodu	
35	Puthannada – Eravipuram Vadakkumbhagam	
36	Nair's Hospital – Uliyakovil	
37	Randamkutty – Uliyakovil	
38	Randamkutty – Kadappal	
39	Ammannada – Polayathodu	
40	KSRTC Stand – Anandavalleswaram via Olayil Jn.	
41	Uliyakovil Temple- Link Road from Mangad to Shivaji Jn.	
42	Moonamkutty- Mangad road	
43	Koottil Jn.- Neeravil via Kochalummoodu Jn.	
44	Kadavoor – CKP	
45	CKP – Neeravil – Anchalumoodu road	
46	Mulluvila – Palathara Jn.	
47	Thirumukku – Koottikkada	
48	Thattamala – Thirumukku	
49	Palathara - Thattamala	

Table 31.4 Other proposed link roads

implemented near Chinnakada railway over bridge, the delay will be more and it will cause traffic congestion in beach road. Hence an underpass is proposed at the railway crossing from YMCA road to Payikkada road.

proposed right of way 15 M or more over bridges are suggested. The suggested locations are shown in figure 31.2.

The general details of the flyover are given below:

- Length of the flyover = 380m
- Number of piers = 32
- Maximum height of the flyover = 4m
- Span between piers = 10m
- Horizontal length of approach road = 30m
- Grade percent for the ramp = 1.052\%
- The up-ramp is proposed to be located 30m before the present Ayathil bus stop at Kallumthazham road.
- The down-ramp is proposed to be located at the end of Ayathil bus stop at Mevaram road.

Source : Junction improvement to solve traffic congestion at the five legged intersection of ayathil junction, IJESRT 2019

1.Grade separated intersections at SN College ROB Jn, Kadappakkada, Kallumthazham, Pallimukku, Kadavoor, Mevaram and Ayathil junctions

All these junctions are proposed as higher order commercial nodes in the planning area. Hence grade separated intersections are proposed with slip roads to provide connection between the intersecting traffic so as to avail the services from these higher order nodes. A schematic diagram for Ayathil junction is shown in figure 31.1

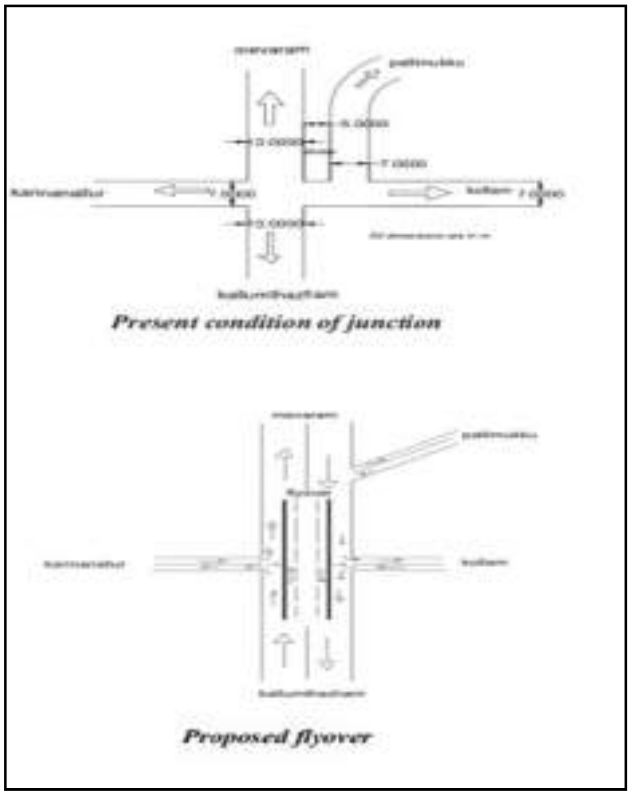


Figure 31.1 Proposed schematic diagram for the junction improvement of Ayathil junction at NH66 bypass

5. Over bridges (6 no's) at railway crossings on major link roads of width 15 M or more

To avoid traffic delay due to railway crossings in major link roads of



Figure 31.2 Proposed ROB's in KLMC area

31.1.3 Proposal for New Mobility Hubs and Mini Satellite Bus Stations

A new mobility hub is proposed near Chinnakada railway station. Due to non availability of contiguous land of sufficient area, mobility hub is proposed at two locations with walkable distance from railway station. One portion near over bridge and the other near FCI godown both locations are separated about 200 M and both are located equidistance from the railway station as shown in Figure 31.3. This mobility hub may be developed as a modern bus stand with multi-level parking bays depending on the demand.

Another Mobility Hub is proposed to develop by extending the existing KSRTC bus stand area and utilizing the area adjacent to Punarjani Park though not contiguous as shown in Figure 31.4.

Facilities recommended are

- Well demarcated bus bays and boarding alighting platforms
- Passenger information kiosks, Wi-Fi facilities
- Cloak room, toilets, rest areas etc.
- Demarcated parking for IPT services

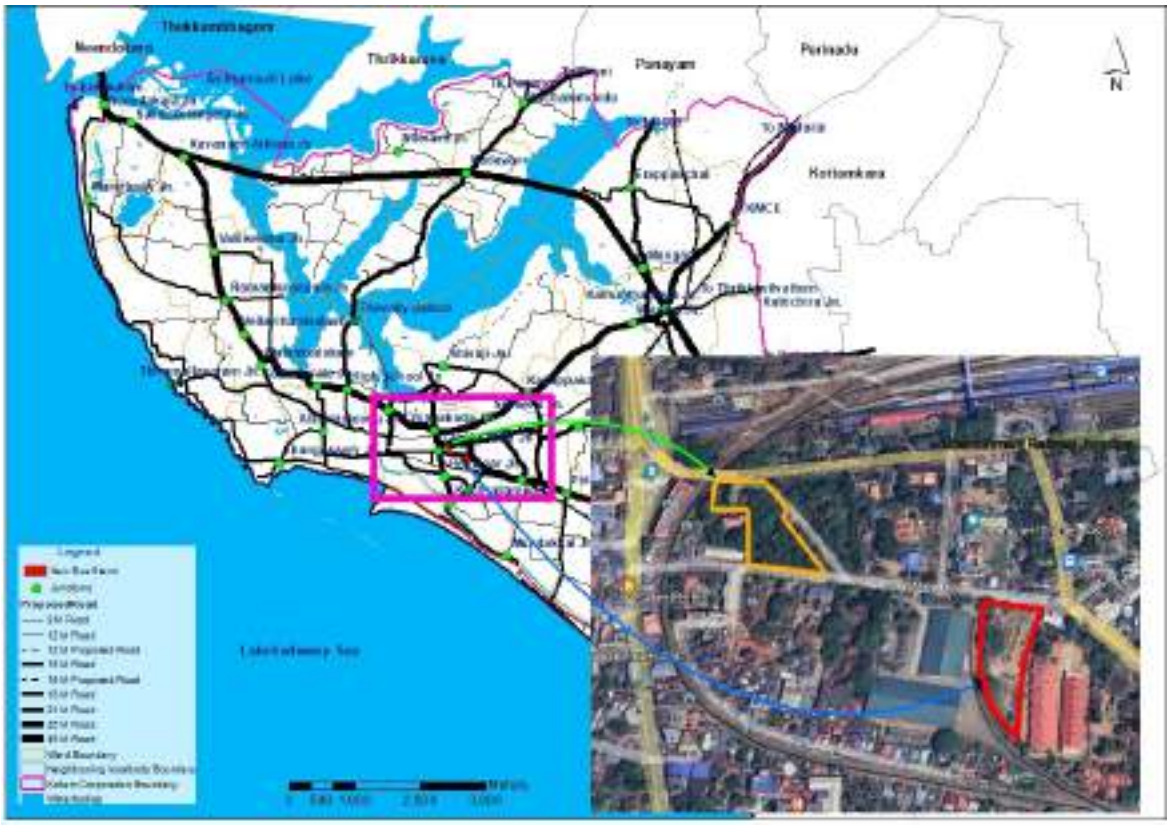


Figure 31.3 Location of new bus stand



Figure 31.4 Proposed mobility hub and NMT

- Mini Satellite Bus Stations are proposed at six locations, ie at Kallumthazham, Anchalumoodu, Mavaram, Karikode, Kavanad, Kollam beach as shown in figure 31.2

31.1.4 Parking Facilities

1. Off street parking near KSRTC bus stand
2. Multi-level parking plaza near clock tower
3 Multi-level parking plaza on land used for present bus stand at Andamukkam



Andamukkam private bus stand

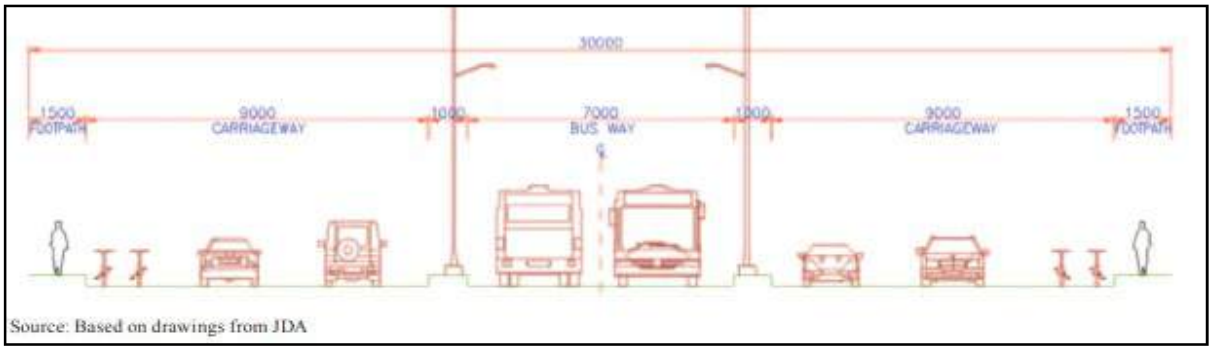


4 Off street parking space is necessary at Kadappakada, Civil Station

5 At Anchalummoodu off street parking space is to be developed near sub registrar's office on block road

31.1.5 Proposal for BRTS System in NH66 Bypass from Mevaram to Sakthikulangara

Total of 27m Carriageway is required for this type of system. The system runs on Integrated Transportation Management System (IMTS) which includes Advanced Vehicle Tracking System (AVLS), Fleet Management System (FMS),



Proposal for BRTS System in NH66 Bypass

Automatic Fare Collection System (AFCS), Passenger Information System (PIS), Passenger announcement (PA), and Vehicle Scheduling and Dispatching (VSD).



BRTS System in Ahmedabad

31.1.6 Pedestrian Crossing Facilities

- Circular subway at Chinnakada round
- While constructing the subway the feasibility for providing a pedestrian passage to Bishop Jerome Nagar and NTC junction may also be explored.
- Subway at Taluk Office junction
- Foot over bridge near clock tower
- Foot over bridge with escalators connecting MG Park and Kollam beach.
- Subway at High school junction

31.1.7 Non-Motorised Transport

- Covered walkway in Residency road from 2nd entry of Railway station to proposed mobility hub as shown in figure 31.4.
- Cycle track along one side of By-Pass road and coastal road, roads around Asramam ground and link road.
- Footpath- on both sides of all primary and secondary distributors.
- Additional footpath on all school access roads and residential roads wherever possible
- Absolute minimum width suggested for footpath is 2.0 m
- Footpath should be continuous and free from all kind of obstructions with railing guards

31.1.8 Truck Terminal

Considering the future development of Kollam port and industries, trade and commerce sectors in the planning area, a truck terminal is proposed in this Master Plan The ideal location for a truck terminal is the peripheral area and by the side of a bypass. However land value and distance to important loading/ unloading centres are also some of the important criteria for the selection of site for a truck terminal .Considering these factors, a truck terminal extending over an area of about 5 acre is proposed by the side of NH bypass near Mangad junction

tentatively. Office, godown and loading/unloading facilities for transport operators, service industries such as petrol pump, Weigh Bridge etc., parking and other amenities are to be provided here.

31.2 PROPOSALS FOR RAIL CONNECTIVITY

1.New Link for connecting Kollam Port and Railways

A coastal railway of proposed width 12 M connecting Kollam port to the existing rail network is proposed for ensuring rail connectivity to Kollam port. The proposed alignment is along the sea coast up to ParavurKayal and thereafter the alignment is proposed along the left bank of Paravurkayal to reduce the number of families to be rehabilitated. However detailed studies are required to finalize this alignment. Hence reservation of land for this proposal as shown in proposed traffic and transportation map cannot be enforced till the correct alignment is finalized.

2.Other proposals

- Additional passenger trains are to be operated between Kollam, Kundara, Thiruvananthapuram and Ernakulam for facilitating easy movement of people for work purposes. In this regard the already declared memu service between Kollam and Ernakulam need to be made operational at the earliest.
- Automatic signalling system and sub urban rail system with two exclusive tracks in Ernakulam-Thiruvananthapuram sector.



Location & existing condition of Koikkal bridge

- More facilities such as drinking water and sanitation, rest rooms etc to be provided in all the existing railway stations in the planning area

31.3 PROPOSAL FOR WATER WAY CONNECTIVITY

1.Link between Kollam port and existing waterways

The proposed waterways includes National Water Way No. III, Kollam Thodu and Ashtamudi Kayal. It is proposed to link Kollam port to waterways by providing an additional link from Lakshadweep Sea to Kollam thodu. In order to finalise the location of link canal, further detaild studies are required. However a tentative location is suggested at Pallithottam. This location is suggested considering the lower effect of tidal impact only. Other factors for finalising the location is to be considered while the detailed studies are conducted. Hence reservation of land for this proposal as shown in proposed traffic and transportation map cannot be enforced till the correct alignment is finalized.

Water metro to be named as "Kollam Water Metro" can be proposed in Ashtamudi back water. It will facilitate speedy movement of men and material. This will also boost the tourism potential of Kollam.



Figure 31.5 Proposed Site Location For Inland Water Cargo Terminal

2.Link between Kundra IT park to Kollam KSRTC station boat jetty:

The proposed boat jetties in this route are: IT Park, Padappakkara, Muttam, Neendumthuruthy, S&T institute.

3.Extension of National waterway No III

National waterway III (Kollam-Kottapuram) begins at Ashtamudi Kayal in Kollam. It is proposed to extend National water way III to Kovalom (via Eravipuram, Paravur, Varkala, Kadakkavur, Chiranyinkkezu) to boost up the tourism potential of Kollam.

4.Revival of waterway from Vattakayal to Ashtamudi Lake

Another proposal is to revive the connectivity of Vattakayal to Ashtamudi Lake by developing the Kattakayal which is already reclaimed at many places. This can also increase the tourism potential of the planning area.

5. Proposal for inland water cargo terminal

Inland water cargo terminal is proposed near ESI hospitals as shown in figure 31.5

31.4 PROPOSAL FOR AIR CONNECTIVITY

The nearest airport is Trivandrum International airport at Thiruvananthapuram which is situated hardly 70 Km away from the planning area. Hence no additional airport is proposed in the development plan. However it is proposed to develop a helipad in Asramam area. India's first seaplane service from the backwaters in Kollam in Ashtamudi Lake was launched in 2013. Initially, the six-seater Cessna 206 H amphibian aircraft will be utilised for this service, which was to be officially launched for tourists in August 2013 but mission got cancelled. However, the proposal for sea plane can be implemented after conducting detailed feasibility study and wide range of stake holder discussion.



Amphibian Aircraft

CHAPTER - 32
SECTORAL PROPOSAL

32.1 TRADE AND COMMERCE

Proposals for development of economic infrastructure include development of commercial centres, proposals related to informal trading activities and financial institutions.

32.1.1 Commercial Centres

The major proposals for developing commercial centres includes development of higher order commercial centres as per the development concept, Redevelopment of old commercial areas, development of city centre extension at Andamukkam and for improving facilities in the existing commercial centres.

32.1.2 Development of higher order commercial centres

The higher order commercial centres proposed are:

1. District centres

Chinnakkada and surrounding area consisting of Kadappakkada, Polayathodu, High school junction.

2. Sub-centres

1. Pallimukku
2. Kallumthazham
3. Kadavoor
4. Kavanad

3. Zonal centres

1. Sakthikulangara
2. Ramankulangara
3. Ayathil
4. Kuttichira
5. Anchalumoodu
6. Eravipuram

4. Local centres

1. KochalummooduJn
2. Maruthadi
3. Thirumullavaram
4. Thangassery
5. Thevally
6. Randamkutty
7. Madannada

The location of these centers are shown in figure 32.1.

The development of commercial centres mainly depends on the market demand. Demand is directly related to the availability of both external and internal infrastructure. Hence development of infrastructure is a prerequisite for developing new commercial areas. The proposal for development of external infrastructure includes the following:

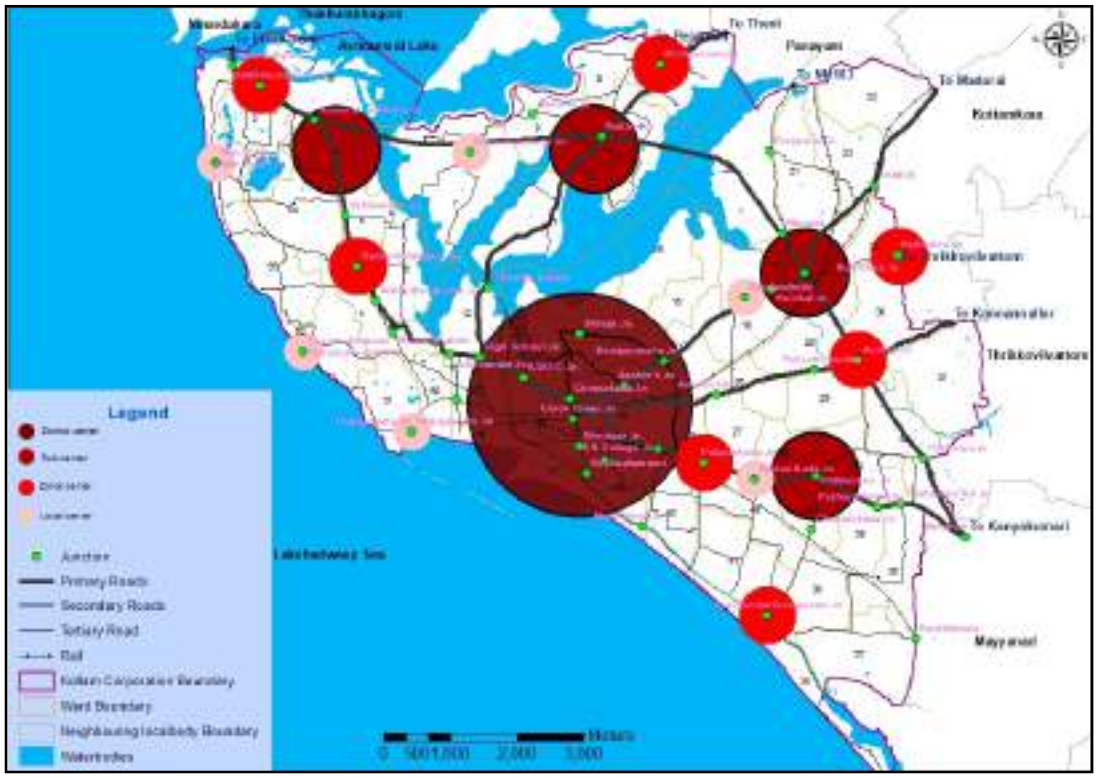


Figure 32.1 Higher Order Commercial Centers

Ï% All the road widening proposals to be initiated with priority to those roads leading to proposed higher order nodes.

Ï% Arrangement for meeting the power demand including construction of new sub-stations to be made.

Ï% Linkage of drainage and sewage system to the commercial areas

Ï% Telecommunication facilities to be arranged.

The responsibility of providing external infrastructure is with government/ government agencies. For arranging the internal infrastructure since land belongs to private agencies, it is suggested to develop the area in the private sector with government as the facilitator for developing the area as per the concept of this development plan. The cost of implementation of external infrastructure is to be recovered from the private agencies proportionately. Plot reconstitution technique can be adopted for supply of land required for commercial development. Hence detailed town planning schemes are to be prepared for the higher order commercial centres with priority for district sub centres proposed at Kavanad, Kadavoor, Kallumthazham and Pallimukku.

The general facilities to be

provided in the district sub centres are listed below:

- Waste management system including solid/liquid waste management
- Drinking water supply system
- Internal roads with street lighting and landscaping
- Parking facilities including for lorry parking
- Wholesale and retail trading centers
- Specialized trading such as jewellery, textiles, electrical and electronics equipment, fruits and vegetables.
- Lodging and restaurant facilities
- Banks and commercial offices
- Multiplex and movie halls
- Professional education centres like information technology development centres, short term technical education coaching centres etc.
- Auditorium, conference halls, library, convention hall
- Public offices
- Recreation facilities
- Centralized cold storage facilities

The energy efficient / green building and other construction technologies which support environmental conservation are to be adopted for construction of buildings in these commercial centres.

In the case of zonal centers following facilities are proposed:

- Waste management facilities
- Drinking water supply
- Parking facilities except lorry parking
- Wholesale / retail shops
- Lodging/restaurant facilities
- Daily markets for selling perishable items

Each local centre is to be provided with retail shops, daily markets dealing with perishable items like meat, egg, fish, fruits and vegetables etc. for meeting the daily requirement of the local community. Other facilities such as barbershop, internet cafe, Xerox/DTP, mobile recharging, milk booth etc. to be provided in the local centres.

32.1.3 Redevelopment of old commercial areas

The commercial areas around Maharani Market and along the side of Chamakkada road are very old and in a dilapidated condition.The figure 32.2 shows the old commercial area and its access roads. While the road widening proposal is implemented, this commercial area is to be redeveloped with protection to the historic old



Figure 32.2 Old Commercial Areas

buildingswithproper access roads and other facilities.

32.1.4 Development of city centre extension at Andamukkom

The land available with KLMC in Thamarakulam area adjacent to the present private bus stand needs to be developed as an extension of Chinnakkada. Since the land belongs to KLMC the suggested development is PPP model (Public Private Partnership Model). Corporations can select builders through an open bidding system based on maximum unit built-up sharing cost criteria for each building block. Suitable partnerships need to be prepared as part of implementation of this land development. The facilities provided in district sub centres are to be provided here also. The building designs and lay out plans prepared by the builder are to be in accordance with the general guideline issued by the Corporation authority.

32.1.5 Proposals for improving existing commercial areas

- Suitable waste disposal facilities to be implemented
- All commercial areas are to be provided with at least minimum number of parking spaces and



Vacant land near present private bus stand at andamukkam

other basic facilities such as sanitation and drinking water

- The existing lorry stand near FCI godown is to be developed by providing compacted parking areas with proper drainage and street lighting facilities. Restrooms and other basic facilities are to be provided for truck drivers.
- Redevelopment of market area with pedestrian friendly- with proper parking and essential amenities like recreation, drinking water, sanitation facilities
- The Chamakada Market space is famous for its market prominence and its buildings as well. Since mostly the grain storage shops are with asbestos sheets and ordinary roofs, markets look dull. With modern roofing solutions, which adds an additional membrane layer to the high quality stainless steel roof, makes its extra strong as well as heat absorbance, widening its life expectancy. Also with the White, Terracotta and light coloured roofs absorb more heat and extra savings on electricity. Thus a New Built form can be adopted along these spaces to look unique and pleasing, that can attract visitors and customers to the marketplace.

32.1.6 Proposals related to Informal Trading

- Separate spaces to be earmarked for street vending in busy roads without affecting pedestrian crossing
- The details on street vendors to be recorded in the KLMC



Extra layer of membrane


Heat absorbance solution with light coloured roofs and images of asphalt roof and modern membrane roof, respectively

and they are to be provided with identity cards.

- Provide weekly market in every division as per the recommendation of street vending committee.
- At places where a greater number of female workers are working minimum basic facilities such as drinking water and sanitation facilities are to be provided.
- Periodic free health checks are to be conducted for detecting communicable diseases and free medical aids are to be provided free of cost to prevent spreading of communicable diseases.
- Footpaths redesigning proposals including physically disabled requirements
- Floating Market.



Proposed weekend street vending market at kollam beach

- The Kollam Canal from its past has its importance in trade and commerce, has the potential to develop as a floating market space, such as in Kolkata and has a tourism potential along its regional stretches.
- The Kollam Canal stretch in the study area can have a potential of having a pedestrian access and sitting place which can be developed as a Water Metro in Kollam. It is also a crucial link to connect Kollam Port with the Inland Waterways Authority of India's Kollam Inland Terminal. to further uses are the gap areas identified in this proposal



Floating Markets

32.1.7 Financial Institutions

The analysis revealed that financial institutions are concentrated at the city centre. Hence to provide banking facilities to more people to the eastern side of the planning area following proposals are suggested.

- Nationalized banks, one each in Thrikkadavoor.
- One co-operative bank in Thrikkadavoor.
- Non-banking financial institution 1in Thrikkadavoor.

32.2 FISHERIES

32.2.1 Proposals for Seed Production Centres

a) All Male Tilapia Seed Production Centres

Starting up an 'all male Tilapia seed production centres' will considerably increase the fresh water fish production. Hence it is proposed to start up an all-male Tilapia seed production centre in the Vattakayal area (50 cents) in KLMC.

b) Shrimp Hatchery

In order to ensure the availability of quality shrimp seeds, a commercial level shrimp hatchery is proposed at Sakthikulangara.



All male tilapia seeding unit design

c) Freshwater Prawn Hatchery

Considering the export potential of scampi (freshwater prawn) and the growing demand for the seeds for aquaculture it is proposed to set up a scampi hatchery in the public sector at Sakthikulangara area.

d) Mud Crab Hatchery

Considering the export potential of crabs and the growing demand for crablets, one crab hatchery is proposed to be set up at sakthikulangara near the sea shore.

e) Marine and Brackish water Fin Fish Hatchery

It is proposed to set up a fin fish hatchery at Sakthikulangara.

f) Cage Fish farming

It is proposed to adopt sea cage fish farming in coastal areas near Thangassery Breakwater and in brackish water at Thevally.

32.2.2 Tourism Fisheries

32.2.2.1 Game fisheries

Game fisheries like angling, payao fishing etc. are the favourites of



Cage Fish farming

foreign tourists. The proposal is to set up 4 game fisheries centers in the organized parks and open spaces proposed. The approximate cost of implementation is Rs. 20 lakhs.

a) Marine recreation

Examples of marine recreation/tourism activities:

- SCUBA diving
- snorkelling
- yachting
- water-skiing
- wake-boarding
- boat based fishing
- wildlife watching
- scenic boat cruising
- underwater archaeology
- sea-kayaking
- surfing
- paddling
- kite-surfing
- board-sailing(windsurfing)
- dragon-boat paddling
- stand-up-paddle boarding
- swimming

b) Coastal recreation.

Examples of coastal recreation/ tourism activities:

- Sand-dune surfing
- beach volleyball
- tidal-pool exploration
- kite flying
- land-yachting
- fishing
- walking
- skim-boarding
- horse-riding
- sand-castle
- building or sand sculpting
- radio-controlled boating
- wildlife watching
- shell-fish gathering
- beach-combing
- sunbathing

c) Inland recreation

Examples of inland-coastal recreation/tourism activities:

Hotel centred activities

- golf
- karting
- shopping
- urban tourism
- rural-natural tourism



Angling & Net Fishing in Thangassery Breakwater

Kayaking in Ashtamudi Lake

Parasailing in Ashtamudi Lake

Focus:

To make tourists stay a day or more effectively in Kollam and to create an effective tourism strategy for tourists to come to Kollam as a tourist spot rather than a passing destination.

1. Tourism Route

Connecting coastal tourism and inland tourism (Figure 32.3) can make a tourist to stay for a day or two like

- They can spend time with fishermen and fishing activities,
- They can stay in a fishing village,
- They can experience the inland fishing methods like gill netting, trawling, hook and line fishing, etc.

By connecting inland and coastal tourism, almost 41km of waterways can be used as tourism resource



Figure 32.3 Proposed tourism route connecting marine and inland regions

a)Proposal for an Aqua-One centre

The Aqua One Centre will provide Information & Communication Technology (ICT)-enabled Aquaculture Support Service, disseminate proven technologies and innovations and facilitate their wider adoption by registered fish farmers thereby facilitating the sector's overall growth, initiated by the National Fisheries Development Board.



A Model Aqua One Center

b)Oceanarium

It is proposed to set up an oceanarium at Kollam beach which needs infrastructure facilities on par with international standards by the fisheries department. It also helps to attract tourists. The oceanarium will be maintained by the fisheries department.



Oceanarium

c) Sea Fishing Tour

To enjoy the beauty of seas and for the safe accommodation of tourists with all facilities to stay in the mid sea, it is proposed to replace existing sea fishing boats. Thangassery fishing harbour and Sakthikulangara harbour can be selected as the base of operation of this sea fishing tour. It is proposed to rebuild 10 units for sea fishing tours.

e) Fisheries museum

To protect those fish species which are under the threatened category and at the verge of extinction, it is proposed to set up a fishery museum in the land provided by the fisheries department at Thevally. By establishing this, many of the fisher folk art and cultural heritage could be preserved and exhibited. The methods of traditional fishing and models of fishing crafts of modern / traditional origin can also be exhibited here.



Sea Fishing Tour

d)Proposal for Sea Food Restaurant in Thangassery Beach at Bus bay

Restaurant selling live fish based items based on the needs of customers can be proposed along the beachside of Thangassery area.

f) Proposal for Eravipuram coastal area

The Eravipuram coastline stretch is constantly under the threat of coastal erosion, which has destroyed several houses and coastal roads. So the area need a permanent solution



for the perennial problem of rough sea and coastal erosion. The construction of groynes at even intervals along the coastline as the effective measure to deal with the problem. The area covered by groynes develop new soil deposits which will be effective in countering soil erosion. Currently,the construction of groynes started in the stretch as part of the coastal protection initiatives. These groynes are of very small in size, limited stretch towards the sea only up to a maximum of 50m from the road.

The proposal involves re-construction of groynes i.e. straight and T shaped (figure 32.4), to control fierce waves and aid sand accretion,along the 1.5 km beach-front near Eravipuram, where groyne could be putting into the sea for a distance of about 110 metres. These groynes are expected to reduce the impact of waves and facilitate proper distribution of sand thereby preventing further erosion of the shoreline. The proposal also involves recreational area along the entire stretch provided with better seating,lighting and paved paths as shown in figure 32.5. Renovation of the existing Paravoor coastal road is needed to be done.

g) Ornamental fish shows

In order to augment the ornamental fish culture and trades, it is proposed to conduct 'Ornamental fish exhibition at Asramam maidan every alternate year at a cost of Rs. 30 lakhsper each show.

32.2.3 Proposals on Infrastructure Development

a) Infrastructure for Kollam Port

For promotion of marine export business, creation of adequate

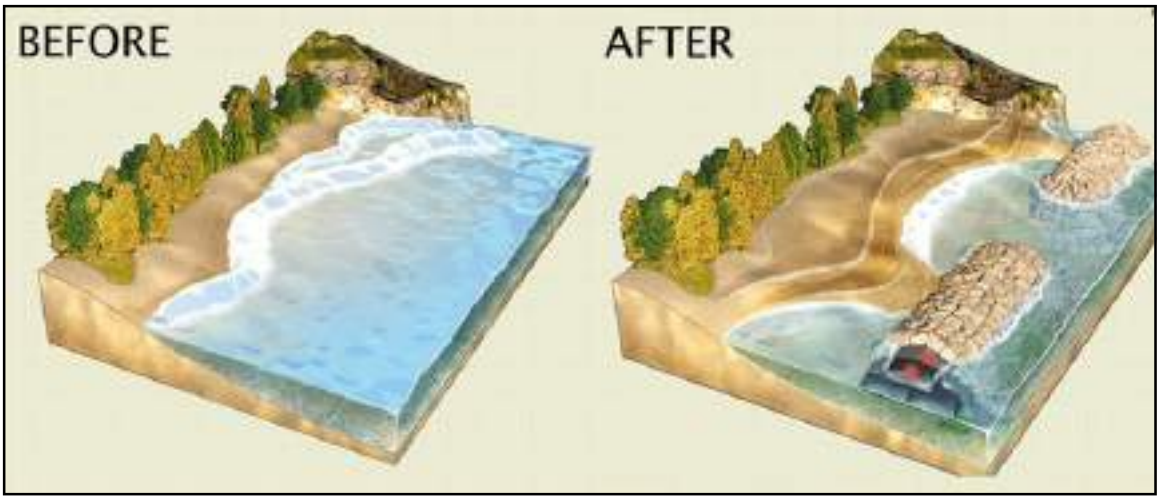


Figure 32.4 Proposed T- shaped groynes in Eravipuram

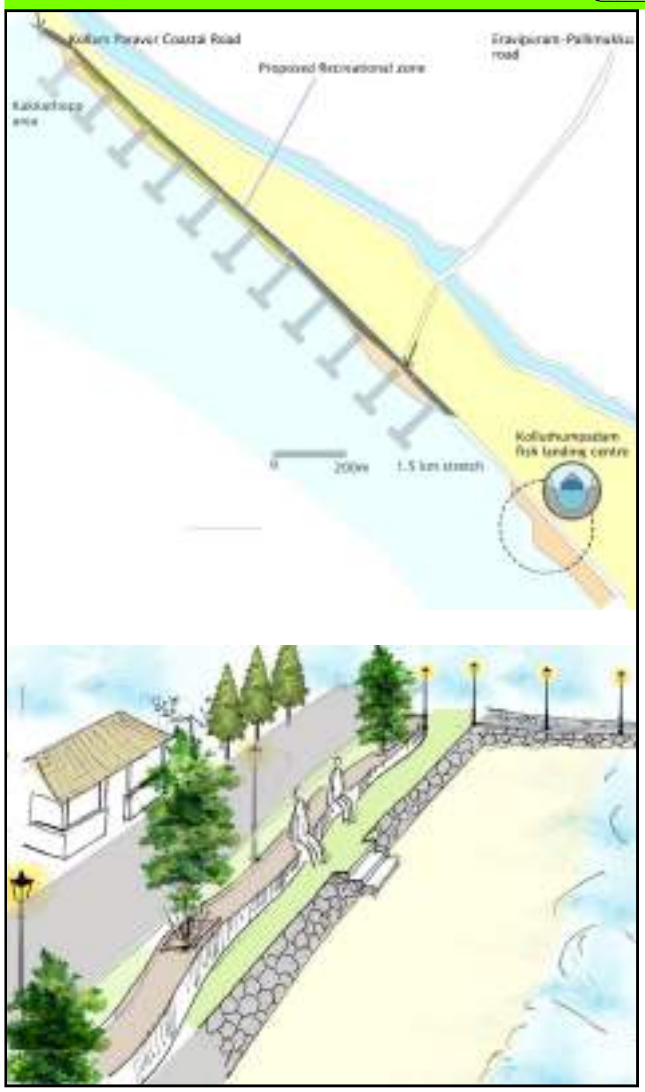


Figure 32.5 Proposed recreational area along the coastal road

infrastructure facilities like wharfage, cargo, container handling crane, customs clearance facilities etc. are proposed at Kollam port.

b) Development of Matsyabhavan, Vaddy

It is proposed to modify the existing matsyabhavan at vaddy, with better infrastructure facilities

c) Modernization of fishing harbour

It is proposed to modernize/ renovate the existing fishing harbours located at KLMC. The proposal aims at extending additional infrastructure facilities including boat berthing facilities in Ashtamudi Kayal near sakthikulangara harbour and extending competitive market services leading to expansion of domestic and export supply.

d) Modernization of fish pre-processing Centers

It is proposed to upgrade the pre-processing centers in the coastal area by involving women working groups. The pre-processing centers at KLMC are included under this scheme.

e) Plastic shredding unit at Thangassery

It is proposed to set up a plastic shredding unit near the coastal area of Thangassery. The location for the shredding unit is shown in figure 32.6. Plastic wastes such as old or torn fishnets, plastic bottles, plastic covers, etc can be brought here for shedding. The shredded plastics can be reused for many other purposes like road tarring.



Figure 32.6 Plastic shredding unit at Thangassery

32.2.4 Infrastructure for research extension and training

a) Establishment of new MatsyaBhavan

New Matsyabhavan are proposed at Eravipuram, Sakthikulangara and Thangassery.

b) Aqua book shelves and knowledge centres in Matsyabhavan

The proposal envisages setting up of aqua-book shelves and knowledge centres within the Matsyabhavan to strengthen each matsyabhavan with basic data, information and other reliable technical information. It is proposed at Eravipuram, Sakthikulangara, and Thangassery.

32.2.5 Special Development zone for fisheries related activities

The proposal is to set up a special development zone for promoting fisheries related activities with special focus on value addition and export. In this zone other than physical infrastructure such as roads, drinking water facilities, electricity and other communication facilities etc additional facilities such as, centralized freezing plant with latest technology, quality control/research laboratory, waste recycling /disposal facilities, full-fledged technology upgradation / training centre and other common facilities. The suggested location is in the proposed industrial zone near Sakthikulangara harbour.

a) Sea Weed Farming

Seaweeds are macroscopic algae that inhabit marine, shallow coastal and brackish waters. Seaweeds are wonder plants of the seas having multiple uses as a source of food, various industrial products and chemicals (e.g. Agar, Agarose and Carrageenan) which are used in pharmaceuticals, cosmetics, processed foods, bacterial culture media, fuel, etc. Seaweed farming is the practice of cultivating and harvesting seaweed. In its simplest form, it consists of the management of naturally found batches. In its most advanced form, it consists of fully controlling the life cycle of the algae. Seaweed farming has frequently been developed as an alternative to improve economic conditions and to reduce fishing pressure and overexploited fisheries.

Favourable zones for seaweed farming:

1. Shallow coastal region of Thirumullavaram
2. Near Thangassery Breakwater
3. In Kureepuzha

b) Promotion of Integrated Paddy-cum-Fish culture

2. System of producing fish in combination with paddy farming using the same resources of a same unit area.

Advantages



- Full utilization of the paddy field in all season
- Fish metabolic waste acts as nutrient and boost paddy production
- Presence of fish reduce weeds and pest
- Increase crop yield in same unit area
- Enhance income generation with little modifications from the paddy field

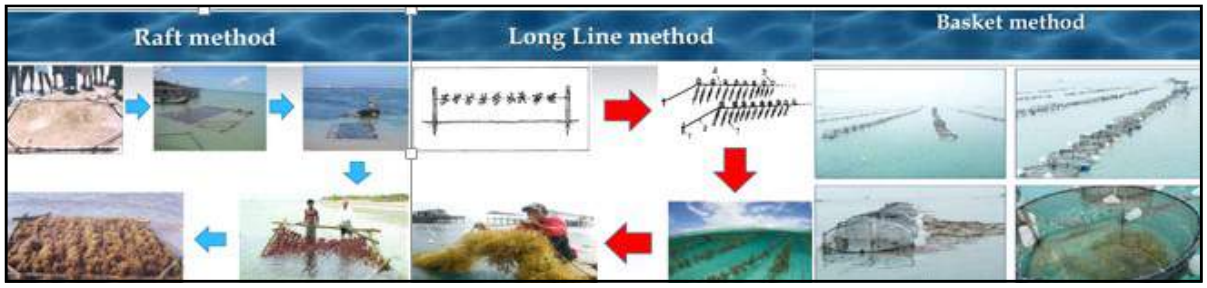


Figure 32.7Raft Method of seaweed farming

Types:

1. Simultaneous or Concurrent Method where fish and paddy grow together in the same field at the same time.
2. Alternate or Rotational Method where fish are cultured in the paddy field during paddy off-season.

Other proposals

1. By increasing subsidy for fish farming leads to promotion of cultivating fishes in their respective houses
2. Protection of Vattakayal and ban fishing in area where fish breed
3. Larval fishes should be supplied to those houses where fish farming is done
4. Construct a fish landing centre and a fish market besides Ashtamudi lake
5. Schemes such as saving cum relief scheme, educational concessions to fisher folk, kerosene subsidy, assistance for treatment of total diseases etc. to be continued for the welfare of fishermen folk

32.3 TOURISM

32.3.1 Proposal for Eco Tourism development at Kandachira

The site comprises of mainly wetland area which has been subjected to frequent encroachment and land conversion over the years. The area is rich in biodiversity and there have been frequent sightings of exotic birds and animals. The area currently faces waste dumping issues, encroachment activities and socially undesirable activities. Therefore there is an urgent need for intervention which could maximize the potential of the site thereby enhancing the lives of the common people and at the same time achieving ecological stability. The project proposes a bio park which includes three zones namely active, semi active and a silent zone. The active zone consists of pathway which is designed in such a way as to incorporate cycling and pedestrian activities and ambient seating spaces and an amphitheatre for small functions. The semi active zone consists of spaces that are designed for fishing and other local interests. The silent zone comprises of mainly bird islands and other exotic flora and fauna which is designed in such a way as to keep disturbances to a minimum. The proposed view of Kandachira is shown in figure 32.8. The project should be implemented as PPP model so as to encourage local participation, create a feeling of ownership and to incorporate advanced technological



Figure 32.8 Schematic diagram & location of mini industrial park

developments. The details of the proposal is given in chapter 33.

32.3.2 Proposal for lake front tourism promotion zone

The project is proposed on Ashtamudi banks, with an area extent around 55 acres near the new road connecting Asramam and Mangad. With the development of this new road, tourism of the area could be promoted. The main focus of the project isthe conservation of Ashtamudi lake and associated ecosystem, from waste dumping issues, illegal encroachments along the banks and promote the delineated area as the main tourism focus point in the Ashtamudi region as a part of new Asramam –Mangad road proposal. The project focuses on construction of temporary structures made of bamboo for the tourism experiences. The entire stretch can be divided into different zones - park zone, cultural zone, tourist zone, communal harmony zone as shown in figure 32.9.The details of the proposal is given in chapter 33.

32.3.3 Paddy tourism

Paddy tourism is proposed in south – east periphery of the KLMC, ie at Eravipuram paddy fields and a portion of Mayyanad village. The proposed site faces land conversions, shortage of labour supply, low profitability issues and therefore it needs urgent interventions for the revival of paddy fields by using the tourism potential of this area. The

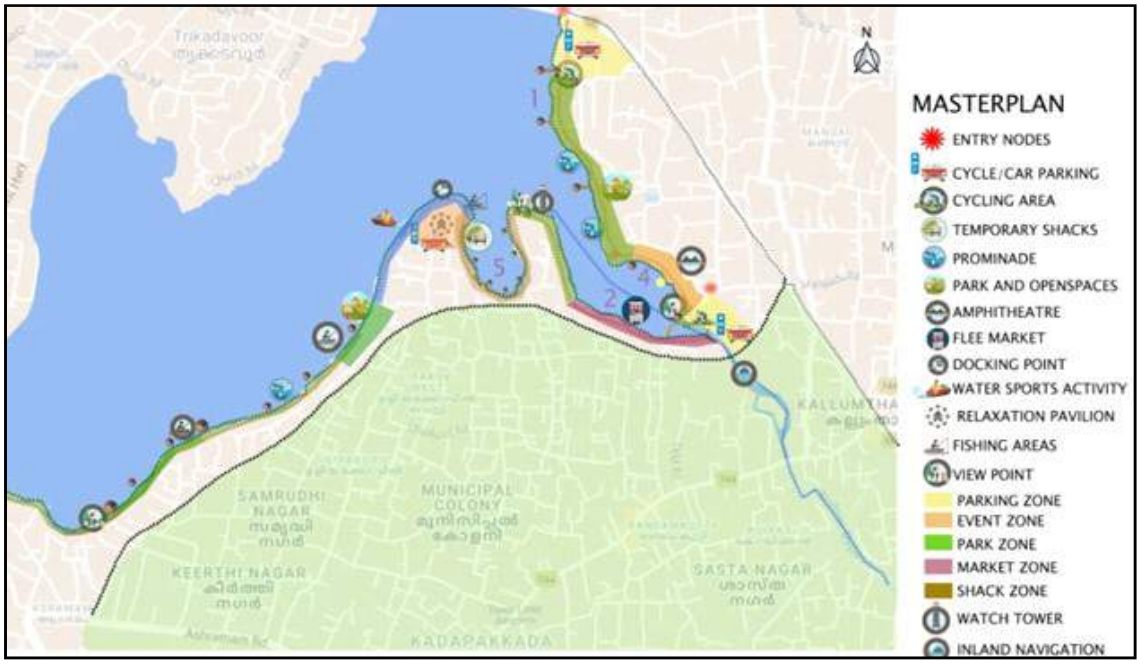


Figure 32.9 Layout for Lakefront Tourism Development Zone

main aim of the project is to conserve the existing wetland area, promote tourism and enhance the living condition of the local people. The main elements of the proposal are rejuvenated water pond, water canal with foot path on either sides and over bridges, cultivated paddy fields, stilted thatched–roof huts with interlacing network of bamboo and wooden bridges in the paddy field, cottages for homestays and boat landing area as shown in figure 32.10. The details of the proposal is given in chapter 33.



Figure 32.10 Proposal for paddy tourism at Eravipuram

32.3.4 Island tourism

It is proposed in Sambranikodi island whichis one of the most popular tourist attractions in Kollam district. Even though this area is rich in biodiversity and has tremendous tourism potential, this area is currently facing various issues like waste dumping, stability of the island, safety of the tourists etc. due to the lack of proper stakeholder management. The island is both environmentally and geologically sensitive areas, during the first phase of the project various

environmental and geological stability improving measures like mangrove afforestation, side protections by geotextile, geo-membrane materials, safety measures for both the tourists & local community should be carried out. The details of the proposal is given in chapter 33.

32.3.5 Development of organized parks and open spaces

The proposal includes provision of open spaces with limited construction required for providing basic amenities for the tourist at potential areas. The organized park and open space proposed at Thirumullavaram is supposed to develop as one of the main beach tourism centres attracting many foreign as well as domestic tourists. In this park suitable area to be demarcated for sun bath, angling, boating, resting place, fairground for exhibiting and selling local products, excluding space 'Bali tharpanam', open restaurants, eco-friendly sculptures etc. The existing beaches at Thangassery, Mundakkal, and Kollam are also to be maintained as organized parks and open spaces as the area falls in the CRZ zone. Along the side of Ashtamudi Lake in Thrikkadavoororganized parks and open spaces are proposed. In these organized parks and open spaces, in addition to the facilities for tourists such as angling, rest place, open restaurant etc, projected jetties to view the beauty of Ashtamudi lake and for berthing facilities for house boats are also proposed. All these organized parks and open spaces are linked by eco-walk way, another important proposal for tourism development. The organized parks and open spaces may be developed and maintained by local people. The cost of implementation and maintenance may be recovered by charging a user fee. The parking mechanism may be decided by an expert committee constituted by members from land owners, LSGI, KTDC etc.

32.3.6 Eco-walk way

In order to utilize the tourism potential of Ashtamudi Lake in an optimum manner, Eco-walk way is proposed along the side of Ashtamudi Lake (35.86Km) which has a link to the existing road network (figure 32.11). The main objective is to make it accessible to the public from the landward side. The suggested Eco-way is constructed with locally available material like brick bats, stone, broken tiles etc which is not intended for motorable traffic. The landward side of

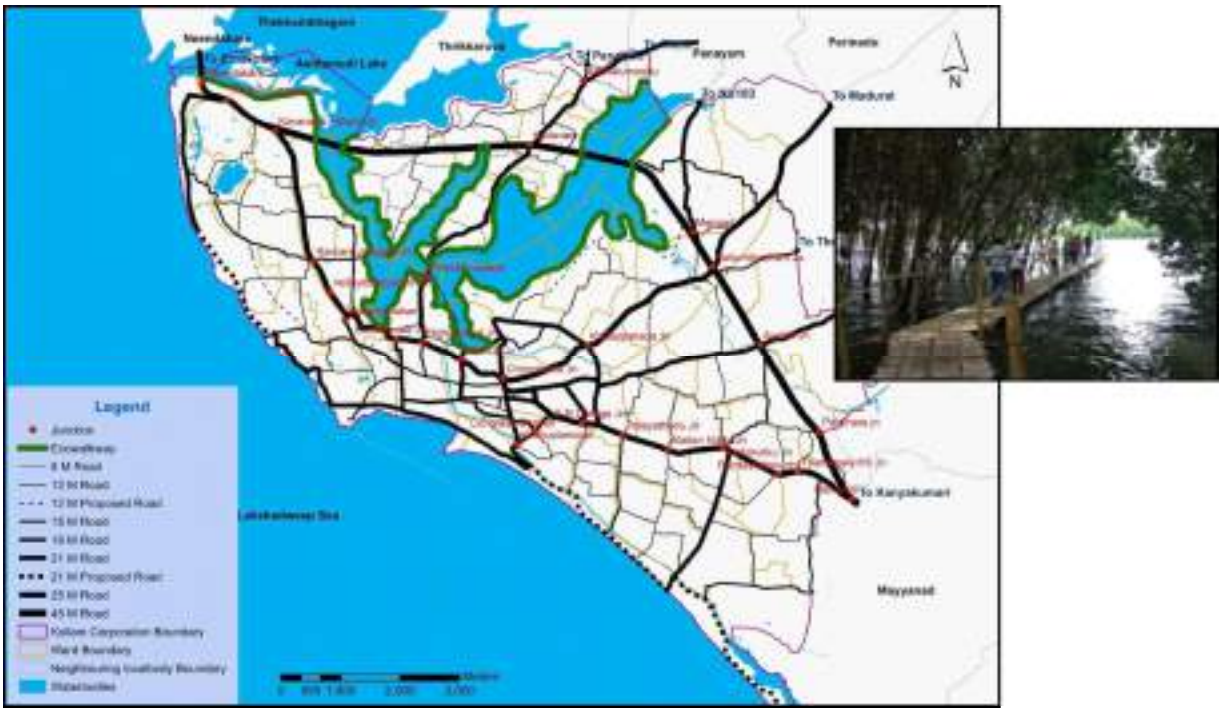


Figure 32.11 Eco Walkway along the side of Ashtamudi lake

the walkway is to be provided with flowering plants and the lakeside is to be provided with flowering mangrove associates which will act as a natural barricade to the walkway. The proposal is to develop and maintain the walkway by the local community under the guidance of the Tourism Department. Initially financial and technical assistance may be given to the people for planting mangroves and trees etc. This walkway is also to be included as part of organized parks and open spaces and the cost of maintenance may be recovered in the same manner as explained in the case of organized parks and open spaces proposed in Thrikkadavoor.

32.3.7 Linking of festivals with Ashtamudi eco-tourism

Festivals like Kollam pooram, Kollam fest, festivals in Thrikkadavoor temple and St. Casimir church, Presidents Trophy boat race etc may be linked to Ashtamudi. Eco-tour to promote tourism activities based on Ashtamudi Lake. Prior to these festivals sufficient promotional activities such as web page, newspaper advertisements, promotional activities through hoarding at railway station, bus station, airport etc and other promotional activities through media like radio, TV etc. The organized parks and open spaces and the eco-walk way around Ashtamudi need to be

maintained eco-friendly to receive tourists during these days by the local committee with the support of DTDC, LSGI etc.

32.3.8 Museum at Thevally Palace

The project aims to convert the Thevally palace as a museum of history and Heritage of Kollam with due importance to the history of Kerala. The location of the palace is strategic, as it lies on the Shore of Ashtamudi Lake. This can also be a part of the distribution centre in Ashtamudi eco – tour.

32.3.9 Linking of Ashtamudi eco-tourism proposals in the planning area with proposals of other LSGIs

The tourism potential of Ashtamudi Lake to be optimally utilized by all the LSGIs based on a long-term eco- plan for Ashtamudi based tourism activities. DTDC all concerned LSGIs, Town Planning Department and an expert agency with a proven record in preparing such a tourism plan may together contribute for preparing such a tourism plan. All the proposals included in the development plans (around Ashtamudi Lake) already in place need to be made an integral part of the new town plan. The terms of reference should include socio-economic-environmental impact studies. The proposals need to be curved for the development of the local committee to a large extent without affecting the environmental balance of Ashtamudi ecosystem.

32.3.10 Development of road network in tourism packages

It is proposed to introduce road networks in the Ashtamudi tourism packages. These roads could be used in critical situations to provide basic amenities for the tourists. The proposal is to maintain the road leading to eco-walk way in motorable condition with regular maintenance / repair works. The roads identified as for tourism need to be widened to the minimum width of 7 m if the existing width of road is less than 7 meters.

32.3.11 Renovation of slaughter house near Kollam boat jetty

As Kollam boat jetty is one of the major tourist points in the backwater tourism. Most of the foreign and domestic tourists repeatedly complained about this slaughter house. Since this is the only authorized slaughter house in the public sector and re-locating the same is found difficult due to non-availability of land, modernization of the slaughter house is suggested. The proposal is already

included under the proposals for the animal husbandry sector.

32.3.12 Removal of unauthorized Kuttivala

The unauthorized Kuttivala erected at various locations prevents the movement of tourist's boats near the bank of the Lake. Hence the opportunity for closely watching the rural activities are missing. Hence the proposal is to remove all the unauthorized kuttivala. The concerned agencies are fisheries department and LSGI.

32.3.13 Special Cultural Activities

In order to revive the traditional art forms, folks etc. a traditional cultural festival is planned under the title – Utsavam. The proposal aims to provide several suitable platforms for these traditional art forms which helps to promote these art forms.

32.3.14 Health tourism

Ayurveda can be effectively marketed through the fast-growing health tourism concept. Thrikkadavoor is proposed as the sub centre for health tourism.

32.3.15Pilgrim centre infrastructure development

The proposal envisages a pilgrim facilitation centre consisting of a hall, toilet blocks, mandapam, lighting, drinking water, preservation of natural ponds, signage for promotion, brochures and leaflets on festivals, facilities for seating etc. The suggested location in the commercial node at Kadavoor junction.

32.3.16 Proposals for the promotion of festivals of Kollam

A festival calendar consisting of all relevant data and schedule of event will be prepared in advance and made available to the potential tourism originating zones including foreign countries and also a festival facilitation centre will be launched to ensure proper facilitation to the visiting tourists at each festival venue. This facility can be provided at the DTDC's outlet in KSRTC.

32.3.17 Proposals for marketing and promotion

The logo – Kollam God's Own Capital is one of the most deceiving captions to market its tourism potential. In order to ensure the affecting marketing of a destination, the primary objective is to make awareness among the Stakeholders as well as clients.

32.3.18 Proposals for private investors

Private sector / investors contribute a major share for the development of tourism. Hence the

schemes, strategies and action plans for the development of tourism are planned with an objective to encourage private investment in tourism.

32.3.19 "PaithrikaTheeram" – Preservation of natural and cultural heritage on the shores of backwaters and beaches of Kollam

The proposal aims to preserve the natural as well as cultural heritage on the shores of backwaters by setting up all the basic amenities.

32.3.20 Smart waterway terminal and Water sports centre

To explore the tourism potential for backwater it is proposed to develop infrastructural facilities to suit the requirements for the promotion of various water sports, pleasure boating adventures, aqua spots etc. It also aims to develop the potential for unseen backwater / river locations which have connectivity to the highways, historical river places etc. water sports centres are proposed at Thanni beach and Vattakayal Lake.



Economic Paddled Boats with 4 Seats

32.3.21 Development and beautification of Kollam beach

Kollam beach being the major international as well as domestic tourism centre, it is proposed to develop the facilities and services and to add more attractions to suit the requirements of growing tourism demand. It is proposed to set up a walkway, mandapams, pay and use toilets, tourist information centre, latest playing equipment for children's park, parking area redesign, redesign of open air theatre, seating provisions etc. Suitable maintenance mechanism needs to be implemented.



Kollam beach

Kollam beach

The Kollam beach will get a new walkway, gallery and entry gate along with a spate of beautification works. The Irrigation Department will be the implementing agency of the ₹1.5-crore project.

- Walkway, mandapams, pay and use toilets,
- Tourist information centre,
- Designed parking area and proper maintenance system.
- Refreshment centres
- Kiosks or well-designed seating areas
- Water sports activities like scuba diving, rafting, kayaling, rowing, boating etc.
- Parks or open spaces or interaction spaces with seating
- Seafood restaurants
- Beachside accommodations
- Fishing activities where they can get involved along with the local community



Figure 32.12 Beautification of Kollam canal with cycle tracks in Eravipuram area

32.3.22 Beautification of Kollam canal Ashtamudi to Eravipuram

To develop Kollam canal as a tourism corridor, beautification measures have to be taken to make it more tourist attractive. It is proposed to landscape both sides of the canal by promoting organic cultivation and also maintaining the canal pollution free. The figure 32.12 shows the schematic plan for the beautification of Kollam canal with cycle tracks in the Eravipuram area.

32.3.22.1 Purified Canal with Canal Edge developments(Method Adopted in Perandoor Canal)

The technology of generating and spreading micro and Nanobubbles works on the method of infusing oxygen into the contaminated water. It is a highly sophisticated version of the aeration process. It sucks air from the outer atmosphere and only channels the oxygen into the canal. The dissolved oxygen helps in the growth of bacteria which disintegrate the weeds, waste and silt and also dies. This process generates water and carbon dioxide of which carbon dioxide escapes into air and water remains. Thus we can get clean water.



Waste Shark for collecting plastic/floating debris

32.3.23 Development and beautification of Thangassery breakwater beach

The project aims at developing Thangassery as a heritage beach of Kollam. The breakwater could be a major attraction by using battery cars through it, aged people also can enjoy its beauty. The project envisages the development of a beach with proper landscaping, lighting, walkway, basic amenities, signage, children play area, kiosks, tourist information centres etc.

32.3.24 Underwater marine aquarium

The proposal aims to set up an underwater marine aquarium to experience underwater marine life. The idea is to ensure free movement through an artificial glass chamber which provides visual life of the sea-marine life.

32.3.25 Beautification of Asramam area

Landscaping the entire area comprising the Adventure Park and children's park at Ashramam. The



Underwater marine aquarium



Adventure Park and children's park at Asramam

components are mainly beautification and landscaping of the Ashramam area with due importance to preserve the natural attraction.

Another major project will be the Punarjani eco-park that will come up on the lakeside, converting Asramam Link Road and KSRTC bus stand premises to a tourist spot. Open air stage, green room, amphitheatre, gallery, walkway, pavilions and parking facility are part of the project.As part of Ashtamudi tourism circuit, the building next to the lake will be refurbished as a village craft museum and sales emporium at a cost of ₹ 49.3 lakh.

32.3.26 Proposed tourism network

Ashtamudi Lake circuit

The primary focus is to develop and promote a water-based tourism experience that would link key 'destination points' (organized parks and open spaces) located along the stretch of the Ashtamudi Lake.

Beach backwater tourism circuit

To attract both domestic and foreign tourists a beach-backwater tourist circuit is prepared by including the following locations within the planning area via Eravipuram, Thangassery, Thirumullavaram and Ashtamudi.

Inland water transportation circuit through TS canal creating a link between Ashtamudi kayal and Paravurkayal.

Heritage tourism circuit

- Heritage tourism circuit is proposed for the district which includes the locations within the planning area via Ashramam, Kollam town, Thangassery and Thevally.
- Tourism circuit from KLMC to other parts of Kollam
- Thangassery to Thoppilkadavu via road
- Thoppilkadavu – Munroe Island
- All the above circuits should be integrated together to form the intra tourism circuit and the same is to be integrated to Inter tourism circuits at different parts of district, state and nearby states.

32.4 INDUSTRIES.

32.4.1 Exhibition cum trading centre for small scale industries

Small scale industrial units play an important role in employment generation within the planning area. However, the main problem associated with this sector is lack of facilities for marketing the product. It is suggested to provide the facility in the commercial area proposed at Andamukkam. To attract more people to this sector is to establish a permanent exhibition cum trading centre. About 50 cents of land is required for implementing this proposal.

32.4.2 Strengthens of handloom units

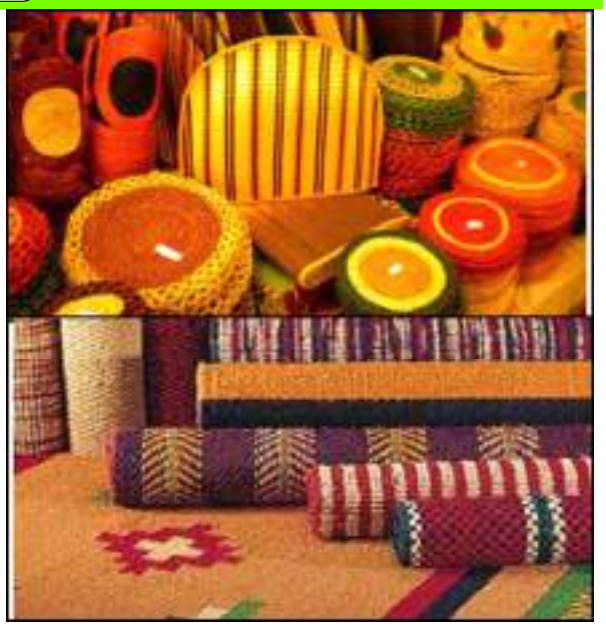
Handloom industry carries a vital role in the socio-economic development of the sector as well as in the field of employment. Hence it is proposed to set up handloom units in KLMC.Inorder to design spaces for handloom weaving industry, the process and its subsequent spaces should be thoroughly understood. The weavers need a comfortable working space. The production unit consists of spaces that include the space for weaving and all its ancillary activities. So in order to find the location, a detailed study is needed. Marketing assistance will be provided by Hantex and Handey. Several training programmes to be conducted for diversification of products for ensuring easy movement of finished products.

32.4.3 Packing and labelling units

In the planning area, there are a large number of small-scale industrial units. The packing and labelling of small-scale industrial products play a key role for its marketing and hence it



Handloom units



Coir Products

is proposed to establish a packing and labelling unit within the planning area. This generates more employment opportunities. The suggested location is the small industrial zone at Kallumthazham.

32.4.4 Exporting coir products through Kollam harbour

Presence of backwaters and other water bodies made coir industries possible within the planning area. Along with safe disposal of coir pith and modernization, environmental impact can be reduced. The natural coir in the domestic market was replaced by artificial fibres. However, demand exists for naturally made coir and other products in this global market. Hence the proposal is to increase the production of coir / coir-based products and facilities exported through Kollam Port. The production process can be decentralized through trained people at household level and the trading can be done through Coir cooperatives.

32.4.5 Fish processing units

The main occupation of the people in the planning area is fishing and related activities. At present fishermen catch and sell fish in raw form without any value addition. Hence it is proposed to start 20 fish processing units 10 each in the industrial area proposed at Maruthadi and Sakthikulangara.

32.4.6 Entrepreneurship development training centre

Entrepreneurship development training is conducted by the industrial department. The training centre is proposed in the premises of District





Fish processing units

Industrial Centre. KLMC will work as a sub-centre of KIED (Kerala Institute of Entrepreneurship Development at Kalamassery) giving all the necessary support to DIC.

32.4.7 Revival of Parvathy Mill

At present the Parvathy Mill is not functioning effectively. Therefore, it is proposed to speed up the revival of Parvathy Mills. Special initiative to be taken by the political parties to speed up the renovation process.



Existing condition of parvathy mills

32.4.8 Wood based industries

Export demand for the decorative wooden furniture is found as high due to the universally accepted skilled workmanship of the state. Hence wooden furniture export units are proposed to be established at the industrial zone at Mundakkal and Kallumthazham. These units envisage manufacturing of wooden furniture on different designs made of good quality wood like Teak, Anjili, Rose wood etc.



Wooden products

32.4.9 Food park

Food processing industrial parks act as a catalyst for the agro industrial development by providing common multi user facilities, where women entrepreneurs can set up small units for agro food processing. The ideal location for setting up food parks are at small industrial zones near Ayathil area.

32.4.10 Coir yarn manufacturing units

Considering the scope and demand for value added coir products it is proposed to set up coir



Agro food processing units

yarn manufacturing units in Thrikkadavoor. Coir yarn is the main input for the production of coir mats and mattings. The proposal is to start the units as household industrial units. This can attract the foreign tourists also.



Coir yarn manufacturing units

32.4.11 Units for constructing eco-friendly portable bio – gas plant, vermi composting equipment etc

Solid waste disposal is found as a serious issue all over the planning area. It is necessary to develop cost effective and eco – friendly portable biogas plants and vermi composting facilities to supply for all the people in the District. Hence a manufacturing and service unit of biogas plants and vermi composting facilities is proposed in the industrial zone at Kallumthazham.



Biogas plant, vermicomposting equipment

32.4.12 Setting up of handicraft units

Considering the potential of tourism development in the Ashtamudi area, it is proposed to establish small non-nuisance type industries for manufacturing handicraft items in Thrikkadavoor.

32.4.13 Setting up of Mini Industrial Park at Kollam Mundakkal area

For tiny, small and medium scale entrepreneurs for setting up units in sectors like rubber, plastic, and general



Figure 32.13 Schematic Diagram & Location of Mini Industrial Park

engineering. Area for Industrial park – 6.09 acres. The schematic diagram and location is shown in figure 32.13.

32.5 AGRICULTURE AND ANIMAL HUSBANDRY

32.5.1 Agriculture Sector

The proposals of this sector are for promoting homestead cultivation and for maintaining the agriculture activities for environmental conservation.

32.5.1.1 Paddy Cultivation

Promotion of group farming activities

Paddy cultivation needs to be promoted for maintaining the environmental balance. For the efficient and profitable paddy cultivation, it is suggested to promote group farming activities in paddy lands of KLMC.

Proposal for increasing productivity.

The proposal is to increase the productivity of existing paddy fields by supplying high yield variety seeds, adopting new farming techniques and applying adequate quantity manure etc. with the active involvement of cultivators, Agriculture Department and LSGs.

Proposal for ensuring labour supply

One of the main reasons for not cultivating paddy is the high labour cost and shortage of labour. Hence it is proposed to provide an adequate number of labour supply by providing



the services of NREGA workers. As paddy cultivation is viewed as a process of environmental conservation, the service can be considered as for public purpose.

32.5.1.2 Vegetable Cultivation

Homestead cultivation

Homestead cultivation is proposed to provide self-sufficiency in attaining the basic needs for each household. Households of average plot area 10 to 30 cents can develop model homestead farms with vermi composting/organic manuring as the integral part of the farming. By promoting this type of homestead farming, the by-product of organic waste management, i.e. the slurry can be used for farming. It is proposed to implement this proposal for 1000 households in the planning area.

Promotion of cultivation on building terrace

Another proposal is to promote vegetable cultivation on building



terraces. The proposal includes supplying high yield varieties of seeds and onsite technical guidance through trained personnel. The Agriculture Department can create a pool of such trainers from each residential locality.

Precision farming

Precision farming is a kind of new farming technique using only the required quantity of water and manure using the service of a computer.

The cultivation is done within Poly House so as to prevent attack of pests. It is proposed to implement 3 units in the KLMC area.



Precision farming

Protected farming

Protected farming is another modern technique in farming in which a greenhouse is constructed for protecting the crops from pest attack i.e.3 units in Corporation area.

32.5.1.3 Coconut Cultivation

Proposal for increasing the productivity

Even though the area under coconut cultivation within the planning area is pretty high, the productivity is very low. Hence to increase the productivity, rehabilitation of coconut is suggested. Farms of suitable sizes will be selected within KLMC. About 180 ha of land is proposed for rehabilitation over a period of 18 years.

Supply of good quality coconut saplings

Lack of supply of good quality coconut saplings results in low productivity. Thus, it should be ensured that good quality saplings are distributed within KLMC and other LSGs in the planning area.

32.5.1.4 Agro clinical centres

Agro clinical centres are proposed at KLMC from where farmers can avail various services including maintenance /hiring of agricultural machineries and implements.

32.5.1.5 Ensure efficiency of chemical fertilizers/ pesticides

Efficiency of chemical fertilizers / pesticides supplied is to be checked regularly to ensure effectiveness. The agriculture department shall develop suitable mechanisms for the purpose.

32.5.1.6. Coir pith composting unit

Scientific methods of coir pith removal and its composting or processing is to be introduced within KLMC, to reduce its pollution and to enhance the utility of coir pith.

32.5.1.7. Secondary Agricultural Market

Secondary agricultural market is proposed in Kadappakada market considering road, rail connectivity and land availability. Secondary markets receive supply from primary markets and will act as a conduit point for



movement of items to tertiary terminal markets and processing centres.

32.5.1.8 Proposal for supplying adequate labourers

The major problem faced by the agricultural sector is the non-availability of labourers. Hence creation of a labour bank system is proposed. Also, convenient and ergonomically designed light machines are to be made available to the cultivators easily.

32.5.1.9 Other proposals

- Maintenance of native crops
- Controlling usage of chemical fertilizers and pesticides
- Promotion of arecanut cultivation
- Promotion of floriculture activities

o Gerbera cultivation : Promotion of Gerbera Cultivation in Polyhouse increases the contribution to economy in KMC area (1 in KMC area)



Gerbera cultivation

32.5.2 Animal Husbandry

32.5.2.1 Quality control of milk and milk products

Quality control labs are proposed to be established at KLMC, to ensure quality of milk and milk products.

32.5.2.2 Medium scale dairy farms

It is proposed to establish 5 dairy medium/ farms with 10 milk animals within Thrikkadavoor.

32.5.2.3 Modernization of slaughter house

It is proposed to modernize the slaughter house in KLMC near KSRTC bus-stand by a suitable waste management system like rendering plants along the slaughterhouse and promoting greenery area.

32.5.2.4 High tech parent stock and poultry farms

The proposal is to set up a hi-tech parent stock poultry farm rearing about 10,000 birds. A hatchery will also be established in the farm. At its full



CONSTRUCTION OF MODERN MEAT PROCESSING UNITS

potential, 33,000 eggs will be set for hatching per week and 12,000 - 15,000 female chicks will be hatched out every week. It is supposed to partly meet the demand of quality day old chick in the region. The poultry farm is proposed at the regional poultry farm, Kureepuzha in KLMC.

32.5.2.5 Portable Dung drier

After dewatering the dung, the leftovers can be packed and sealed to be used as manure for agricultural activities.



Portable dung drier

32.5.3 Other proposals

Following existing projects/ programmes are to be continued in the planning area.

- Comprehensive baby calf health scheme
- Calf feed subsidy scheme
- Zoonotic disease control & surveillance programme
- Comprehensive rabies control programme
- Milk product outlet at schools so that the usage of coloured drinks can be prevented
- Lack of adequate labourers is a major problem this sector is facing so creation of labour bank system is proposed i.e. (It is a three-pronged concept. First of all, it will ensure work for labourers all through the year. It will also guarantee supply of sufficient workers in agricultural and allied areas and would eliminate middlemen in the labour sector).
- Proposal for Crop health management covering pests and disease surveillance, safe food production and integrated pest management.
- Production and distribution of quality planting materials with an appropriate certification mechanism should be described.
- Agricultural Markets should be proposed in major locations like Thevally, Kadappakkada etc.
- Small Crematorium for animals using paid collaborations
- Stray dogs shelter home " Gothans" to be constructed in KMC outskirts area which has to be managed by Kudumbasree
- License to pet dogs should be made compulsory



Stray dog shelter

- Conservation of livestock should be of highest priority to maintain diversity of breeds and preserve those showing decline in numbers especially goats, thereby increasing meat production.
- Proposal to increase milk production and to improve quality of milk through improvement of chilling infrastructure to meet standards
- To provide incentives to entrepreneurs to attract increased investment in the dairy sector as well as in the poultry sector thereby increasing milk, egg and meat production.
- To utilize areas not used for agricultural purposes by farmers for growing fodder and to provide technical and financial assistance to encourage farmers to rear high yield cattle so as to produce quality milk.
- Proposal to utilize cow dung to be burnt as a fuel and used in biogas plants as an alternative source of energy for electrification and cooking in KMC area
- Animal protection clubs should be promoted in schools, at least 2 units should be in KMC area, incentives are given to schools promoting this clubs



Animal protection clubs

- Proposals to promote straw and hay production, thereby importing from other states can be controlled.
- Duck Nursery unit, to promote duck cultivation, thereby egg and duck meat production is also increased, at least 1 unit of nursery to be implemented in KLMC area



Proposed duck nursery unit

32.6 HOUSING

32.6.1 Proposals for Substandard Housing Colonies

32.6.1.1 Proposals for A,B,C Grade Colonies

The lack of facilities in each of the colonies are listed in chapter 12. In a phased manner, the lack of basic facilities shall be provided in each colony area giving priorities to the lower grade colonies.

32.6.1.2 Proposals for Housing projects at QSS Colony, Pallithottam and flat construction at Mundakkal

Housing projects proposed under KLMC are Qss Colony project at pallithottam with 114 units by fisheries department and 65 units by KLMC and a flat under LIFE mission at Mundakkal with 32 units.

32.6.2 Proposal for Public Housing

32.6.2.1 Proposal for renovation existing staff quarters

All the staff quarters including G.O, NGO and police quarters were constructed long back and the houses are in dilapidated condition. The land available in these plotted housing areas is not optimally utilized. Hence the proposal is to rebuild the area to promote group housing so that more members of employee's families can be accommodated in the existing areas. The figure 32.14 shows the location of these quarters.



Figure 32.14 Location of Staff Quarters for Renovation

32.6.2.2 Public housing for floating population

Group housing is to be promoted in the intensive residential activity area by constructing flats in public as well as private sector to ensure housing facilities for the floating population. Initially group housing for 1000 families may be constructed and thereafter the number may be increased based on demand.

32.7 EDUCATION

For a projected population of 5,03,775 in 2041, the requirement of educational institutions based on the planning standard is worked out as follows.

- High schools at the rate of 700 seats/13000population = 27,127 seats
- Higher secondary schools at the rate of 400 seats / 3000 population= 67,170seats.
- Arts and science colleges at the rate 1 college per 80,000 population=7Nos
- Professional colleges at the rate of 1college per 2,50,000 population = 3Nos
- Polytechnic at the rate of 1number/ 36000 population = 17 No's
- ITI/ITC at the rate of 1 per 35000 population= 17 ITI/ITC

Since land availability for providing all the required facilities in KLMC is not found feasible. Hence for accommodating further facilities a wider region is to be delineated for the district centre and a perspective plan is to be prepared within 5 years. Considering the present capacity, following proposals are suggested: -

32.7.1 Proposals for starting new educational institutions

a) Primary schools

From the analysis, it is found that primary schools are not available in 4 locations within a reach of 1 km. Hence it is proposed to start 2 primary schools one each indivision14 and 28 in KLMC and one primary school at Thrikkadavoor in ward 7.

b) *Institution for tourism management*

A world class institution for teaching tourism management is proposed in Thrikkadavoor considering the tourism potential of Kollam district.

32.7.2 Proposals for improving the physical environment of educational institutions

From the analysis it is found that most of the government schools lack many of the infrastructure required for effective functioning. Hence the

following school specific proposals are suggested.

a.Kollam town U.P.S

- Provision of adequate toilet facilities
- Number of smart classrooms are to be increased
- Computer room and multimedia class room are to be provides
- Store room to be constructed to keep food grain and other utensils for providing meals to children

b.Kollam Model Boys HSS

- Complete replacement of old tiled roof
- Leak portion of ceilings in the double strayed building
- Electrification of class room
- Renovation of toilet roof
- To construct an auditorium
- Completion of compound wall with gate to the side of Anchalumoodu road
- Install legible school name board
- Construction of a centralized Library with access to large collection of books

c.Uliyakovil TKDM VHSS

- Providing adequate toilet and drinking water facility
- Class rooms space are to be provided

- **d.Valathungal Boys HSS**
- Adequate toilet and drinking water facilities
- Periodic maintenance of building

e.Vallikeezhu HSS

- More number of classroom spaces are to be provided
- Construction of playground
- Replacement of dilapidated roof of school building
- Required number of furniture
- Kitchen store room to be provided
- Waste management facility to be provided
- Compound wall to be constructed

f.West Kollam HSS

- Adequate toilet and drinking water facilities to be arranged
- More class room spaces are to be provided

g.Kollam Govt. TTI

- Adequate number of classroom spaces are to be provided
- Replacement of roof of existing building
- Construction of auditorium and open space

h.Koickal Govt. HSS

- Periodic maintenance of building
- Adequate number of toilet facilities and open space to be provided

- Additional required number of taps to be provided
- Strengthening of lab facilities by providing required equipments

i.Mangad HSS

- More class room spaces are to be provided
- Toilet facility for students and staff need to be provided
- New auditorium to be constructed
- Maintenance of compound walls
- Additional facilities such as Multimedia class room, computer, library, conference hall, reading room etc to be provided
- Maintenance of taps
- Provision of waste management facilities
- Construction of cycle shed and basketball court

32.7.3 Proposals for improving the quality of education

- Staff strength to be increased in government high schools in Thrikkadavoor areas and also in the unaided high schools in the planning area.
- The training programmes for teachers at present are not found effective. It is proposed to conduct several training programmes to make aware the teachers about modern policies in education sector

32.8 HEALTH

32.8.1 Proposals for new Primary Health Centres

Primary health centres are proposed in Thrikkadavoor zone. It is also proposed to establish a health centre at KLMC. 60 cents of land available at Mundalumood can be used to construct an additional health centre in KLMC.

32.8.2 Proposals for Cancer Care Centre

The only cancer care centre is located at Neendakara Grama Panchayat outside KLMC area. This cancer care centre is to be developed further for treating the entire cancer patients within the planning area.

32.8.3 Proposals for posting specialist doctors

Government hospitals at Eravipuram lack specialist doctors. Hence it is proposed to post a sufficient number of specialist doctors.

32.8.4 Community health centres

One Community centre is proposed at Pallithottam. Community health centre at Thrikkadavoor is proposed to be further developed with additional infrastructure facilities. Also ENT, Ophthalmology, Ortho, Gynecology specialist doctors are to be posted for giving better treatment.

Further development of ESI hospoiital is required, including travel facility and ancillary services.

32.8.5 Monitoring cells

The proposal intends to establish a monitoring cell to inspect the functioning of hospitals.

32.8.6 Mobile health unit

The proposal aims to establish mobile health units within the planning area which could be used at the time of emergency. It can be used for



facilitating health services like conducting general preventive awareness camps.

32.8.7 Sea Ambulance

Kollam being the one with a large extent of coastal area & Kollam beach being highly dangerous Seashore need for marine ambulance deployed in Kollam port is a must.



Sea Ambulance

32.8.8 NRHM activities

It is proposed to post a greater number of staff in NRHM for delivery of the service effectively.

32.8.9 Proposals for strengthening District hospital

- Bed strength to be increased from 537 to 1037.
- Bed strength to be increased from 6 to 16 in the pain and palliative care unit.
- ICU units to be increased from 2 to 4.
- Doctor's strength to be increased from 60 to 120.
- Additional specialty departments like Nephrology, Neurology, Urology, Cardiology, Interventional Cardiology Departments are required ((Except nephrologists all other super specialities are working with doctors on working arrangements and NHM doctors. Only one permanent post of consultant urologist at present)
- The diagnostic facilities to be improved by establishing microbiology and pathology department
- Operation theatre to be increased from 3 to 9.

- Lab facility to be increased from 1 to 2.
- Canteen to be required.
- Ambulance number to be increased from 3 to 5 (Basic Life Support-1, Advanced Life Support-1)
- One more Sewage Treatment Plant is required.

The location and available land area for the up gradation is shown in figure 32.15 and details of the land and built up area is given in table 32.1.The proposal for strengthening district hospital includes the up-gradation of existing buildings (OP & Dialysis block, Main Block, Casualty, Rotary Pay ward, MRI Block and Medical Annex), development of new buildings (Diagnostic block, Ward Tower, Utility block) & demolition of dilapidated buildings.

Total available land	20448.766 m²
Existing Built-up area	20038 m²
Proposed Built-up area	48049 m²

Table 32.1 Details of Land & Built-up area for Upgradation of District Hospital

32.8.10 Proposals for Women-children hospital (Victoria hospital)

- Bed strength and staff strength to be increased from 273 to 418.
- Doctors strength will be increased from 30 to 50.
- Laparoscopic surgery facility is required.
- Provide a new building for the proper working of the canteen.
- Ambulance number to be increased from 3 to 4 (Advanced Life Support-1).



Figure 32.15 Location & area for Proposed Up-gradation of Existing District Hospital & Victoria Hospital

- Sewage treatment plants and liquid treatment plants are required.
- Additional sick room for paramedical staff
- A separate canteen facility for staff

32.8.11 Proposals for disease preventive measures

Awareness programmes

In the planning area, awareness camps are to be organized at ward level for control of both communicable and non-communicable diseases.

Detection camps

Detection camps are to be conducted at all LSGs within the planning area for lifestyle diseases like hypertension, diabetes, heart diseases covering all people above forty years of age utilizing government fund and fund of LSGs.

32.8.12 Proposals related to prevention/ curing of occupational diseases

Cashew workers

Periodic detection camps for cashew workers are to be conducted since prolapse of uterus is found to be more prevalent among cashew workers. This can be done by LSGs through nearby government hospitals.

The cashew workers should be provided with masks for preventing the entry of dust particles into the lungs. Proper raised platforms should be provided so that the workers can shell the nuts by standing or sitting conveniently.

Coastal fisherman

Provide detection camps to be conducted among fishermen folk for identifying diseases like cancer, thyroid etc.

32.8.13 Proposal for tackling newly emerging diseases

Newly emerging diseases like Chikunguniya, dengue, lepto, spirosisetc are on increase. Early detection facility should be made available. Also awareness camps to be conducted. If a proper waste management system is implemented in the planning area other communicable diseases like diarrhea can be avoided.

32.8.14 Proposals for District medical office (Ayurveda), Kollam

A separate new building is proposed to be constructed for the functioning district medical office at KLMC with following facilities.

- Vehicle facility may be provided for the smooth functioning and administration of the district medical officer, who is the controlling officer of the 62 ayurvedic institutions in this district.

- Adequate number of computer with internet and video conferencing facility to be provided
- Conference hall
- District medical store attached with district medical office.

32.8.15 Proposals for District Ayurveda Hospital, Kollam

- District ayurveda hospital, Kollam is to be immediately upgraded with a bed strength of 500 in the general sector.
- Specialty ward for marma, panchakarma, visha, nethra, kauma-rabhrithya and prasooditantra with fifty bed
- Bed strength to be increased from 86 to 186.
- Post-operative room is required.
- Advance lab with hormone assessment is required
- Building for canteen is required
- Sewage Treatment Plant and advanced waste disposal facility is required.
- Special pay wards with 100 rooms
- Deluxe pay wards with 50 rooms
- Hitechpanchakarma theatre
- Mini operating theatre
- Ultrasound scan
- Digital X-ray unit
- Clinical lab with pathologist
- Ambulance
- Staff quarters
- Physiotherapy unit
- Recreation facility
- Canteen service
- Patient waiting lounge with purified drinking water, toilet and recreation facilities
- Staff training facilities
- Geriatric centre
- Research and development wing

32.8.16 Proposals for new government Homeo dispensary

A new government homeo dispensary at Thrikkadavoor of the planning area is proposed. A mobile unit is also proposed to be attached to this new dispensary so that it may function as speciality clinics as requirement arises.

32.9 POWER

32.9.1 Proposals for increasing the efficiency of supply

1. Proposals for gas insulated substation

Since the gas insulated substation requires lesser maintenance and lesser space compared to the normal substation it is proposed to establish a gas insulated substation within the planning area. Gas insulated substations also have longer service life.

2. Proposals for ABC system in power supply

Interruption in power supply is one of the major problems within the planning area. Hence a new system called Aerial Bunched Conductor (ABC) system is proposed for power supply, since it is free from supply interruption. The ABC system is the better choice because of the flexibility for re-routing as demanded by changes in urban development plans. It also has high reliability in maintaining services.

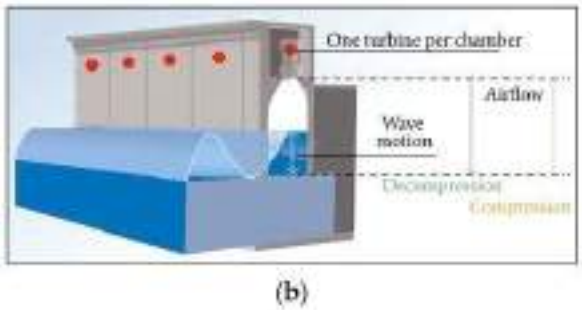
32.9.2 Proposal for generating electricity from non-conventional sources

1. Power generation from break water

It is proposed to generate power from the break water which is needed for Kollam port.



(a)



(b)

Power Generation from breakwater
(Fig shows Mutrikupower plant at Spain)

2. Energy from Biogas

The project aims to generate energy from non- conventional sources like biomass. This proposal is an extension of proposals for solid waste management.

32.9.3 Proposal for street lighting

1. Uniformity in street lights

As part of beautification within the planning area, street lights should be provided with similar kinds of light throughout the area.

2. Protection of street lights

Provision of lamp shades to street lights to increase the life of street light

3. Junction lighting

Development of alternatives to high mast towers for providing street lighting at major junctions are proposed. The operation cost due to high power consumption and difficulty in repair are the major issues associated with high mast towers.

32.9.4 Proposal for Solar Powered Bus-stops & Traffic light Control systems

The proposal for E-Vehicle charging station along NH-66 Bypass is essential as there is only one e-vehicle charging station in Kollam at High school junction. Therefore, two e-vehicle charging stations are proposed, one at Kadavoor and other at Kallumthazham(figure 32.16).



Proposal for E-vehicle charging station at NH-66 Bypass

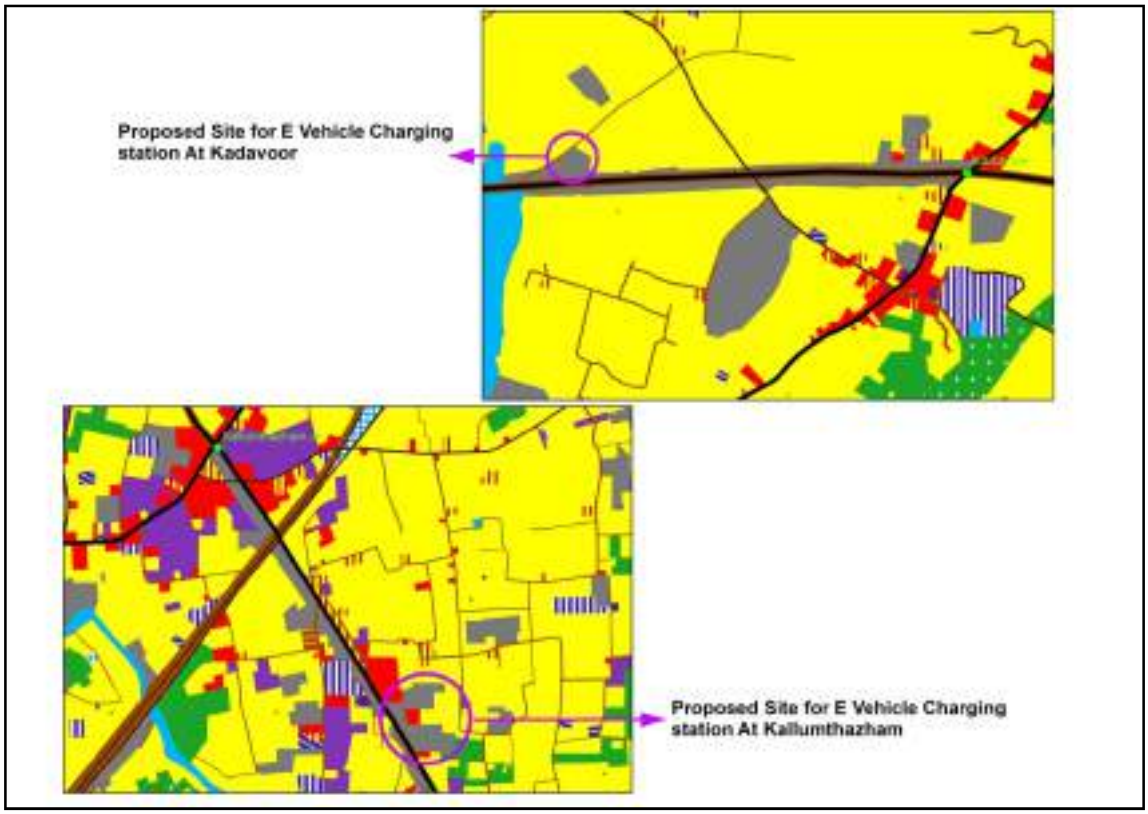


Figure 32.16 Proposed E-vehicle charging station at NH 66 Bypass



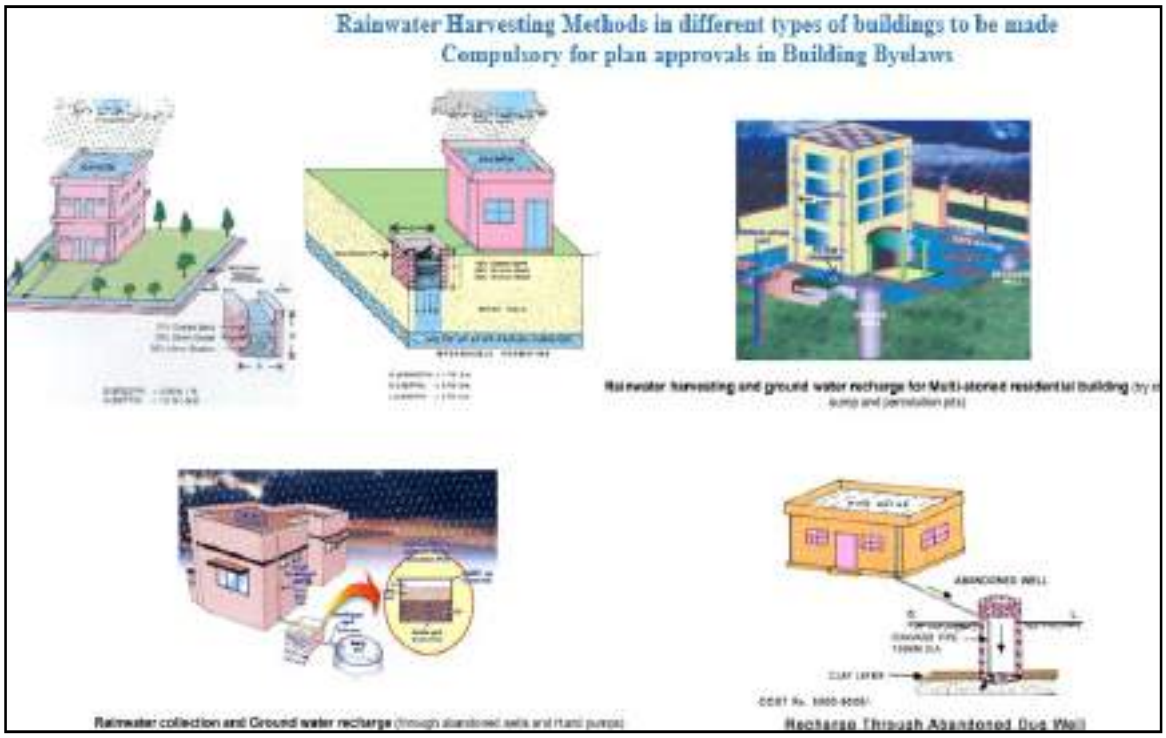
E-Vehicle charging station at High School Jn.

32.10 WATER SUPPLY

32.10.1 Drinking Water

32.10.2 Proposals for rain water harvesting

Different techniques such as contours banding, sub surface bunding, roof top rainwater collection, roof top rain water recharge etc. were developed by the ground water department for rain water harvesting suitable to different terrain / built form. LSGs in association with ground water departments, NGO's, SHGs etc. shall make serious efforts to implement any of this technique at household/ institution level. Considering the average annual rainfall as 2500 mm, the quantity of water that can be harvested from a roof top of area 100 m^2 with a runoff coefficient of 0.8 is about 0.2 ML per year. Assuming the average household size as 4.5, nearly 0.044 ML of water per capita per year can be harvested through rainwater harvesting. Hence in the planning area the rain water harvesting potential through roof top collection system alone may be worked out as 70 MLD. Even if 50% of households in the



planning area are provided with roof top water harvesting, the entire water shortage can be met with. This can reduce the huge capital cost of installing a centralized water supply system. Hence the major proposal for the drinking water sector is to implement roof top water harvesting techniques to at least 50% of households in the planning areas to meet the future water demand along with the implementation of other proposals already taken up for implementation and also to conserve the existing water sources. The approximate cost of implementation of a roof top water harvesting system is Rs. 30,000 per household. Both financial and technical assistance may be provided by the LSGs and agencies such as the ground water department, KWA etc.

32.10.3 Proposals for developing Vattakayal as a drinking water source.

Vattakayal is the only fresh water lake in Kollam city. Hence it can be developed as a drinking water source for future needs and a new drinking water project is proposed for Sakthikulangara area where marine export zone is proposed with Vattakayal as the source of water.

32.10.4 Proposals for soil conservation

The major surface source being utilized for water supply in the planning area is Sasthamkotta Lake. Minor surface sources include ponds. It is porposed to concern all the existing ponds and also construct additional ponds wherever required and found feasible. So that ponds can meet the dringking water demand for two or three wards. The yield of surface water sources can be increased through soil conservation measures. With the technical help of the soil conservation department soil conservation measures can be implemented. The LSGs selected for soil conservation measures is Thrikkadavoor.

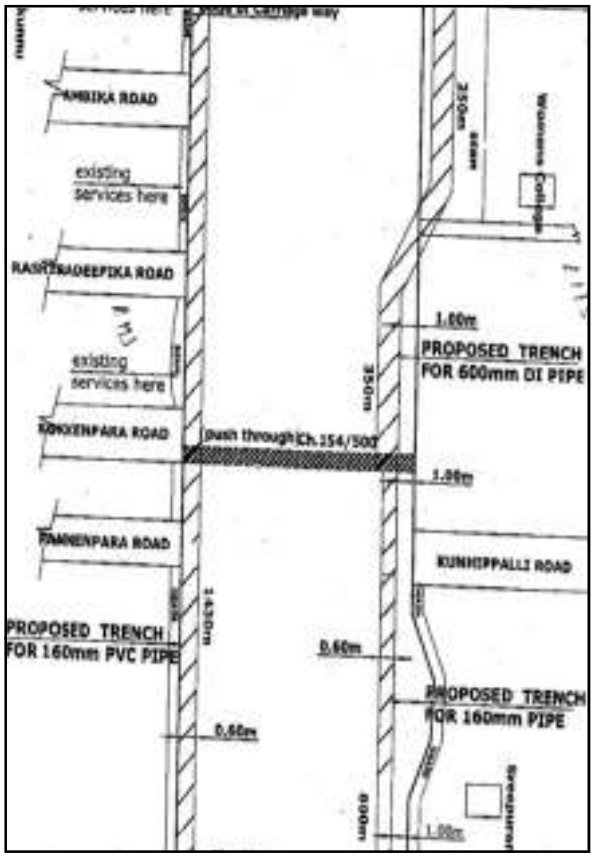
32.10.5 Water supply schemes to Thrikkadavoor area

Most of the areas of Thrikkadavoor are waterlogged and well water is saline and contaminated. Existing water supply scheme including 6 tube wells and 2 DHSR having 2.20 lakh liters at Mathilil and Neeravil is inadequate to supply water to the entire area. Hence it is proposed to construct a 2lakh liters capacity OHSR at Anchalumoodu area to supply to the elevated areas. It is also proposed to dig new tube wells at Mathilil and Neeravil since the yield of existing tube

wells is less. 1 MLD of water can be extracted from these new tube wells.

32.10.6 Replacement of deteriorated distribution lines

In order to reduce the wastage of water from 15% to 10% the corroded / damaged distribution pipes in the planning areas to be replaced in a phased manner. This will reduce the level of contamination of water supplied through the pipe system. The trench system followed in Kannur can be adopted in KLMC also.It reduces damage to roads while digging for pipe laying jobs etc.Ease for repair and maintenance of pipes also increases.



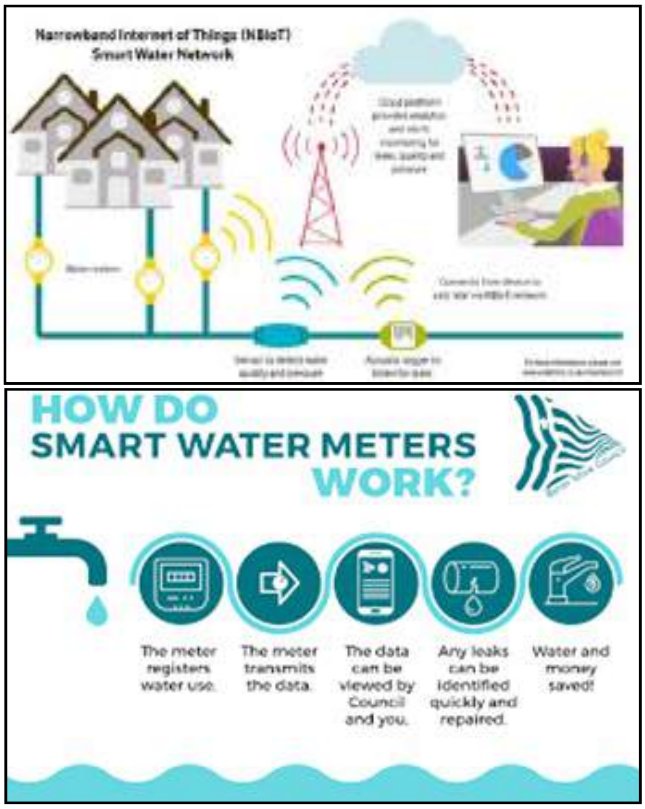
Trench system followed in Kannur

32.10.7 Proposal for treatment of tubewell water

About 6425 water supply connections are supplied from 39 tube wells in the KLMC area. Water quality tests shall be conducted twice in a year by GWA to check the quality of supplying water.

32.10.8 Smart Water Metering System

A typical smart water meter runs wire from the meter inside the home to a communication module located outside the home which in turn wirelessly communicates interval data to the smart electric meter. The smart electric meter later sends the data back to the utility.



Smart Water Metering system

32.11 WASTE MANAGEMENT

32.11.1 Solid Waste Management

Solid waste management has become a very severe issue in the planning areas especially in KLMC. In order to sort out this issue a combination of centralized and decentralized initiatives is required. Above all the people should be very much aware of the advantages and disadvantages of waste generated in their localities.

1 Proposals for making awareness among people

- The potential for imparting awareness through spiritual institutions such as temple, mosque, church etc to be utilized for educating people in managing their own waste.
- Awareness through special programmes initiated by LSGs, government departments, NGOs etc.
- Ï% Through influential personalities like film stars, sports stars etc
- Giving rewards to those who implement model waste management facilities
- Imposing heavy penalties on throwing waste in public places, water bodies etc.
- Patrolling of community level squads for watching the solid waste management
- Making special exhibitions on waste management techniques based at schools. This should also include demonstration on how waste is converted into energy and the advantage of waste in generating income to be stressed.
- Inclusion of topic on practical ways of solid waste management techniques in school syllabus.
- Awareness through Anganwadis, Asha workers etc.

2 Centralized waste management

- Ensure proper waste treatment at the centralized plant at Kureepuzha chandidipo after installing leachate tank etc.
- Additional plants using latest technologies like bio-methanation /gasification are to be provided in Kureepuzha chandi dipo so that the quantity of waste treated through windrow composting can be reduced. A plastic recycling plant is also proposed in the Chandi depo.
- 275MCF and 2 RRF are proposed within the planning area for the effective segregation of waste into reusable. The locations for these

facility units are to be identified after a detailed study.

- The load on centralized plants to be reduced by segregating degradable and non-degradable waste at source and also by reducing the areas of collection to selected pockets where decentralized activities are not found feasible. This may include the old municipal areas and banks of Ashtamudi Kayal.
- The collection, conveyance, treatment and disposal to be strictly monitored by an expert committee constituting representatives from public, local government, subject expert, departmental staff etc.
- The land fill site to be made operational at the earliest.

3 Decentralized waste management

- Decentralized waste management systems already implemented (Thumboormuzhi model) need to be made functional.
- Decentralized waste management system to be implemented in the sub centres and zonal centres.

The sub centres are: -

1) Kavanad
2) Kadavoor
3) Kallumthazham
4) Pallimukku

Zonal centres are: -

1) Ramankulangara
2) Ayathil
3) Anchalumoodu
4) Kuttichira
5) Polayathodu
6) Keralapuram
7) Sakthikulangara
8) Eravipuram

- Decentralized waste management facilities to be implemented in all the residential areas through residents associations.
- Decentralized waste management facilities to be implemented in all Anganwadis.
- Individual household level waste management to be ensured by increasing the supply of equipments / technology required for waste management
- Individual waste management systems to hotels, community halls, places of worship, hospitals and office buildings are to be ensured.

4 Proposals for supplying waste management equipment's / technologies

- It is proposed to start a manufacturing unit and allied technology support centre at the

proposed industrial area at Kallumthazham.

- Self-help groups need to be trained to supply the equipments required for vermin composting, portable biogas plant etc
- Technical support cell for implementing solid waste management system at household / community level is to be functioned in the planning area.

32.11.2 Liquid Waste management

1. Sewage Management

A. Decentralized sewage management

Community level

Proposal is to provide a common collection tank for collecting sewage from individual households and installing facilities for converting sewage into Biogas with appropriate technology. While the centralized system is ready to function, these decentralized units may be linked to the centralized system if required. This proposal can be adopted in high density areas including colonies.

House hold level

For effective disposal of sewage at household level, special initiative is required to identify households without proper sanitation facilities and through a total sanitation programme toilets with proper septic tank are to be provided to these households. The proposal also includes ecosan units in the water-logged areas of Thrikkadavoor. Through the implementation of providing ecological sanitation facilities, health risks related to sanitation, contaminated water and waste may be reduced to a great extent.

B.Centralized sewage management

The centralized sewage management system proposed for KLMC may be implemented in a time bound manner. It is also proposed to include areas along the side of Ashtamudi Kayal as a part of this centralized system designed for KLMC since the existing system of septic tank and soak pit for disposal of night soil may contaminate Ashtamudi Kayal. Faecal Sludge Treatment Plant(FSTP) is also proposed in Kureepuzha Chandi Depo (figure 32.17).

The site has an area of 32766 sq m. It is located at latitude of $8^0 53' 00''$ N and longitude of $76^0 35' 00''$ E. Its MSL is 15 m and is at a distance of 3.8 km from CBD. For FSTP, an area of 2529.05 sq m and for STP 7587.86 sq m area is required.



Figure 32.17 Proposed locations for STP and FSTP

2. Proposal for Sanitation Park

It is proposed to set up a sanitation park at Kureepuzha. Sanitation Park including Waste managing zone, Recreational zone, Buffer zone with vegetation, Pedestrian walkways and basic amenities, Training and seminar area, marketing zone (nursery, bio-fertilizer etc.) is shown in figure 32.18. It consist of

1. Awareness programs to people who are living near the area of this site, working monitoring committee including members of residents association, social activists.
2. High elevated compound wall with security cameras, gate of way, security room etc.
3. Green buffer zone with bushy plants, bamboos etc.
4. Bio-mining of dumped waste and segregated wastes (Glass, metal, rubber, plastics) used for recycling; soil used for filling some portions of existing artificial ponds.
5. Zoning of dumping yard- 10 no's (health circles) waste management areas in the yard. Biodegradable waste-windrow composting, non-Biodegradable waste- plastic shredding and baling
6. Thumboormuzhi model waste management plants are adopted outside the yard
7. Existing old buildings renovated/ newly constructed for administrative block with training

cell, seminar hall, exhibition areas etc.

8. Pedestrian walkways and sitting space for outcomers, parking space also provided.
9. Manure out let unit, plant nursery
10. Lake bank protection by cultivating varieties of mangroves and making mini mangrove forest, artificial bed for plants like phytorid (purifying groundwater).
11. Entry gate from lake to park for transporting waste cheaply through boats
12. 75% employment for the people of adjacent areas of the "sanitation park"
13. Specially designed boats can also use for transporting waste from various areas to plant cheaply

32.12 RECREATION AND OTHER CIVIC AMENITIES

Recreational facilities include tourism centers, parks and playgrounds. Hence all the proposals included for the development of the tourism sector are for providing recreational facilities also. In addition to the above, following proposals are suggested for ensuring adequate recreation facilities in the planning area which can serve the entire district population.

32.12.1. Beautification of Asramam Maidan

Asramam maidan is to be converted as a multipurpose open ground which includes helipad area, microlight, playing area, health walk, fare ground, theatre, learner's driving



Figure 32.18 Proposal for sanitation park

area, parking area, security arrangement, street lighting etc. The main attraction of maidan will be the health ring around maidan with medicinal plants, flowery shrubs, canopy trees etc. The maidan should also provide a senior citizen's launch where they can calmly spend time watching the entire maidan area. At the entry point in between police quarters and Ashramam link road an area to be developed for providing facilities like open restaurant, comfort station, parking etc. The proposals for beautification of Ashramammaidan is schematically shown in figure 32.19.

32.12.2 Proposal for recreational hub

Many recreational spots in Kollam city are located near the water bodies such as Thevally palace, Govt.Guest house, Asramam ground, children's park, Adventure park, Thangal Kunju Musaliar park, M.G Park, Beach etc. This can be taken as an advantage for creating a recreational hub by linking these spots. Tourist boat rides interconnecting different destinations can be a point of attraction. Solar roofed benches can be provided in the parks on the banks of Ashtamudi lake and in the Kollam beach. A canal view point can be set up near M.G park.The figure 32.20 shows the locations of different recreational spots and proposals for the recreational hub.

32.12.3 New zonal level parks

Zonal level parks are proposed in divisions 9,23 and 32 of KLMC.There should be at least one park and open space in each division.

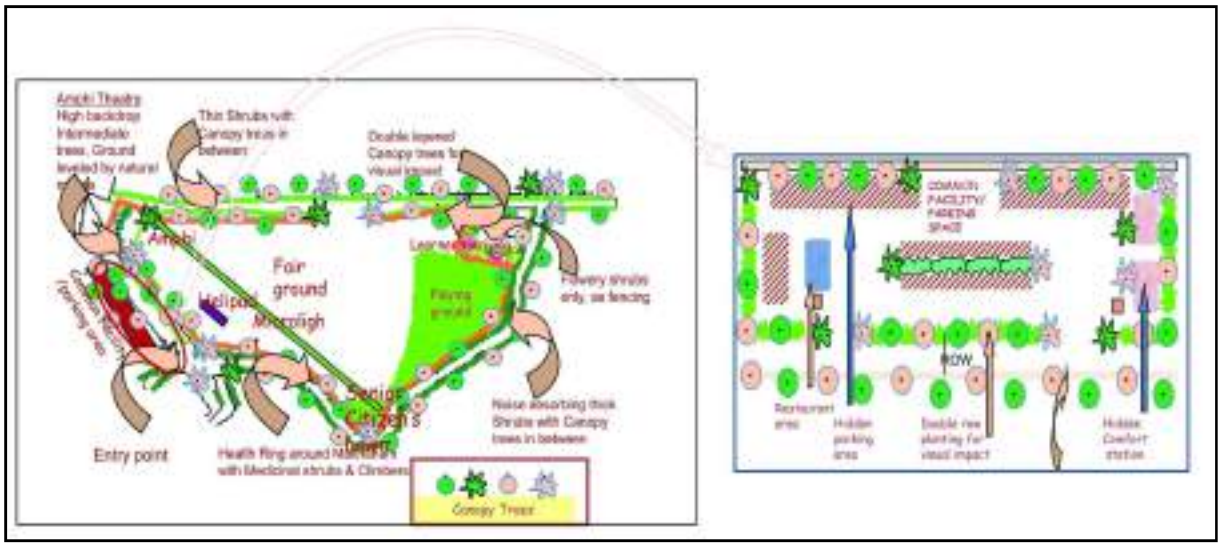


Figure 32.19 Proposals for beautification of Asramam maidan

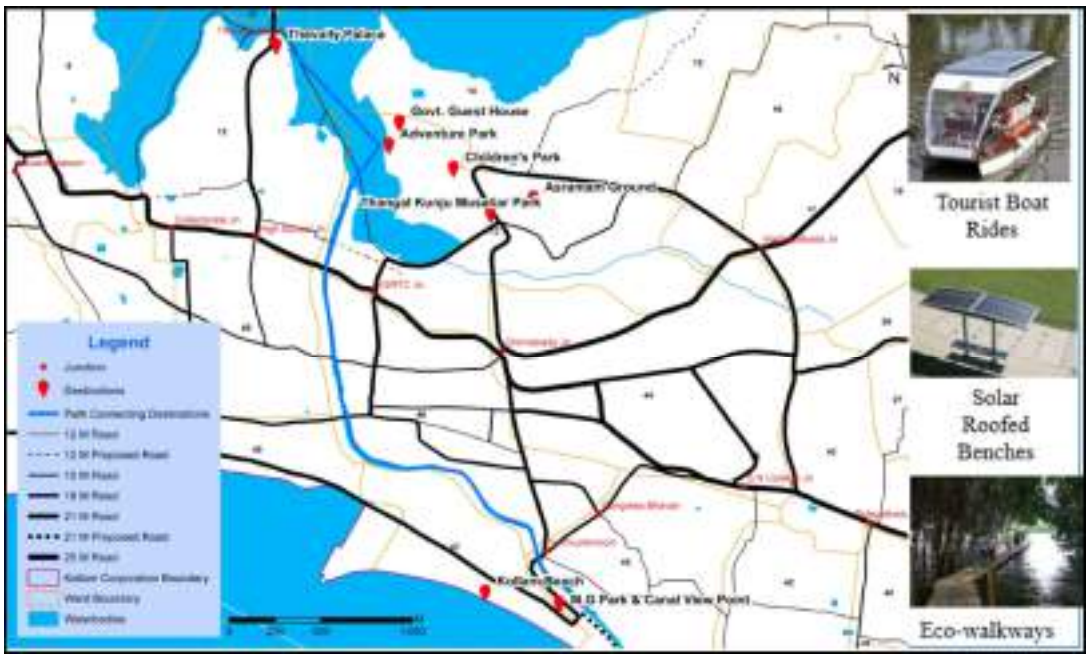


Figure 32.20 Recreational hub connecting Asramam & Kollam thodu

32.12.4 Proposals for proper maintenance of existing parks

- The existing parks and open space to be maintained for meeting the recreation demand of people. In this regard proper operation and maintenance programmes to be implemented by the representative LSGs with the help of local people.
- The water logging in Peeranky maidan to be removed by providing proper drainage facilities. The sides are to be plated with flowering trees and an organized parking area to be provided here.
- Vattakayal area to be maintained as an approachable open area without disturbing the environmental sensitivity.

32.12.5 Beautification of Kollam Thodu

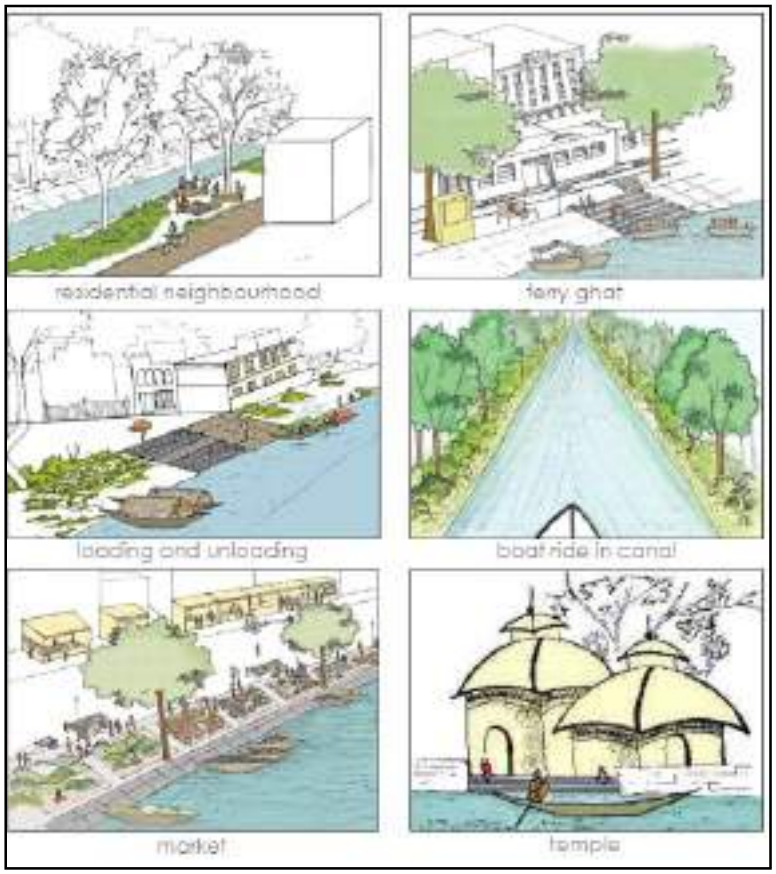
The beautification of Kollam thodu was proposedunder the tourism sector to be completed in the initial stage of plan implementation to provide recreation facilities. The proposed beautification patternfor canal stretch near Kollam beach with recreational facilities is shown in figure 32.21.

32.12.6. Beautification of Kilikolloor Thodu

The Kilikolloor thodu connects the Perumpuzhachira in Elampalloor panchayat and Ashtamudi Lake near Koickal in KLMC with a length of about 14 km. The Kilikolloor canal has a potential of promoting tourism and also takes a major role in mitigating flood in the eastern side of KLMC limits.



Figure 32.21 Beautification of canal pattern proposed near Kollam beach with recreation facilities



Beautification of Kilikolloor thodu

32.12.7 Proposals for swimming pool

Kambilkulam in Thrikkadavoor is proposed to be renovated as a swimming pool with proper infrastructure facilities.

32.12.8 Proposals for Mini stadium

The proposal intends to establish a mini stadium at Uliyakovil. Roaring engines, screeching spins, sharp contours, thundering speeds, the adventure and glamour of motorsports have always turned on the passions for billions, around the world

including Kollam. People in Kollam have the craze and frenzy for the sport, and they are offering to spend money maintaining the facilities offered.

- The other interesting part of this attraction is that one doesn't need to get intensive training to experience this fun.
- Induction of this fun-sport will definitely increase the attraction for the Sport, Leisure & Recreation Centre and will also boost up the revenue sources of the complex.

32.12.9 Proposal for Go-karting near Kollam Beach

Go-karting is an outdoor track design that is 670 feet at center-line.

- The pit area has two long lanes and handles up to 24 karts

The Go-karting Complex Involves Spaces Like

1. Go-karting Track
2. Maintenance Building
3. Fuel Tank
4. Admin Room
5. Store Room



GoKarting

6. Changing Room & Toilets

GoKarting

- Central Line Distance : 420m
- Track Width (Inside Rail) : 6.5-7m
- Track Width (Total) : 8.5m

Building Area : 145 Sqm.

- Admin Room - 40sqm
- Store - 40-50sqm
- Changing Room & Toilet - 25 Sqm
- Service Space (Maintenance Building)– 150-180sqm
- Fuel Tank
- Service Road

32.12.10 Other Social Amenities

Other social amenities proposed are:

- Cremation/burial ground in Thrikkadavoor.
- Old age home at KLMC.
- Pain and palliative care unit
- Night shelters.
- Community hall in Thrikkadavoor
- Authorized slaughter houses in Thrikkadavoor.
- New Police station at Kallumthazham

32.13 ART AND HERITAGE

32.13.1 Heritage conservation plan

From the analysis it is found that a number of heritage centres are available in the planning area. The spiritual buildings may not require any additional conservation programs as

the followers will take care of the conservation measures. However other heritage centres such as Thangassery fort, Dutch cemetery, Thevally palace, Cheenakottaram, Clock tower, Thangassery light house area etc. need special conservation measures. Hence it is suggested to prepare a detailed heritage conservation plan which includes documentation of heritage precincts, restoration / conservation activities with minimum interventions to the structures.

The proposals included intourism development such as Museum at Thevally palace, traditional cultural festival etc. will also act as conservation measures for the heritage centres of the planning area.

32.13.2 Heritage street

In a bid to showcase Kollam's history and cultural heritage, a heritage street will be constructed at Asramam. The street will have sculptures, artistic works and outlets selling regional products such as cashew and spices.

32.13.3.Thangassery breakwater tourism

It include a cycle track, walkway, parking area, information centre, children's park, and rain shelter.

32.13.4 SreeNarayana Guru Cultural complex

The project site is in a land measuring 3.82 acres near to Asramam ground, Kollam. The site is 0.5 km from Kollam Bus Stand and 1.1 km from Kollam railway station. This cultural centre can provide domestic and international tourists an experience of the art and culture of Kollam.



Sree Narayana Guru cultural complex

32.13.5. Heritage Zone -I

The proposed heritage zone-I includes the present Civil Station – Vadi road starting from Collectorate to Kollam port. It consists of Vigilance Office, Sub Registar Office, Kottarakulam,Labour Court, Anandavalleeswaram Sri Mahadevar Temple and surroundings, Kollam Rameswaram Mahadeva Temple,

and Thoppilkadavu where remains of heritage precincts of Venad Kingdom still exist. Heritage zone-I joins with Heritage zone-II mainly consists of remains of colonial invasion at Freedom Park near Kollam Port.

32.13.6 Heritage Zone-II at Thangassery area

The delineated area shown in figure 32.22 is proposed as Heritage Zone-II because many of the heritage important buildings and monuments constructed during colonial invasion are concentrated in this area. The area of this zone is about 51.4 ha. It is also proposed to set up special guidelines for this area which will showcase the relations between Kollam and foreigners in the past. The following can be considered for such guidelines:

- Creation of policy environment to preserve the Dutch and English Cemeteries by proper rehabilitation of the informal settlements that encroached the monuments.
- Conservation of the heritage buildings and declaring it as a part of heritage.
- Restoration of old historic buildings through controlled developments and façade upliftment of the streets to improve the architectural morphology and the aesthetics.

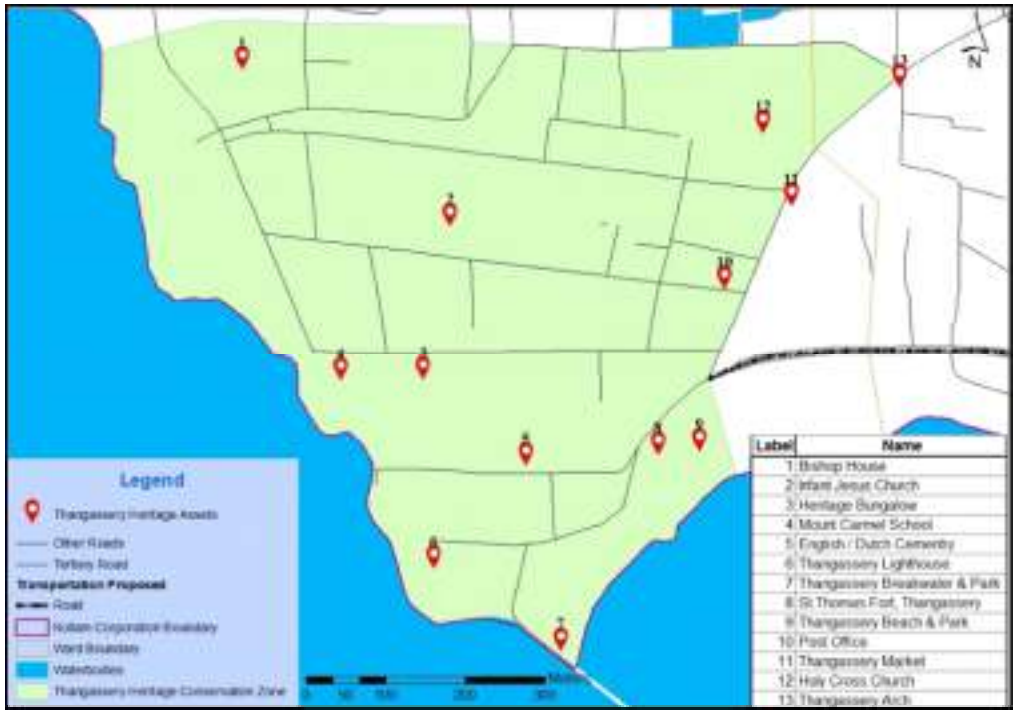
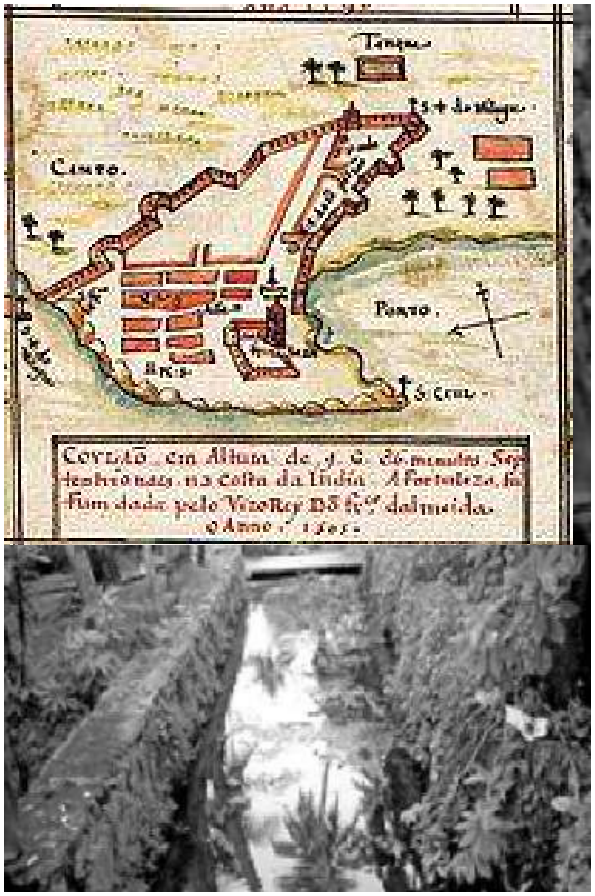


Figure 32.22 Area delineated for 'Proposed Heritage Zone-II'

32.13.7. Conservation of Buckingham Canal

The Canal has a rich past that is also becoming history along with the glory of the Canal. The Canal is believed to be a key conduit built by the Portuguese some 450 years ago



inside their strategic territory, the Fort Thomas. Thangassery area was an exceptional natural port, it was reef infested, and so a canal was constructed to transport the consignments from the ships calling at the port and exports back to the ships.Barges were said to have been used for transportation through the Canal. Thangassery is a projection into the sea and both ends of the Canal originally opened at the Arabian Sea. Now the width of the canal is narrowed due to encroachments. Therefore, it's important to revitalize and re-establish the canal.

32.13.8.Other Proposals

- Improving the existing infrastructure at ThoppilKadavu
- Revivifying the old core at the ThoppilKadavu with an interpretation garden leading to Thangasseri
- To preserve the mangrove forest which acts as a preventive agency to water pollution in Ashtamudikayal
- Revivify the Administration and Anandavalleswaram temple square with inclusion of urban open spaces
- Providing proper policy environment to develop and conserve historical precincts
- Conservation, preservation and adaptive reuse of the heritage precincts should be the major strategies
- Basic infrastructure facilities near heritage sites like signage, walkways, and lighting and

transportation facilities must be provided.

- To promote the cultural heritage, museums should provide a platform for offering information about the rich culture of Kollam city.
- Conservation strategies are to be made to protect the existing pristine ecosystem in the area.
- Awareness to the people about the importance and depletion of mangroves.
- Asramam maidan itself has great historical importance and needs to be considered a part of heritage.
- Empowering communities to make educated decisions related to mangrove management.
- Increase technical and institutional for improved environment governance at all levels.
- Promote community-based actions on the ground in mangrove management for improved resilience to climate change.
- Construction of mangrove avenue
- Installation of bio-swales can be used to remove debris and other waste materials.
- Construction of Miyawaki forest around Asramam ground

32.14 SPECIAL CONCERN AREAS

32.14.1 Proposals for Ensuring Basic Infrastructure

1.For SC families

Shelter to homeless families who own land

Special schemes should be implemented to provide housing loans at low rates so that homeless families who own land can construct houses.

Shelter to houseless and landless families

To provide shelter to houseless and landless families, low cost housing schemes with common amenities are to be introduced.

Sanitation facilities

Those families (nearly 29) donot have sanitation facilities are to be provided with sanitation facilities and the unusable toilets of 125 families should be made usable by providing financial assistance for maintenance by respective concerned authorities

Drinking water facilities

In order to ensure safe drinking water facilities additional tap points / common wells are to be provided in the SC habitats.

Electrification of houses

Though electrification is done to all the houses and habitats, special care should be taken to reduce

voltage drop which is occurring in habitats

2. For BPL families

In 39252 BPL Families, those who do not have basic amenities like food and shelter should be identified by conducting surveys and schemes should be implemented for providing it.

3. For Women and Child

For the development of women and children the Anganwadi is to be strengthened with adequate physical infrastructure such as mini conferencing facilities, rest rooms and counseling facilities etc.

4. Elderly people

Shelter for spending time for the old aged people are to be provided in the planning area. The proposal is to construct one senior citizen's camp in each of the LSGIs in the planning area where old people can assemble / stay if required and can engage in various activities. Counselling/ meditation / medical aids are also to be provided in this camp.

32.14.2 Proposals for Sustainable Livelihood Opportunities

1. Imparting technical skill

The proposals are to impart technical skill to the socially vulnerable people by conducting short term courses with the help of technical institutions and DIC so that they can avail jobs in various fields.

2. Promoting self-help groups

Formation of self-help groups among the socially vulnerable people and providing financial and technical support for running small scale ventures will definitely provide sustainable employment.

3. Special training to fishermen folk

The fishermen folk are to be given training in value addition of fish products and financial assistance to be provided for small ventures for manufacturing food products. They are also to be provided with special rationing during off season.

4. Reservation for unskilled work

In all the developmental activities undertaken by the government / government agencies at ward level priority is given to engage socially vulnerable people at the time of construction and maintenance which need unskilled manpower.

5. Training for using agriculture implementation

Special training programs for the usage of agricultural implements to be provided to them so that the technical job in the agriculture sector can be handled by them.

6. Literacy campaign

In order to make the people literate and thereby increase their demanding power, a special literacy campaign will be initiated.

7. Special nursing school

As the nursing profession is providing more job opportunities a special nursing school for conducting courses to the socially vulnerable people alone is proposed.

8. Institution for giving training for making handicraft items

In order to equip the socially vulnerable people to tap the advantages of tourism development a special school for giving training for making handicraft items is proposed.

32.14.3 Other Social Welfare Measures

1. Proposals for the welfare of women

- Promoting a greater number of tailoring units thereby making women self-sufficient.
- Promote a greater number of co-operative societies for women.
- Proposals for mothers which includes welfare schemes such as health and nutrition, education
- Proposals for women headed families which include welfare schemes such as health and education.
- Strengthening women's participation in Technical jobs, agricultural development, dairy development, agro services and small-scale business sector.
- Conducting training programmes through IRDP, TRYSEM, DWCRS

2. Proposals for the welfare of children

- Periodical health check-up and detection of child - hood disabilities through Anganwadi and implementation of community-based rehabilitation programmes.
- Nutrition proposals such as supply of supplementary nutrition and ready to eat food through Anganwadis.
- Education proposals which includes non-formal preschool education, use of audio-visual media, improvement of infrastructure facilities of Anganwadis, strengthening the service of well-trained pre-primary teachers, pleasant and clear atmosphere in Anganwadi.
- Counselling centres to be established within schools to identify child abuse and to find solution to prevent child abuse.
- Ensure the functioning / quality of psycho-social schemes in every school.
- Legal system to be strengthened for disposing cases involving rape, molestation etc.

- Minimum wage act to be compulsorily followed in shops and other establishments and the working time to be limited to 8 hours.
- Special seminars to be conducted for teachers and parents to prevent the occurrence of child abuse.

3.Proposals for the welfare of adolescent girls

- Programmes for the supply of nutrient food for the adolescent girls to be strengthened.
- Social development schemes for victims of molestation, natural calamities, riots etc are to be implemented with the support of the local community to be initiated.

4. Proposals for differently abled

About 119 differently abled SC people should be provided with counselling services, special nutrition, and health facilities through Anganwadi.

- Providing supplementary nutrition from the nearest Anganwadi
- Providing pension to the family.
- Periodical visit to the patient's home by health staff / Anganwadi workers and provide medical and moral support.
- Counselling services
- Awareness to parents of mentally / physically handicaps through Anganwadi.
- Social development schemes which includes early detection of child-hood disabilities, protection from exploitation / abuse, starting special schools for those differently abled ones.
- Employment schemes through providing support for establishing small enterprises for making paper bags, toys, painting works etc.

5. Proposals for old aged

Welfare schemes for the old aged are proposed to be implemented through strengthening the old aged homes. Old aged homes provide care and protection to neglected aged people.

Proposals for strengthening old age homes include: -

- Geriatric care
- Counselling service
- Entertainment (Music / game)
- Spiritual awareness
- Horticulture

6. Social security measures

Reduction of Antisocial activities by:

- Strict enforcement of law
- Equip the people by timely information to police about antisocial activities

- Crime alert system involving public and community

Preventive measures for suicides by:

- Ensuring social justice to all.
- Increasing employment opportunities
- Intervention programmes - eg. Identification of at - risk families / persons, depression patients, alcoholism, psychiatric illness, terminal illness.

Depromoting dowry system by:

- Creating continuous awareness through media
- Deputing special dowry prohibition officers
- Empowering brides
- Timely information to police
- Including pros and cons of the dowry system as a part of legal literacy.

Proposals for reduction of accidents

- Education at school level on good driving practices
- Better road facilities
- Strict enforcement of law against road rule violators
- Making available an Emergency Medical Service system (EMS) covering ambulance service, emergency medical technicians service etc.

32.15 ENVIRONMENT

32.15.1. Proposals for Conservation of Environmentally Sensitive Areas

Proposals include conservation measures to Ashtamudi Lake, other water bodies, paddy / wetlands, sacred grooves, coastal areas and for abating air pollution.

1.Ashtamudi Lake

Proposals for formation of Ashtamudi Wetland Management Authority (AWMA)

Considering the importance of Ashtamudi Lake in the environmental conservation, it is suggested to form an independent authority with full power for planning implementation, monitoring and evaluation of conservation measures to Ashtamudi Ram sar site. The Kerala conservation of paddy land and wetland act 2008 to be amended to provide for such authority.

Ashtamudi Wetland Management Plan

The proposal is to prepare a long-term management plan for the conservation of Ashtamudi Lake which shall be provided with strategies for preventing encroachment, pollution along with other conservation measures.

Provision of Bio filter at seriously affected areas

Bio filters are formed by planting mangrove/ mangrove associates in two rows with Lake water in between. This kind of bio filter is provided at the bank so that the leachate from land word side will be filtered in this bio filter and further contamination of Lake can be prevented. Bio filters are proposed at chandi-dipo area, slaughter house is and along the side of Ashramam link road near KSRTC bus stand. At chandidipo and slaughterhouse area three array of plants consists of tall flowering trees, mangrove associates and mangroves at the bank and another row of mangrove planted on bund made in Lake leaving a width of 5 m from the bank as shown in figure 32.23.

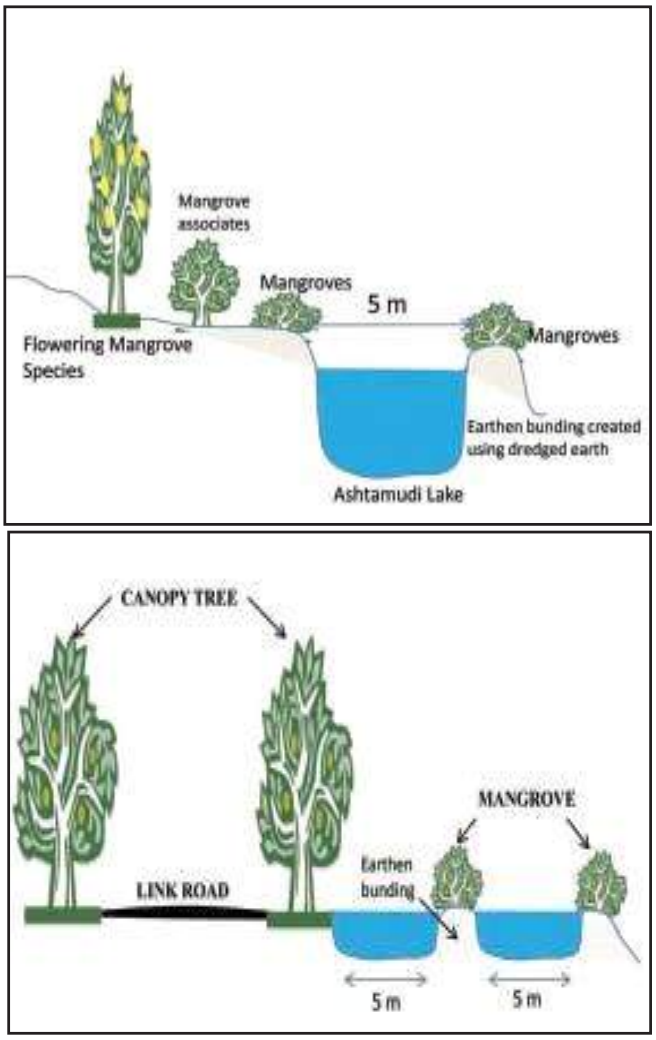


Figure 32.23 Schematic array of Bio filters at Chandi dipo and slaughter

By planting tall flowering trees along the bank, this will act as a screen to prevent direct vision of Kureepuzha waste dumping yard (chandidipo) and slaughter which otherwise spoils the aesthetics of Ashtamudi Lake. The bio filter formed will prevent the leachate from chandidipo and slaughter house area. In the case of bio-filter near Asramam link road instead of providing continuous bund it is proposed to provide isolated bunds in a zigzag manner so that the vision of lake from the link road is not obstructed. The plastic and other solid waste filtered and retained in the bio filter can be removed periodically. The bio filter can be demonstrated as the mangrove park so that nature lovers can see different kinds of endangered mangrove species. As periodic dredging of jetty area is necessary, the dredged soil can be used for bunding.

Conservation and regeneration of Mangrove

A proposal for the conservation and management of mangroves as they stabilize the shore line and act as a barrier against impact of encroachment by the sea and check soil erosion is suggested along the bank of the lake. Regeneration is proposed to be done by planting 3-tier vegetation all along the waterfront. The vegetation includes kandal along the waterfront, kandal associates as a second layer and third layer as thick bamboo fencing as shown in figure 32.24.

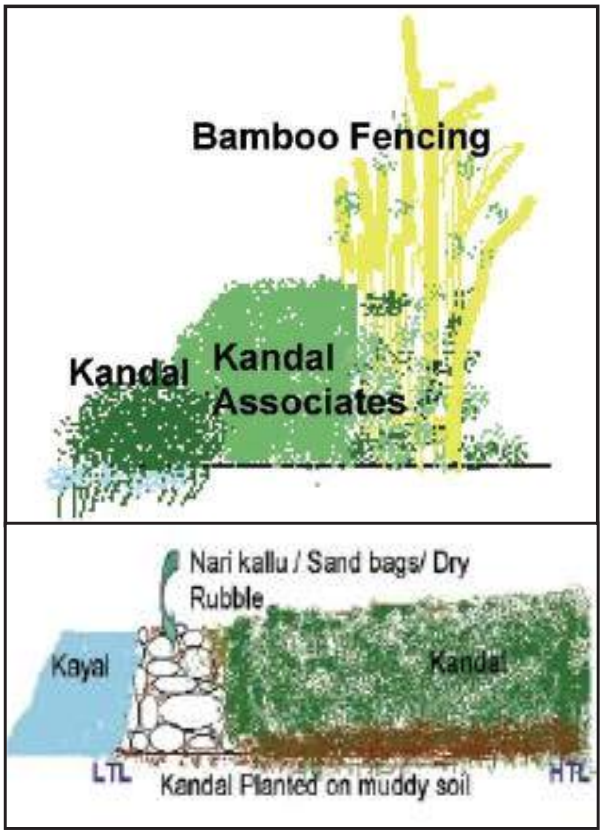


Figure 32.24 Conservation and management of mangroves

The planting of mangrove seedlings may be done on muddy soil in the area between low tide line and high tide line after demarcating low tide line with locally available narikallu or dry rubble or even sand bags accordingly. Conservation and requirements of mangroves is to be carried out throughout the bank except at the location of bio filters.

Exhibition cum Information centre for mangroves, mangrove associates, and other organisms that depend on mangroves (Figure 32.25) can give awareness about the importance of mangroves in the ecosystem. It is proposed at Asramam.

Waste management in house boat

All the house boats should be provided with a waste management system so that no waste either solid or liquid can be entered into the Kayal.

Periodic monitoring of water quality

The water quality of the lake at selected locations shall be monitored regularly to know the rate of contamination. The service from the higher order educational institutions can be availed for this purpose.

Plastic free zone

The Ashtamudi lake is to be declared as plastic free zone and dumping of plastic to the lake shall be

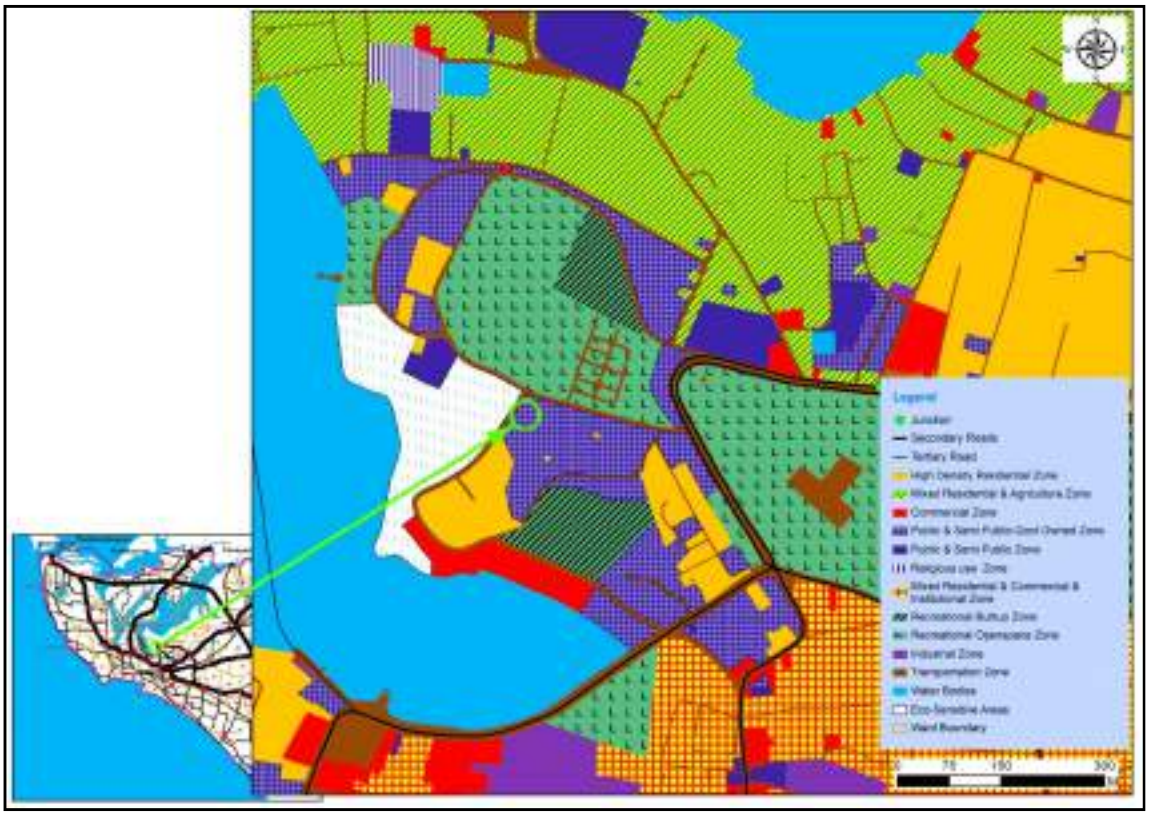


Figure 32.25 Proposed location of information centre

restricted by promoting the usage of other substitutes and by imposing heavy penalties to those who throw plastic waste into the lake.

Modernization of coconut husk retting units

It is proposed to modernize the coconut husk retting units around Ashtamudi lake by providing efficient treatment plants attached to the soaking units.

Prevention of direct discharge of waste water through waste water recycling

Most of the hotels, restaurants, hospitals, clinics, markets etc. are discharging the wastewater directly or indirectly into the Ashtamudi lake. Hence its proposed to implement a waste water recycling plant to all major institutions along the side of lake.

Conversion of hanging toilets to eco san toilets / bio toilets

Hanging toilets along the banks of Ashtamudi Kayal especially in KLMC to be replaced by eco friendly toilets like eco san toilets and bio toilets. Through eco san toilets the waste is converted into the bio fertilizer and through bio toilets methane gas can be utilized in kitchens.

2. Proposals for conservation of other water bodies

Renovation Vattakayal and Kattakakayal

The Vattakayal area is included in the environmentally sensitive area. Along the bank of the Kayal mangrove afforestation to be promoted. The Kattakakayal, now almost filled up by dumping solid waste, needs to be cleaned and side protection with geotextiles is to be done.Figure 32.26 shows a schematic diagram for the renovation of Vattakayal. The details of the proposal is described in Chapter 33. 25 m buffering using natural fencing with locally available plants are also suggested to protect other water bodies.

Beautification of Kollam Thodu

This proposal is included for tourism development while beautifying the canal after rehabilitating the encroached families and widening the thodu, the conservation of this artificial water body can be ensured.The details of the proposal is described in Chapter 33.

3. Paddy / Wetlands

Promotion of active paddy cultivation

The most effective way in conserving the paddy area is by promoting paddy cultivation in the fallow land. The wetland / paddy owners are to be given special awareness programmes about the necessity of maintaining paddy areas for environmental conservation. The

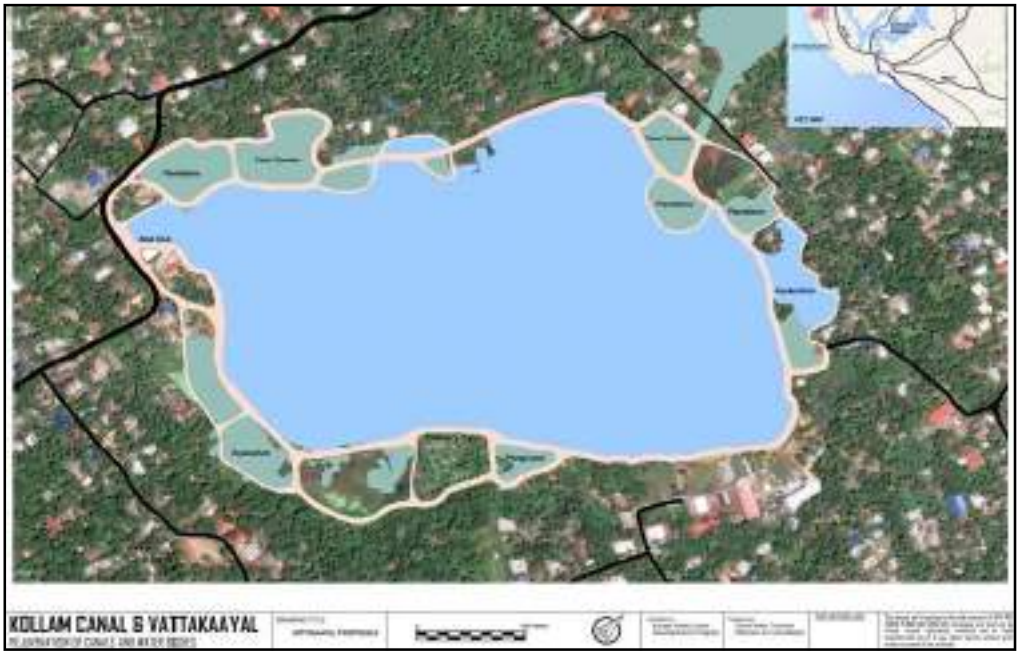


Figure 32.26 Renovation of Vattakayal

services of workers in NREGS programme to be extended for making the fallow land ready for cultivation. This will reduce the cost of cultivation. Other assistance such as timely supply of high yield variety seeds, agriculture implements etc. will encourage the cultivators.

Promotion of water recharging measure

If any land is kept as fallow in spite of all promotional activities for paddy cultivation, suitable water recharging measures are to be adopted to maintain the area as such.

Strict enforcement of 'The Kerala Conservation of Paddy land and Wetland Act'

Inorder to conserve paddy / wetland area strict enforcement of the Kerala Conservation of paddy land and Wetland Act' is to be done by the concerted effort of LSG and people. The elected representatives from each division/ward shall be aware of the location and availability of such land in his/her jurisdiction and any illegal conversion shall be brought to the notice of the respective authorities and the area to be protected.

4. Proposals for protecting sacred grooves.

Making awareness among local people

Sacred grooves protect watersheds and water sources. These areas provide habitat, water and nest sites for the wildlife and birds. Most of the tree species are protected inside the sacred grooves for years. At present, most of the sacred grooves are under various threats. However, the importance of the sacred grooves is not known to most of the people, especiallythe younger generation. Old generation worships the sacred grooves as they consider this as the holy space. Hence the proposal is to impart awareness among youth with the help of senior citizen's by conducting seminars, workshops etc.

Conservation measures

The existing sacred groves are to be conserved by planting new species wherever required, nurturing and maintenance of plants and trees and by soil and water conservation measures.

5. Conservation of coastal areas.

Limiting the tourism activities to the carrying capacity level

The beach tourism activities will be limited to its carrying capacity level to maintain the environmental balance of the sea coast.

Coastal management plan

The coastal management plan is to be prepared in line with CRZ notification and strictly implemented for conserving the coastal areas. While preparing the coastal management plan however equity shall be ensured. In the case of KLMC, it is pointed out that some areas are not designated as developed areas and hence people in those areas are deprived of some of the benefits in the provisions in CRZ for developed urban areas.

6. Proposals for reducing Air/Noise pollution.

Reduction of air pollution from cashew factories

One of the major industries within the planning area is cashew processing. Thick emission coming out from the roasting plants and borma units creates air pollution to a great extent. Hence it is proposed that the emission from roasting plant and borma unit is to be scrubbed with a suitable medium in a scrubber and then vented through chimneys of suitable height.

Reduction of air/noise pollution from vehicles

Air pollution and noise pollution due to traffic can be reduced by various techniques like construction of barrier walls, allowing single lane traffic, isolated traffic for heavy vehicles, constructing smooth roads etc. This is proposed to be established in most of the congested roads within KLMC. Promoting NMT wherever possible is also reduce air and noise pollution.

32.15.2 Other proposals

- Creating public awareness to keep the lake clean with signboards
- Imposition of fines for polluting the area by for throwing waste in the open areas
- Proper waste management- waste bins should be made available for safe disposal of urban wastes

32.16 DISASTER MANAGEMENT

32.16.1 Disaster management plan

Since the planning area is the most vibrant zone of the district, associated with various hazard prone areas, it is suggested to strengthen the functioning of the disaster management cell and also to prepare a dynamic Disaster Management Plan for the planning area.

32.16.2 Mapping of rehabilitation areas

In the case of an emergency situation, the people need to be rehabilitated at suitable locations. For this mapping of rehabilitation areas considering the availability of road network and other amenities is to be

prepared in advance by the disaster management cell in association with other agencies.

32.16.3 Proposal for permanent rehabilitation of people from hazard prone areas

The people living in the hazard prone areas need to be rehabilitated to suitable locations stage wise. The disaster management plan should also cover this aspect.

32.16.4 Proposal for safety against fire hazards

According to the proposed land use for 2041, Sakthikulangara area gains the potential of becoming a commercial and industrial hub. Also it is to be noted that this area is comparatively far from the existing fire stations. Therefore, the new fire station is proposed to be established at Sakthikulangara.

- The existing fire stations at Kadappakada, and Chamakada are to be strengthened by providing recovery vehicles and other facilities.
- It is proposed to provide fire hydrants at different places within the city limits.

32.16.5 Other Proposals

Training workshops should be hosted in 1. Incident Command System 2. Early Warning Systems and Methods of Evacuation 3. Emergency Medical Care I 4. Rapid Damage and Needs Assessments 5. Volunteer Ethics and Protocol 6. Organizing and Managing Volunteers.

- To build a network of community volunteers via CDS which will recruit and train vulnerable persons and civil society groups from the KLMC area, thereby giving them the necessary skills and capacity which will enable them to respond effectively in an emergency and



Mapping of Rehabilitation areas using Mobile Application

engage their communities in disaster risk reduction activities.

- Strengthen disaster preparedness for effective response at all levels.
- Remote Sensing Solutions for Disaster Management & Emergency Response should be developed so that we can achieve Rapid, Actionable Decisions.
- The mobile terminal is the key receiver of early warnings because people always carry it with them and its penetration ratio is higher than that of traditional fixed telephones. Even when mobile traffic is severely congested, the warning notification must reach multiple mobile terminals simultaneously, so a Disaster Relief Guidance system should be implemented especially during floods which occurred in 2018 and 2019.
- Disaster relief guidance system: When a victim starts the software for "Guidance service for Disaster Relief" in his mobile terminal, the terminal displays the map showing the site of evacuation shelters, hospitals and other relief locations. Once the victim has selected one of the locations of rehabilitation camps, the terminal displays a graphical route showing directions to it. Then the victim can easily identify the walking route to the selected location.
- Training of urban community volunteers on climate linked epidemic control should be implemented for ASHA workers, ICDS workers, and Kudumbashree ward health volunteers with technical and resource support from National Health Mission and District Medical Office.
- To support the preparedness, readiness and response for COVID-19, project proposals are should be developed for diagnostics, medical devices, Sanitizers, Disinfectants, masks, ventilators, goggles, other medical equipment, IT based solution for tracking, awareness, mental health or any other intervention for prevention and control of COVID-19 by Individuals or start-ups.
- Post-Covid clinics should be started so that many mentally and physically distressed persons can share psychological stress to the medical staff. Appropriate psychological support is also needed.

32.17 GOVERNANCE

32.17.1 Proposals for Mobilization and Utilization of Resource

Following suggestions are included for mobilizing more resources for meeting the fund for developmental activities.

- Enhancing effectiveness of tax administration mechanism
- Tax mapping
- Simple, payer-friendly pay meet gateways.
- Conducting ABC analysis in property tax collection
- Assigning of unique premise number
- Incentives and panel provision for effective tax collection
- Restoring buoyancy of property tax
- Introducing self-assessment scheme for property tax collection
- Land available with the corporation may be used as a potential resource by implementing remunerative projects, sale and lease or leveraging land for raising funds.
- Collection of land based non-property taxes such as vacant land tax, tax on land value increment
- Levy of betterment charges
- Effective pricing and collection of user charges
- Accessing the capital market either through urban project management approach or through municipal financial management approach
- In order to utilize the resources following suggestions are made
- Project planning wing to be strengthened to formulate plans in advance
- Ensuring proper coordination among implementing agencies
- Monitoring of projects while implementation is to be done effectively
- Continuous evaluation on projects implementation to identify new issues and further planning

32.17.2 Proposals for Increasing the Efficiency in Delivery of Services

- Effective functioning of public grievance cell
- In every LSGs a public grievance cell for booking complaints from the public on delayed or poor services
- Proper feedback from the public grievance cell and respective departments and back.
- Timely implementation of repair / maintenance works

- Arrangement of mobile unit for attending urgency works
- The enquiry cell needs to be strengthened by employing competent person for giving correct information on various services so that people need not visit the various departments for collecting information on various services
- Proper monitoring mechanism to be implemented for various developmental activities
- In the technical committees' subjects experts are to be included for proper planning implementation of projects
- Special drive for speedy delivery of services to be initiated with the help of all concerned departments
- E-governance to be implemented for speedy transfer of information and thereby quick decisions can be taken on service delivery.

32.17.3 Proposals for Increasing Participation and Coordination

- Special training programmes to be conducted for ward sabha members at each ward to ensure effective participation of people in developmental activities
- Wide publicity on Ward Sabha meetings through a core group consisting of representatives of different political parties, NGOs, residential associations, government servants etc.
- Discussing feedback on the decision taken in the previous meeting in ward sabha so that the members feel that they are also part of the governance system.
- Proposals for increasing the coordination between different departments are as follows
- Organizing inter departmental review meetings at least in a month in which detailed discussions on the developmental activities taken up by each department to be carried out so that each department can take up the respective works without any overlapping or isolation. Proper integration of works can be ensured through such meetings.
- The respective standing committee chairman and the section should have close interaction for carrying out the activities effectively.

CHAPTER - 33
PRIORITY PROJECTS, ACTION PLAN & PHASING

In this chapter 20 priority projects selected from all the suggested proposals are detailed out with action plan with phasing of proposals. The suggested locations wherever finalized by the special committee, rough cost of implementation without making detailed analysis of cost component, suggested agencies for implementation and resource mobilization are also included.

33.1 PRIORITY PROJECTS

Priority projects are;-

1. Road widening
2. Junction improvement
3. Proposal for mobility hub & Mini satellite station
4. Proposal for New bus stand
5. Proposed NMT
6. Truck terminal
7. Oceanarium
8. Eco Tourism development, Kandachira
9. Lakefront tourism promotion zone
10. Paddy tourism
11. Island tourism
12. Eco-walway
13. Sanitation park
14. Beautification of Kollam canal
15. Beautification of Killikolloor Thodu
16. Proposal for swimming pool
17. Asramam heritage street
18. heritage zone-I
19. heritage zone -II
20. Renovation of Vattakayal and Kattakayal

Figure 33.1 shows the locations of the priority projects.

33.1.1 Road widening

This project includes widening of outer ring roads, inner ring roads, radial roads and important link roads including balance work of NH-Bypass. For implementing the project required land is proposed to be availed using different options such as free surrender of plots by the owner and giving relaxation to construction in remaining plot, land pooling, TDR methods and land acquisition if required. A Special Purpose Vehicle (SPV) in which major share holder is KLMC is proposed for availing land using different methods in consultation with state government. Once land is made available it can be implemented using fund from central and state government under different



Figure 33.1 Locations of priority projects

schemes of infrastructure development or by funding from other developmental agencies. Phasing of project is shown below.

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Road widening	Finalization of SPV, preparation of DPR	Availing required land	Completion	

33.1.2 Junction Improvements

3 major junctions viz Chinnakkada, S N College junction and Ayathil junction are taken in this project

A. Chinnakkada Junction

Presently the movements are restricted at every point and hence there needs to be efforts made to pull out barrier free networks which not only save time but also helps to reduce confusion and congestions at the junction.

Hence it is high time to introduce a multi way grade separated intersection at Chinnakkada round. According to the traffic studies, it is observed that the most traffic movement is along the NH 66 and NH 744 (figure 32.2) So these ways can be designed for a continuous free traffic movement with service roads, considering the importance of the junction as a first order commercial node. With this concept three options

are evolved which are as described below.



Figure 33.2 Existing traffic flow

Option 1

In this layout, an elevated roundabout is proposed connecting NH 66 and NH 744 as shown in figure 33.3. This will give a continuous free way for the vehicles which are just passing through the city. Service roads are also provided for connecting these elevated roads to other city roads i.e, Chinnakkada round–Asramam road, Vadayattucotta road, Beach road. All the city roads meeting the junction will be as per the existing layout.

Option 2

In this proposal, the flyover is extended till the Bishop Jerome Junction which expels one of the major movements along NH 66 (figure 33.4). This enables a grade separated movement along NH 66 while other roads are at ground level. The flyover has been proposed to flange along the existing divider in the arm towards Alappuzha to serve one lane at each end for to-and-fro movement along NH 66. Service roads are also provided to connect the to-and-fro movement along Thiruvananthapuram side of NH 66. The circle has also been shifted slightly towards east to serve in a better way.

A pedestrian underpass is also proposed along with it connecting the railway station and the bus bay.



Figure 33.3 Proposed layout 1



Figure 33.4 Proposed layout 2

Option 3

This layout includes a grade separated under pass flyover with 4 meter vertical clearance at a gradient of 5 degree as per the recommended gradient as per I.R.C for plain terrain. The proposed underpass is a single lane road connecting NH 744 to NH to 66 (figure 33.5). This clears one of the crossings at the Chinnakkada Junction. All other traffic movements are as per the existing layout.

The phasing is shown below.

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Chinnakada Junction improvement	Finalization of SPV, preparation of DPR after finalising the option	Availing required land	Completion	



Figure 33.5 Proposed layout 3

B. SN College Junction

The existing flyover connecting SN junction with beach road creates an intersection point with NH. The traffic from beach area towards Thiruvananthapuram side has to cross existing NH. It is now controlled with a roundabout and medians as shown in figure 33.6.This creates a delay in free flow of traffic on both roads.



Figure 33.6 Intersection points at SN junction

As a solution for this, a flyover that connecting the out flow from beach road is proposed to join at other side of the road with grade separation. So, the traffic from the flyover can join with NH traffic without crossing point. Two options have been put forwarded for SN junction improvement as described below.

Option 1

In this layout (figure 33.7), the junction is redesigned within the available existing land. No additional land is needed to be acquired. The traffic movement from beach road



Figure 33.7 Proposed layout (Option 1)

towards Thrivananthapuram is connected to the other side of the NH with the help of an extra arm for the existing flyover. A service road with 4 m width is also proposed adjacent to new flyover which provides access to existing stadium and cantonment ground.

Option 2

In this layout (figure 33.8), the traffic movement from beach road towards Thrivananthapuram is connected to the other side of the NH with the help of an extra arm for the existing flyover. This provides traffic movement on both roads without crossing points. The land in between the roads is proposed to be landscaped with elements representing the identity of Kollam City (figure 33.9). A service road with 4 m width is also included in this proposal adjacent to new arm of the flyover which provides access to existing stadium and the cantonment ground.



Figure 33.9 Schematic view of landscape area

But for the implementation of this layout, land of cantonment ground and stadium needs to be acquired.

Phasing is as shown below.



Figure 33.8 Proposed layout (Option 2)

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
SN Junction improvement	Finalization of SPV, preparation of DPR after finalising the option	Availing required land	Completion	

C.Ayathil Junction

Figure 33.10 shows the existing condition of the Ayathil junction.



Figure 33.10 Existing traffic flow at Ayathil

The proposed layout (figure 33.11) includes a 4-lane flyover. The adjacent 6-meter service roads on the either side of the flyover serve the movement along the Kollam-Ayoor Road below the flyover. The Puthuchira junction road connecting Pallimukku also opens up in the service road much before the junction to control the traffic at the junction. A roundabout of 9 meter diameter is proposed at the junction. The area below the flyover is proposed to be used as pay and park space and at one end an underpass has been proposed to serve the traffic



Figure 33.11 Proposed layout for junction improvement

movement from Kallumthazham towards Pallimukku.

For implementing the project required land is proposed to be availed using different options such as free surrender of plots by the owner and giving relaxation to construction in remaining plot, land pooling, TDR methods and land acquisition if required Here also a Special Purpose Vehicle (SPV) in which major share holder is KLMC is proposed for availing land using different methods in consultation with state government. Once land is made available it can be implemented using fund from central

and state government under different schemes of infrastructure development or by funding from other developmental agencies. The phasing of implementation is shown below.

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Ayathil Junction improvement	Finalization of SPV, preparation of DPR after finalising the option	Availing required land	Completion	

33.1.3 Extension of Mobility Hub & Mini Satellite Bus Station

A. Extension of Mobility Hub

The existing KSRTC bus stand area is proposed to be extended by availing the revenue land between Punarjani Park and building constructed by KTDC (figure 33.12) so that it can be upgraded as a mobility hub to integrate different modes of transport i.e. National waterway, city bus, rail, long distance bus KSRTC services, auto, taxi and private buses and private vehicles etc. for the maximum convenience of the passengers through seamless connectivity across all modes and provide international class of travel comfort. The mobility hub creates convenient, safe, and accessible connections between different modes of transportation. The elements proposed in this project are

- Public transit - Buses, Real time signage for wait times and delay alerts, Transit store, kiosk, fare machines
- Private Vehicles - Parking lot or garage, Pick up/drop off area, Electric vehicle charging,
- Other Amenities - Restrooms, pick up waiting area, Wi Fi, cell phone charging stations, Commercial services.

All the above facilities can be implemented at both places after detailing out the activities in DPR.

As no land acquisition is proposed, it can be implemented using fund from central and state government under different

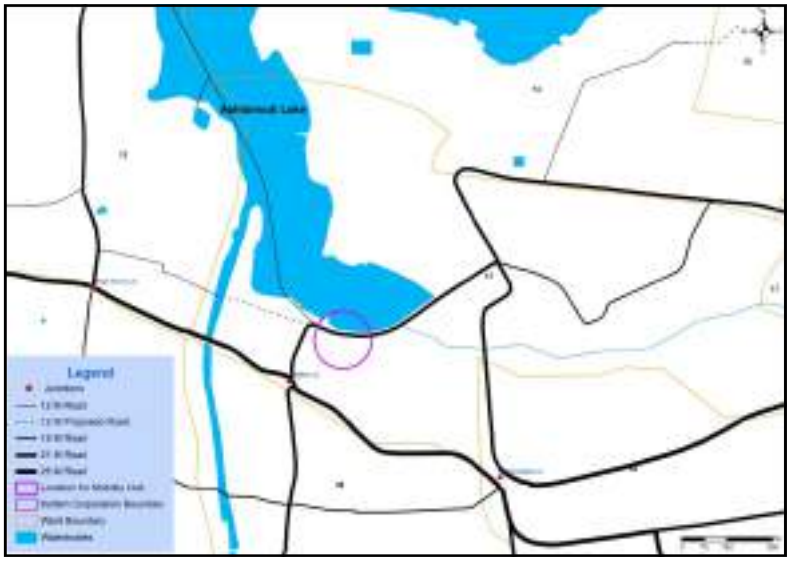


Figure 33.12 Location of Mobility Hub

schemes of infrastructure development or by funding from other developmental agencies. The construction is expected to be completed in 10 years as per the phasing shown below.

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Mobility Hub	Detailed project report	Completion		

B. Mini Satellite Bus Stations

It is suggested at six locations, ie at Kallumthazham,Anchalumoodu, Mavaram, Karikode, Kavanad, Kollam beach (figure 33.13)

(a) Mini Satellite Bus Station at Karikode

The major focus of the bus stand is to reduce the traffic congestion caused by the bus stop near Karikode Jn. The proposed bus stand has few commercial complexes and a restaurant which could be relocated to the new proposed complex with better parking facility. For better accessibility with the educational institutions around it pedestrian pathways are also proposed. The layout of the site is shown in figure 33.14.

(b) Mini Satellite Bus Station at Kollam Beach

The major focus of the bus stand is to become a formal pick up and drop



Figure 33.13 Satellite bus stand proposed site



Figure 33.14 Proposed layout of Mini satellite bus station at Karicode

off point for the buses passing through beach road. The location for the proposed bus stand is along the TS canal opposite to MG Park. This puts the canal edge to effective use and also helps in solving the present parking issues along the beach stretch. Pedestrian pathways are also proposed along the beach stretch to promote NMT.



Figure 33.15 Proposed layout of Mini satellite bus station at Kollam beach

For implementing the project required land is proposed to be availed using different options such as free surrender of plots by the owner and giving relaxation to construction in remaining plot, land pooling, TDR methods and land acquisition if required Here also a Special Purpose Vehicle (SPV) in which major share holder is KLMC is proposed for availing land using different methods in consultation with state government. Once land is made available it can be implemented using fund from central and state government under different schemes of infrastructure development or by funding from other developmental agencies

The layout is shown in figure 33.15 . Phasing all the mini satellite bus station is shown below.

33.1.4 New Mobility Hub

The new mobility hub is proposed at two locations separated by a distance of less than 200 M with one portion adjacent to over bridge near Kollam railway

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Mini Satellite Bus Station	Finalization of SPV, preparation of DPR ,Availing required land	Implementation of the project at Karicode and Kollam beach	Implementation of the project at Mevaram and Kavanad	Implementation of the project at anchalumood and kallumthazham

station and the other portion near FCI godown. This project will also reduce the congestion near the railway station due to improper bus stop facility and acts as a feeder network for the existing KSRTC bus stand. The extent of land for project is 2.16 acres. The site is located in Public & Semi Public Government Owned Zone as per the proposed land use (figure 33.16).

The arrival to the hub near over bridge will be routed to an entry point at the north east corner of the plot, by a new service road (figure 33.17) and the departure will be routed through the exit point at south west corner (figure 33.18). Both these routes are connected to the NH 66. This is done to reduce the congestion near the railway crossing near the site.

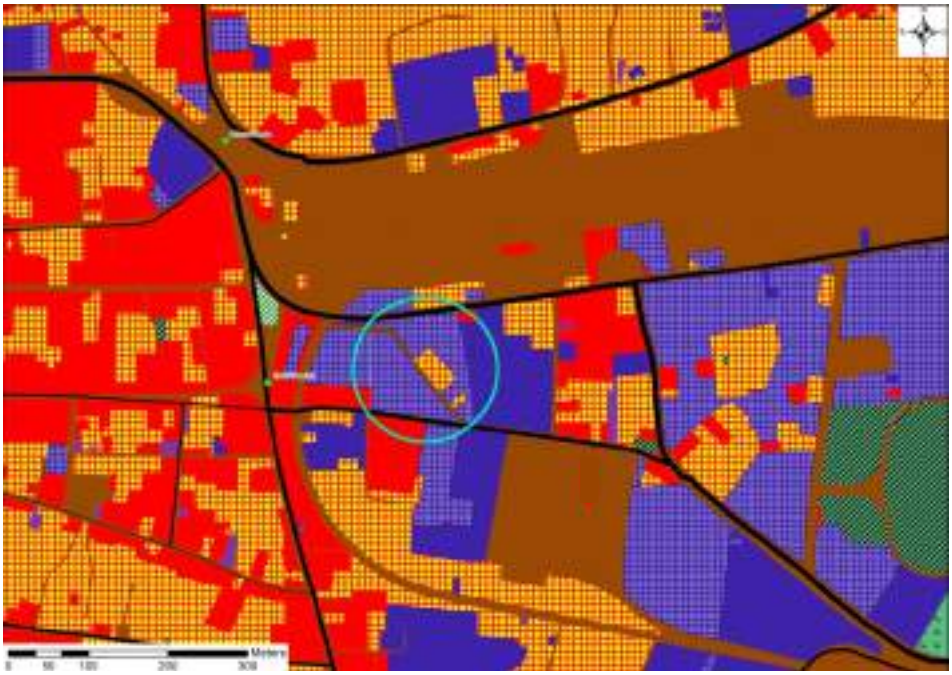


Figure 33.16 Location of New Bus Stand

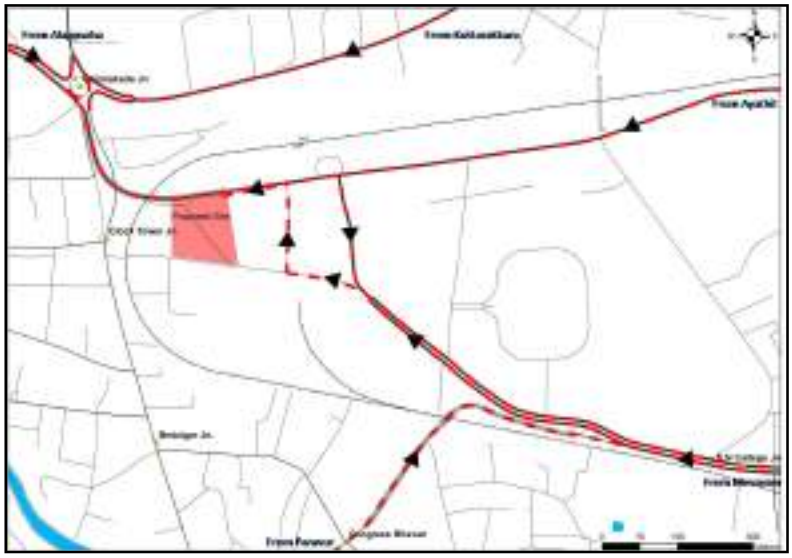


Figure 33.17 Proposed layout for arrival

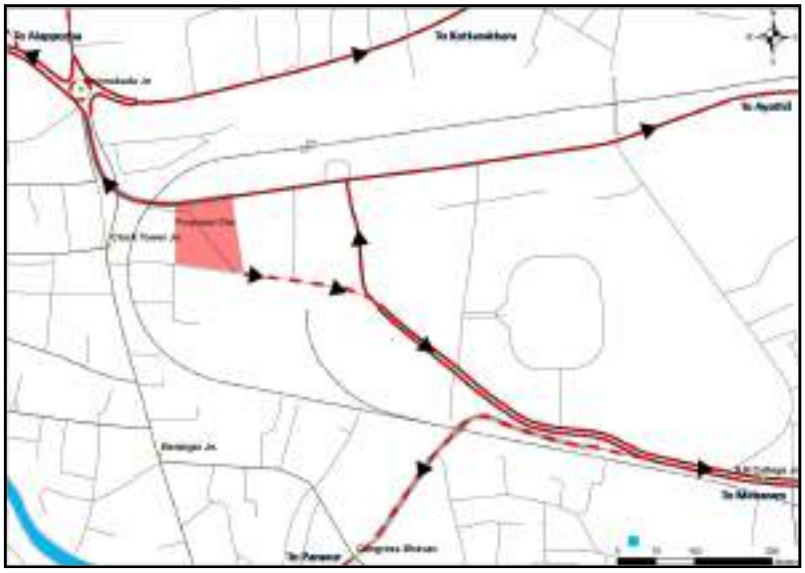


Figure 33.18 Proposed layout for departure

The layout has been set with three integrated blocks at ground level. The site also consists of electric vehicle charging station and shared cycle stations. Figure 33.19 shows the routes to different blocks.

Block 1 – KSRTC bus station: Ground floor of the block caters to the long route service KSRTC buses and also feeders to main KSRTC station.

Block 2 – Private bus stand for buses travelling south towards Eravipuram and Trivandrum route. The first floor is to be occupied as commercial space and also as offices for this bus stand.

Block 3 – Private bus stand for buses travelling north i.e. towards Needakara, Chavara, Azheekal route and east towards Kottarakara. The other side of the block acts as electric vehicle charging station, which is one of the major aspects of the project.

In addition to this, bus stand is to be developed as a modern bus stand with multi-level parking bays depending on the demand.

The multi-level parking lot will have a capacity of 104 cars on each floor with the possibility of future expansion of levels (figure 33.20). A separate road has been proposed to serve the multi-level park and Welfare Fund Audit Office of Kerala State Audit Department. The proposed bus stand view will be as shown in figure 33.21.

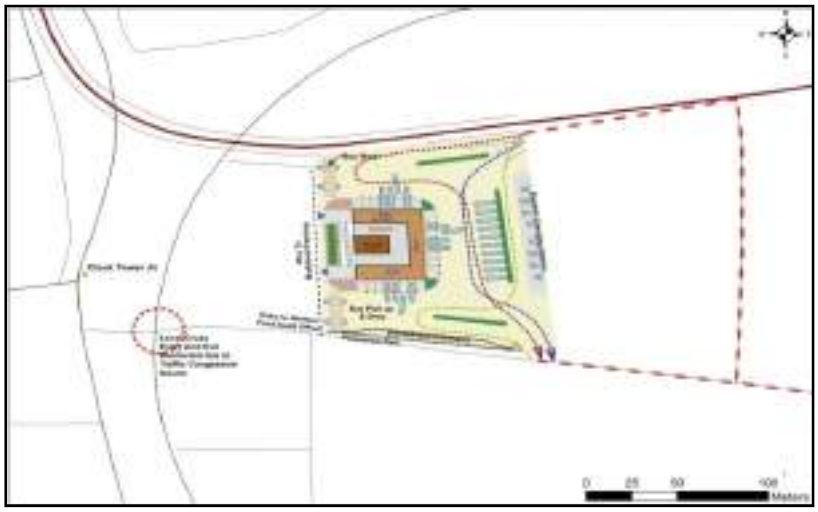


Figure 33.19 Proposed site layout

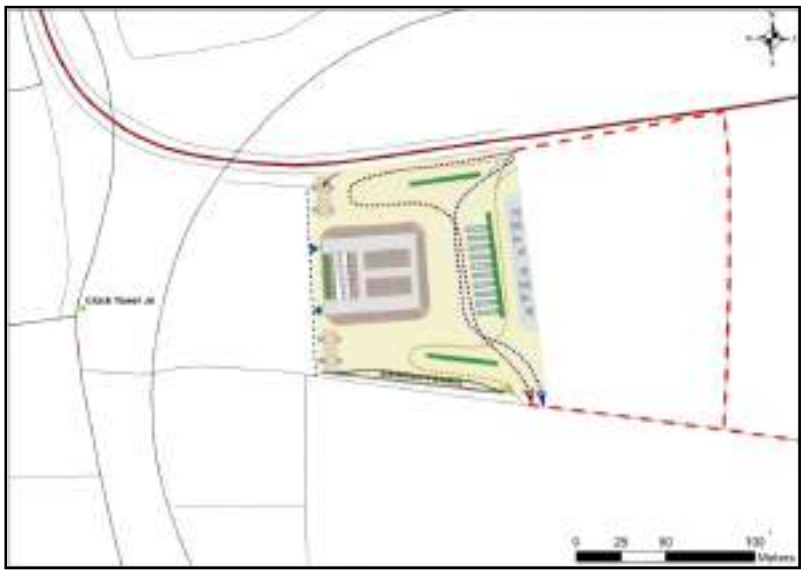


Figure 33.20 Proposed layout for multi-level car parking



Figure 33.21 Proposed Bus Stand View

The other part of mobility hub proposed near FCI Godown includes bus bays, commercial building and other common facilities. The junction in front of the hub is also proposed to be improved to facilitate easy movement of vehicles.

Land near FCI godown is already available and the land near railway over bridge is to be made available by KLMC after sorting the issue of taking over land from railway authority. The project can be funded on PPP basis using Design Build Finance Operate and Transfer (DBFOT) model. Through multi-level car parking charges, commercial space use rent and charging station, revenue could be generated. Also, concessions on bus charges for users of multi-level parking will promote the use of public transport and also reduce the issues of on-street parking.

The implementation of the project expected to be completed within 10 yrs. For the first 5 years, it is expected to avail land and complete the detailed project report preparation and the construction is expected to be completed within the next 5 years.

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
New bus stand	availing required land and preparation of DPR	Comp letion		

33.1.5 Non-Motorized Transport Proposal

The major focus of the project is to incorporate the idea of responsible transportation and to encourage Non-Motorised Transport (NMT) by providing covered walkways and providing a separate bicycle track adjacent to the walkway. This also increases the maximum efficiency of the road.



Figure 33.22 Locations of Non-Motorised Tracks

A covered walkway is proposed in Chinnakkada- Asramam road from 2nd entry of railway station to proposed mobility hub. Cycle track is proposed from Asramam connecting KuravanpalamJn, SankersJn, ChinnakadaJn, KochuplamooduJn, Thangassery via coastal road, KavalJn, AltharamooduJn, Kallupalam, KSRTC Jn via District Hospital Road and then reaches back to Asramam. Both the proposals are in transportation zone as per the proposed land use. The location of Non-motorized tracks are shown in figure 33.22.

The objective of covered walkway is to provide protection for the pedestrians from weather conditions and there by promoting a walking culture. The objective of cycle track is to encourage bicycling in an effort to relieve automobile congestion, reduce pollution and to reduce overall confusion and tension for all users of the road. Cycle tracks project consist of following:

- It may be one-way or two-way.
- It has some separation from motor traffic, car parking, and barriers.
- Barriers may include curbs, concrete berms, posts, planting/ median strips, walls, trenches, or fences.

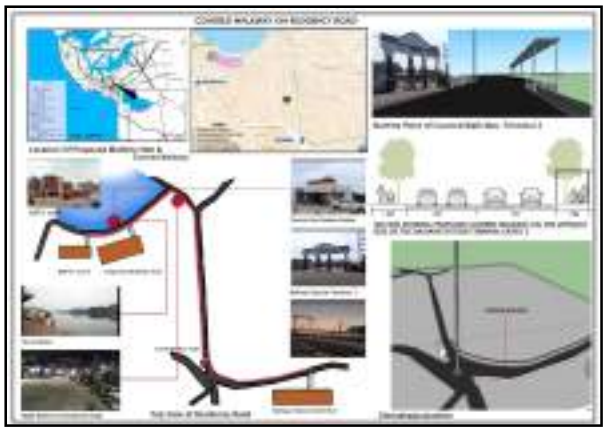


Figure 33.23 Layout for covered walkway



Figure 33.24 Layout for cycle track

- Provide a curb extension or other features at intersections to simplify crossing.

The layout for covered walkway and cycle tracks are shown in figures 33.23 and 33.24 respectively.

Once land is made for widening the road, project can be implemented using fund from central and state government under different schemes of infrastructure development or by funding from other developmental agencies . However this project can be completed after completing the widening proposal of the road. With a view to Implement NMT , widening of this road is to be done on a priority basis. The phasing of project is shown below.

33.1.6 Truck Terminal

For the future development of Kollam port, industries, trade and commerce sectors in the planning area, a truck terminal is essential. Existing truck movement in CBD area creates conjunction and traffic issues in city centre. So, the truck terminal can be shifted to more accessible and conjunction free location near to CBD area and the supply to markets in city centre can be done with the help of small carriage vehicles. Considering these factors, the ideal location for a truck terminal is the peripheral area

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Non-Motorized Track	Detailed project report	Completion of stretch where road width is sufficient	Completion of remaining stretch	

and by the side of NH bypass. The truck terminal extend over an area of about 5 acre is proposed in the side of NH bypass near Mangad junction tentatively (figure 33.25). The proposed truck terminal is shown in figure 33.26. Facilities provided in this terminal are office, go-down and loading/unloading facilities for transport operators, service industries such as petrol pump, weigh bridge, maintenance bay for truck, food court, toilets, accommodation facility etc., parking and other amenities (figure 33.27).

The existing bus stand at Andamukkam can be converted as small carriage vehicles parking area of Kollam Market.



Figure 33.26 Schematic View of Truck Terminal



Figure 33.27 Facilities provided in truck terminal



Figure 33.25 Locations of Truck Terminal

For implementing the project required land is proposed to be availed using different options such as free surrender of plots by the owner and giving relaxation to construction in remaining plot, land pooling, TDR methods and land acquisition if required Here also a Special Purpose Vehicle (SPV) in which major share holder is KLMC is proposed for availing land using different methods in consultation with state government. Once land is made available. The project can be funded on PPP basis using Design Build Finance Operate and Transfer (DBFOT) model. The cost can be recovered through different types of services provide to the users. The construction is expected to be completed in 10 years.

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Truck Terminal	Finalization of SPV, preparation of DPR ,Availing required land	Completion		

33.1.7 Oceanarium

The main aim of this project is to attract tourists to Kollam. It is proposed to set up an oceanarium at Kollam beach which needed infrastructure on par with international standards. Oceanarium includes recreational zone, Freshwater aquarium, Marine water aquarium, exhibition center etc. The location comes in Recreational Opens pace zone in proposed land use, as shown in figure 33.28.

The design elements are Exhibition center, Marine plants exhibition, Refreshment zone, Freshwater fish aquarium, Marine water fish aquarium. The layout of the oceanarium is shown in figure 33.29. Figures 33.30 and 33.31 shows the views of the oceanarium and figure 33.32 show the proposed underground water tunnel in the oceanarium.

As no land is required to be acquired, the project can be funded on PPP basis using Design Build Finance Operate and Transfer (DBFOT) model. The cost can be recovered from users.

33.1.8 Eco Tourism development, Kandachira

The site is located along the periphery of KLMC at Kandachira as shown in figure 33.33. Coordinates of the proposed location are 8.93N, 76.62W. The extent of land for the first phase of the project is 10.43 hectares.

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Ocenarium	Site selection, preparation of DPR	Construction works		



Figure 33.28 Proposed Location for Oceanarium

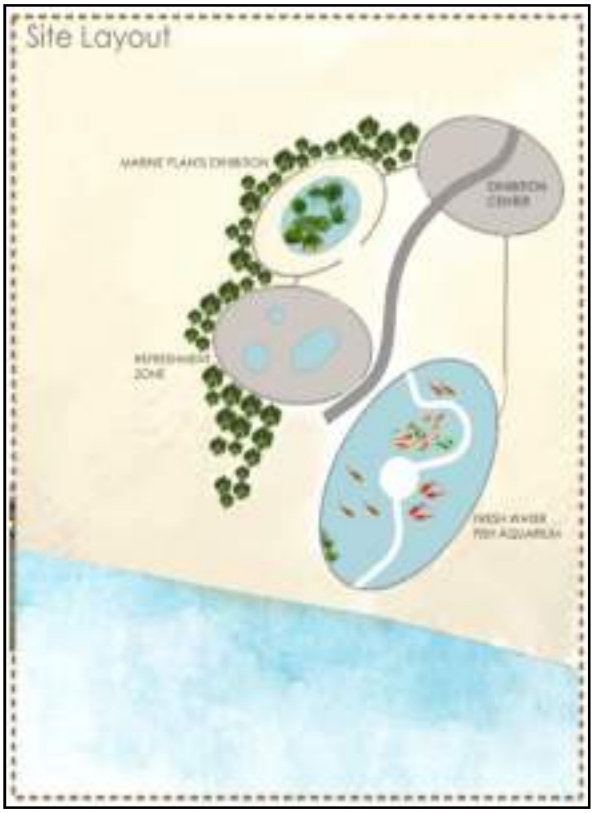


Figure 33.29 Layout for Oceanarium



Figure 33.30 Top view of oceanarium

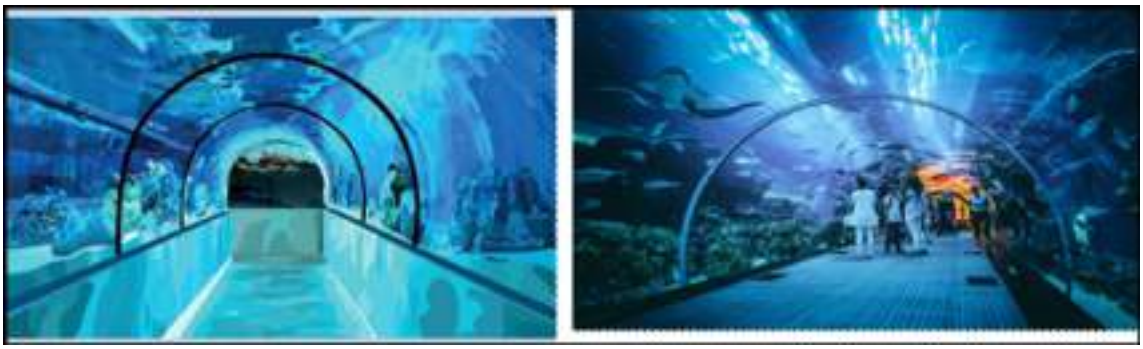


Figure 33.31 Proposed underwater tunnel in Oceanarium

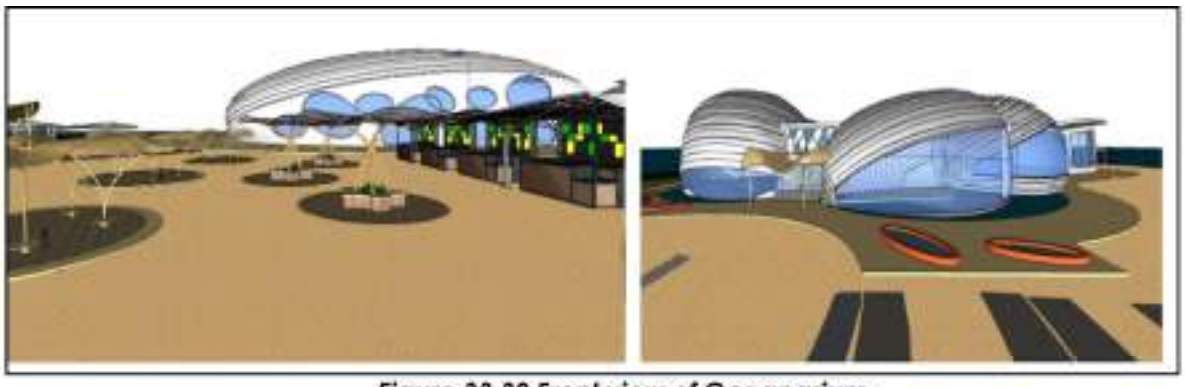


Figure 33.32 Front view of Oceanarium

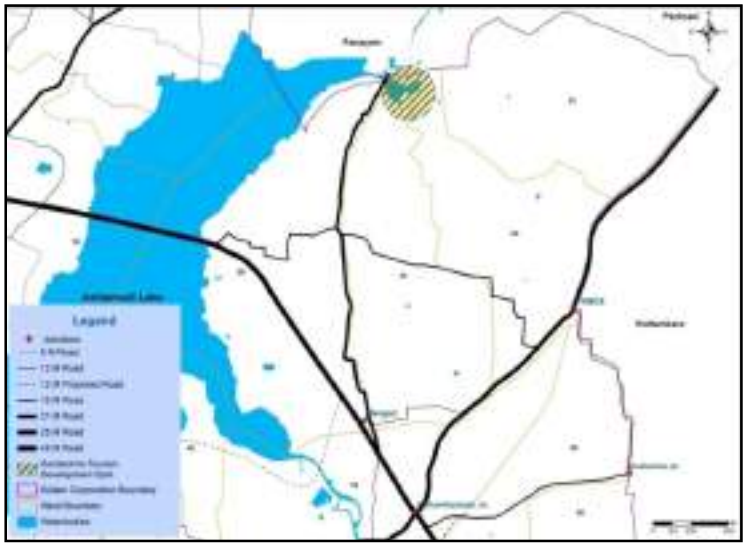


Figure 33.33 Location of the project

The proposed site is in conservation zone of proposed landuse.

The site comprises of mainly wetland area which has been subjected to frequent encroachment and land conversion over the years as visible from satellite image (figure 33.34). The area is rich in biodiversity and there have been frequent sightings of exotic birds and animals. The area currently faces waste dumping issues, encroachment activities and socially undesirable activities (figure 33.35) due to neglect from the side of the people and authorities. Therefore there is an urgent need for intervention which could maximize the potential of the site thereby enhancing the lives of the common people and at the same time achieving ecological stability. Satellite image of the site located for the project is shown in figure 33.36.

This project proposes a bio park, boat jetty, water sports centre and cultural market. The bio park includes



Figure 33.34 Satellite images of Kandachira wetland area for the past years



Figure 33.35 Present condition of proposed site

three zones namely active, semi active and a silent zone. The active zone consists of pathway which is designed in such a way as to incorporate cycling and pedestrian activities and ambient seating spaces and an amphitheatre for small functions. The semi active zone consists of spaces that are designed for fishing and other local interests. The silent zone comprises of mainly bird islands and other exotic flora and fauna which is designed in such a way as to keep disturbances to a minimum. The main aim of phase 1 of the project is to conserve the existing wetland area, promote tourism and enhance the living condition of the local people. The different features in the project are shown in figure 33.37. They are:-

1. Main water feature
2. Floating construction
3. Fishing area
4. Amphitheatre
5. Triple path,
6. Buffer area
7. Birds Island
8. Observation tower
9. Culture market
10. Boat landing area
11. Railway track.

The view of the proposed project will be as shown in figure 33.38.

A Special Purpose Vehicle (SPV) with major share holder as KLMC and land owners is proposed for availing land. Once land is made available it can be implemented using fund from central and state government under different schemes of infrastructure development or by funding from other developmental agencies. The cost sharing and cost recovery will be decided by the SPV. Phasing of project is shown below.



Figure 33.36 Site selected for Kandachira Tourism Development Spot



Figure 33.37 Layout for Kandachira Tourism Development Spot



Figure 33.38 Proposed views of Kandachira Tourism Development Spot

33.1.9 Lakefront Tourism Development Zone

One of the objectives of Asramam – Mangad link road is to fully utilise the tourism potential of Ashtamudi Lake and surroundings. Tourism potential has not been tapped in Ashtamudi region as the lake act as tourist transit point rather than tourist destination point. Scope of further increase in the backwater tourism and other water based activities along with promoting local economy still exist. The main focus of

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Eco Tourism Development, Kandachira	Finalisation of SPV, Preparation of DPR, Availing required land , Implementation of Bio park and conservation project	Boat jetty and water sports centre	Cultural market.	

the project is the conservation of Ashtamudi Lake and associated ecosystem, from waste dumping issues, illegal encroachments along the banks and promote the delineated area as the main tourism focus point in the Ashtamudi region as a part of new Asramam –Mangad road proposal.

The project is proposed on an area of 1.42 sq.kms of land bounded between the proposed Asramam - Mangad link road, NH bypass, Ashtamudi Lake and Taluk office - Kappalandimukku road via Asramam is shown in figure 33.39 and sketch of proposed Asramam – Mangad link road is shown in figure 33.40. It is proposed to construct temporary structures and open spaces towards the lake side of the road as it comes under CRZ zone. Other necessary facilities that require permanent structures are proposed to be built on the landward side.

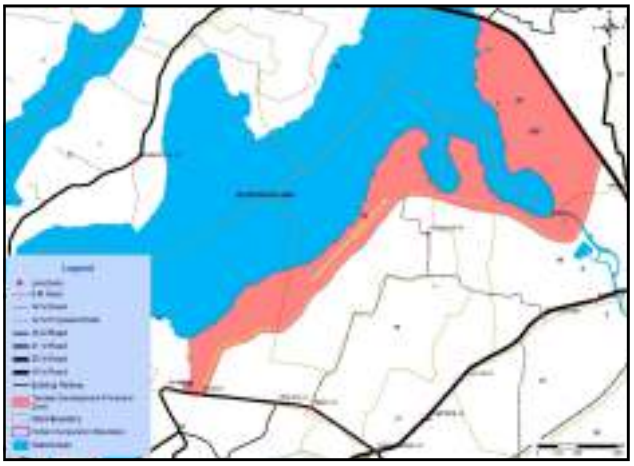


Figure 33.39 Location of the project

The entire stretch can be divided into different zones as in the figure 33.41 and are explained below:

Park zone – This zone consists of open spaces with limited construction, as the area falls in the CRZ zone. Separate pavement stretch for cyclists and pedestrian is proposed along the banks. Complete buffer of bushes can be introduced along the lake stretches for the safety reasons. Spaces in children's park involving kids in outdoor activities, also allowing kids to interact with various murals showing Kollam development. A sketch of the park zone is given in figure 33.42.

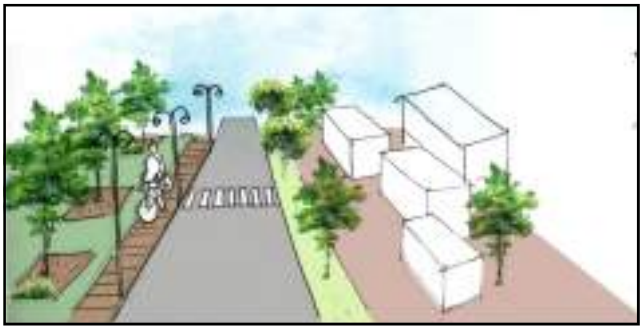


Figure 33.40 New proposed road view



Figure 33.41 Layout for Lakefront Tourism Development Zone

Cultural zone – The aim of this zone is to conduct cultural related activities organised by Kollam District Tourism Promotion Council, art and crafts festivals and events. The seminars, discussions, can be held in this



Figure 33.42 Park Zone near the lake

craftsmen to exhibit their works. From wall paintings to stone murals, various events can be conducted that promote the culture of public art. Under the tourism department, the floating theatre designed in the typical traditional structure of a Koothambalam, built-in temple and a ritual arts stage can be introduced (figure 33.43). The Koothambalam, can



Figure 33.43 Floating Theatre-Koothambalam

be anchored on the sea shore when performances are being showcased. It can also sail through Ashtamudi Lake. There will also be a flea market and food pavilion for the visitors to enjoy the events (figure 33.44). The local community has a priority of selling of traditional products directly to consumers in a person-to-person manner, away from permanent retail locations.

Tourist Zone - Erection of temporary seasonal structures (figure 33.45), floating shacks (figure 33.46), huts for attracting tourists. Temporary shacks, serving local cuisine of the area within the natural setting with basic amenities to be erected on identified



Figure 33.44 Temporary structures for Flea –market

stretches, will be invited from the persons and license shall be issued to put up only shack by the local community people or one member of a family who is unemployed. Boat jetties are proposed, to develop a good network of water transportation



Figure 33.45 Temporary bamboo structures



Figure 33.46 Floating shacks

for the movement of people and goods. A wayside relaxation pavilion is proposed that can attract more tourists. 'Take-A-Rest' will have facilities for refreshment, cloakroom, souvenir shop-cum-information kiosk, and store for essentials, ATM, and space for parking. Provisions for a houseboat, speed boat, and safari boat for the visitors could be proposed near to the relaxation pavilion. Water sports event-Kerala Backwaters Challenge (KBC), organised by a group of young experts trained in water sports, environment-friendly event can be conducted that aims to spread awareness about the need to protect the backwaters, by attracting more people to water sports.

Communal harmony zone – It can also call as home stay zone. Since the area comes under the CRZ, special incentives to be given to the local people for constructing temporary cottages for the tourist home stays. Fishing in the lake can be continued with restrictions and with the help of Fisheries department, Kudumbasree, local self-governments, and fishermen cooperative societies, inland fish farming can be developed along the banks. Encouraging planting of mangroves along the banks, and the cost of planting mangroves have to be shared with government and land owners. Introducing multi-functional play and open space area. The park contains play areas for all age groups, events space and garden spaces for rest and relaxation. Green space especially benefitting the local community can offer in terms of physical activity, relaxation, play, socialising and viewing nature.

A Special Purpose Vehicle (SPV) with major share holder as KLMC and land owners is proposed for availing land. Once land is made available it can be implemented using fund from central and state government under different schemes of infrastructure development or by funding from other developmental agencies. The cost sharing and cost recovery will be decided by the SPV.

Illegal encroachments (CRZ) near to the lake banks are to be evicted with the help of revenue department. It is expected to complete the implementation of Asramam-Mangad link road as first phase of the project. The second phase will be the completion of construction works in park zone. The third phase is the construction of Koothabalam and creating cultural zone. The fourth phase is to provide required facilities to attract tourists and creating tourist zone. Along with all these phases, promote the local communities to provide home stays for the tourists and create a community zone.

All the proposals are expected to be completed within next 20 years.

33.1.10 Paddy tourism

Paddy tourism is proposed in south – east periphery of the KLMC, ie at Eravipuram paddy fields and a portion of Mayyanad village (figure 33.47). The visitors can easily reach the proposed site by NH highway, coastal highway and by inland waterways (TS canal). By promoting the paddy tourism in this area, the transport facilities through TS canal can also be promoted.

Paddy fields are a vital part of our environment and ecological systems, that provide natural drainage paths for flood waters, conserve ground water, and are crucial for the preservation of a rich variety of flora and fauna. Whereas Paddy cultivation in Kerala has witnessed a steady decline over the past years due to

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Lake front Tourism Development Zone	Finalisation of SPV, Preparation of DPR,	Availing required land	Completion	



Figure 33.47 Location of Paddy tourism at Eravipuram

various reasons like land conversions, shortage of labour supply, low profitability etc. The present condition of the proposed site is shown in figure 33.48. The proposed site also faces these issues and therefore it needs urgent interventions for the revival of paddy fields by using the tourism potential of this area. The beautiful green of Kerala's paddy field is one of the tourist attraction spots for guests and will never fail to attract tourist attention. The proposal takes its inspiration from the huge influx of visitors to the rural locations just to witness the green paddy fields. Paddy farming is carried out in many Kerala locations to enhance the region's unique geographical and biological characteristics and also offers some functions in balancing the local environment like climate mitigation,



Figure 33.48 Present condition of the site

flood control, groundwater recharge, biodiversity, and ecosystem development. The beautiful green of Kerala's paddy field is one of the tourist attraction spots for guests and will never fail to attract tourist attention. The proposal takes its inspiration from the huge influx of visitors to the rural locations just to witness the green paddy fields. The proposal is to connect the guests to the local community to make it a mutually enhancing and educational interaction. The concept of paddy tourism can be applied as a medium for paddy farming learning for tourists. This proposal can also be a tool for wayside tourism.

The main aim of the project is to conserve the existing wetland area, promote tourism and enhance the living condition of the local people. The proposed layout is shown in figure 33.49. The main elements of the proposal are rejuvenated water pond, water canal with foot path on either sides and over bridges, cultivated paddy fields, stilted thatched–roof huts with interlacing network of bamboo and wooden bridges in the paddy field (figure 33.50), cottages for homestays and boat landing area. The rejuvenated water pond can be used for aquaculture i.e.



Figure 33.49 Layout for paddy tourism

the controlled farming of aquatic organisms such as fishes, and other organisms of value such as aquatic plant (lotus). Boating can also be provided on the water canal to experience the beauty of lush paddy fields (figure 33.51). The cottages for homestay can be designed and constructed with materials that reflect localities along the paddy field side. All cottages have to be located in such a way with the paddy field at the rear side so the guests can enjoy the views of rice paddies from the time they wake up until sunset (figure 33.52). Considering that paddy tourism is not



Figure 33.50 Proposed pond and water canal

limited to visiting farms and paddy fields, but tourists can also participate in the various stages of paddy cultivation like tilling, sowing and reaping, all at the same time in one place and do activities conducted on private agricultural lands, which might include fee - fishing and overnight stays, this could be intriguing for many tourists. Holding some customs and celebrations that are done during the harvest can also be effective in promoting paddy tourism. More than offering the chance to be a part of all stages of paddy farming, the proposal also intends to share the culture and tradition of the land with the foreigners who travel to Kerala for an ethnic experience. It could be effective in attracting not only foreign tourists but also domestic tourists to the region. Boosting paddy tourism in the region could help the development of villages and rural areas as well as their economic prosperity by creating a source of income for the local communities. There needs to be strong participation and commitment between the community, government, and private sector to implement and control agricultural and tourism activities to develop well and work together. Control efforts are



Figure 33.51 Proposed huts and walkways in the paddy field





Figure 33.52 Proposed cottages in the paddy fields

needed so that paddy fields that must be maintained do not change function quickly.

A Special Purpose Vehicle (SPV) with major share holder as KLMC and land owners is proposed for availing land. Once land is made available it can be implemented using fund from central and state government under different schemes of infrastructure

development or by funding from other developmental agencies. The cost sharing and cost recovery will be decided by the SPV.

The pond, water canal, huts, walkways, homestays and boat jetty are expected to be done within the first 5 years.

33.1.11 Island Tourism

Sambranikodi Island is a picturesque island that is situated at the southern tip of Ashtamudi Lake (figure 33.53), which invites tourists to experience the virgin beauty of God's Own Country. Currently, it is one of the most popular tourist attractions in Kollam district. It offers a breath-taking view of waterways fringed by lush mangroves. Moreover this narrow patch of land popped up a few years ago in the Ashtamudi Lake about 350m away from the Sambranikodi coast and it became a complete isle after soil dredged for the construction of the national highway was dumped in the backwaters. The isle would have knee-deep water throughout the year except for a couple of months when the island would be dry. Even though this area is rich in biodiversity and has tremendous tourism potential, this area is currently facing various issues like waste dumping, stability of the island, safety of the tourists etc. due to the lack of proper stakeholder management. In order to explore the tourism potential of the area thereby enhancing the lives of the local community and conserve the ecological stability of the area, detailed study about the scope of converting the isle into a tourism destination should conduct by various line departments like DTPC, LSGIs, KSDMA, Mining & Geology Department etc.

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Paddy tourism	Finalisation of SPV, Preparation of DPR, construction of pond, water canal, huts, walkways and homestays, boat jetty			

Based on the study report regarding the stability of the newly popped up island, this island area may be converted as the centre of the



Figure 33.53 Location of Island tourism



Figure 33.54 Present site condition of Island Tourism

major tourism attraction point of this area along with nearby islands. Since these islands are both environmentally and geologically sensitive areas, during the first phase of the project various environmental and geological stability improving measures like mangrove afforestation, side protections by geotextile, geo-membrane materials, safety measures for both the tourists &



Figure 33.55 Sattelite image of location of Island Tourism



Figure 33.56 Proposed view of Island Tourism

local community should be carried out. It includes boat landing centres, floating walkways(figure 33.57). So the major proposals of this project are for improving the environmental and geological stability of the areas by various measures like mangrove afforestation, side protections by geotextile, geo-membrane materials etc. The complex network of mangrove roots can help in limiting erosion. Other major detailing includes.

- Non Development Zone (NDZ) in the nearby islands due to CRZ notifications, can be utilized for various tourism promotional activities like conducting cultural programmes, traditional food festivals etc.
- Connectivity to the nearby lands should be ensured by providing various facilities like boat landing centres for the country boats, houseboats, frequent services of boats, etc.
- Proper waste collection and treatment facilities should be provided and monitored by the local committee. This can be achieved by the active participation of the local community.
- Attract the tourists with various leisure activities like hammocks, fishing rods, bamboo raft, canoes, pedal boat, boating, sliders and much more to enjoy for a full day.
- Various proposals to attract the tourists to visit the nearby fishermen islandswhichwill enhance significantly to the livelihoods, well-being and security of coastal communities.
- Beautification of landing centres.
- Since these islands are environmentally sensitive, the constructions in these areas should be restricted and necessary constructions should be carried out with light weight, ecofriendly materials.

A Special Purpose Vehicle (SPV) with major share holder as KLMC and land owners is proposed for availing land. Once land is made available it can be implemented using fund from central and state government under different schemes of infrastructure development or by funding from other developmental agencies. The cost sharing and cost recovery will be decided by the SPV.

It is expected to be completed within 5 years.



Figure 33.57 HDPE Floating boat landing centres

33.1.12 Eco-walkway

Eco-walk way is proposed in order to utilize the tourism potential of Ashtamudi Lake which also promotes the local community with minimum environmental impact. The eco-walkway will create a physical barrier against the encroachment along the edges of the Ashtamudi Lake. The proposed location of the eco-walkway is shown in figure 33.58.

The proposed eco-walk way has a length of about 35.86 kms which linked to the existing road network at several locations. For the purpose of implementation, the entire project was divided into two main phases:- the first one being to identify key nodes along the stretches and develop the walkway and further after successful implementation of phase one, interconnecting these nodes with a complete walkway around the Ashtamudi lake within the corporation limits.

The identified nodes are shown in figure 33.59 and can be listed as below:-

1. 2- Bypass area
3 . Kollam Bus stand area
4 . Mulankadakam Area
5 . Thoppilkadavu Area.

Other than the walkway, intermediate floating boat landing

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Island tourism	Finalisation of SPV, Preparation of DPR, Availing land and completion of work			

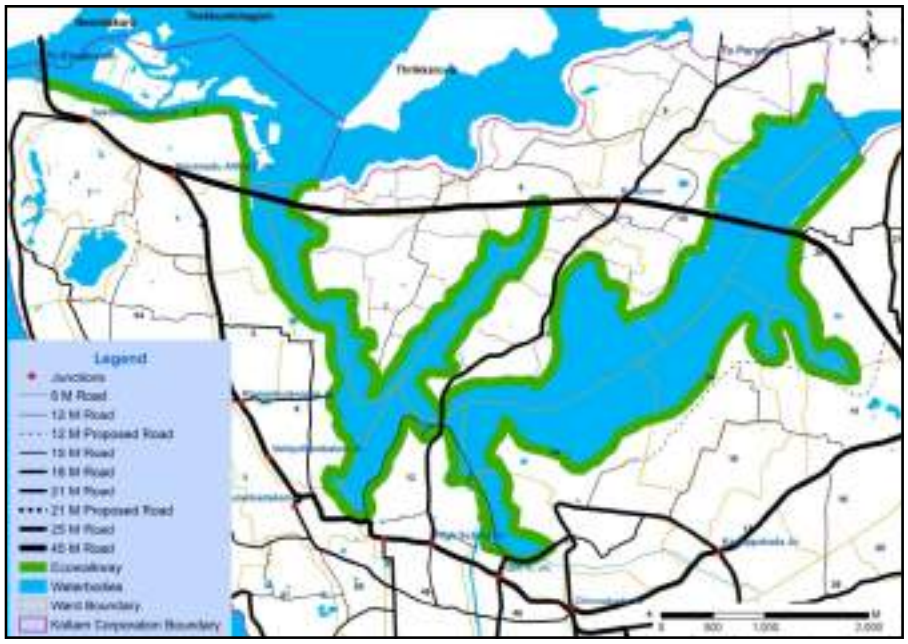


Figure 33.58 Proposed Eco-walkway

areas are provided to connect these nodes to each other and other tourist destination in and around the Ashtamudi Lake and the inland water circuit.

The main elements in design are:-

- Walkway paving- Walkways are designed with 180cm width so as to allow free passage and to provide

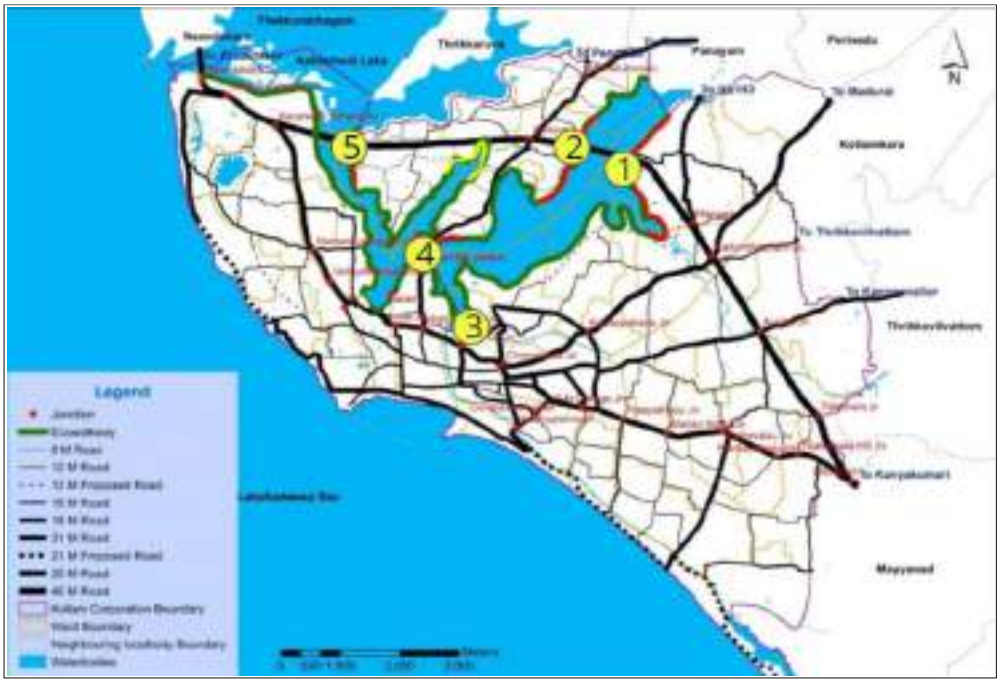


Figure 33.59 Identified nodes for eco-walkway

ample seating at selected intervals and areas that have special requirements. Material used for paving should be either clay brick or natural stone that does not block the natural environment or hydrological flow in any way.

- Fencing and Privacy- Chain link fencing could be provided so that local people get the required privacy without the tourist's disturbance. Solid walls are to be provided solely on the basis of the local community with regulation on its height and design as per walkway concept. Wall height is to be limited to 150 cm.
- Seating- Seating of materials of eco-friendly durable materials like treated wood should be used to provide seating at regular intervals and nodes.
- Pathway edges- Pathway edges are to be aligned with different kinds of flowering mangroves which acts as a breeding area for various aquatic organisms and helps to maintain ecological balance.
- Lighting- Lighting facilities are to be provided where required only using proper renewable solar light posts.
- Upon the completion of this project the entire inland water tourism will be linked with each other. For e.g. A person arriving at Kollam bypass can employ water tourist circuit in this proposal to reach different parts of the Ashtamudi lake and other tourist spots in and around the area.
- Wall construction should be limited and their height and design should be under proper regulation.
- Materials used in the entire project should be eco-friendly and natural that do not interfere with the natural environment balance.
- Boat landing centre used in the design should be floating model so that no environment damage occurs.
- Small scale inland water transport network should be established with the help of private sector investments
- Encourage local fishing activity and community activities such as coir making etc.
- Providing a platform for cultural exchange.
- Reduce illegal encroachment and waste dumping and thereby environmental degradation of the water body and its surroundings.

A view of the proposed eco-walkway is shown in figure 33.60.

The project implementation can be done by involving agencies such as LSG, Local community, NGOs, Private Investors etc. The approximate cost for the project is 20 lakhs. Initially financial and technical assistance may be given to the people for planting mangroves and trees etc. This walkway is to be included as part of organized parks and open spaces and the cost of maintenance may be recovered in the same manner as in the case of organized parks and open spaces.

A Special Purpose Vehicle (SPV) with major share holder as KLMC and land owners is proposed for availing land. Once land is made available it can be implemented using fund from central and state government under different schemes of infrastructure development or by funding from other developmental agencies. The cost sharing and cost recovery will be decided by the SPV.



Figure 33.60 View of walkway

The detailed survey for selection of nodes and develop patches should be done within the first 5 years. The implementation of the project to the entire area is expected to be completed in 10 years.

33.1.13 Sanitation Park

The project focuses on bringing people rather than isolating them from the waste management or sanitary process while giving awareness on those areas as part of daily life. The intention of the project is to transform the mind-set of the people about sanitation as an ugly and concealed affair to an exalted and open place. Currently, the site is near to the chandidepo, landfill area, where the

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Eco-walk way	Finalisation of SPV,Preparation of DPR, availing land, identifying and developing nodes	Implementing to the entire area		

local people are reluctant to visit those areas, even though the area has the scenic beauty of Ashtamudi. The location of project is at Kureepuzha as shown in figure 33.61. The extended area of the site is around 3.90 acres. It is in waste management zone in proposed land use.

A. Sanitation Park

The Sanitation Park, provides an opportunity for interested community members, students, leaders, and community health workers to examine how the wastewater treatment options work to treat excreta and protect human health. A well-designed landscaped area around the sanitation park, serves as a backdrop for community activities and social gatherings. The layout for the sanitation park is given in figure 33.62. Some of the amenities incorporated in the design include children's park and playgrounds, gym areas, jogging tracks, open-air stadium, coffee shop etc. Pedestrian walkways, seating and parking spaces also provided. This project could promote employment opportunities for the people of adjacent areas of the sanitation park. Entry gate could be provided from lake to park for transporting waste cheaply through boats. Proper awareness programs are needed for people who are living near the area of this site, working-monitoring committee



Figure 33.61 Location for Sanitation Park and park with Solid Waste Treating Plant



Figure 33.62 Layout for Sanitation park

including members of the residents association and social activists.

Design elements-

- Green buffer zone with bushy plants, bamboos to improve aesthetic beauty.
- Presence of the Ashtamudi Lake increases the tourism potential of respective site.
- This project is more focused on the neighbourhood community for recreation & better living.
- Automated coffee shop is provided
- Manure outlet unit, plant Nursery and bio fertilizer shop is provided as a better option to fully utilize the resources.
- Pedestrian walkways and seating, parking spaces also provided.
- Entry gate from lake to park for transporting waste cheaply through boats
- Open-air stage is provided to conduct awareness programmes, training, and recreational purposes.
- Playground, Open gym, children's play area are other recreational areas which are more focused on the participation of neighbourhood peoples.
- Seating spaces, green areas are provided facing Ashtamudi Lake is one of the scenic spots of the park.

The view of the area after implementation of the project is shown in figure 33.63.

B. Park – Near Solid waste treatment plant, Chandi depot

The site next to the sanitation park is the solid waste treatment plant-Chandidepo. The surrounding area to the dump has been converted into the green zone, it is ranging from plantation area, grass lawns and picnic area, seating spaces. The aim of the project is to fulfil the long-felt demand of the citizens in creating more spaces nearer for family outings and leisure gatherings. This area could attract species of butterflies, birds and insects by planting trees and shrubs of various nature and importance. Planting of more than 1000 plants, creepers, shrubs and grass could enhance the green canopy in the



Figure 33.63 Proposed view of Sanitation park

area. Birds and butterflies could attract to park that has increased the biodiversity present in the area. The land parcel will be bird watching paradise filled with footpaths and cycling lanes. Fertilizer shops, scrap art shops, and parking areas could be provided for attracting people.The park emphasizes native vegetation and biodiversity, and gives residents a green place to chill and relax. A factory tour can also be conducted in the solid waste treatment plants, to study about the procedures in factories.

The figure 33.64 shows the layout of the project site for park with Solid Waste Treating Plant. The design elements are included in the project -

- Factory tour
- Green spaces for leisure
- Seating facility in banks of Ashtamudi lake
- Fertilizer shop
- Scrap craft shops

The land is already available. Hence the project can be implemented using fund from central and state government under different schemes of infrastructure development



Figure 33.64 Layout for Park with Solid Waste Treating Plant

or by funding from other developmental agencies. Landscape projects along with providing social amenities are expected to be completed within 10 years.

33.1.14 Beautification of Kollam thodu

Kollam thodu though significant for its water way connectivity also serves as a main channel for drainage of the city area into the sea and Lake. But the present conditions of the canal at various stretches, shown in figure 33.65, are pathetic due to the waste dumping and encroaching. Also silting is occurring resulting in depth reduction which obstructs the free flow of water to sea and cause flooding on the riparian regions of Kollam thodu and Ashtamudi lake. Therefore, it's important to revitalize and re-establish the riparian ecosystem and make the canal front active to avoid degradation of edges and prevent waste accumulation. This project envisages looking into the beautification of the canal to counter pollution and leakage into the canal and thereafter into the water bodies. For the implementation of project, 5 stretches are identified which are shown in figure 33.66 for beautification such as

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Sanitation Park	Construction of Waste Water treatment tanks	Landscape projects along with providing social amenities		

A. OlayilKadavu – Iron Bridge
B. Iron Bridge - Pallithottam
C. Beach Area -KINFRA
D. Katchikadavu Ferry
E. Waterfront development for Rehabilitation Settlements Eravipuram



Figure 33.65 Kollam thodu present condition



Figure 33.66 Location of Identified potential stretches of Kollam Thodu

The first 2 stretches i.e., OlayilKadavu – Iron Bridge stretch and Iron Bridge - Pallithottamstretch can be in be implemented as first phase. The extent of Olayilkadavu – iron bridge stretch is 10.73 acres out of which the slaughterhouse and timber depot have 1.7 acres and 0.9 acres of land respectively. The rest are residential areas. There are some informal settlements at the mouth of the Kollam thodu which have to be rehabilitated as part of project implementation to solve the bottle neck at the bifurcation area. The mangroves present in the edges need to be re-established which can prevent flooding. A foot over bridge over the Kollam thodu connecting the slaughter house and timber depot is proposed. Extend the link road to the slaughterhouse area. Channel between the land strips shall be channelized and dredged to enable water intake at the mouth of TS canal. Regular de-sledging shall be enabled using machines by auto detecting and prevent sludge deposits and siltation. The riparian zones need to be monitored using community participation to prevent waste deposit along the banks of the rivers. Community awareness is to be provided about the consequences of encroachments along the riparian zones. The figure 33.67 shows the sketch for the proposals in Olayilkadavu – Iron Bridge stretch.

The stretch along the Pallithottam road extending over from theIron Bridge to Kallupalam shows scope for development for floating markets and for cargo shipments. The proposal for this stretch is sketched in figure 33.68. Once the Kollam thodu was the main channel used for cargo movement.But now the large level



Figure 33.67 Olayilkadavu– Iron Bridge Stretch

difference ranging from 5m depth to 10 m depth at the Kallupalam area is a limitation which needs to be solved.The continuous siltation from the edges causing the decrease in canal depth is also an issue. Riparian management to prevent erosion needs to be done. Stepped retention walls needs to be constructed to bridge the depth gap which will also

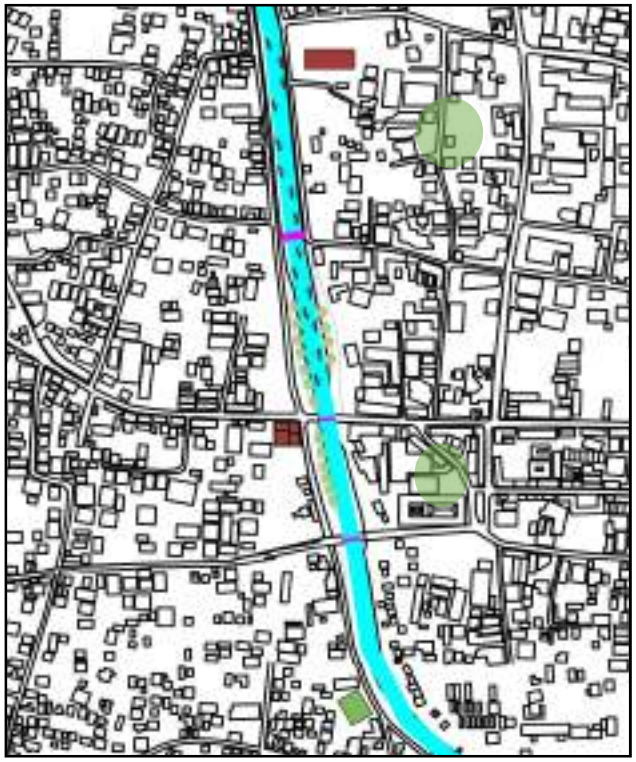


Figure 33.68 Stretch extending from Market Stretch

prevent siltation. The difference in depth can be solved by providing stair to the lower areas and the chances for open elevators can also be sort to. The riparian bidder along with community involvement from the market and nearby residences can be sought out to solve the seepage issues and use of geo textiles and rubbles to enable efficient filtration. Multilevel landing points can be provided, and stepped embankments will provide extra strength to the retaining walls. The canal side character of settlements and warehouses need to be maintained for retaining the heritage ambience of the area (figure 33.69).

Bio- fencing to be provided along the reaches to allow natural filtration of water seepage into the canals or effluent discharge. Stepped landscape and floating markets using pedalled boats to increase the BOD of the water and a prevent contamination The market are at a level difference of 10 m from the canal this should be modified though levelling and by providing flight of steps with intermediate landing which would segregate user dynamics. The landings can host markets or cottage restaurants along the canal till the beach stretch. The developments should be activity based such that to counter the edge effect of the canal. The figure 33.70 shows the sectional view of the canal in market area. The view of the market stretch after implementation of the project is shown in figure 33.71.

The beautification of canal from beach area to KINFRA shall be implemented as second phase and that between Kondeth bridge up to Kachikadavu ferry as third phase. The waterfront development for

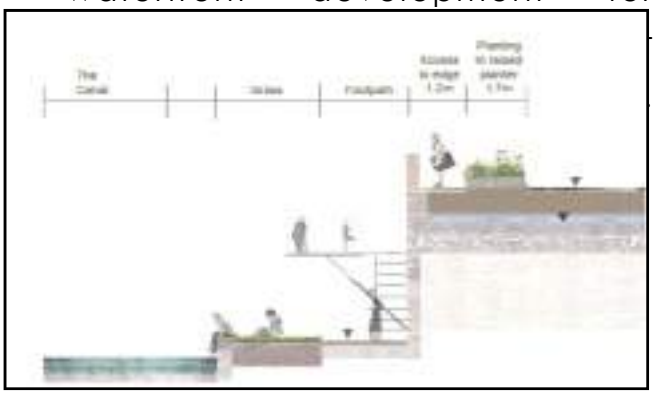


Figure 33.70 Sectional view of the canal in market area



Figure 33.71 View of market stretch after project implementation

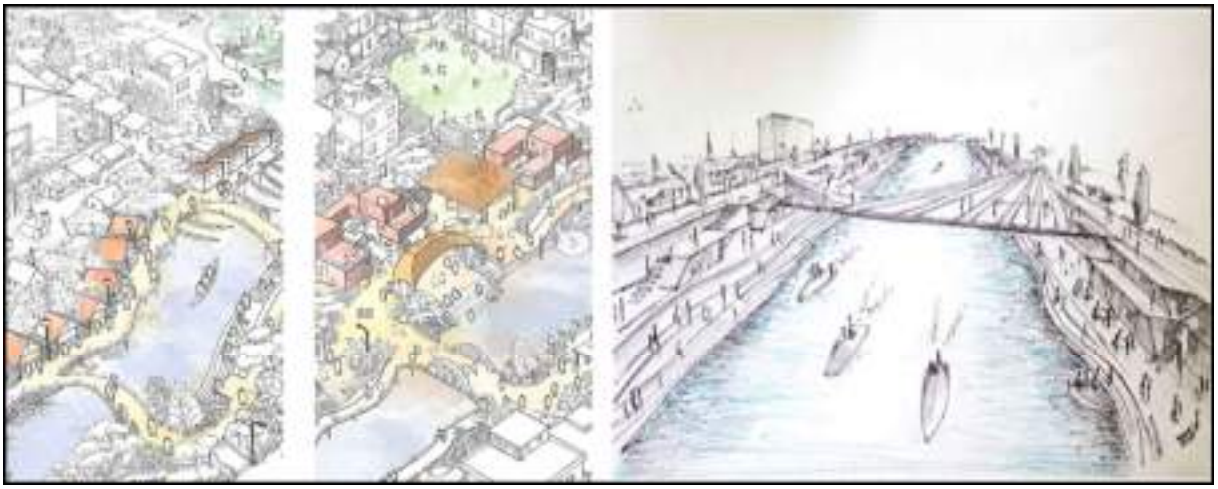


Figure 33.69 Redevelopment efforts for retaining the heritage ambience of the market area

It can be implemented using fund from central and state government under different schemes of infrastructure development or by funding from other developmental agencies

33.1.15 Beautification of Killikolloor Thodu

The Kilikolloor thodu has a potential of promoting tourism and also takes a major role in mitigating flood in the eastern side of KLMC limits. But the problem that faces today is the insufficient depth of canal due to silting and waste dumping. These problems are addressed by the Kilikolloor thodu beatification project. In addition to this, the following benefits can also be obtained:

- It provides a safe public place.
- Enhanced public health amenities such as walkway, play area, outdoor gym area.
- Development of ecology through urban forestry and groundwater recharge.
- Cleaner and Greener Environment
- Effective and enhanced connectivity from various locations
- Improved landscape around the facility

The Kilikolloor thodu connects the Perumpuzhachira in Elampalloor panchayat and Ashtamudi Lake near Koickal in KLMC with a length of about 14 km. Beautification is done along with a focus on disaster management and Tourism (boating facilities). Five spots were identified along the entire stretch of Kilikolloor thodu out of which three are within the planning area (figure 33.72) for providing recreational facilities which includes open gym, pedestrian pathway, cycling path, skating zone, garden, boat jetty, park area etc. The project is to beautify the Kilikolloor thodu, as an integrated socio-ecological corridor, that is not only a public realm but an inclusive, resilient infrastructure that could bring about positive transformation on many fronts - social, economic and environmental. The waterways are seen as ecological and socio-cultural assets, beautification project will change the overall outlook on the canal which includes water transport facilities

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Beautification of Kollam thodu	Olayil Kadavu – Iron Bridge stretch and Iron Bridge – Pallithottam stretch	beach area to KINFRA	From Kondeth bridge up to Kachikadavu ferry	waterfront development for Rehabilitation Settlements Eravipuram



Figure 33.72 Identified spots in Kilikolloor thodu within planning area

be stopped. The bed of the canal is to be cleaned by removing silt & other waste materials and free flow through canal is to be maintained. De silting shall be done and a uniform depth should be maintained, Measures should be taken to preventing dumping of waste into the canals by through the canal network, prevention of drains and sewage being let out into the canal, public parks and landscaping, open-air gyms, setting up of infrastructure for social gatherings, residents and volunteer collectives, who conduct regular clean-ups along the canal.

The Tourism Department can execute the project and Canal Management Society can be constituted for maintaining the canal beautification works. Entire stretch of the canal can be utilized for inland navigation. As a part of inland navigation, canal should be cleaned by removing plastic wastes and weeds from the waterway. The discharge of waste water into the canal shall also erecting CCTV cameras all across the canals. Canal beautification includes footpath, hand rails, concrete benches and other amenities along the identified canal stretches. This will help the canal banks to become more vibrant and the canals the lifeline of the city. The views after beautification near Koikkal Bridge on different directions are shown in figure 33.73 and a view of the whole area in figure 33.74.

A Special Purpose Vehicle (SPV) with major share holder as KLMC and land owners is proposed for availing land. Once land is made available it can be implemented using fund from central and state government under different schemes of infrastructure development or by funding from other developmental agencies. The cost

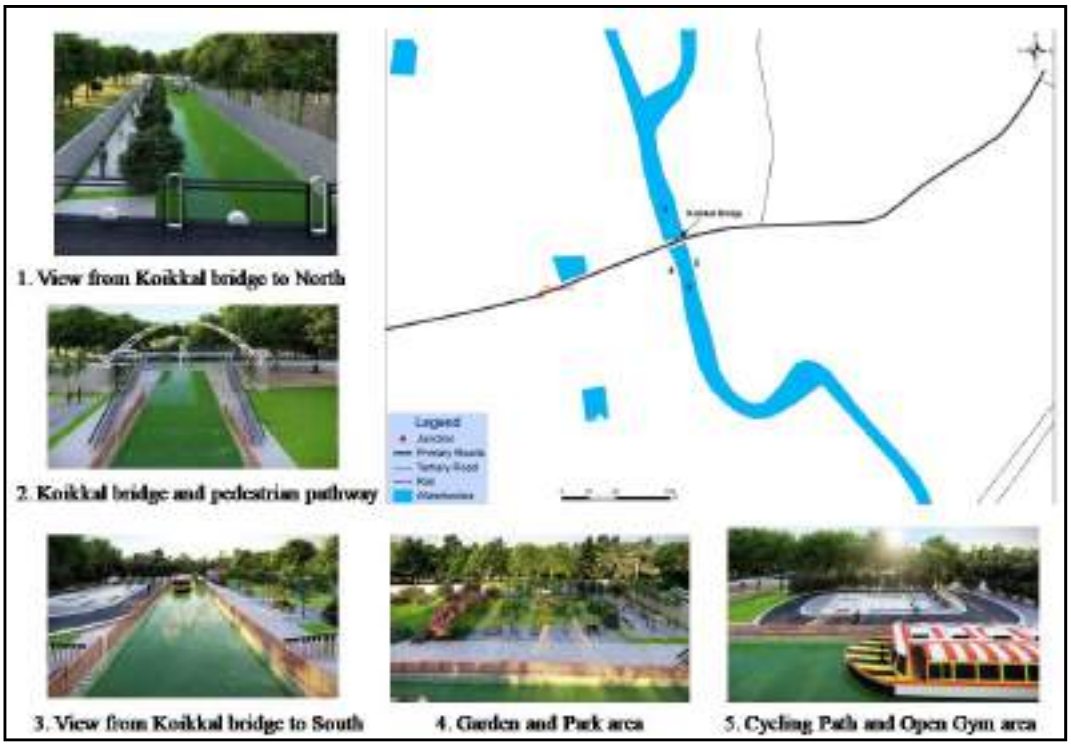


Figure 33.73 Beautification proposals near Koikkalbridge



Figure 33.74 Koikkalbridgeand surroundings

sharing and cost recovery will be decided by the SPV.

The phasing of the project is given below.

33.1.16 Proposal for Swimming pool

The aim of the project is to create a neighbourhood recreational space at Kadavoor area. The project site is Kambilkulam, which is located half kilometre away from the Kollam bypass between Mangad Bridge and Neeravil Bridge. As per the proposed land use, the project site is marked as water bodies as shown in figure 33.75.

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Beautification of Kilikolloor Canal	Finalisation of SPV, Preparation of DPR, availing land	Completion		

The project is to beautify the Kambiyilkulam pond and park by purifying the water and landscaping the surroundings, making a cleaner and greener environment. The park will act as a safe public space for spending the leisure time with families. The pond can also be used as a training swimming and also collects the storm water from the surroundings, which will be an additional advantage in disaster management aspect.

The beautification project will improve the overall outlook of the pond which includes water purification mechanism and recreational facilities like swimming, open spaces, foundation which increases aesthetic appearance, bamboos for privacy along with landscaping. The bed of the pond should be cleaned, and silt and other waste material are to be removed. De silting should be done and a uniform depth should be maintained. Measures should be taken to preventing dumping of waste into the ponds by erecting CCTV cameras. It acts as a private recreational space for the nearby households. Beautification includes footpath, hand rails, drainage facility, water purification system, benches and other amenities. The KLMC can execute the project and its maintenance with public partnership. The figure 33.76 show the different views of the project

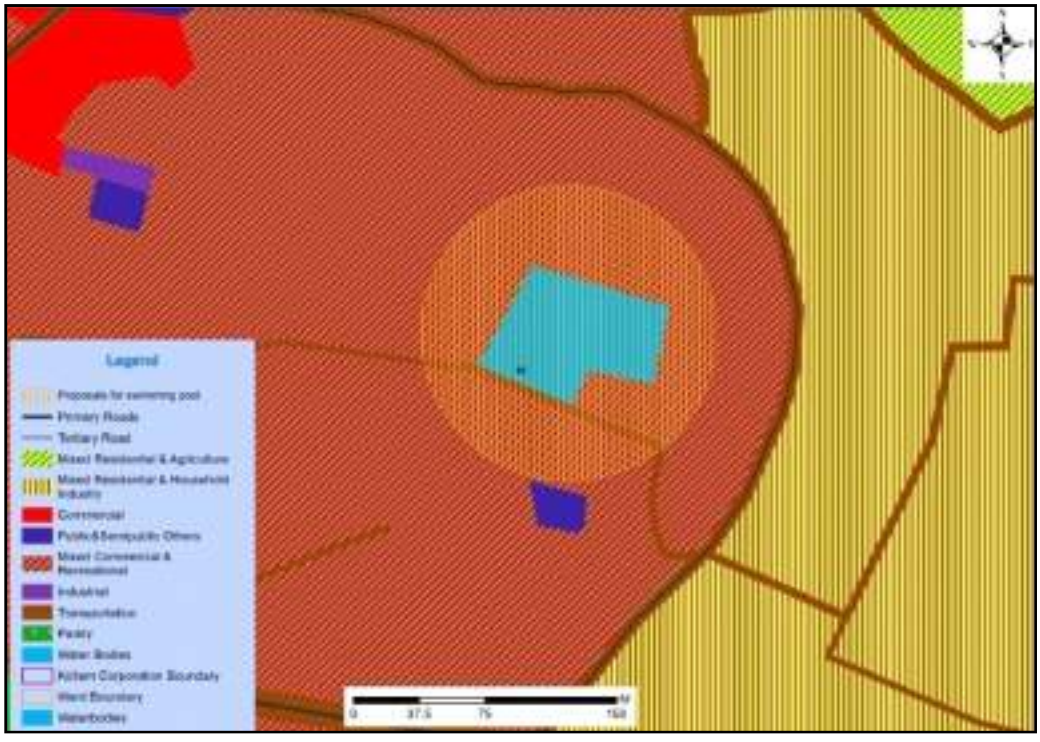


Figure 33.75 Location of Kambilyilkulam



Figure 33.76 Views of Proposed Kambiyilkulam park

site after implementation of the project.

The stakeholders for the project are Local Community, LSG, Private Investors, and State/Central Government etc. The landscaping and construction of pool is to be done within the first 5 years.

33.1.17 Asramam Heritage Street

The heritage street is proposed with a motive of creating awareness about the Kollam's rich history and cultural heritage. The project is proposed to implement by utilising the street around the children's park and its surroundings at Asramam. The land is proposed as recreational open space and public & semi-public zones in proposed land use. The location of the project is shown in figure 33.77.

The components are mainly beautification and landscaping of the Asramam area comprising Adventure Park and Children's park along with

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Proposal for swimming pool	Landscaping , construction of pool and park			



Figure 33.77 Location for Heritage Street

showcasing the rich heritage of Kollam in the form of sculptures or statues. Another major component will be the Punarjani eco-park that will come up on the lakeside, converting Asramam Link Road and KSRTC bus stand premises to a tourist spot.

Incorporating Eco Walks & Wild Trails in the vicinity of Asramam which have immense potential in Tourism can be utilised efficiently. Other sustainable components are,



Figure 33.78 Layout of Asramam Heritage Street

- Making roads pedestrian friendly by method of NMT.
- Heritage & cultural walks
- Non polluting
- Usage of locally available & eco-friendly materials for construction.

The project can also utilise the cultural heritage importance of temples such as Sri Krishnaswamy temple, pallivettaalthara etc.

The project shall be implemented with the responsibility of agencies such as Tourism Dept, DTPC etc. The site selection, land acquisition, construction works should be done within the first 5 years.



Figure 33.79 proposed view of Asramam heritage street

33.1.18 Heritage Zone -I

The Venad ruled Kollam from the 9th century CE to the early 18th century. Kollam was the capital of the Venad Kingdom, so the place holds a unique and unusual cultural heritage with several historically important buildings. The proposed heritage zone-I include

the present Civil Station – Vadi road starting from Collectorate to Kollam Port. It consist of Vigilance Office, Sub Registar Office, Kottarakulam, Labour Court, Anandavalleeswaram Sri Mahadevar Temple and surroundings, Kollam Rameswaram Mahadeva Temple, and Thoppilkadavu where remains of heritage precincts of Venad Kingdom still exist. The location of the proposed heritage zone-I is shown in figure 33.80. The total area of heritage zone - I is 11.69 ha.

The straight road in North - South direction connecting Collectorate and Vadi was once the King's Way of Venad, which is rounded by historic residential buildings of nobles on both sides. There is a gateway as the entrance to each residence which was in the height of elephant. The Puthukulangara palace complex was near to the Collectorate of Kollam, only the remaining of women quarters was left now.Also the pond of Palace-Kottarakulam is still existing in front of Palace. The then guest houses were converted into Sub Registar Office and Labour court. Another important historical building is the Anandavalleeswaram Sree Mahadevar Temple is one of the ancient Hindu temples in Kerala (figure 33.81). The main Sanctum Sanctorum of temple is 1200 years old. King of Venad worshiped deity at this temple. The neighbouring areas of temple is called 'Gramam', where several Brahmin settlements are here. Another building is the Kollam Rameswaram Mahadeva Temple is one of the 108 Shiva temples

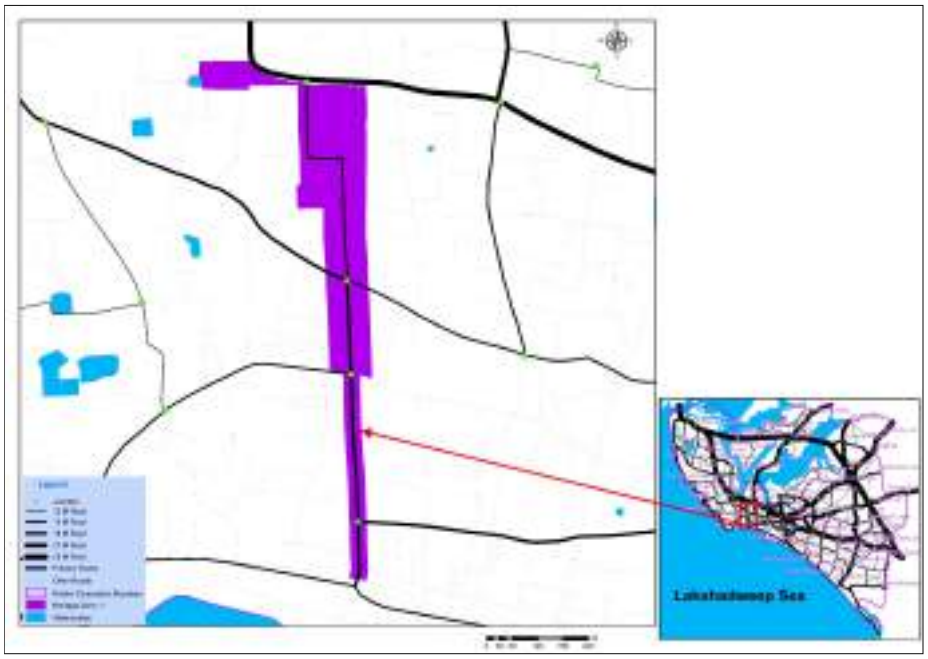


Figure 33.80 Location of proposed heritage zone-I



Figure 33.81 (a) Settlements along Kings Way,(b) Kottarakulam, (c) Venad Palace, (d) Anandavalleshwaram Temple

of Kerala. A pillar set up in the courtyard of Rameswaram temple contains a royal order of king Rama Kulasekhara, a 12thcentury Chera king of Kerala. It is believed that Kollavarsham starts here. Thoppilkadavu is the entrance to the 'Old Capital of Venad'. Earlier there exist a huge mansion called Thoppil Purayidam. Also Chinese ships are anchored in here earlier times. So these historical monument, concentrated in this area need to be protected. Conserving and protecting the heritage areas of Venad adds to the tourism potential of Kollam. It also helps to create job opportunities among the local people living in Kollam.

Heritage Zone- I Circuit

A tourism circuit itinerary of heritage zone-I needs to be prepared. It starts from Vadi junction. The straight road in North - South direction ie the 'Kings Way' leads the tourist to the palace complex. Also there are historic residential buildings of nobles on both sides of the road. The Palace complex consists of Adhithi Mandapam, Women's Quarters and Kottarakulam. The next destination can be Anandavalleswaram Temple and the residential neighborhood around temple - 'Gramam'. Thoppilkadav - the entrance to Old Capital of Venad can also be included. Finally it is connected to Rameshwaram Temple where the Kollavarsham started. Also there are some ancient settlements of Kerala, which can be added as a tourist destination.The proposed Venad heritage circuit is shown in figure 33.82.



Figure 13.82 Proposed Heritage Zone- I Circuit

- Create a unique destination identity such as logo or tagline that promote the heritage of Venad.
- Develop or enhance electronic media such as tourism websites with information and photos of all cultural heritage attractions.
- Develop or enhance print media such as brochures including the information of each site.
- Commission a video documentary integrated with tour websites showcasing the best visual content
- Develop a Multilingual App for the ease of tourist navigation and information
- A training program could be established to train local individuals with an interest in local history to become Heritage Ambassadors. They could greet visitors at the heritage sites promote history.

Kings Way

The road connecting Collectorate and Vadi Junction in North South Direction was once the Kings Pathway that connects to the Palace Complex. There are several settlements of noble person on the sides of this pathway. A gateway in the height of elephant acts as the entrance to the residence. The Map showing the King's pathway is shown in figure 33.83.

- This roadway can be properly segregate with pedestrian, cycle path and vehicular path.
- The fencing of street can be painted with the history of Venad Kingdom.
- Traditional roofed resting spaces can also be provided.
- The Architect of Modern Kollam was 'Velluthambi Dalawa'. A statue of Velluthambi Dalawa can be constructed at the present Ammachiveedu Junction. (figure 33.84)
- The statue of most powerful king of venad kingdom Ravivarma Kulashekaranalso known by the name 'Sangradeeran' can be placed at the Thangassery - Fatima road Junction (figure 33.85).



Figure 33.83 Map Showing King's pathway



Figure 33.84 (a) Ammachiveedu Junction (b) Gateway of Residence



Figure 33.85 Proposed view of King's way

Kottarakulam

Kottarakulam can be redeveloped as a public space. Steps can be provided into the pond where tourist can sit and relax. Also the space is landscaped and small garden sculptures can be added(figure 33.86).

Thoppilkadav

Thoppilkadav can be developed as a park for tourist. An entrance gateway with lake viewing points can also be added.



Figure 33.86 Proposed view of public space of Kottarakulam

For implementing the project required land is proposed to be availed using different options such as free surrender of plots by the owner and giving relaxation to construction in remaining plot, land pooling, TDR methods and land acquisition if required Here also a Special Purpose Vehicle (SPV) in which major share holder is KLMC is proposed for availing land using different methods in consultation with state government. Also finalization of heritage guidelines and conservation measures in consultation with Art and Heritage commission is also vested with SPV. Remaining activities can be implemented using fund from central and state government under different schemes or by funding from other developmental agencies. The phasing of the project is given below.

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Heritage Zone-I	Finalisation of SPV, preparation of Heritage Guidelines and conservation measures, installation of colonial style signboards and information boards, seating, paving of walkways etc.	Implementation of guidelines with conservation measurers		

33.1.19 Heritage Zone -II

Thangassery has a history that traces back to the colonial era making it one of the most historically significant places in Kerala. British called it by the name 'DutchQuilion' while the locals refer to it as the 'Golden village' indicating the distant past when spice trade was conducted here using gold coins. Location of Thangassery is shown in figure 33.87. Manyof the heritage important buildings and monuments are concentrated in this area, shown in figure 33.88. The area of this zone is about 45.9 ha. Thangassery area is proposed as a Heritage Zone-II and is proposed to set up special guidelines for this area which will showcase the relations between Kollam and foreigners in the past. The following can be considered for such guidelines:



Figure 33.87 Location of Thangassery

- Conservation of the heritage buildings and declaring it as a part of heritage.



Figure 33.88 Heritage settlements and buildings



Figure 33.89 Proposed Heritage Circuits in Thangassery

the first heritage circuit, the Thangassery Arch welcomes visitors to the Heritage Zone. Both cycle paths and walkways can be used as NMT for effective transportation along these routes. The second heritage circuit connects Thangassery Fort, Freedom Park, Breakwater, Lighthouse and Dutch Cemetery by pedestrian walkways. Parking services are proposed at the entrance of Thangassery Fort. Colonial style sign boards and information boards are provided along the route for easy identification of routes within the heritage zone (figure 33.90). Resting areas are provided along the street with colonial style seating. Also the street is paved with Portuguese style street patterns (figure 33.91).

- Restoration of old historic buildings through controlled developments and facade upliftment of the streets to improve the architectural morphology and the aesthetics.
- Regulation of development activities for maintaining the colonial character of the area.

Two heritage circuits are proposed for connecting all the historical monuments (figure 33.89). In

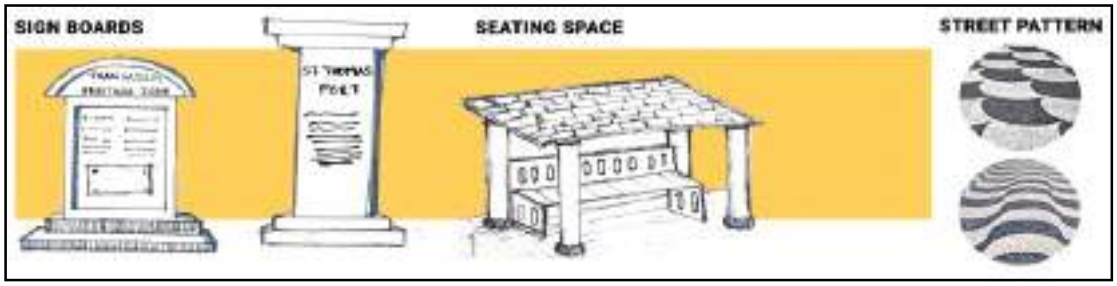


Figure 33.90 Sketches of sign boards, seating with colonial style

Freedom Park- It exhibits the history of Portuguese and Dutch invasion with the help of sculptures and monuments. The proposed site for freedom park is shown in figure 33.91

Parking spaces are provided near the entrance of Freedom Park. Along the pathway that leads to the St. Thomas Fort, sculptures tell the history of Portuguese and Dutch Invasion. Seating spaces with shading trees and well defined pathways adds to the recreation of space (figure 33.92). Marine walkway starts from the freedom park.



Figure -33.92 View showing proposed Freedom Park



Figure -33.91 Proposed site of Freedom Park

Marine Walkway-Sea side from Freedom Park to Breakwater Park are developed by providing a marine walkway. The existing condition is shown in figure 33.93. The marine walkway helps to connect these two parks as a continuous entity. It has greater view to the Thangassery harbour. Also this space can be utilized



Figure 33.93 Existing condition of marine walkway

for various activities like jogging space. Steps are provided to the sea. Also shading trees, seating spaces are provided along the sides of walkway (figure 33.94).



Figure 33.94 Views of marine walkway

Sea View Point-Near the Dutch Cemetery there is a sea view point (figure 33.95) which can be developed as a tourist attraction point. Portuguese style waving street patterns can be used in pathway that leads to the sea view point (figure 33.96). A gateway is created with semi-circular arches. The gateway opens to the Arabian sea. Stepped viewing decks are provided for viewing the sea. The landscape directs the circulation through the site. The railings of deck and pavements are also colonial style.



Figure 33.95 Proposed site of sea view point

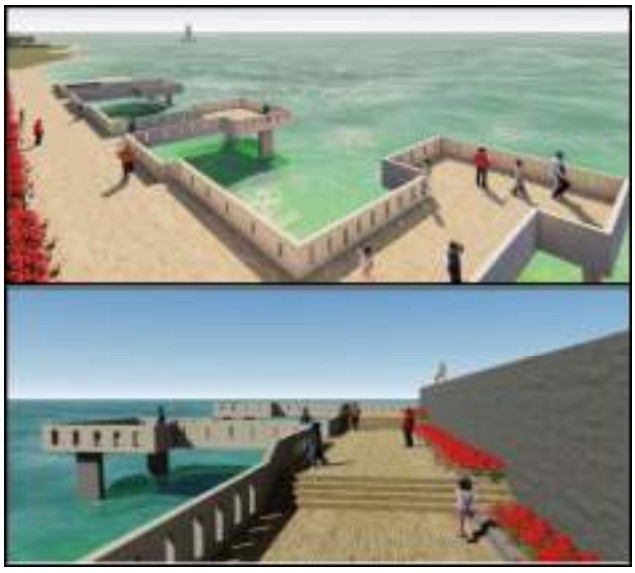


Figure 33.96 Proposed view of sea view point

Dutch Cemetery-Colonial style circular stone paved steps leads to the Dutch Cemetery. An entrance arch in Dutch style is also provided (fiugure 33.97). Green spaces and paved pathways

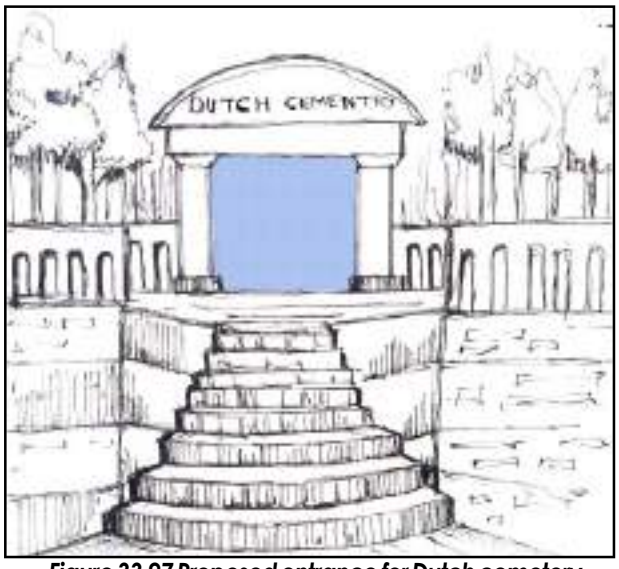


Figure 33.97 Proposed entrance for Dutch cemetery

are provided inside the cemetery. Also the existing ruins of cemetery need to be properly maintained.

Souvenir Shops-Souvenir shops are provided at the end of pedestrian pathways. Dutch, Portuguese and British style artefacts, trade history of Thangassery are sold here including the participation of local people. It helps to create local economy.

Beach Road-Beach road is segregated with proper pedestrian paths, cycle routes and vehicular roads. Perforated colonial style hand rails and fencing walls are used. The solid wall which blocks the view to the sea is demolished. Trees are also provided along the sides for shade. The section of beach road is shown in figure 33.98. The buildings along the beach road shall be atleast with colonial style facade (figure 33.99).

Sea Food Restaurants- Temporary structures are constructed as sea food restaurants along the sides of beach road incorporating the fishermen community of Thangassery.

For implementing the project required land is proposed to be availed using different options such as free surrender of plots by the owner and giving relaxation to construction in remaining plot, land pooling, TDR methods and land acquisition if required Here also a Special Purpose Vehicle (SPV) in which major share



Figure 33.98 Proposed section of beach road



Figure 33.99 Proposed elevations of buildings along Beach Road

holder is KLMC is proposed for availing land using different methods in consultation with state government. Also finalization of heritage guidelines and conservation measures in consultation with Art and Heritage commission is also vested with SPV. Remaining activities can be implemented using fund from central and state government under different schemes or by funding from other developmental agencies. Phasing of the project is given below.

33.1.20 Renovation of Vattakayal and Kattakayal

Certain areas in the KLMC experience flooding during monsoon season when the storm water finds it difficult to drain off from the area in case of excessive rain. This is a result of haphazard development and encroachments of wetlands which were part of the ecosystem in the old time. There was said to be an extensive system of wetlands associated with the water bodies Kattakayal and Vattakkayal, but with time the connection was lost leading to flood. Waste accumulation is also a major issue faced by the water bodies. The location of these 2 lakes are shown in figure 33.100.

These areas are included in the environmentally sensitive area. Along the banks of the lake, mangrove afforestation is to be promoted. The Kattakayal, now almost filled up by dumping solid waste, needs to be cleaned and side protection with geotextiles is to be done. The water connections which are encroached between Kattakayal and Astamudi Lake and Vattakayal and Kattakayal have to be re-established. The following actions can also be taken for the protection of the area a part of the project:

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Heritage Zone -II	Finalisation of SPV, preparation of Heritage Guidelines and conservation measures, installation of colonial style signboards and information boards, seating, paving of walkways etc.	Implementation of guidelines with conservation measurers		

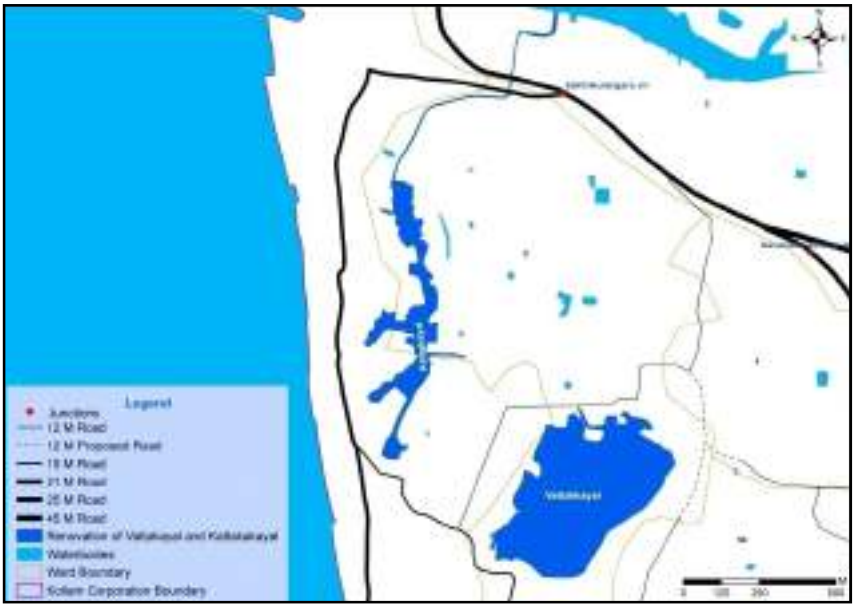


Figure 33.100 Location of Vattakayal & Kattakayal

alternate livelihoods to be provided during fish breeding break.

- The encroached connections to Vattakayal and Kattakayal need to be reinstated to ensure smooth flow of storm water to the drains and then to the water body channels.
- Regular cleaning and waste removal and community instated monitoring of waste dumping need to be adopted to keep the waters clean and improve fishing.

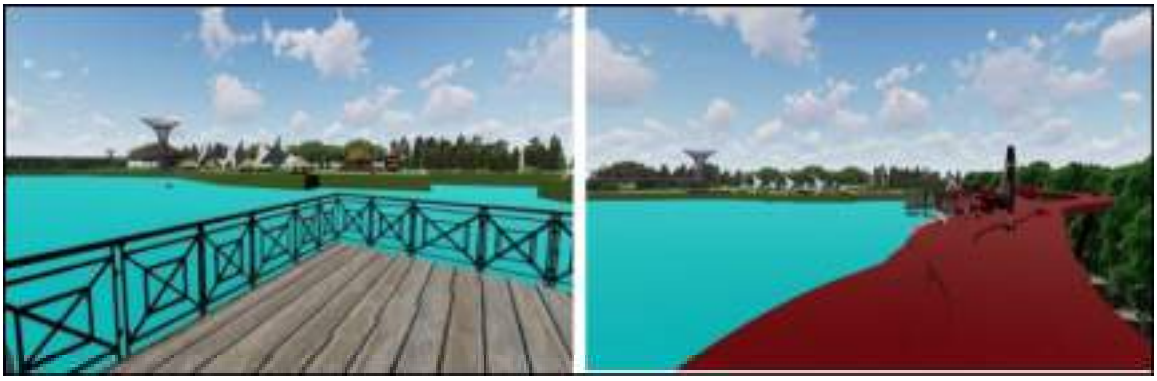
To redefine Vattakkayal, a series of activities have to be done in which community participation is involved in wetland conservation and promotion of tourism in the area.

A fisheries protection and rearing organisation is proposed whose roof leads to the wooden reeds which take the visitor along the banks of the river and through the mangrove forest. Mangrove and sapling growth techniques are offered to the visitors with conservation techniques. Another landing area is the area near

- Proposal for a malsya board for fish conservation due to overfishing and degradation of fishing practices.
- Access roads need to be developed to promote tourism.
- Use of geo textiles along banks and forming a riparian buffer to avoid effluent intrusion.
- Treatment of effluents at the point of discharge.
- Conservation of pond systems.
- There are several wetlands and mangroves associated with the area which is being encroached this needs to be prevented using strict regulation and conserved.
- Subsidies to be provided for fisher men to avoid overfishing and



Interventions which are possible



Deck view from Mangrove forest

the temple where recreational amenities are provided, and the elevated bamboo walk over the wetland can be accessed from there which leads to the bating point (figure 33.101). The visitors can engage in fishing activities, wetland conservation activities or can head



Figure 33.101 View from the Bamboo Walkway and Childrens Park



Schematic diagram of Vattakayal

towards the fish conservation board from here. Another area is the Children's Park area where safe swimming is also practiced. All the activities are taken up with due regards to the sensitivity of the zone and least disturbs the zone.

A Special Purpose Vehicle (SPV) with major share holder as KLMC and land owners is proposed for availing land. Once land is made available it can be implemented using fund from central and state government under different schemes of infrastructure development or by funding from other developmental agencies. The cost sharing and cost recovery will be decided by the SPV. The completion of the project is expected to done within 10 years.

Project	First 5 years	5 to 10 years	10 to 15 years	15 to 20 years
Renovation of Vattakayal and Kattakayal	Finalisation of SPV, Preparation of DPR, availing land ,Cleaning, side protection with geotextiles, buffering with tree plantation	Completion		

33.2 COST OF IMPLEMENTATION AND AGENCIES INVOLVED

The approximate costs of implementation of priority projects along with the agencies involved are shown in table 33.1.

Sl No	Proposals	Activities involved	Location	Approx Expenditure	Agencies involved
1	Road widening	Detailed alignment, Providing required land and construction of roads and completion of NH By-pass	KLMC area	1040crores	SPV,NHAI , Kerala PWD, ,KRFB,KIIFB
2	Proposals for Junction Improvement	Detailed plan, providing required land and construction activities	Chinnakkada Jn., Taluk Office jn., SN College ROB Jn, Kadappakkada, Kallumthazham, Pallimukku,Kadavoor, Mevaram, Ayathiljn.,	220 crores	SPV, Kerala PWD, ,KRFB,KIIFB
3	Proposals for Mobility Hub extension at KSRTC bus stand and Mini Satellite Bus Stations	Detailed plan, Implementation of Mobility hub extension, providing required land and construction activities for Mini Satellite Bus Stations	Mobility hub- near KSRTC bus stand Mini Satellite Bus Stations at Kavanad, Anchalumood, Karikkod, Kallumthazham, Mevaram,Kollam Beach	55 crores	SPV, Kerala PWD,KSRTC, KLMC,KRFB,KIIFB
4	Proposals for New Mobility hub	Detailed plan and construction activities	Near Chinnakkada railway over bridge on the land handed over by railway	130 crores	Kerala PWD, Railway, ,KRFB,KIIFB
5	Non-Motorised Transport (Covered walkway)	Construction activities	Covered walkway in residency road from 2nd entry of railway station to proposed mobility hub	10 crores	Kerala PWD, KLMC,KRFB,KIIFB,
6	Truck terminal	Providing required land and construction activities	Mangad near NH 66 Bypass, &Andamukkam bus stand can be converted as Truck Parking Area of Kollam Market	75 crores	SPV, Pvt Partner , KIIFB, Kerala PWD
7	Oceanarium	Site selection, DPR preparation, ground clearing and construction works.	Kollam beach	30crores	KLMC, Fisheries Department, Pvt partner & Harbour Engineering Department
8	Eco Tourism development, Kandachira	Providing required land ,Bio park and conservation project, Boat jetty and water sports centre, Cultural market.	Kandachira	50 crores	SPV ,, DTPC, Dept of Tourism
9	Lakefront Tourism Development Zone	Finalization of location, providing required land and development	near proposed Asramam- Mangad link road	30crores	SPV, DTPC, Dept of Tourism, Pvt Partner

Sl No	Proposals	Activities involved	Location	Approx Expenditure	Agencies involved
10	Paddy Tourism	pond, water canal, huts, walkways and homestays, boat jetty	Eravipuram	10 crores	SPV, DTPC, Dept of Tourism
11	Island Tourism	Environmental and geological stability improving measures, boat landing centres and other facilities	Sambranikodi Island	20 crores	DTPC, SPV, KSDMA, Mining & Geology Department
12	Eco-walk way	Detailed surveys and planning, providing required land ,identification of agencies, formation of walkways and planting mangroves and other species	Along the side of Ashtamudi Lake	2 crores	SPV, NGOs, DTPC, Dept of Tourism
13	Sanitation Park	DPR Preparation, Site clearance, Construction of new buildings and setting up of required facilities for effective functioning.	Kureepuzha	5 crores	KLMC, KWA,KPWD
14	Beautification of Kollam Canal	Implementation of project as per the master plan of KSUDP	Western part of KLMC	5 crores	SPV, Irrigation Department ,Inland navigation, DTPC, Dept of Tourism
15	Beautification of Kilikolloor thodu	DPR Preparation, eviction of encroachments, de silting, development of parks, Planting trees, walkways etc	Eastern part of KLMC	20 crores	SPV, Irrigation, DTPC, Dept of Tourism
16	Proposals for swimming pool	Site selection, land acquisition construction of pool	Kambilkulam	50 lakhs	Local Community, KLMC,KWA
17	Heritage street	Site selection, land acquisition, construction works	Asramam	5 crores	KLMC,Tourism Dept, DTPC
18	Heritage Zone -I	Finalisation of SPV, Availing land Preparation of Heritage Plan & Guidelines and implementation	Anandavalleswaram-Vadi	25 crores	SPV, Art and Heritage Commission, Tourism Dept, DTPC , Archaeology Dept
19	Heritage Zone-II	Finalisation of SPV, Availing land, Preparation of Heritage Plan & Guidelines and implementation	Thangassery	20 crores	SPV, Art and Heritage Commission, Tourism Dept, DTPC , Archaeology Dept
20	Renovation of Vattakayal and Kattakayal	Finalisation of SPV, Availing land Preparation of detailed plan, Buffering with tree plantation, renovation of Kattakayal, etc	Division1,2	2 crores	SPV, Tourism Dept, DTPC

Table 33.1 Action plan and cost of implementation of Priority projects along with the agencies involved

ZONING REGULATIONS

1. All future developments shall be in conformity with the provisions of the Master Plan for Kollam-AMRUT City encompassing the entire area under the jurisdiction of Kollam Municipal Corporation and future constructions shall conform to the Building Rules and other applicable statutes in force unless otherwise specified in this regulation or in any detailed scheme prepared within the framework of this Plan.
2. Zoning is not retrospective. It does not prohibit the uses of land and buildings that are lawfully established prior to the coming into effect of these Zoning Regulations. If these uses are contrary to the newly proposed uses, they are termed Non-conforming uses and may gradually be eliminated over years without inflicting unreasonable hardship upon the property owner.
3. The provisions in this Master Plan shall prevail over the respective provisions in the prevalent KMBR.
4. For the implementation and enforcement of the proposals envisaged in this Master Plan, areas have been zoned under various categories such as *High Density Residential Zone, Mixed Residential & Agriculture Zone, Mixed Residential & Household Industrial Zone, Commercial Zone, Public & Semi Public- Government Owned Zone, Public & Semi Public- Others Zone, Mixed Residential & Commercial & Institutional Zone, Mixed Residential And Commercial Zone, Recreational –Built-up Zone, Recreational –Open Space Zone, Mixed Commercial & Recreational Zone, Industrial Zone, Industrial Estate Zone, Mixed Commercial & Industrial Zone, Mixed Commercial & Educational Zone, Mixed Residential & Educational Zone, Transportation Zone, Conservation Zone, Water bodies, Buffer Water Bodies, Heritage Zone I & II, Waste Management Zone And Eco Sensitive Areas*. Details regarding the nature of uses '*permitted*', uses '*restricted*' in each zone are given in the accompanying sheets. These regulations shall be enforced in conjunction with other specific provisions if any mentioned elsewhere in the scheme and in accordance with the local Coastal Zone Management Plan approved by the Ministry of Environment and Forests in accordance with CRZ notifications in force and Conservation of Paddy and wetland Act, 2008.

   Uses '*permitted*' in a zone cover the uses that can be normally accommodated in the relevant zone. In some cases it may be possible to permit some other uses also, which are not likely to affect the quality and environment in a zone specified for a particular use. Such cases have to be individually studied based on their performance characteristics and special locational factors. Such cases which come under this category are classified as "Uses Restricted". Restricted –1 category deals with the uses that shall be permitted by the Secretary Kollam Corporation, hereinafter referred to as the Secretary, with the concurrence of the Town Planner of the LSGD (Planning), Kollam. Restricted – 2 category deals with the uses that shall be permitted by the Secretary with the concurrence of the Chief Town Planner of the LSGD (Planning).

   Those Uses which are not included under "Uses *permitted" and "Uses Restricted" shall be normally be treated as* "Uses prohibited", which shall not be permitted under normal circumstances.
5. If any portion of a zone is put to a "*Use Prohibited*" as stated in Para 4, before the sanctioning of the scheme, such use shall be termed as *non-conforming use*. A non-conforming use may be allowed to continue in its existing location, if they are lawfully established prior to the enforcement of these regulations, and essential repairs and maintenance for the structure may be permitted by the Secretary, provided that the said use create no adverse environmental influence in the zone. Addition, alteration or reconstruction, if found necessary as part of any mitigation measures may be permitted for such uses by the Secretary with the concurrence of the District Town Planner. The total built up area of such non-conforming use shall not exceed 1.5 times the existing built up area.
6. Existing areas and structures of archaeological/heritage importance, agricultural uses and religious uses may be permitted to continue in all the zones and shall not constitute non-conforming uses.
7. Subject to the zoning regulations of the respective use zones, more than one use may be combined in a building/ plot, provided that the area of individual uses shall be limited to that prescribed for each such use in the zoning regulation for the respective zone.

8. In the case of concurrence issued for constructions involving filling of wetland, low lying land and paddy fields, various mitigation measures including proper drainage measures have to be insisted.
9. Regulation of constructions and / or land developments on the sides of newly proposed roads / roads proposed for widening as per the Master Plan shall be governed by the distance from the centreline of the road, unless otherwise specified in the Master Plan or Detailed Town Planning Scheme in force or any Detailed Road Alignment plans approved by the Government. If widening on one side of any stretch of the road is constrained due to the physical barriers of water body zone, railway land, protected archaeological monuments/sites, the road widening in that stretch shall be accounted from the other side.
10. In the event of change in alignment of newly proposed roads in the Master Plan, after the commencement of land acquisition of the new alignment, the land parcels in stretches excluded from the original alignment may be changed to adjacent suitable land use zone with the concurrence of the Town Planner. This provision is applicable only to new road development proposals and not to widening proposal.
11. Operational constructions as defined in the Kerala Town & Country Planning Act 2016 shall be treated as permitted use in the Master Plan Area.
12. Constructions and / or land developments, if any, in paddy lands and in wetlands, shall be in conformity with the conservation of Paddy land and Wetland Act in force in the state except for land which are legally converted to dry land by order of the competent authority or dry land as per revenue records, but included in "Paddy/ Agricultural Land/ Land reserved for Paddy field/ Conservation zone" as per the scheme, the regulation of "Paddy/ Agricultural Land/ Land reserved for Paddy field/ Conservation zone" will not be applicable. In such cases the developments/ constructions for Single Family Residential Buildings shall be permitted by the secretary and for all other land developments / constructions may be permitted by the secretary with the concurrence of the District Town Planner of the Local Self Government Department (Planning) after considering the zoning regulations of surrounding land use zone.
13. Secretary shall ensure that any construction or developments shall comply with the provisions contained in Kerala Conservation of Paddy Land and Wetland Act, Notifications under Archaeological Sites and Remains Act, Coastal Regulation Zone Notification, Notifications under Aircraft Act 1934 and any other State/central Govt. Statutes as amended from time to time shall prevail over the respective provisions of this Master Plan.
14. Any use not specified in the "Permitted & Restricted Uses" of a particular use zone, but which is of similar nature to any use under "Permitted & Restricted Uses" can be considered by the Secretary with the concurrence of the Town Planner of the LSGD (Planning).
15. The Government shall have the power to issue clarifications in respect of technical interpretations, if any, required in any of the provisions of the Master Plan in consultation with the Chief Town Planner concerned of the Local Self Government Department (Planning).
16. In case of uncertainty in identifying the alignment and boundary of thodu, canal, river, existing public road, railway line, and in the absence of survey boundaries for the same in the Proposed Land Use maps, it shall be referred to the actual position on ground as well as revenue records and decision taken by the Secretary in this regard shall be final.
17. Telecommunication/ Transmission towers, Gas pipe lines, Wireless station, ATMs, water tanks, waste management units and similar public utility buildings/ structures shall be permitted in all zones except *Water bodies* in subject to other rules and regulations in force.
18. If any private property is included within the boundary of "*Public & Semi Public- Government Owned Zone, Public & Semi Public- Others Zone, Industrial Zone, Industrial Estate Zone, Eco Sensitive Areas, Conservation Zone*" in the Proposed Land use Map, the secretary may after verification of the revenue ownership documents and if found that the land is not under the ownership of the above mentioned zones as per the revenue records, the secretary with the concurrence of District Town Planner of LSGD (Planning) may permit such uses that are permissible in adjacent land use zone as per the proposed

Land Use Map subject to the provisions as applicable to the Kerala Conservation of Paddy and Wetland Act,2008, CRZ notifications and their subsequent amendments, other applicable Acts, Rules and Government Orders in force in the State.

19. If any private property is included within the boundary of water body zones of the Proposed Land use Map, the secretary may after verification of the revenue ownership documents and if found that the land is not a water body as per the revenue records, the secretary with the concurrence of Chief Town Planner of LSGD (Planning)may permit such uses that are permissible in adjacent land use zone as per the proposed Land Use Map subject to the provisions as applicable to the Kerala Conservation of Paddy and Wetland Act,2008, CRZ notifications and their subsequent amendments, other applicable Acts, Rules and Government Orders in force in the State.
20. Expansion of existing "*Public & Semi Public- Government Owned Zone, Public & Semi Public- Others Zone and existing Industrial units including their incidental uses" may permit by secretary with the concurrence of District Town Planner of LSGD (Planning) to all adjacent land use zones except* eco-sensitive areas, Conservation zone, water bodies, buffer water bodies zones, Venad & Colonial heritage zones as per the proposed Land Use Map subject to the provisions as applicable to the Kerala Conservation of Paddy and Wetland Act,2008, CRZ notifications and their subsequent amendments, other applicable Acts, Rules and Government Orders in force in the State.
21. Parks & Open Spaces, Play grounds, turfs are permitted in all zones.
22. In the case of new roads/ road widening projects taken up by the implementing agency, the implementing agency concerned shall provide the alignment of such new roads/ road widening to the District Town Planner for the future planning purpose.
23. Livestock buildings for keeping not more than 20 cows, 50 goats and poultry farms for keeping not more than 1000 birds shall be permitted in all zones except eco- sensitive areas, Conservation, water bodies, buffer water bodies.
24. Electric Vehicle charging stations shall be permitted in all zones except eco- sensitive areas, Conservation, water bodies, and buffer water bodies.
25. Household Nano Enterprises (HNE) as shown in Annexure – V are permitted in residential buildings or within the residential plot with the following conditions.
    (i) It shall be provide at the ground floor /ground level of the buildings /Plots for single family residential buildings.
    (ii) If separate building is constructed within the plot for the above mentioned unit, it shall follow the provisions of residential building within the plot as per KMBR in force in the state.
    (iii) The total area used for the Household Nano Enterprises (HNE) is limited to 30 sq.m/household.
    (iv) It may also allow in the ground floor/ ground level of the buildings for multiple dwelling units under various housing schemes for Lower Income Groups (LIG), Economically Weaker Section (EWS) and Middle Income Groups (MIG) by Central/State Government. In this case the total area used for the HNE is limited to 30 sq.m/dwelling units.
    (v) Maximum power limited up to5 HP with 5 workers (Out of the 5 workers, at least one of them should be the resident of that single family residential building)
    (vi) It shall obtain all necessary No Objection Certificates/Clearances from the concerned department/ authorities/ Boards.
    (vii) The owner shall provide the necessary provisions of the waste treatment facilities as per the norms of Kerala State Pollution Control Board (KSPCB)
26. Location of link canal between T.S canal and sea and railway line connecting Kollam port and existing rail network is marked as tentative. Correct alignment will be decided only after further studies. Hence reservation of land for this proposals may not be implemented till final location is approved by the competent authority.

27. **General Guidelines**

1. Large Scale development proposals in an area not less than 1 hectares, exceeding an investment of Rs.100crores, which provide direct employment (after commissioning of the project) to the tune of not less than 500 may be permitted in all zones other than Conservation, water bodies, Buffer Water bodies, Heritage, Eco sensitive areas, Recreational open space zone and Recreational Built up zone if not included in the permitted uses or restricted uses as per zoning regulation applicable. In such cases, the recommendation of a committee with constitution as below shall be obtained, subject to satisfying the procedures laid out here under and the secretary shall comply the same while issuing permit.
   Also, Adequate provision shall be made for supporting infrastructure such as water supply, sewerage, solid waste management, power supply etc. Separate systems for management of solid waste and sewage shall be provided and maintained by the developer at his cost. The project shall be completed within a period of 5 years or as suggested by the Committee.

1.1 Procedure to be followed

(a) The developer shall submit the project report, detailing the demand, feasibility and Environmental Impact Assessment aspects of the project, together with the approval, if necessary, obtained from the Ministry of Environment and Forests, Government of India to the Convener of the committee and the Convener shall make all arrangements for convening meeting of the committee at the earliest and the committee shall consider and dispose of the project report within a period of one month from the date of receipt of the same.

(b) The constitution of the committee shall be as given under:

Principal Secretary/Secretary to Government, Local Self Government Department	-	Chairperson
The Director, Local Self Government Department (Urban)	-	Member
The Chief Town Planner, Local Self Government Department (Planning)	-	Convenor
The District officer of the LSGD (Planning) having jurisdiction over the district concerned	-	Member
Secretary(s) of Local Self Government(s) concerned	-	Member(s)

(c) The Convener shall fix the venue, date and time of the meeting in consultation with chairperson and shall be responsible for safe custody of records and communications thereof.

(d) The meeting shall be presided over by the Chairperson or in his absence by a member to be authorised by him.

(e) The quorum of the meeting shall be majority of the total number of members of the committee for the project.

(f) The developer shall also produce before the committee, all required clearances from the State and Central Government agencies concerned.

2. Silence Zone, as prescribed by the Noise Pollution (Regulation and Control) Rules 2000, under the Environment (Protection) Act 1986 and its subsequent amendments shall be applicable to the Master plan area.

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
28	**High Density Residential Zone**		
	(1) All Residences including apartments, Night Shelters, Orphanages, Old Age Homes Dharmasala, Residential Quarters.	(1)Abattoir.	
	(2) Shops/ Hotels/Restaurants/Professional Offices/ Commercial Offices/ Banking and Financial institutions/ Gymnasium/Yoga Centres/ Clinics (Outpatient)/Diagnostic centres - floor area up to **500 sq.m**	(2) Public utility areas and buildings other than those included in the permitted category	
	(3)Cottage Industries, Service Industries of non-nuisance Nature (See Annexe VI) with number of workers limited to 15 without power or 10 workers with power limited to 20 HP	(3) Fuel Filling Stations	
	(4) Day Care and Crèche, Nursery Schools, Kindergarten, Primary Schools	(4) Places of Worship	
	(5)Local/state/central government offices like Police Post, Fire Post/Fire Station, Post office etc. serving the local community	(5) Solid waste,sewage and septage treatment plants/ units	
	(6)Library and Reading Rooms, Community Halls- floor area up to **200 sq.m**	(6) Crematorium	
	(7)Tot Lots, Parks, Play Grounds		
	(8)Green houses, Plant nursery, Pump House, Public Utility areas & buildings of floor area up to **200 sq.m** essentially serving the needs of the local community		

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(9) Ashram/Mutt		
	(10) Automobile workshops for 2/3 Wheelers		
	(11) Poultry farms and dairy farms, modern meat processing unit		
28.1	**In addition to the regulations mentioned in Sl.No:-28 (under Permitted & Restricted uses) the following uses may also allow in this zone with access road has an existing / proposed width of 8m minimum**		
	(1) Shops/ Professional Offices/ Commercial Offices/ Banking and Financial institutions - floor area up to **1000 sq.m**	(1) Shops/ Hotels/Restaurants/Professional Offices/ Commercial Offices/ Banking and Financial institutions/ Gymnasium/Yoga Centres/ Clinics (Outpatient)/Diagnostic centres - floor area above **1000 sq.m**	
	(2) Educational Institutions up to Higher Secondary Schools	(2) Educational institutions of higher order such as colleges/universities/ general education institutions/specialised/professional education institutions/research and development institutions	
	(3) Hospitals up to 10 beds	(3) Hospitals up to 50 beds	
		(4) Auditorium / Wedding Halls / Movie Halls Community halls with parking of additional 10% that of KMBR	
		(5) Automobile workshops for 4 Wheelers	
		(6) Parking Plaza	

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
28.2	**In addition to the regulations mentioned in Sl.No:-28.1 (under Permitted & Restricted uses) the following uses may also allow in this zone with access road has an existing / proposed width of 12m minimum**		
			(1) Multiplexes
29	**Mixed Residential & Agriculture Zone**		
	(1)Agriculture, Horticulture, Fodder cultivation, Pastures, Grazing grounds, Fish Farms, Seed Farms, Pump House, Wells and Irrigation Ponds, Storage of Agricultural Produces and Seeds, Plant Nursery	(1)Places of Worship	
	(2)All Residential buildings- floor area up to **500 sq m,** Orphanages, Old Age Homes, Dharmasala, Ashram / Mutt, Home stays	(2)Stacking Yards of non-hazardous materials	
	(3)Buildings and other amenities such as toilet block, watchtower, boat jetty, angling point, jogging track and the like incidental to tourism/recreation activities with total floor area limited up to **1000 sq.m**	(3)Buildings and other amenities such as toilet block, watchtower, boat jetty, angling point, jogging track and the like incidental to tourism/recreation activities with total floor area above **1000 sq.m**	
	(4) Cottage Industries, Service Industries of non-nuisance Nature (See Annexe. VI), with number of workers limited to 15 without power or 10 workers with power limited to 20 HP	(4) Industries of non-nuisance nature(See Annexe -VI) engaging not more than 30 workers without power or 20 workers with power limited to 200 HP, Ice plant/factories, Cold Storage industries, Cottage industries	

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(5) Shops, Professional Offices, Commercial Offices / Establishments, Banking and Financial institutions, Restaurants /Canteens - floor area upto**200 sq m**	(5) IT,ITES, Bio Technology, Nano technology Units/Parks	
	(6) Shops, Professional Offices, Commercial Offices / Establishments, Banking and Financial institutions, Lodges, Restaurants /Canteens, of floor area upto**500 sq. m** provided that the access road has a width of **5m minimum.**	(6)Saw Mills	
	(7) Public Utility Areas & Buildings of area limited to **200 sq.m**	(7) Water Treatment Plant above 5 MLD	
	(8)Automobile workshops for 2/ 3 Wheelers	(8) Fuel Filling Stations	
	(9) Clinics (Outpatient) and Diagnostic centres - floor area up to **200 sq. m**		
	(10)Social Welfare centres above **200 Sq.m** floor area.		
	(11) Gymnasium / Yoga Centres - floor area up to **100 sq.m**		
	(12) Local/State/central government offices / institutions like Police Post, Fire Post/Fire Station, Post office etc. serving the local community		
	(13) Godowns / Warehouses / Storage - non-hazardous - floor area upto**200 sq. m**		

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(14)Day Care and Crèche, Nursery / Kindergarten / Primary &Upper primary schools		
	(15)Library and Reading Rooms		
	(16)Poultry farms and dairy farms		
	(17) Water treatment plants below 5 MLD, Tot Lots/Parks/Play Ground, Open Air theatre, Zoological and Botanical Gardens/ Birds Sanctuary, Camping Sites		
29.1	**In addition to the regulations mentioned in Sl.No:-29 (Under Permitted & Restricted uses) the following uses may also allow in this zone with access road has an existing / proposed width of 8m minimum**		
	(1)All Residential buildings floor area up to **1000 sq.m**	(1)Auditorium / Wedding Halls / Community halls- floor area upto**1000 sq m**	
	(2)Hospitals & Health Centres - floor area up to **500 sq. m**	(2)Weigh bridge	
	(3)Godowns / Warehouses / Storage of non-hazardous materials with floor area upto**500 sq. m,** Markets	(3)Automobile workshops for 4 wheelers	
29.2	**In addition to the regulations mentioned in Sl.No:-29.1 (Under Permitted & Restricted uses) the following uses may also allow in this zone with access road has an existing / proposed width of 12m minimum**		
	(1) Residential Flats / Apartments	(1) Higher education/health care facilities	
		(2) Parking Plaza	
29.3	**In addition to the regulations mentioned in Sl.No:-29.2 (Under Permitted & Restricted uses) the following uses may also allow in this zone with access road has an existing / proposed width of 18m minimum**		
			(1) Truck terminals, Bus stands, container terminals

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
30	**Mixed Residential & Household Industry Zone**		
	(1)All Residential buildings- floor area up to **1000 sq. m**, Orphanages, Old Age Homes, Dharmasala, Ashram / Mutt	(1)Places of Worship	
	(2) Service Industries of non-nuisance nature(See Annexe - VI) engaging not more than 30 workers without power or 20 workers with power limited to 30 HP	(2)Stacking Yards of non-hazardous materials	
	(3) Shops, Professional Offices, Commercial Offices / Establishments, Banking and Financial institutions, Restaurants /Canteens - floor area up to **200 sq m**	(3) Fuel Filling Stations	
	(4) Shops, Professional Offices, Commercial offices/ Establishments, Banking and Financial institutions, Lodges, Restaurants/canteens, hotels of floor area upto**1000 sq m** provided that the access road has a width of 5m minimum.	(4)Saw Mills	
	(5) Public Utility Areas & Buildings of area limited to **200 sq.m**	(5)IT,ITES, Bio Technology, Nano technology Units/Parks	
	(6) Clinics (Outpatient) and Diagnostic centres - floor area up to **200 sq m**	(6)Social Welfare centres above **200 Sq.m** floor area.	
	(7) Gymnasium / Yoga Centres - floor area up to **100 sq.m**	(7)Abattoir.	
	(8) Local/State/central government offices/ Institutions like Police Post, Fire Post/Fire Station, Post office etc. serving the local community		
	(9) Godowns / Warehouses / Storage - non-hazardous - floor area up to **300 sq m**		
	(10)Day Care and Crèche, Nursery / Kindergarten / Primary &Upper primary schools		

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(11)Library and Reading Rooms		
	(12)Agriculture,Horticulture,Foddercultivation,Pastures,Grazinggrounds,Fishfarms,Seedfarms,Pumphouse,Wells and irrigation ponds,Storage of Agricultural produces and seeds,plant nursery green houses		
	(13)Tot Lots/Parks/Play Grounds		
	(14)Automobile workshops for 2/ 3 Wheelers		
	(15) Poultry farms and dairy farms, modern meat processing unit.		
30.1	**In addition to the regulations mentioned in Sl.No:-30 (Under Permitted & Restricted uses) the following uses may also allow in this zone with access road has an existing / proposed width of 8m minimum**		
	(1)All Residential buildings floor area up to **3000 sq.m**	(1)Auditorium / Wedding Halls / Community halls- floor area upto**500 sq. m**	
	(2)Hospitals & Health Centres - floor area up to **500 sq m**	(2)Weigh bridge	
	(3)Godowns/ Warehouses/ Storage of non-hazardous materials with floor area up to**1000 sq m,** Markets.	(3)Automobile workshops for 4 Wheelers	
		(4) Solid waste, Sewage and Septage treatment Plants / units	
30.2	**In addition to the regulations mentioned in Sl.No:-30.1 (Under Permitted & Restricted uses) the following uses may also allow in this zone with access road has an existing / proposed width of 12m minimum**		
	(1) Residential Flats / Apartments.	(1) Higher education/Hospitals/health care facilities	
		(2) Shops, Professional Offices, Commercial Offices / Establishments, Banking and Financial institutions, lodges, Restaurants /Canteens, hotels - floor area above **1000 sq m**	

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
30.3	**In addition to the regulations mentioned in Sl.No:-30.2 (Under Permitted & Restricted uses) the following uses may also allow in this zone with access road has an existing / proposed width of 18m minimum**		
			(1) Truck terminals, Bus stands, container terminals
31	**Commercial Zone**		
	(1) All Shops including shopping complexes, Shopping malls, Movie halls, , Hypermarkets, Restaurants, Hotels, Professional offices, Commercial Offices & Establishments, Banking and financial institutions, IT Software units	(1) Places of Worship	(1) Multiplexes
	(2) Cottage Industries, Automobile workshops, Automobile Service Stations, Automobile show rooms ,Cold storage, Ice factory, Service Industries of non-nuisance nature (See Annexe VI) with number of workers limited to 20 without power or 10 workers with power limited to 30 H.P, weigh bridges, printing press, I.T hardware/electronic industries	(2) Outdoor Games Stadium	(2) Container terminals with access width of 18m minimum
	(3) Public Utility areas & buildings of floor area limited to **200 sq.m**	(3) Other Public Utility areas & buildings of floor area above **200 sq.m**	
	(4) NewConstruction/ Expansion of existing residential buildings with total floor area limited to **300 sq.m,** Residential apartments with ground floor for commercial use, Night Shelters,lodges,boardings,hostels, Guest houses,Gymnasium and Yoga centre	(4) Fuel Filling Stations	
	(5) Govt. or Public sector offices/ institutions, Water treatment plants of any capacity	(5)Solid waste,sewage and septage treatment Plants/ units	

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(6) Day care, creche, Nursery, Kindergarten, primary schools and Expansion of existing educational institutions	(6) Hospitals & Health Centres above 50 beds	
	(7) Social Welfare centres, Museum/ Auditorium / Wedding Halls / Community halls, Convention Centres/Indoor stadium/Exhibition centres/Art galleries		
	(8) Clinics, Diagnostic Centres and hospitals up to 50 beds.		
	(9) Police post/Police station/Forensic science lab/fire station/Radio and TV stations/library and reading rooms		
	(10)Godowns/Warehouse/Storage/ stacking yards of non-hazardous materials		
	(11) Parking Plazas, Transport terminals, Auto rickshaw stand and boat jetty		
	(12) Plant Nursery, Roof top gardens, Fair Grounds, Markets		
	(13) Parks & playgrounds, Open air Theatre, swimming pools		
	(14) dairy farm, Poultry farm		
32	**Public & Semi Public -Government owned Zone**		
	(1) Local/State/Central Govt. or Public sector offices / institutions, Educational Institutions, Civil Defence and Home Guard, Library and Reading Rooms, Social Welfare centres, Museum, Indoor Games Stadium, Swimming Pools, Exhibition Centres and Art Gallery, Public Utility Building, Clinics, Diagnostic Centres and Hospitals.	1) Fuel Filling Station, Auditorium/Wedding Halls/Community Halls above **1000 sq.m**, incidental to public and semi-public uses, Cremation Grounds/Crematorium, Burial Ground	1) Bus Terminal/Stand, Lorry Stand

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(2) Auditorium/ Wedding Halls/ Community Halls, Convention Centres up to**1000 sq.m**, Outdoor Games Stadium, Parking Plazas, Auto rickshaw/Taxi/Jeep Stands, Boat Jetty	(2)Any other use for which prior approval is obtained from state government	
	(3) Residential Uses incidental to the public and Semi-public use, Ashram/Mutts	(3) Retail shops/Restaurant/Canteen above **100 sq.m**	
	(4) Retail shops/Restaurant/Canteen up to**100 sq.m,** ATMs		
	(5) Water treatment plants below **5 MLD**, Tot Lots/Parks/Play Ground, Open Air theatre, Zoological and Botanical Gardens/ Birds Sanctuary, Camping Sites		
33	**Public & Semi Public -Others Zone**		
	(1) Local/State/Central Govt or Public sector offices/ Institutions, Educational Institutions, Civil Defence and Home Guard, Library and Reading Rooms, Social Welfare centres, Museum, Indoor Games Stadium, Swimming Pools, Exhibition Centres and Art Gallery, Public Utility Building, Places of Worship, Clinics, Diagnostic Centres and Hospitals.	(1) Auditorium/ Wedding Halls/ Community Halls , Convention Centres up to **500 sq.m**, Outdoor Games Stadium, Parking Plazas, Auto rickshaw/ Taxi/Jeep Stands, Boat Jetty	(1) Bus Terminal/ Stand, Lorry Stand
	(2) Retail shops/Restaurant/Canteen upto**100 sq.m,** ATMs	(2) Fuel Filling Station, Auditorium/Wedding Halls/Community Halls above **1000 sq.m** incidental to public and semi-public uses, Cremation Grounds/Crematorium, Burial Ground	
	(3) Water treatment plants below 5 MLD, Tot Lots/Parks/Play Ground, Open Air theatre, Zoological and Botanical Gardens/ Birds Sanctuary, Camping Sites		

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
34	**Mixed Residential &Commercial & Institutional Zone**		
	Land to a depth of 200 meter on either side of following roads in all zones except Conservation, Transportation, Recreational, Eco sensitive, Water bodies and Buffer Water bodies are also deemed as Mixed Residential & Commercial & Institutional zone		
	a) N.H – 66 (Sakthikulangara – Mevaram Road)		
	b) N.H – 744 (Chinnakkada–Chandanathope Road)		
	c) N.H –183 (High School Jn – Anchalummoodu Road)		
	d) N.H 66 – Bypass (KavanadAltharaJn – Mevaram Road)		
	Regulations applicable to High Density Residential, Commercial, Public and Semi Public -Government, Public and Semi Public -Others are applicable to Mixed Residential &Commercial & Institutional zone.		
35	**Mixed Residential &Commercial Zone**		
	Land on either side of following roads to the prescribed width in all zones except Conservation, Transportation, Recreational, Eco sensitive Water bodies and Buffer Water bodies are also deemed as Mixed Residential &Commercial zone		
	i. land to a depth of 50 metres on either side of :		
	a) AnchalummooduJn – Perumon Road		
	b) RamankulangaraJn – Maruthady Road		
	c) KavalJn – Anchukallummoodu Road		
	d) MundalummooduJn – Thirumullavaram Road		
	e) AltharammooduJn – ThangasseryJn Road		
	ii. land to a depth of 100 metres on either side of:		
	a) D.S.P Office Jn – Mulankadakam via Vadi, Soojukkaranmukku, Pandakasala, Thamarakkulam, P.W.D Jn and Congress Bhavan Road(Inner Ring Road)		
	b) Congress Bhavan – KochuplamooduJn Road		
	c) Kollam Railway station – Kannanalloor Road		
	d) EravipuramJn – Thannikkamukku Road via Pallimukku Jn., Puliyathumukku, Erapanchal		
	In addition to the regulations mentioned in Sl.No:-28.2 (under Permitted & Restricted uses) the following uses may also allow in this zone		
	(1)Guest Houses/Lodges	(1) Museum, Exhibition centres and Art Gallery	

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(2)Shops, Professional Offices, Banking and Financial Institutions, Commercial offices / Establishments, Restaurants / Canteen / Hotels / Gymnasium / Yoga centres, Community Halls – floor areas upto**1000 sq.m**	(2) Indoor games stadium	
	(3) Parking Plaza, Taxi / Jeep stand		
	(4) Social welfare centres and other Public Utility Areas & Buildings-Floor area up to **500 sq.m**		
	(5) Fish Farms, Seed farms, dairy farms, Poultry farms		
	(6) Storage of Agricultural Products and seeds, Green houses and Roof top gardens		
35.1	**In addition to the regulations mentioned in Sl.No:-35 (under Permitted & Restricted uses) the following uses may also allow in this zone with access road has an existing / proposed width of 8m minimum**		
	(1) Shops, Professional Offices, Banking and Financial Institutions, Commercial offices / Establishments, Restaurants / Canteen / Hotels	(1) Saw mills, Ice factory, Cold storages, printing press, Water treatment plants	
	(2) Auditorium / Wedding Halls / Community halls- floor area upto**1000 sq m**		
	(3) Godowns/ Warehouses/ Storage – non hazardous		
35.2	**In addition to the regulations mentioned in Sl.No:-35.1 (under Permitted & Restricted uses) the following uses may also allow in this zone with access road has an existing / proposed width of 12m minimum**		
	(1) Social welfare centres– floor area above **500 sq.m**	(1) Industrial estate & Industrial Parks,IT/ITES,Bio Technology/Nano Technology parks/units	
	(2) Secondary / Higher Secondary Schools, Technical Institutions		
	(3) Movie Halls / Auditorium / Wedding Halls – with parking @ 1.1 times that of KMBR		

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(4) Diagnostic centres above **500 sq.m** floor area, Hospitals & Health centres – (upto 10 beds)		
	(5) Weigh bridge		
	(6) Markets		
	(7) Godowns / Warehouses / Storage – non hazardous		
	(9) Marbles and Granite Storage / Cutting centres		
	(10) Automobile workshops /Automobile show room/ Automobile Service Stations of Light vehicles		
35.3	**In addition to the regulations mentioned in Sl.No:-35.2 (under Permitted & Restricted uses) the following uses may also allow in this zone with access road has an existing / proposed width of 15m minimum**		
	(1) Educational institutions of higher order such as colleges/universities/ general education institutions/specialised/professional education institutions/research and development institutions		(1) Bus Terminals/stand, lorry stand
	(2)Automobile workshops/ Automobile Service Stations for Heavy vehicles		
	(3) Hospitals & Health Centres– (upto 100 beds)		
35.4	**In addition to the regulations mentioned in Sl.No:-35.3 (under Permitted & Restricted uses) the following uses may also allow in this zone with access road has an existing / proposed width of 18m minimum**		
	(1) Hospitals & Health Centres – (upto 300 beds)	(1) Container Terminal	
	(2) Movie Halls / Auditorium / Wedding Halls	(2) Hospital above 300 beds	
		(3) Court Complexes	
	Note: In the case of contiguous plots under single ownership, that extends beyond the depth specified in Sl. No. 35 above, such uses may be permitted for the entire plot depth, provided that plots have a minimum frontage of 25 meters on such roads.		

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
36	**Recreational-Built up Zone**		
	(1) Any construction/land development essential for the development/ improvement of open air recreational facilities.	(1)Night shelters, Guest houses, Lodge, Restaurant, Canteen, Resorts, Hotels with floor area **above1000sq.m**	
	(2) Watch Towers, Eco Walk Ways / nature trails, Fair Grounds etc.	(2)Movie halls, convention centres with floor area **above 1000 sq.m**	
	(3) Park, Play Grounds, Swimming Pools, Open Air Stadium, Open Air Theatre, Zoological and Botanical Garden etc.		
	(4)Night shelters, Guest houses, Lodge, Restaurant, Canteen, Resorts, Hotels with floor area limited to **1000sq.m**		
	(5)Bakeries and confectionaries floor area limited to **200 sq.m**		
	(6)Museum, exhibition centres and art gallery		
	(7)Library and reading room		
	(8)Public utility areas and buildings		
	(9)Retail Shops/Professional Offices-built up area upto**200 sq.m**		
	(10) Commercial Offices / Establishments, Banking and Financial Institutions - built up area upto**200sq.m**		
	(11) Gymnasium / Yoga Centres		
	(12) Godowns / Warehouses / Storage non-hazardous - built up area upto**200 sq.m**		
	(13) Police post, Fire post		
	(14) Clinics (Outpatient) and Diagnostic centres - built up area up to **200sq.m**		
	(15) Movie halls, convention centres with floor area limited to **1000 sq.m**		

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
37	**Recreational-Openspace Zone**		
	(1) Fish Landings, Boat Jetties, Guided Boat Rides, Watch Towers, Water Sports Facilities, Fair Grounds etc.		
	(2) Park, Zoological and Botanical Garden, Birds Sanctuary etc.		
	(3)Tourist resorts with area limited to **200 sq.m**		
	(4) Eco Walk way / Nature Trails, Mangrove garden		
	(5) Angling point, Guided boat rides		
	(6) Open restaurant, Eating Place, resting place, Art gallery, Souvenir Shop made of bio degradable material such as wood panel board etc.		
	(7) Open air recreational facilities		
	(8) Water treatment plants,Waste recycling facilities without causing environmental degradation		
	(9)Sanitation facilities for the visitors		
	(10)Public comfort stations,restaurants,sales outlets etc. essential for promoting recreation activities each with floor area limited to **200 sq.m**		
	(11) Minor Public Utility areas & Public utility buildings which will not affect the character of the area.		
	(12) Agriculture/ Horticulture/Fodder cultivation, Fish Farms/ Seed Farms/ Pump House/ Wells and Irrigation Ponds.		

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
38	**Mixed Commercial & Recreational Zone**		
	(1) All Shops including shopping complexes, Shopping malls, Movie halls, Hypermarkets, Restaurants, Hotels, Professional offices, Commercial Offices & Establishments, Banking and financial institutions, IT Software units, Night shelters, Guest houses, Lodge, Resorts	(1) Places of Worship	(1) Multiplex
	(2) Cottage Industries, Automobile workshops, Automobile Service Stations, Automobile show rooms ,Cold storage, Ice factory, Service Industries of non-nuisance nature (See Annexe VI) with number of workers limited to 30 without power or 20 workers with power limited to 30 H.P, weigh bridges, printing press, I.T hardware/electronic industries	(2) Outdoor Games Stadium	
	(3) Godowns/Warehouse/Storage/ stacking yards of non-hazardous materials	(3) dairy farm, Poultry farm	
	(4) New Construction/ Expansion of existing residential buildings with total floor area limited to **300 sq.m**, Residential apartments with ground floor for commercial use, Night Shelters, lodges, boardings, hostels ,guest houses, Gymnasium and Yoga centre	(4) Fuel Filling Stations	
	(5) Govt. or Public sector offices/ Institutions, Water treatment plants of any capacity		
	(6) Day care, creche, Nursery, Kindergarten, primary schools and Expansion of existing educational institutions		

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(7) Social Welfare centres, Museum/ Auditorium / Wedding Halls / Community halls, Convention Centres/Indoor stadium/Exhibition centres/Art galleries		
	(8) Clinics, Diagnostic Centres and hospitals up to 50 beds.		
	(9) Police post/Police station/Forensic science lab/fire station/Radio and TV stations/library and reading rooms		
	(10) Public Utility areas & buildings of floor area limited to **200 sq.m**		
	(11) Parking Plazas, Transport terminals, Auto rickshaw stand and boat jetty		
	(12) Plant Nursery, Roof top gardens, Fair Grounds, Markets		
	(13) Parks & playgrounds, Open air Theatre, swimming pools		
	(14)Any construction/land development essential for the development/ improvement of open air recreational facilities.		
	(15)Watch Towers, Eco Walk Ways / nature trails, Fair Grounds etc.		
	(16) Museum, exhibition centres and art gallery		
39	**Industrial Zone**		
	(1) All industries other than obnoxious and nuisance type industries, Automobile Workshops & Automobile Service Stations, Spray Painting Workshops, Saw Mills, Timber Yard, Ice Factory, Cold Storage, Fish and Meat Processing Units, Printing Press, Water Treatment Plants, Marble and Granite Storage and Cutting Centres, Industrial Estates & Industrial Parks.	(1)Other Public Utility Areas and Public Buildings. Cremation Ground / Crematorium, Burial Ground, Common Vault.	(1) Container Terminals with access width of 18m minimum.

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(2)Godowns/Warehouses/Storage of non-hazardous material, stacking yards, weigh bridge.	(2)Storage of Explosives and Fire Works, Gas Godowns, Crusher Units.	
	(3)Dairy and Dairy Farms, Dairy related Industries, Poultry Farms, Piggery Farm, Smoke House.	(3)Fuel filling station	
	(4)Dry Cleaning Plants, Power Plants, Sub Stations	(4)Slaughter House	
	(5)Government or Public Sector Offices	(5)Sewage Treatment Plants, Solid Waste Treatment, Septage Treatment Plants/ Units.	
	(6)Transport Terminals incidental to industrial use.	(6)Obnoxious or nuisance industries (see Annexure-VII)	
	(7)Residential Uses incidental to the Industrial Use. Any other activity essentially incidental to Industrial use.		
	(8)Tot lots, Parks and Play Grounds attached to incidental residential use.		
40	**Industrial Estate Zone**		
	(1)All industries other than obnoxious and nuisance type industries, Automobile Workshops & Automobile Service Stations, Spray Painting Workshops, Saw Mills, Timber Yard, Ice Factory, Cold Storage, Fish and Meat Processing Units, Printing Press, Water Treatment Plants, Marble and Granite Storage and Cutting Centres.	(1)Other Public Utility Areas and Public Buildings. Cremation Ground / Crematorium, Burial Ground, Common Vault.	(1)Container Terminals with access width of 18m minimum.
	(2)Godowns/Warehouses/Storage of non hazardous material, stacking yards, weigh bridge.	(2)Storage of Explosives and Fire Works, Gas Godowns, Crusher Units.	
	(3)Dairy and Dairy Farms, Dairy related Industries, Poultry Farms, Piggery Farm, Smoke House.	(3)Fuel filling station	
	(4)Dry Cleaning Plants, Power Plants, Sub Stations	(4)Slaughter House	

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(5)Government or Public Sector Offices	(5)Sewage Treatment Plants, Solid Waste Treatment, Septage Treatment Plants/ Units.	
	(6)Transport Terminals incidental to industrial use.	(6)Obnoxious or nuisance industries (see Annexure -VII)	
	(7)Residential Uses incidental to the Industrial Use. Any other activity essentially incidental to Industrial use.		
	(8)Tot lots, Parks and Play Grounds attached to incidental residential use.		
41	**Mixed Commercial &Industrial Zone**		
	(1) All Shops including shopping complexes, Shopping malls, Movie halls, Hypermarkets, Restaurants, Hotels, Professional offices, Commercial Offices & Establishments, Banking and financial institutions, IT Software units,Night shelters, Guest houses, Lodge, Resorts	(1)Other Public Utility Areas and Public Buildings. Cremation Ground / Crematorium, Burial Ground, Common Vault.	(1)Multiplexes
	(2)All industries other than obnoxious and nuisance type industries, Automobile Workshops & Automobile Service Stations, Spray Painting Workshops, Saw Mills, Timber Yard, Ice Factory, Cold Storage, Fish and Meat Processing Units, Printing Press, Water Treatment Plants, Marble and Granite Storage and Cutting Centres, Industrial Estates & Industrial Parks.	(2)Storage of Explosives and Fire Works, Gas Godowns, Crusher Units.	(2)Container terminals
	(3)Godowns/Warehouse/Storage/ stacking yards of non hazardous materials	(3)Fuel filling station	

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(4) Construction/ Expansion of existing residential buildings with total floor area limited to **300 sq.m**, Residential apartments with ground floor for commercial use, Night Shelters, lodges, boardings, hostels ,guest houses, Gymnasium and Yoga centre	(4)Slaughter House	
	(5) Govt. or Public sector offices/ institutions, Water treatment plants of any capacity	(5) Obnoxious or nuisance industries (see Annexure VII)	
	(6) Day care, creche, Nursery, Kindergarten, primary schools and Expansion of existing educational institutions	(6)Sewage Treatment Plants, Solid Waste Treatment, Septage Treatment Plants/ Units.	
	(7) Social Welfare centres, Museum/ Auditorium / Wedding Halls / Community halls, Convention Centres/Indoor stadium/Exhibition centres/Art galleries		
	(8) Clinics, Diagnostic Centres and hospitals up to 50 beds.		
	(9) Police post/Police station/Forensic science lab/fire station/Radio and TV stations/library and reading rooms		
	(10) Public Utility areas & buildings of floor area limited to **200 sq.m**		
	(11) Parking Plazas, Transport terminals, Auto rickshaw stand and boat jetty		
	(12) Plant Nursery, Roof top gardens, Fair Grounds, Markets		
	(13)Dairy and Dairy Farms, Dairy related Industries, Poultry Farms, Piggery Farm, Smoke House.		

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
42	**Mixed Commercial & Educational Zone**		
	(1) All Shops including shopping complexes, Shopping malls, Movie halls, Hypermarkets, Restaurants, Hotels, Professional offices, Commercial Offices & Establishments, Banking and financial institutions, IT Software units, Night shelters, Guest houses, Lodge, Resorts	(1)Other Public Utility Areas and Public Buildings. Cremation Ground / Crematorium, Burial Ground, Common Vault.	(1)Multiplex
	(2) All Educational institutions and other uses incidental to educational use.	(2)Fuel filling station	(2)Container Terminals with access width of 18m minimum.
	(3) Cottage Industries, Automobile workshops, Automobile Service Stations, Automobile show rooms ,Cold storage, Ice factory, Service Industries of non-nuisance nature (See Annexure VI) with number of workers limited to 20 without power or 10 workers with power limited to 10 H.P, weigh bridges, printing press, I.T hardware/electronic industries	(3) Slaughter House	
	(4)Godowns/Warehouse/Storage/ stacking yards of non hazardous materials	(4) Sewage Treatment Plants, Solid Waste Treatment, Septage Treatment Plants/ Units.	
	(5) Construction/ Expansion of existing residential buildings with total floor area limited to **300 sq.m,** Residential apartments with ground floor for commercial use, Night Shelters, lodges,boardings,hostels ,guest houses,Gymnasium and Yoga centre		

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
	(6) Local/State/Central Govt. or Public sector offices/ Institutions, Educational Institutions, Civil Defence and Home Guard, Library and Reading Rooms, Social Welfare centres,Museum, Indoor Games Stadium, Swimming Pools, Exhibition Centres and Art Gallery, Public Utility Building, Places of Worship, Clinics, DiagnosticCentres and Hospitals.		
	(7) Water treatment plants below 5 MLD, Tot Lots/Parks/Play Ground, Open Air theatre, Zoological and Botanical Gardens/ Birds Sanctuary, Camping Sites		
	(8) Police post/Police station/Forensic science lab/fire station/Radio and TV stations/library and reading rooms		
	(9) Parking Plazas, Transport terminals, Taxi and Auto rickshaw stand.		
	(10) Plant Nursery, Roof top gardens, Fair Grounds, Markets		
43	**Transportation Zone**		
	(1)Transport terminals including constructions that form an integral or essential part of the terminal.	(1)Public Utility Areas and Buildings	(1)Container Terminals provided that the access has a width of **18m** minimum.
	(2)Any incidental uses to the transport terminals such as Retail Shops, Restaurants, Canteen etc. with built up area limited to **1500 sq.m**	(2) Fuel Filling Stations	
	(3) Staff Quarters, Offices, Night Shelters, Guest Houses etc. incidental to the transport terminals	(3)Retail Shops, Restaurants, Canteen etc. with built up area above **1500 sq.m**	

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
44	**Conservation Zone**		
	Paddy cultivation		
	Agriculture/ Horticulture/Fodder cultivation, Fish Farms/ Seed Farms/ Pump House/ Wells and Irrigation Ponds without any building construction.		
	Constructions/ land developments in conformity with the Conservation of Paddy Land and Wet Land Act in force in lands designated as paddy land or wet land under the said Act.		
45	**Water Bodies**		
	1) Mangroves afforestation, provision of bio-filters including contour bunding and other activities which will not affect the sustainability of ecosystem, Bridges, Side protection walls, Bathing Ghats, jetty etc may be permitted based on community level requirements.		
46	**Buffer Water body Zone**		
	(1) All the uses permitted in item 45	(1)Water Treatment plants, residential building of area up to **200 sq.m** with a maximum coverage of 55%, Expansion of existing public and semi-public activities with maximum coverage of 35% and FAR limited to 1.75,Minor Public Utility areas & buildings which will not affect the character of the area without causing environmental degradation to the water bodies	

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
47	**Waste Management Zone**		
	(1)New Construction/ Reconstruction of buildings, yard for segregation of wastes, sanitary fills and other technologies for solid waste management/treatment, public utility areas and buildings incidental to solid waste management.		
	(2) Sewage treatment Plant / Septage treatment Plant or Units of Capacity more than 100KLD and buildings/ structures incidental to liquid waste management.		
48	**Eco Sensitive Areas**		
	(1) Mangroves afforestation, provision of bio-filters including contour bunding and other activities which will not affect the sustainability of ecosystem	(1) Agriculture/ Horticulture/Fodder cultivation/ Pastures/ Grazing grounds/ Fish Farms/ Seed Farms/ Pump House/ Wells and Irrigation Ponds without any building construction.	
	(2) Conservation activities to heritage buildings/sites, Activities incidental to conservation of heritage buildings/sites	(2)Minor Public utility areas & buildings which will not affect the character of the area.	
49	**Religious Zone**		
	(1) Places of Worship,		
	2) Ashram/Mutt, Dharmasala, Madrasa.	Cremation Ground/Crematorium, Burial Ground/ Common Vault.	
	(3) Auditorium / Wedding Halls - floor area up to 500 sq m	Social welfare centres, Auditorium / Wedding Halls / Community halls- floor area above 1500 sq.m	
	(4) Other public utility areas and buildings and incidental uses		

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2
50	**Mixed Residential & Educational Zone**		
	The regulations applicable to **High Density Residential zone** are applicable to Mixed Residential & Educational zone. In addition to that the following uses may also allow in this zone		
	(1) All Educational Institutions and incidental uses like Hostels, Canteen, Residential staff quarters, Laboratories, Lodges, recreational facilities etc.	Information technology buildings and Information technology parks, allied uses or as directed by the government.	
General Guidelines for the Heritage areas/buildings			
	As per the provisions of Section 91, sub-section (3), clause (iv) of the Kerala Town and Country Planning Act 2016, the following regulations shall apply to conserve the character of all the listed heritage precincts in chapter -19 and the following heritage areas/ buildings, with due regard to the historical significance and/or architectural character of the area. 2. The architectural character of the facade of the proposed construction shall be in tune with the surrounding environment and as per the advice of the Kerala Art and Heritage Commission. 3. The Local Self Government Institution concerned shall insist on any such recommendations of the Commission. 4. The Commission, if found necessary may entrust the following regulatory aspects to a Committee/Subcommittee, constituted for the purpose. 5. Changes if any required in the following regulations shall be permitted by the Commission on receipt of the recommendation of the Committee/Subcommittee constituted, if any, for the purpose. 6. In addition to the above, the following regulations shall also apply.		
51	Heritage zone-I comprising of Survey Numbers 1(P), 2,3(P),4(P), 5, 7(P), 28(P), 37(P), 38(P), 39(P), 40, 41(P), 42, 43(P), 48(P), 54(P), 55(P), 56(P), 79, 80(P), 81(P), 82(P), 83(P) of Block Number 199; Survey Number 43(P) of Block Number 225; Survey Numbers 1(P), 2(P), 3,4,5,6,7,8,9(P), 16(P), 17(P), 21(P), 22(P), 23(P), 26(P) of Block Number 229; Survey Numbers 1,2,3,4, 5(P), 6(P), 9(P), 10(P), 11, 12, 13(P), 14(P), 15(P), 16(P), 33(P), 34(P) of Block Number 231; Survey Numbers 1,2, 3, 4, 5(P), 6(P), 7(P), 12(P), 13(P), 14(P), 30(P), 31, 32, 33, 34, 37, 38(P) of Block Number 232; Survey Numbers 1, 2, 3, 4, 5(P), 6, 7, 8, 9, 10(P), 12, 13, 14, 15, 16(P), 17(P), 18(P), 19, 20(P), 24, 25(P), 26(P), 28(P), 29, 30, 31, 32, 33(P), 34(P), 35(P), 36 of Block Number 237; Survey Numbers 17(P), 24(P), 25(P), 26(P), 27, 28(P), 29, 30(P), 31, 32(P), 33(P), 34, 36(P), 37(P), 38(P), 39, 40, 41(P), 55(P), 61(P), 62, 63 of Block Number 238; Survey Numbers 1(P), 2(P), 3(P), 4(P), 19(P), 20(P), 21(P), 22(P), 23(P), 69(P), 70(P), 71(P), 72(P), 73(P), 74(P),75, 76(P), 77(P), 78(P), 79, 81(P), 94(P), 98(P), 99(P) of Block Number 239; Survey numbers 16(P), 18(P), 19(P), 20(P), 22(P), 23(P), 42(P) of Block Number 240; Survey Numbers 65(P), 66(P), 67(P), 68(P), 70(P), 73(P), 74(P), 77(P) of Block Number 247; Survey Numbers 1(P), 14(P), 15(P), 17(P), 18(P), 19, 20(P), 21(P), 22(P), 23(P), 24(P), 51(P), 52(P),		

	61(P), 62(P), 63(P), 64(P), 65(P), 112(P), 121(P), 123(P), 124(P), 125, 126(P), 138(P), 153 of Block Number 248 in Kollam West village.
	51.1 Notwithstanding anything contained in the zoning regulations of the master plan and subject to modifications as prescribed hereunder, no development, redevelopment, construction including additions, alterations, repairs, renovations, replacement of special and architectural features, demolition of any part or whole thereof in respect of any objects or buildings in the area, coming under the Heritage Zone-I, shall be allowed except with the prior written recommendation of the Kerala Art & Heritage Commission constituted by the Government under Section 86 of the Kerala Town and Country Planning Act 2016 and *Rule 103 of the Kerala Municipality Building Rules 2019*, in order to conserve the heritage character of the area. Provided that, no area or buildings or objects, which in the opinion of the said commission have architectural, aesthetic, archaeological, cultural or historic value, will be allowed to be altered from the existing condition without the prior written recommendation of the commission: Provided also that, new constructions and additions or alterations to existing buildings may be permitted in this area with the following additional regulations namely:- 1. The facade of the proposed construction and street character shall be in harmony with the architectural character of the heritage zone and as per the advice of the Commission. 2. Slopping roof forms (hipped/cross gabled/front gabled etc.) with a slope angle ranging from 35-45 degrees which depicts the character of the street shall be adhered to. 3. The roof in facade shall be finished with Mangalore pattern (MP) terracotta colour tiles. 4. The sunshade in facades if any provided, shall have the same slope and finish as that of the main roof. 5. The exterior wall surfaces shall be finished in white or off white colour. The Exterior walls shall be given plain texture finish. 6. The overall height of the construction including the existing structure if any, up to the topmost point of the ridge shall not exceed 10 meters from the average ground level.

	7. Existing natural vegetation such as trees and shrubs which added to the character of the area shall be protected and maintained to the extent possible. Provided further that, the use or reuse of any site or building shall be as per the recommendations of the commission.
52	Heritage zone-II comprising of Survey Numbers 7(P), 8(P), 9(P) of Block Number 198; Survey Numbers 101(P), 120(P), 126(P) of Block Number 248; Survey Numbers 148(P), 149(P), 184(P), 187(P) of Block Number 249; Survey Number 119(P), 122(P), 123(P), 124(P), 125(P) of Block Number 250; Survey Number 76(P), 77(P), 82(P), 100(P), 101(P), 105(P), 123(P), 124(P), 157(P) of Block Number 251; Survey Numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 33(P), 38(P), 39(P), 40, 41, 42, 43, 44, 45, 46, 47, 51, 52, 53 of Block Number 252; Block Number 253, Block Number 254; Survey Number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38 of Block Number 255; Survey Number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33(P), 36(P), 37(P), 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 71, 72, 77, 78, 79 of Block Number 256; Block Number 257; Block Number 258; Block Number 259; Block Number 260; Survey Numbers 24(P), 25, 27, 28(P), 29(P) of Block Number 267; Survey Numbers 46(P), 47(P), 48(P), 49(P), 50, 71(P), 72(P), 73(P), 74 of Block Number 268 in Kollam West village.
	52.1 Notwithstanding anything contained in the zoning regulations of the master plan and subject to modifications as prescribed hereunder, no development, redevelopment, construction including additions, alterations, repairs, renovations, replacement of special and architectural features, demolition of any part or whole thereof in respect of any objects or buildings in the area, coming under Heritage Zone-II, shall be allowed except with prior written recommendation of the Kerala Art & Heritage Commission constituted by the Government under Section 86 of the Kerala Town and Country Planning Act 2016 and *Rule 103 of the Kerala Municipality Building Rules 2019*, in order to conserve the heritage character of the area. Provided that, no area or buildings or objects, which in the opinion of the said commission have architectural, aesthetic, archaeological, cultural or historic value, will be allowed to be altered from the existing condition without the prior written recommendation of the commission: Provided also that new constructions and additions or alterations to existing buildings may be permitted in this area with the following additional regulations namely:- 1. The facade of the proposed construction and the street character shall be in harmony with the Colonial architectural character (Portuguese colonial architecture, British colonial architecture, Dutch colonial architecture) of the heritage zone and as per the advice of the Commission.

	2. The exterior wall surfaces shall be finished in white or off white colour. The Exterior walls shall be given plain texture finish. 3. The overall height of the construction including the existing structure if any, up to the topmost point of the proposed construction shall not exceed 10 meters from the average ground level. 4. Existing natural vegetation such as trees and shrubs which added to the character of the area shall be protected and maintained to the extent possible. 5. Excavations, if any required in and around Buckingham Canal (Survey No:-30,31of Block No:-255 and Survey Nos:-13 of Block No:-257) shall be carried out in the presence of a representative from the State Archaeology Department. Provided further that, the use or reuse of any site or building shall be as per the recommendations of the Commission.

Notes:

1. For the purpose of these regulations, floor area means the total floor area of the building on all floors.
2. Subject to zoning regulations of the respective zones, more than one use may be combined in a building, provided that the total built up area of such a building shall not exceed the maximum built up area permitted for any of such use, in that zone. Also, the built up area of individual uses shall be limited to that prescribed by the zoning regulations for the zone.
3. Irrespective of zoning regulations, public utility areas and building under government approved schemes can be implemented anywhere in the planning area.