MASTER PLAN FOR
NORTH PARAVUR TOWN 2031

REPORT

North Paravur Municipality & Department of Town & Country Planning

FOREWORD

North Paravur, constituent part of Kochi Urban Agglomeration, is changing to a major residential suburb of Kochi and is considered as a part of Kochi for all practical purposes. Interestingly, North Paravur will be part of the 'Alappuzha-Ernakulam, Thrissur-Palakkad'urban corridor as per the State Urbanisation Report-Kerala, prepared recently by the Department of Town and Country Planning.It is thus evident that the town is part and parcel of a thriving urban development corridor of the state. The ensuing development prospects have to be optimally utilised through proper planning interventions.

The town needs an integrated approach to development, encompassing all the issues whether it is in infrastructure, environmental conservation, service delivery in various social sectors etc. These requirements can be addressed only through preparation of a comprehensive Master Plan for the town with a long range vision. Recognizing the immediate need for such planning interventions in our urban sector, Government of Kerala has initiated a Scheme for preparation of Master Plans for Municipalities and North Paravur Municipality was included in the first phase of the Scheme. Adhering to the guidelines of the Scheme, this Master Plan is prepared jointly by the Municipality and the State Department of Town & Country Planning.

All the members of the council have actively participated in the discussions for finalizing the plan. Special acknowledgement to the standing committee chairpersons for their guidance and involvement in the work. Members of the Special Committee and working groups also put in considerable efforts in getting the plan prepared through a process of people's participation, carefully understanding the aspirations and expectations of the citizens of the town. I also appreciate the Department of Town and Country Planning, Government of Kerala for their efforts in materialization of the Master Plan for North Paravur Town.

I firmly believe that the Master Plan for North Paravur Town will serve as a guiding frame work for the development of the town for the years to come.

North Paravur

Shri. Ramesh D Kurup
Chairman
North Paravur Municipality

PREFACE

Urban areas are considered the engines of productivity and growth in the country. Present day cities and towns are facing challenges of transformation and management with respect to globalisation, competitiveness, sustainability, climate change, livability and inclusiveness. It is at this stage, the importance of planning and guiding the development of towns in a planned way arises. A Master plan is a guide to orderly development to promote health, safety, welfare and convenience of the people of a community. It organises and co-ordinates the complex relationship between urban land uses and many civic activities considering the resources and requirements.

North Paravur Town in Ernakulam district was once a bustling town with many commercial establishments and trade. Now it is changing to a major residential suburb of Kochi city and is considered as a part of Kochi Urban Region for all practical purposes. As per the delineated urban profile for 2031 of the State Urbanisation Report, North Paravur Town forms part of the delineated urban corridor of 'Alappuzha-Ernakulam, Thrissur-Palakkad'. It is thus evident that the town is part and parcel of a thriving urban development corridor of the state. The ensuing development prospects have to be optimally utilised through proper planning interventions.

Realizing the urgent need for planned development of our urban centers, Government have as per G.O.(Rt) No. 3982/2008/LSGD dtd 13th November, 2008 decided to prepare Master Plans for all urban centers in the state and North Paravur town was included in the first phase of the Scheme. Adhering to the guidelines of the Scheme, this Master Plan is prepared jointly by the Municipality and the State Department of Town & Country Planning. North Paravur Municipality and the Department took concerted efforts in this regard that made possible the time bound preparation of this Master Plan.

The Master Plan was prepared through a systematic process, comprising of extensive data collection and analysis, identification of development issues, setting up of goals and objectives, formulation of development concept and carving out policies & strategies followed by detailed sectoral proposals. The regional development frame work provided by State Urbanisation Report, the District Urbanisation Report of Ernakulam and Draft Master Plan for Kochi Region, became major determinants in formulating the development concept of the Plan. Based on development needs and prospects of the town identified from outcomes of studies and

analysis, spatially located integrated development proposals were arrived at and included in this Plan.

I would like to appreciate the leadership provided by the North Paravur Municipality for this endeavour, the involvement of former chairperson Smt.Valsala Prasannakumar and the present chairman Shri.Ramesh D Kurup are reckoned with gratitude.

The Master Plan for North Paravur Town is prepared after conducting exhaustive discussions and workshops with the council members as well as working group members. Thus good level of people's participation was ensured in this Plan.

The sustained and collective effort of the Special Committee, working groups and the Planning team has helped in the documentation of this Master Plan. The hard work, spirit and the sincerity of the Planning team in the Regional Town Planning Office, Ernakulam in bringing the Master Plan within the scheduled time is highly appreciated.

I also appreciate the officials of the head office of the Department who exerted consistent efforts in vetting and finalisation of the Plan.

Certainly, the Master Plan for North Paravur Town will provide a frame work for orderly development of the town so that the town becomes more productive, sustainable and liveable.

Thiruvananthapuram
October, 2019

Chief Town Planner
Department of Town and Country Planning
Government of Kerala

ACKNOWLEDGEMENTS

Considering the role and importance of rational and orderly growth of urban centres, the Government of Kerala intends to streamline the development process in urban settlements, to ensure that these settlements continue to achieve their objectives of improved efficiency and productivity. In this respect, Government have introduced a Scheme for preparation of Master Plans for Municipalities in the State, and preparation of Master Plan for North Paravur Town was included in the first phase of the said Scheme.

The preparation of Master plan for North Paravur Municipality was kicked off as a joint effort of North Paravur Municipality and Regional Town and Country Planning office, Ernakulam under the Scheme. The guidelines of the scheme issued vide GO. (Rt) No.2766/2009/ LSGD Dated 24.10.2009 envisages a participatory process of preparation of Master Plan. Adhering to the guidelines, the Master Plan for Paravur Town is prepared jointly by the Municipality and the State Department of Town & Country Planning.

The Municipal Council of North Paravur has resolved to prepare a new Master plan for the town by Resolution No: P W1-672/10 Dtd.30.01.2010. Various activities were coordinated by Special Committee constituted specifically for the purpose, under the guidance and supervision of the North Paravur Municipal Council.

Given the stupendous nature of the development planning task and the intricacy of details involved, right leadership and direction is very significant for the effective and successful preparation process of the plan. In this respect, I acknowledge with gratitude the guidance and involvement of Shri. Ramesh D Kurup, present Chairman and Smt. Valsala Prasanna Kumar, Former Chairperson of North Paravur Municipality during the entire course of plan preparation. The dynamic participation and advices rendered by Sri. V.D.Satheesan, MLA of Paravur Constituency was of immense help in the task. The supports and guidance rendered by each and every member of the North Paravur Municipal Council are also thankfully acknowledged. They actively participated in all the workshops conducted as part of preparation of this Plan and contributed highly by giving their concept of development. The members of Special Committee, especially Chairpersons of the working groups, played very remarkable role in shaping this Plan. As the planning exercise encompassed various sectors, it required the support and positive

interaction with many public and private agencies/ line departments. I, thankfully, acknowledge their contributions.

Sri. Gigi George, Chief Town Planner (Planning), was a great source of constant motivation and inspiration in accomplishing the task. I thankfully acknowledge the unlimited support rendered by Smt. Sindhu K.M., Town Planner and other officials of the Office of Chief Town Planner(Planning). The planning wing of the office of Chief Town Planner, constituted in connection with implementation of this scheme, extended all supports to this important task is duly acknowledged. The concerted effort of the officials of the Regional Town Planning Office, Ernakulam was significant in the preparation of the report. In particular, Smt. M.M. Sheeba, Town Planner has to be acknowledged for the leadership and guidance that she provided for materializing this Plan in its present form.

The efforts put in by the officials in the task are reckoned with gratitude. Separate mention must be made to the statistical section of RTP office headed by the Research Officer for the support rendered in the process of gathering data and conducting systematic analysis for the preparation of this Master Plan.I also appreciate all other staff of the Regional Town Planning Office for extending their sincere and dedicated assistance in the task.

Ernakulam
25.10.2019

Shri. J. Jayakumar
Senior Town Planner
Regional Town Planning Office, Ernakulam

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CHAPTER – 1

SUMMARY OF STUDY AND ANALYSIS

CHAPTER 1

Summary of Study and Analysis

1.1 Introduction

The Master Plan aims at improving the urban environment, as the efficiency of urban development largely depends upon how well they are planned, how economically they are developed and how efficiently they are managed. Planning intervention has a dual responsibility of strengthening local economy and bringing in efficiency of the built environment to support the local economy besides being a regulatory mechanism for limiting the physical as well as ecological foot print in order to ensure sustainable development.

Recognizing this, Government of Kerala has introduced a Scheme to prepare Master Plans for all towns in the state in a time bound manner, in order to ensure their planned development. Preparation of Master Plan for North Paravur Town is taken up in the first phase of this Scheme.

The preparation of the Master Plan is a partnership with community through consultation and active participation of citizens, stake holders and officials. The Master Plan is the basis for reservation of land for various uses. Success of a Master Plan depends on people's 'will and willingness' to adhere to certain disciplines in the use of land, roads and public places and on the level of civic awareness in general, with a long term perspective.

Master Plan for North Paravur also lays down the space requirement for the coming years. The plan suggests future width of roads that already exist. It also suggests new roads. For additional population that is expected to arrive in coming years, the plans provide for new residential areas along with amenities and services. The plan also reserves sites for future transport terminals, town centres etc.

The land use prescription of a Master Plan is based on future quantity of land needed for various activities. These are allocated depending on the suitability of different locations, topography, compatible and incompatible uses, accessibility and other objectives of achieving compact settlements where services can be extended economically.

1.2 Summary of Findings

The various studies and analysis carried out as part of Master Plan preparation bring out the fact that the Municipal area suffers from many deficiencies. A brief summary of the findings and conclusions based on studies and analysis are summarized in this chapter.

1.2.1 Profile of the Town

North Paravur Municipality was constituted in 1921 in Thrissur District. On April 1st 1958, when Ernakulam district was formed, Paravur got separated from Thrissur District and included in Ernakulam district. North Paravur town has an area of 9.02 Sq.kms and population of 30059 persons as per 2001 census. There are 26 wards in the Municipality. North Paravur is the head quarter of Paravur Taluk. The town is part of Paravur and Kalamassery Assembly Constituencies. Paravur Assembly Constituency is a part of Ernakulam Lok Sabha Constituency.

The region has a tropical humid climate with an oppressive hot season and plentiful seasonal rainfall. North Paravur is situated in the low land region of the District near the coast. The average elevation of the Municipality is 10 metres above MSL.

No major agricultural activities are present inside the urban limits, and there are no industrial developments. The town is mainly service based and major economic activity is commercial. Even though North Paravur is basically a residential municipal town, this town serves as a feeder town to the surrounding panchayats viz.Chittattukara, Chendamangalam, Kottuvally, Ezhikkara, Pallippuram. North Paravur town is a part of Kochi Urban Agglomeration. The location of North Paravur and its surrounding LSGs is shown in figure1.1.

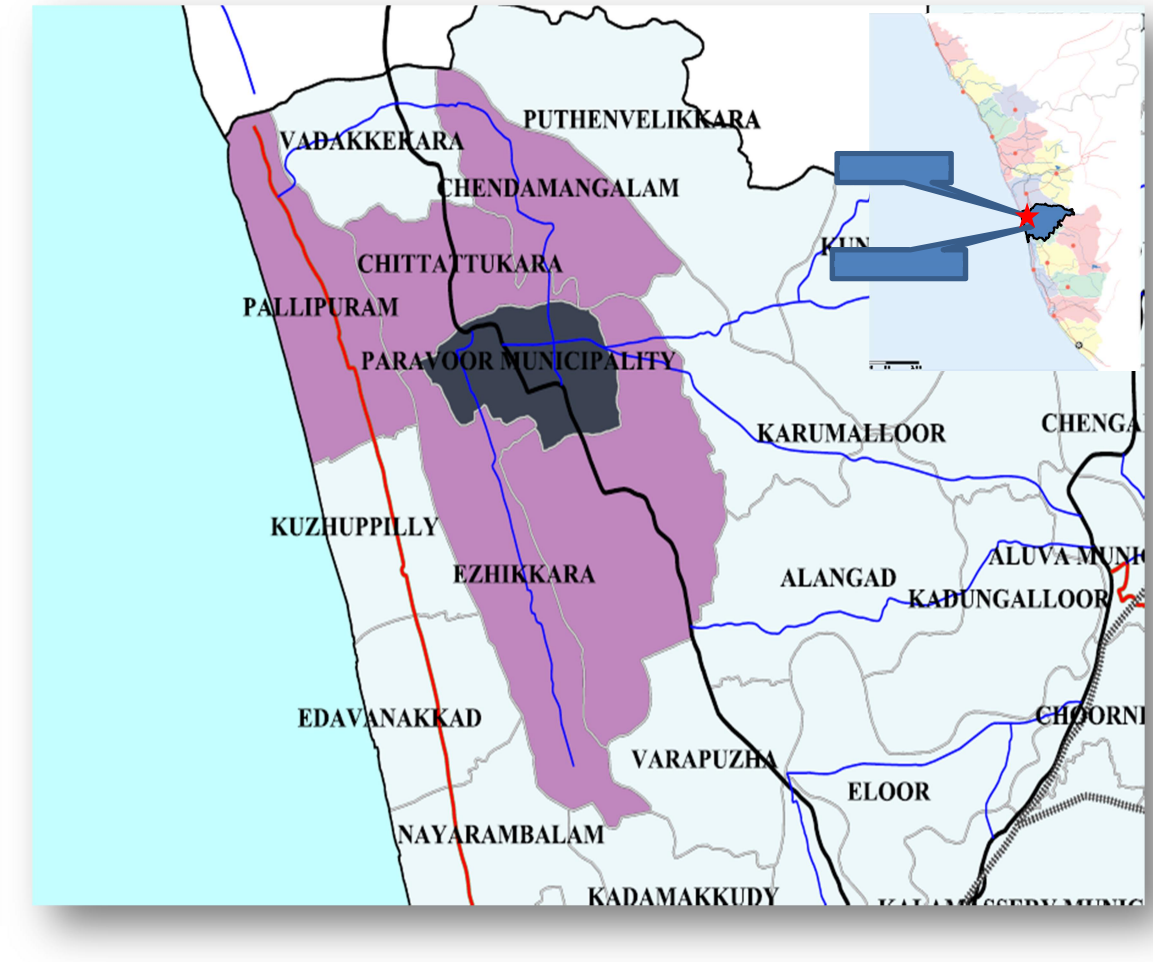


Figure 1-1:North Paravur Municipality & its adjoining LSGIs

1.2.2 History of development

North Paravur is one of the oldest towns in South India, established in 52 BC when an ancient Tamil tribe Cheras, decided to make the city as its capital, owing to presence of a natural port here as well. After partition of Chera Empire, the city came under control of Kochi Kingdom. In 18th century, Kochi Raja partitioned Paravur into two and granted the northern portion to Travancore Kingdom as an enclave to built extensive fortifications known as Nedumkotta to thwart possible Mysore invasion. Thus a new town was established known as North Paravur under Kochi and South Paravur under Travancore. In 1949, both Paravur were united after merge of Travancore-Kochi state. However the name stuck as North Paravur to town.

Muziris in Pattanam was the centre of Indian spice trade for many centuries, and was known to the Yavanas (Greeks) as well as Romans, Jews, Arabs, and Chinese since ancient times. Kochi rose to significance as a trading centre after the port at Muziris destroyed by massive flooding of the river Periyar in 1341.

Paravur was once a bustling town with many commercial establishments and trade links. Paravur market owned by municipality is situated on the banks of backwaters, marking it a very important market of its time. In older days, there was major trading, using vanchi's in the puzha close to the market. Paravur was also once famous in the District for its traditional industries like coir, handlooms and agriculture. Now it's changing to a major residential suburb of Cochin where people looking jobs in city.

1.2.3 Regional Setting

Paravur is a municipal town falling on the north western boundary of Ernakulam district at 10° 05' N latitude and 75° 10' E longitude. Though considered as a part of Kochi for all practical purposes, the town is 17 km away from Edappally in the City of Kochi. It is situated at the north end of Ernakulam District and bordering with Thrissur District. The towns in Thrissur District like Kodungalloor, Mala, Chalakkudy and the towns in Ernakulam District like Kalamassery, Aluva, Angamaly and the Vypin Island are located in the near vicinity of this town. The ancient seaport of India Muziris is located in Pattanam village, 3 km away from town.There is no Railway line and AirPort in North Paravur Town. Nearest railway station, Aluva is 16km from town and nearest Air Port, Cochin International Air Port; Nedumbassery is 21km from town.

National Highway 66 (old NH 17) is passing through the North Paravur Town; it is the spinal cord of the road network. NH 66 provides connection to other parts of State. The other major road in North Paravur Town is Aluva – Paravur Road. The regional linkages of North Paravur is shown in figure 1.2.

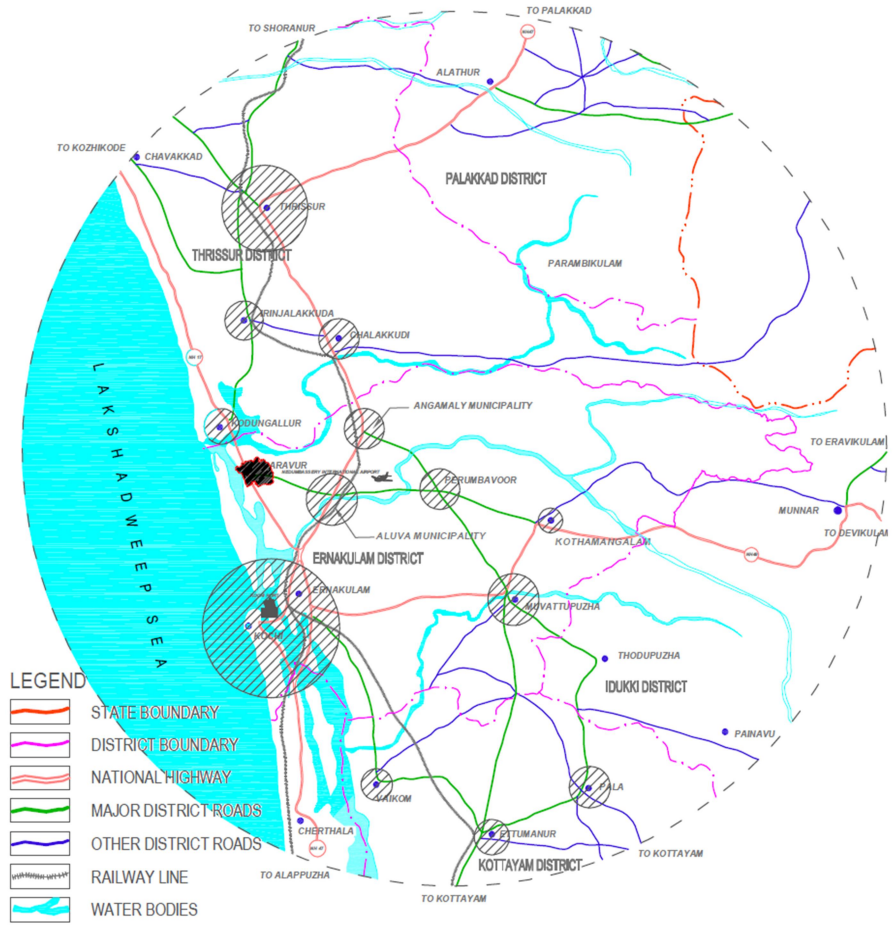


Figure 1-2: Location & Regional linkages of North Paravur

1.2.4 North Paravur- In Regional context

North Paravur is one of the 11 municipalities in the District, which is part of the Kochi Urban Agglomeration. As per the State Urbanization Report of Kerala, prepared by the Department of Town and Country Planning , Kochi Urban Agglomeration stands as the first order urban centre of the state. The State Urbanization Report (SUR) delineates the future urban profiles of the State for 2021 and 2031. As per the delineated urban profile for 2021, North Paravur forms part of the delineated urban cluster of Kochi as shown in fig. 1.3

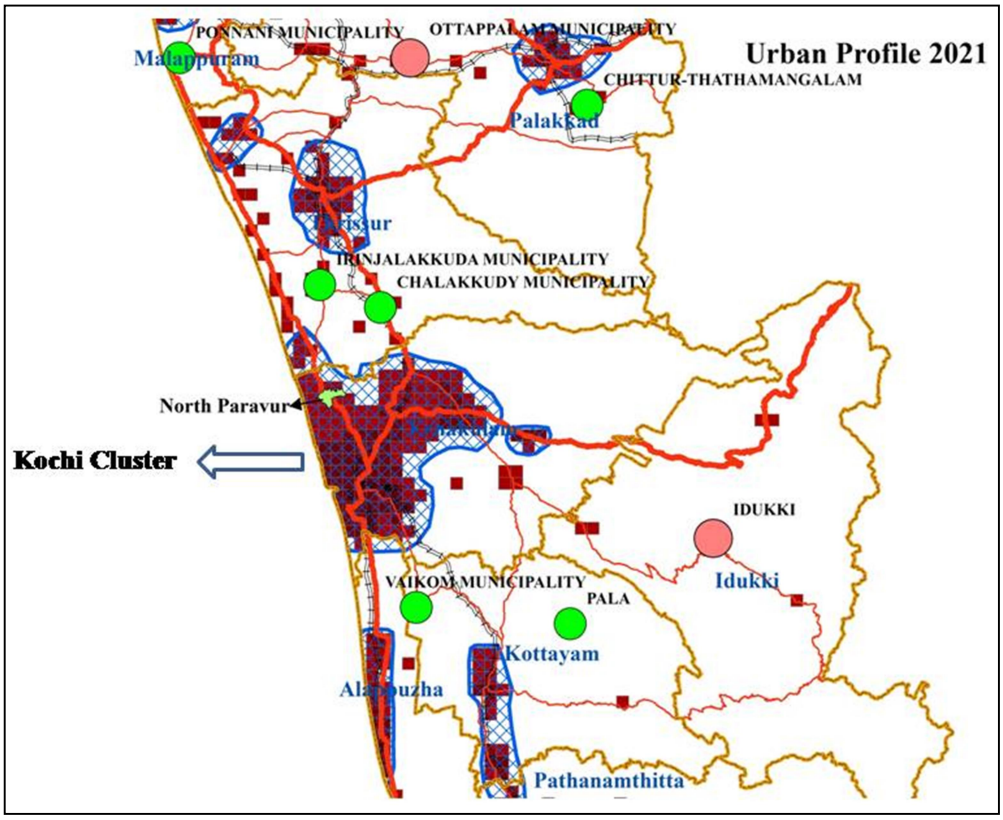


Figure 1-3: Future Urban Profile 2021 – The Kochi Urban Cluster in SUR

As per the delineated urban profile for 2031, North Paravur forms part of the delineated urban corridor of 'Alappuzha-Ernakulam, Thrissur-Palakkad' as shown in fig. 1.4

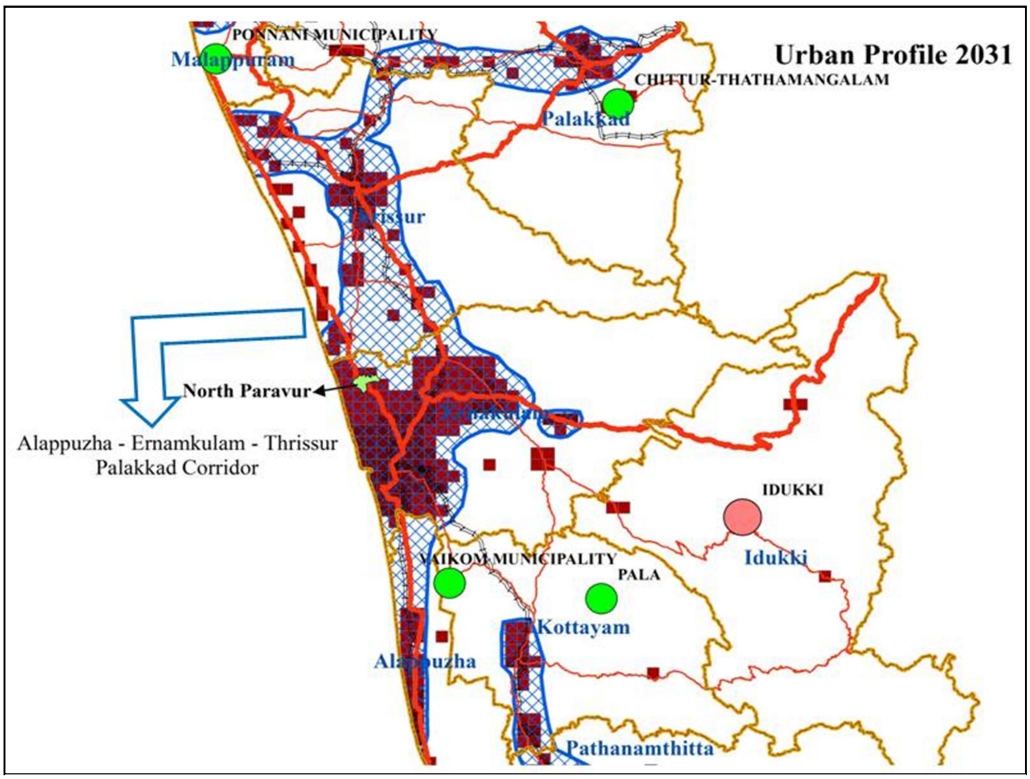


Figure 1-4: Future Urban Profile 2031 – The Kochi Urban Cluster in SUR

It is thus evident that the Town is part of thriving urban development corridor of the state. North Paravur municipality is in the fringe of the Kochi UA, and is having lower density than the core city of Kochi and the fringe areas including the North Paravur town are in transitional stage. This indicates the further scope for densification of the urban agglomeration including this Town. This can be possible by proper planning interventions.

The regional setting of a town spells out the hierarchy of settlement in the regional scenario, the activity which the town has to perform and its connectivity with different settlements. Extensive regional setting study has been carried out in connection with the preparation of Master plan for municipalities in Ernakulam district.

A District urbanization study conducted by the Department and as per this report North Paravur Muncipality has been classified as one of the 2nd order settlement in the district, Kochi Corporation being only one 1st order settlement. The settlement hierarchy of the district is as shown in fig. 1.5

The settlements in the service area of the town are Grama Panchayats of Kottuvally, Chendamangalam, Puthenvelikkara, Nayarambalam, Edavanakkad, Vadakkekkara, Chittattukara, Pallippuram, Kuzhippily and Ezhikkara. The service population of the town as per 2001 Census works out to 303134. Being a second order town, North Paravur has to cater the demands for various higher order rural facilities and middle order urban facilities of these settlements.

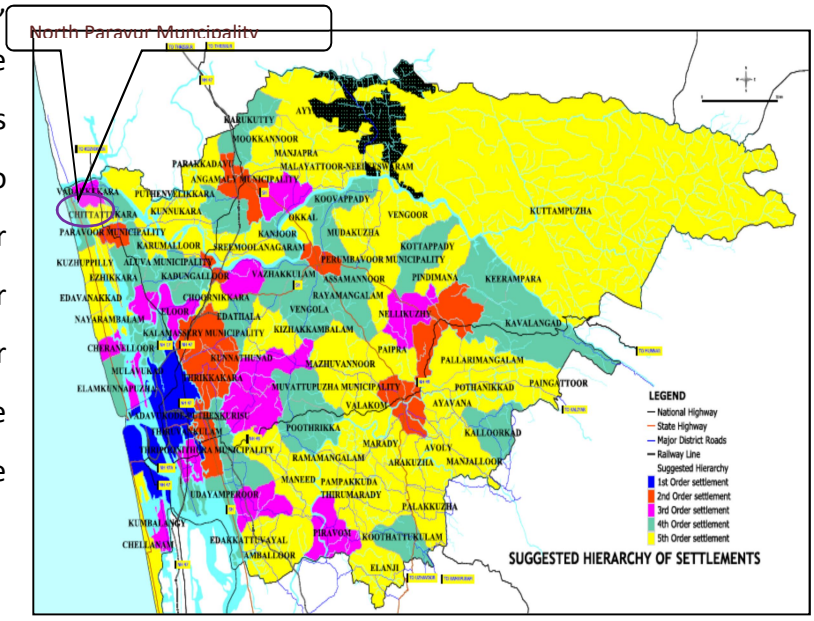


Figure 1-5: Settlement hierarchy of North Paravur in the district

When the functional character of settlements are studied based on land use and average plot size, the functional character of the town is found to be semi-rural, but based on the occupational pattern of the workers, the activities of the town comes under secondary & tertiary activities indicating that the people in the town are engaged mainly in the non-agricultural activities ie. urban activities. The functional character of the district is as shown in fig. 1.6

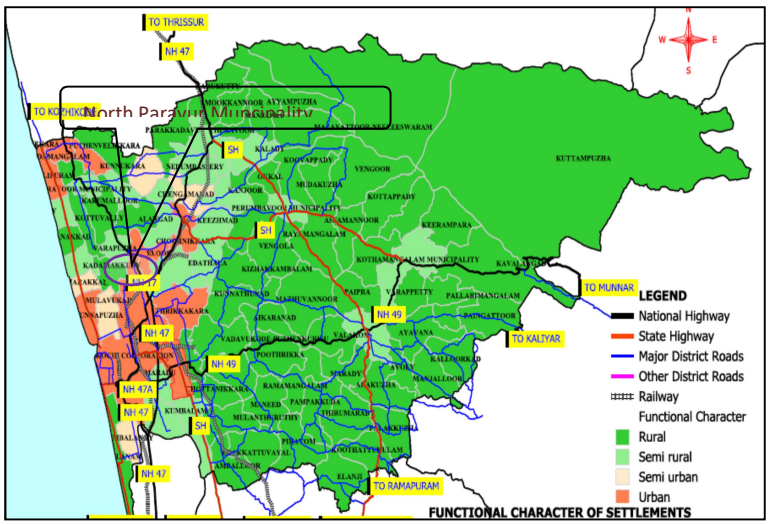


Figure 1-6: Functional character of North Paravur in the district

The Activity pattern of Ernakulam district is shown in fig.1.7. The activity of North Paravur municipality is urban activity – mainly secondary and tertiary activities.

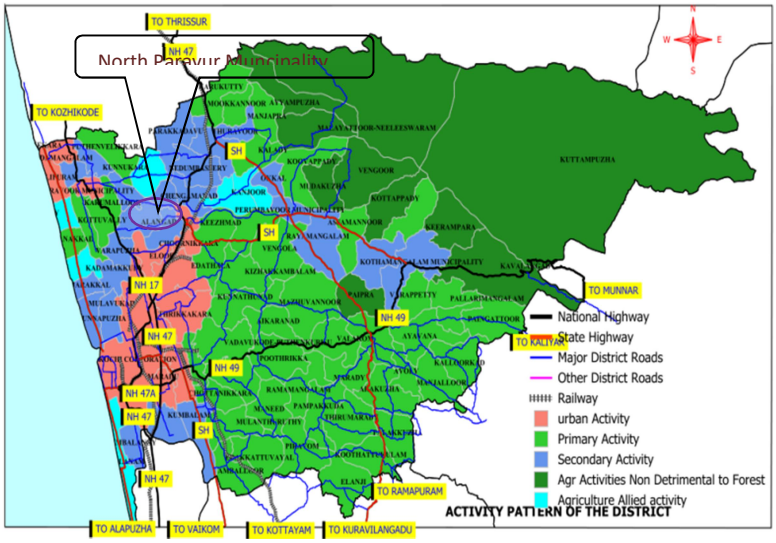


Figure 1-7: Activity pattern of North Paravur in the district

The connectivity of Ernakulam district, as revealed from regional studies based on study on urbanization is shown in fig.1.8 . N H -66 starting from Edappilly and leads to the north towards Mangalore passing through North Paravur is the major regional linkage. Aluva –Paravur road and Chendamangalm road are other major district roads.

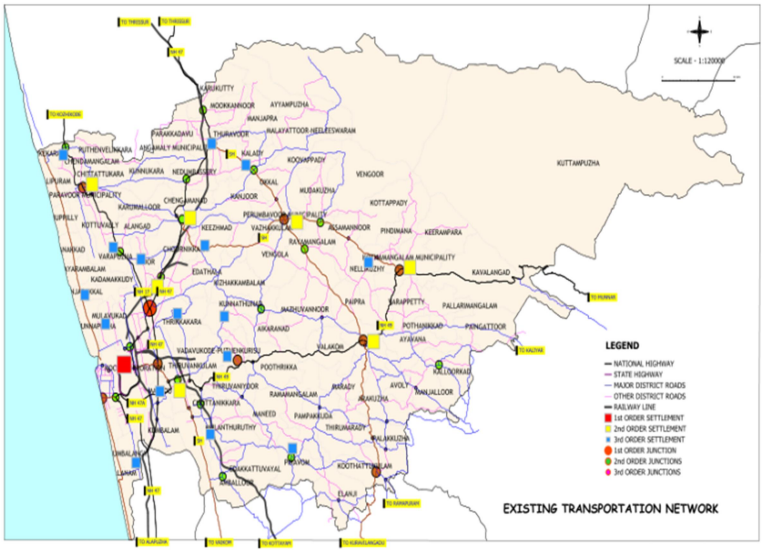


Figure 1-8: Existing transportation network of the district

1.2.5 Delineation of planning area

The regional level analysis based on District Urbanization Report of the district has been considered for the delineation of the planning area for the preparation of Master plan. As per DUR North Paravur town is categorized as second order urban centre and this town has to cater the requirements of higher order rural facilities and middle order urban facilities of the service area. The existing urban profile of the surrounding settlements around the North Paravur town is non-urban. The activity pattern of the town is Urban. None of the immediate surrounding settlements are exhibiting urban activity.

As per the development concepts of the draft Development Plan for Kochi City Region, the major urban centres in the district other than Kochi City shall be given impetus for development to arrest the influx of floating population to Kochi City and also to provide opportunities for the other towns in the region to develop. The floating population converges to the Kochi city for availing of job opportunities, education and health facilities, trade and commerce and other higher order amenities/facilities. Hence the draft plan for KCR suggests stimulating the growth of 'Second order' urban settlement around the city by promoting higher order facilities and services to enhance the job opportunities in that settlement and thereby to reduce the influx of floating population to Kochi. The concept of developing Kochi City Region as a global city and developing other urban centres around Kochi City with higher order facility is explained in fig.1.9.The other urban centres which need infrastructure improvement are

Piravom, Muvattupuzha, Kothamangalam, Perumbavoor, Angamali, Aluva, North Paravur and Kodungallur.

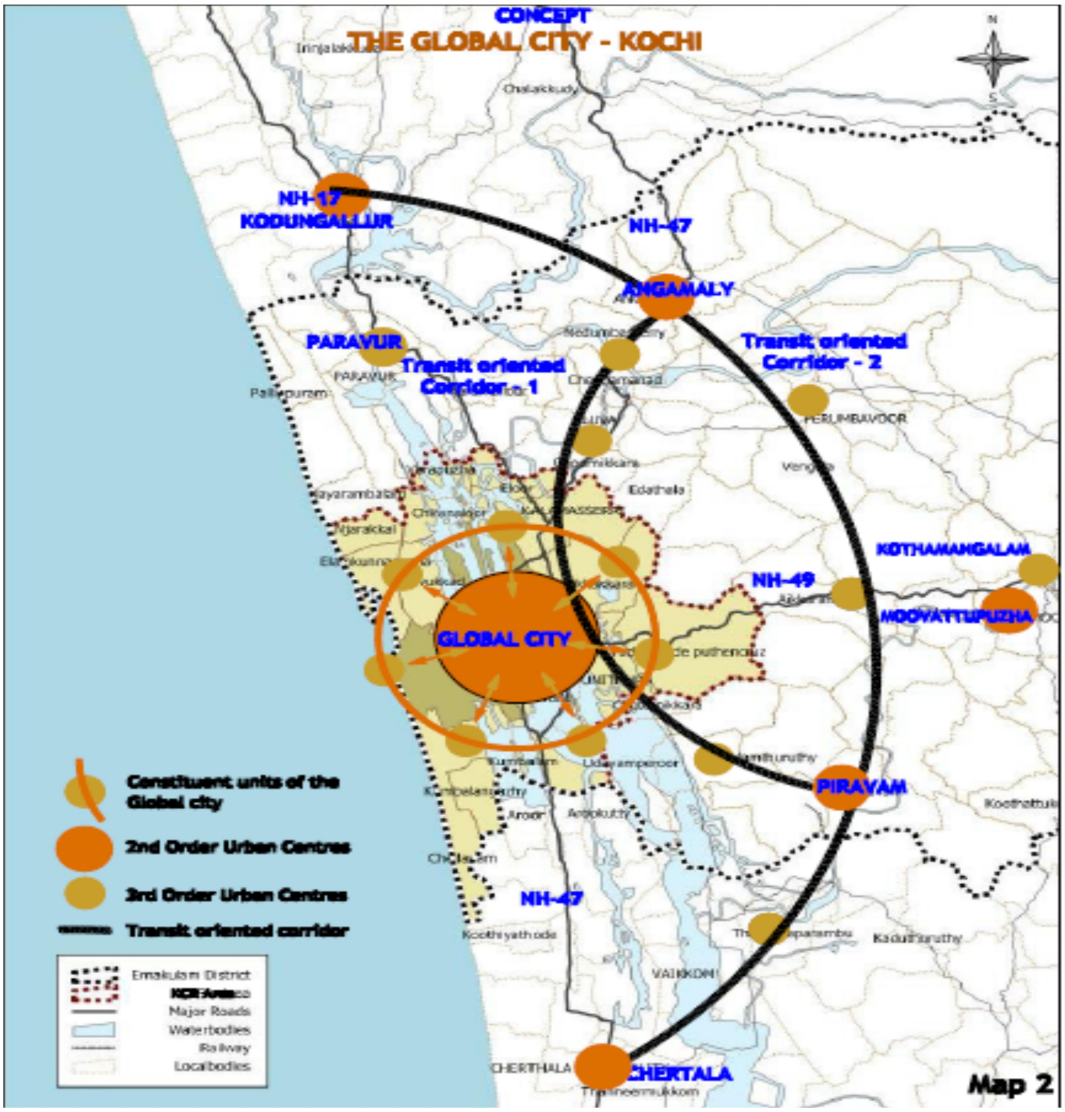


Figure 1-9: Development Concept of Kochi City Region

Hence North Paravur town has to develop with higher order infrastructure facilities as revealed in study of urbanization of Ernakulam district and draft Development Plan for Kochi City Region.

Considering the above factors the planning area is delineated as the North Paravur municipal area alone. The influence area of the town is shown in fig.1.10

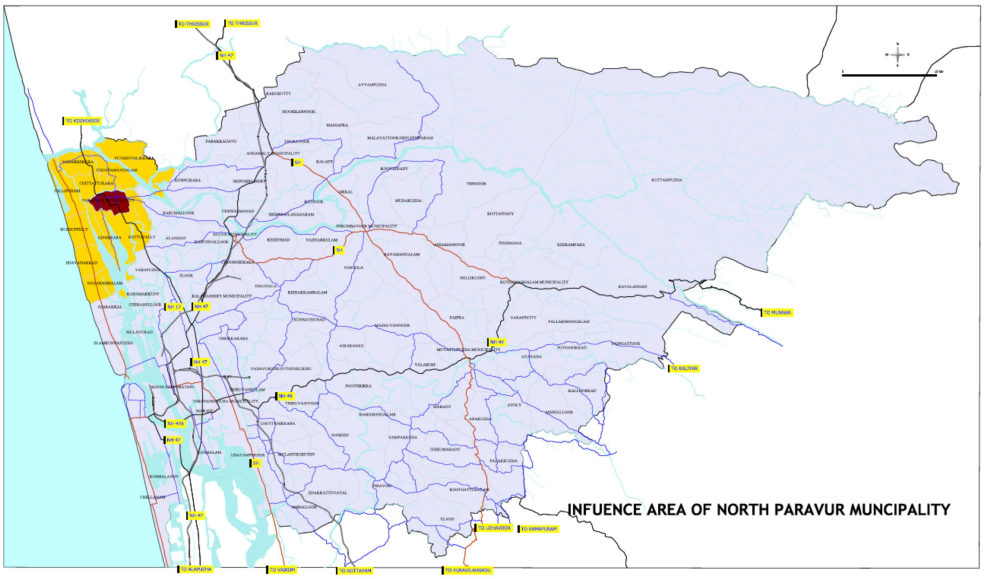


Figure 1-10: Influence area of North Paravur town

1.2.6 Demography

1.2.6.1 Population

As per 2001 Census the population of Paravur Municipality is 30059. This is 0.97% of the total population of Ernakulam District. The male population is 14473 & female population is 15586. The total population of Paravur Municipality in 1971, 1981 and 1991 was 24393, 26288 and 27906 respectively. Population of Paravur town is increasing. The growth of population is shown in figure 1.11

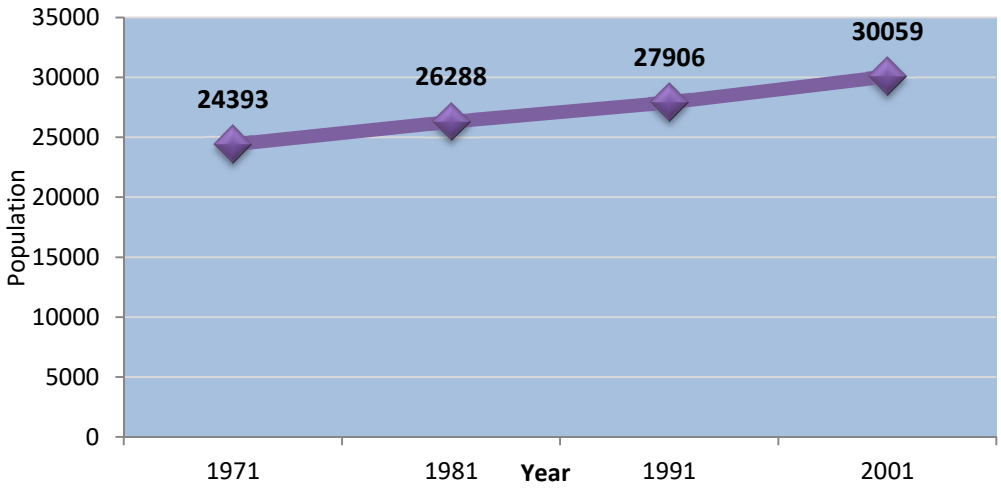


Figure 1-11: Population of Paravur Municipal Town from 1971 to 2001

1.2.6.2 Population Growth rate

The decadal growth rate of population during 1991-2001 period is 7.72%. The population growth rate of Paravur town is low when compared with the District. The decadal growth rate of population of Ernakulam District is 10.24%. The decadal growth rate of Paravur town in 1971-81, 1981-91, 1991-2001 periods are shown in figure 1.12

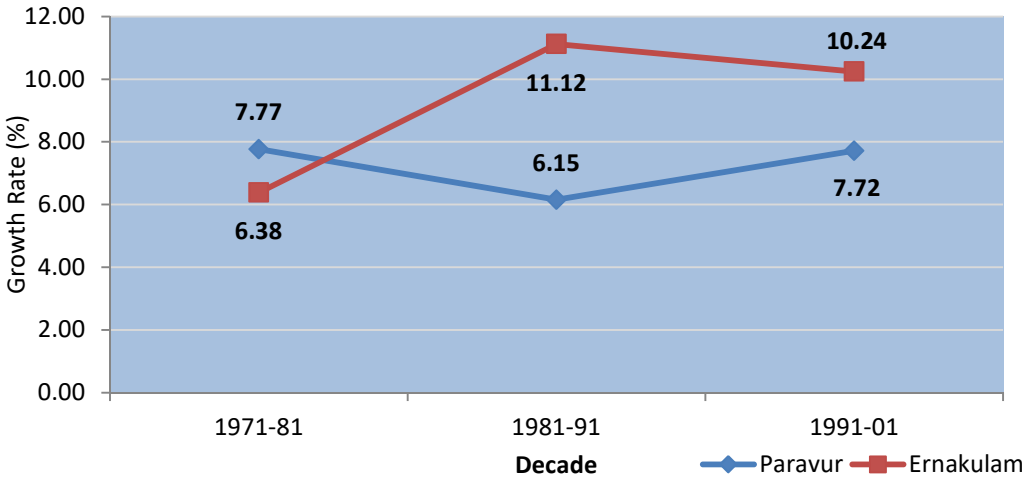


Figure 1-12: Comparison of growth rate of population of town with District

The figure shows that growth rate of Paravur Municipality has decreased from 1971-81 to 1981-91 and then increased from 1981-91 to 1991-01. The growth rate of Paravur taluk and the District are 9.21 and 10.24 respectively. The growth rate of Kerala and Ernakulam has decreased from 1981-991 to 1991-2001, whereas the growth rate of North Paravur Municipality has increased.

1.2.6.3 Population Density

As per 2001 census, the gross population density of North Paravur town is 3332 persons per sqkm which is very high when compared to district figure of 1012 persons per sqkm and taluk figure of 1999 persons per sqkm. Population density - wise, North Paravur Muncipality is 3rd in position among all municipalities in the district. Ward wise population density table is shown in table 1.1.

Table 1-1: Ward wise population density

Ward No	Ward Name	Population	Area in Ha	Density
1	Mattummel Neendoor	1154	24.18	47.77
2	Kuronthottiparambu	1051	40.43	26.02
3	Market	1147	23.53	48.75
4	Kannankulangara	1100	21.46	51.26
5	Town Hall	1147	31.78	36.09
6	Pallanthuruth	1162	44.25	26.26
7	Kottakkakam	1063	47.04	22.6
8	Paravoothara	1195	63.43	18.84
9	Vedimara	1213	37	32.78
10	Santhi Nagar	1202	33.48	35.9
11	Pallithazham	1242	43.59	28.49
12	Nandikulangara	1254	30.23	41.48
13	Vaniyakkad	1260	36.95	34.1
14	Peruvaram Kizhakkepram	1187	36.99	32.09
15	Vazhikulangara	1256	39.72	31.62
16	Kizhakkepram	1169	33.84	34.54
17	Nandyattukunnam	1104	51.09	21.61
18	Kesari	1031	39.28	26.25
19	Stadium	1176	37.74	31.16
20	Samooham High School	1082	31.67	34.16
21	Thonniyakavu	1074	39.85	26.95
22	Kannanchira	1151	30.87	37.29
23	Thyvyppu	1115	24.36	45.77
24	Kedamangalam	1140	18.68	61.03
25	Chandrapura	1235	12.52	98.64
26	Perumpadanna	1149	28.04	40.98
		30059		

Source : Census 2001 & Municipality

The highest concentration is seen in Chandrapura ward and lowest in Paravoothara ward. The ward wise distribution of density is shown in figure 1.13

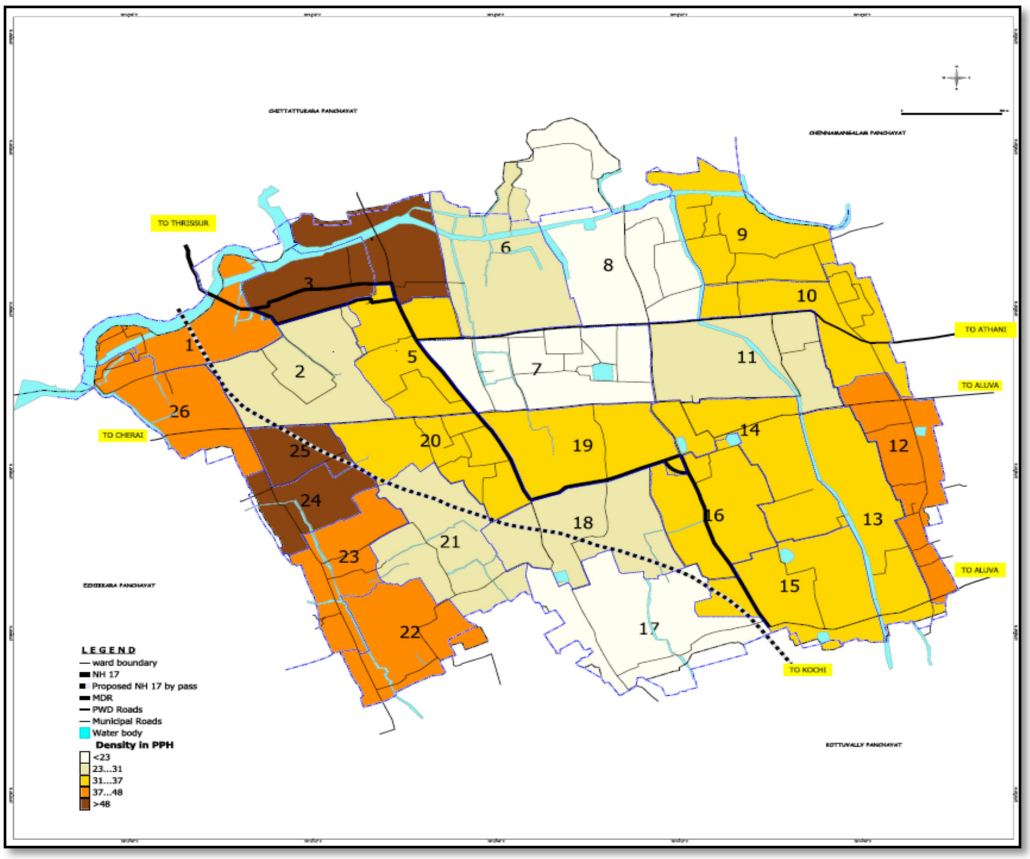


Figure 1-13: Distribution of population density in Paravur Town

Highest population density is on the North – West, Western and Eastern side of the town. The area where NH 66 and Aluva –Paravur road passes have the highest population density. The area having poor accessibility or area where other activities are concentrated have the lowest population density.

1.2.6.4 Literacy Rate & Sex ratio

Literacy rate and sex ratio of North Paravur town, Ernakulam district and Kerala State are given in table 1.2 & 1.3

Table 1-2: Literacy Rate

Particulars	Male	Female	Total
Literates(Nos.) –North Paravur	12553	13122	25675
Literacy(%) – North Paravur	97.05%	93.11%	95%
Literacy(%) – Ernakulam District.	95.81%	90.66%	93.20%

Source : Census 2001

Table 1-3: Sex Ratio

Region	Sex Ratio
North Paravur	1077
Ernakulam Dt.	1019
Kerala State	1058

According to 2001 census, literacy rate of North Paravur Town was 95 % which is higher than that of district and State. The female literacy rate of North Paravur (93.11 %) is higher than the corresponding district figure of 90.66%. Males have a higher literacy rate of 97.05%. The male literacy rate is also higher than the district average of 95.81%. The rate of literacy is higher than that of the State.

The sex ratio of North Paravur is very high compared to Ernakulam District(1019) and Kerala(1058).The maximum percentage of male population is seen in age group 25-30 years and female in range 35-40.

1.2.6.5 Occupational pattern

As per 2001 census, the workforce participation in North Paravur municipality is 31.17% of total population which is low compared to the District figure of 35.97%. In 1981 and 1991 it was 26.14% and 30.10% respectively. Table 1.4 and figure 1.14 shows the variation in work participation rate of the North Paravur town.

Table 1-4 : Work participation rate in North Paravur Town

Description	1981	1991	2001
Total Population	26288	27906	30059
Total Workers	6871	8401	9369
Participation rate	26.14%	30.10%	31.17%

Source : Census 2001

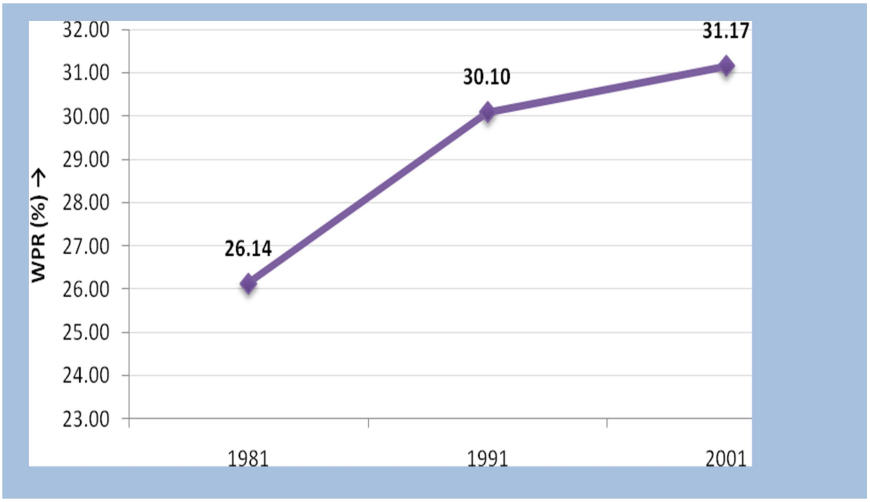


Figure 1-14: Variation of WPR during 1981-2001

The occupational structure of the town shows that 96% of the total workers of the town are engaged in non agricultural activity indicating the declining trend in the primary sector and a shift towards service sector in the North Paravur Town. At the same time industrial activity in this town is also declining but the category "other workers" is increasing.

The figures clearly illustrate that the job opportunities are increasing in proportion to this increase in total working population. The occupational structure shows the predominance of other workers in North Paravur. It will be important to generate appropriate and remunerative employment opportunities in North Paravur town. Table 1.5 and figure 1.15 shows the occupational pattern of the North Paravur Town.

Table 1-5: Occupational pattern of North Paravur

Sl No	Category of main workers	1981				1991				2001			
		No. of workers		Total workers	% of total workers	No. of workers		Total workers	% of total workers	No. of workers		Total workers	% of total workers
		Male	Female			Male	Female			Male	Female		
1	Cultivators	40	3	43	0.69	89	24	113	1.39	11	2	13	0.16
2	Agricultural labourers	54	11	65	1.05	81	25	106	1.30	26	4	30	0.36
3	Household industry workers	200	124	324	5.22	111	121	232	2.85	184	72	256	3.09

4	Other workers	4640	1133	5773	93.04	6186	1496	7682	94.46	6293	1684	7977	96.39
5	Total main workers	4934	1271	6205	100	6467	1666	8133	100	6514	1762	8276	100

Source: Census of India – 1981, 1991 & 2001

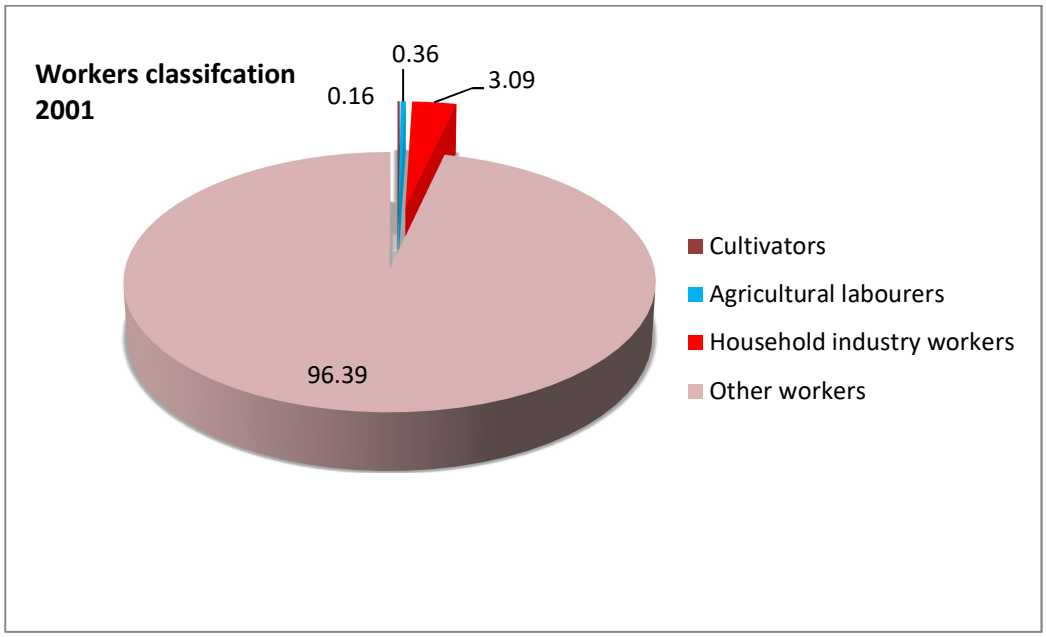


Figure 1-15: Occupational pattern of North Paravur

The table 1.6 given below shows the population, density, growth rate, sex ratio, literacy & WPR of the North Paravur town in the year 1971, 1981, 1991 & 2001.

Table 1-6: Demography Details

Year	Population	Density	Growth Rate	Sex Ratio	Literacy	WPR
1971	24393	2701		1040	71.59	25.29%
1981	26288	2911	7.77%	1033	80.04	26.14%
1991	27906	3094	6.15%	1053	93.91	30.10%
2001	30059	3332	7.72%	1077	93.71	31.17%

Source : Census 2001

1.2.7 Land Use

The land use of an area is indicated by the predominant activity of that area, be it agriculture, residential, commercial, public and semi-public, transportation, park and open spaces, industrial etc. Hence the analysis of existing land use is inevitable to understand the predominant economic activity of the area and to assess the availability of suitable land for the future urban development activities of the town. As a part of spatial planning approach for the

preparation of the Master plan , the in- depth study and analysis of land use is very essential. The functional character, activity pattern and spatial structure of the town to formulate the concept for future development is deriving from the existing land use of the town. From this it is possible to draw the future requirement of land for various uses in the town.

1.2.7.1 Existing land use - 2010

As a part of primary survey, land use survey was conducted by the department in 2010 for North Paravur town and its surrounding area at a depth of 50m. The town, encompassing an area of 9.02 square kilometers, is divided into 26 wards. The total developed area is 8.752 Sq. km (2010).

Residential use occupies about 68% of the total developed area in the town and is the predominant use. It is distributed in almost all parts of the town and is mixed up with the agriculture land. North Paravur has the highest percentage of land under residential area when compared to other urban LSG's of the District. The town is basically a residential town with its amenities and facilities built up.

Being an old town North Paravur had large extent of area under **public & semi public use (5.13%)**. Public and semi-public areas include land where government and semi-government establishments, religious centers, educational institutions, health facilities etc are functioning. It is distributed in almost all wards of the town and major establishments are at town centre.

Commercial area is mainly concentrated in the town centre along major travel corridors of the town which is almost **2.3%** of the town area**.** The central area is acting as the town centre of the town and Paravur market area is the other commercial centre of the town. Few pockets of commercial land use are distributed in other parts of the town also.

Land use under **Transportation & communication** contributes nearly 9 %. Major portion of this area is covered by roads. Agricultural land use covers under **Dry cultivation , i**ncludes mixed crop (acive & non- active) and coconut cultivation, occupies 12% of total area of the town which can be used effectively. There is no land under paddy & Wet land in the town area.

Approximately 3 % of total area comes under **Water bodies**. There are no rivers or major water bodies in the town. The Paravur thodu, pashni Thodu , Kacheri thodu & their

minor branches , which passes through the town occupies major share of the water bodies. In addition to this there are small drains and temple ponds within the town.

Only 0.18% of the total area is under **industry**. Industrial activities are getting deteriorated. The land use park & open spaces is very meager ie only 2.3%. The town is very much lacking Public places such as parks & recreational spaces, which are essential ventures for many recreational activities.

From the analysis of land use with respect to the net area ie . area excluding water bodies, is found to be 8.73 sq Km . It is found that 68 % of net area is under residential use. Corresponding share of other land uses is illustrated in table 1.7. The land use distribution of North Paravur town is given in table 1.7 and in figure 1.16 and the ward wise land use breakup is shown in figure 1.17.

Table 1-7: Existing Land use break up of North Paravur Town 2010

Land use	Residential	Commercial	Industrial	Public & Semipublic	Agricultural	Park &Open Space	Transportation & Communication	Water bodies	Total
Extend in sqkm	5.82	19.79	0.02	0.48	1.22	0.04	0.84	0.38	9
Percentage of Land use	64.68	2.19	0.18	5.33	13.5	0.45	9.2	2.97	100
Percentage of land use based on total developed area (i.e. Excluding water body area)	67.6	2.29	0.19	5.56	14.08	0.47	9.82		100

Source : Land Use Survey 2010

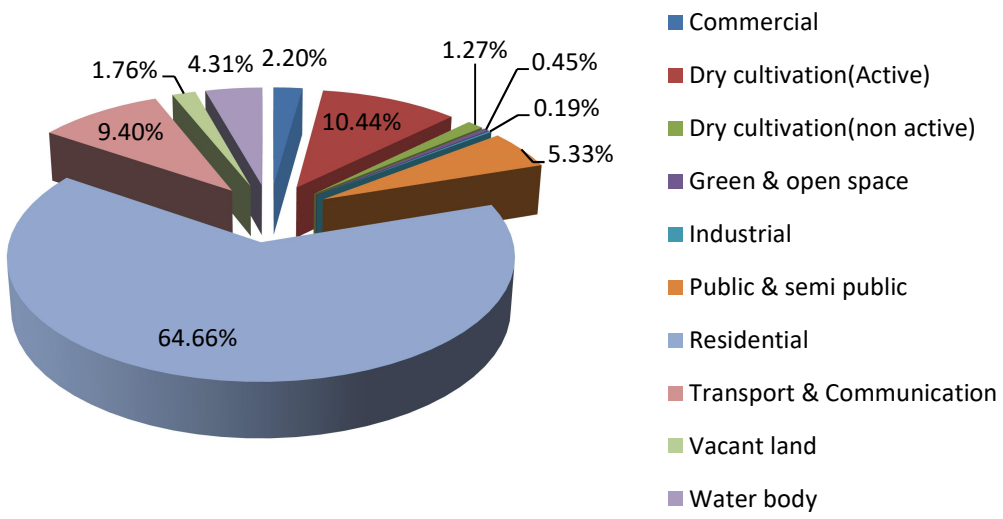


Figure 1-16: Existing Land Use Break Up of North Paravur

When compared to the URDPFI guideline, the land use for industrial, park & open space is very low. Need attention to provide more land for open spaces & recreational areas. The existing land use map of North Paravur town is shown in figure 1.18

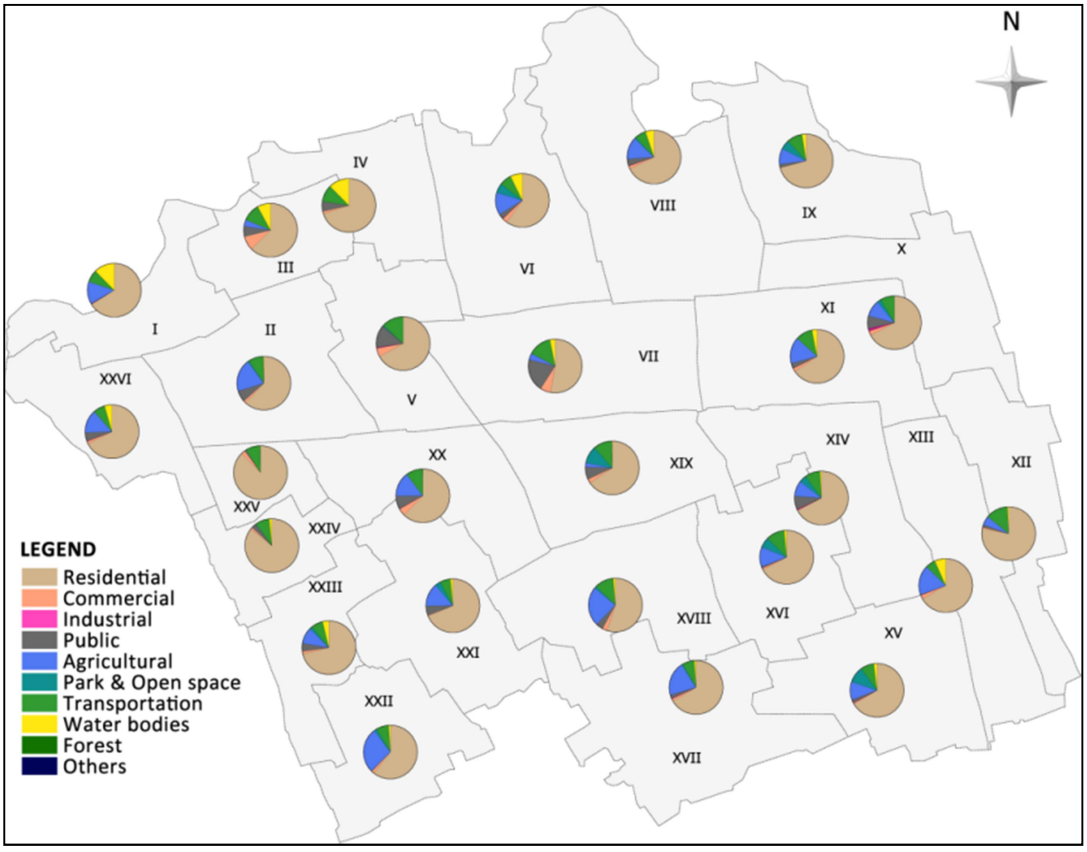


Figure 1-17 : Ward wise land use breakup

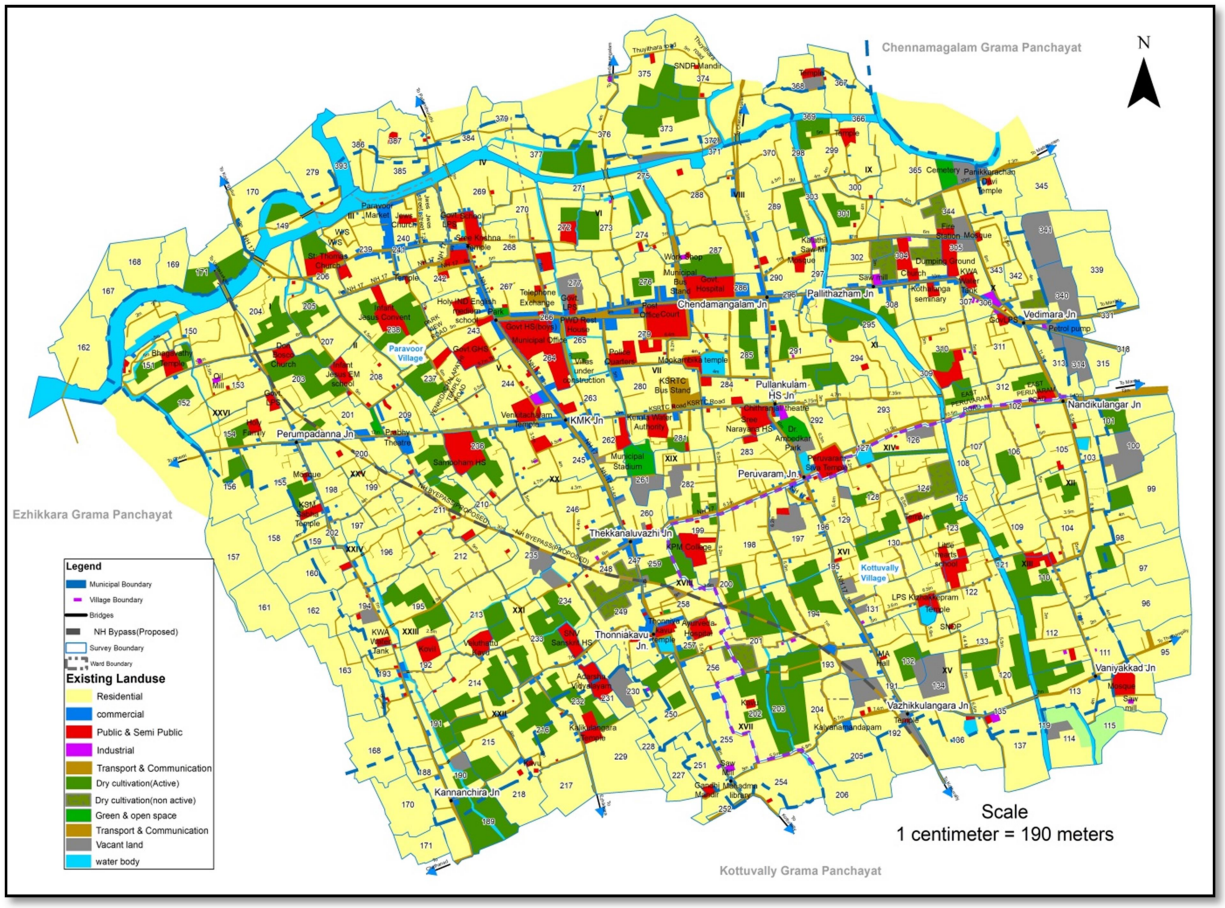


Figure 1-18: Land Use Map of North Paravur Town 2010

1.2.7.2 Concentration of different Land Uses

The concentration pattern of a particular land use gives an idea about where that particular land use is concentrated within the town. The concentration pattern of a land use can be ascertained by the concentration index (CI) of that land use. The concentration index (CI) of a particular land use = ((Area of that land use in a ward) / (Total area of the ward)) / ((Area of that land use in the town) / (Total area of the town)). The concentration index values may be greater than one, equal to one or less than one. The CI greater than one for a particular land use indicates that the land use under consideration is concentrated more in that ward than other wards of the town.

Concentration of major land use, residential, commercial public& semipublic and agriculture land uses are revealed through the analysis are shown in fig 19 to fig 22

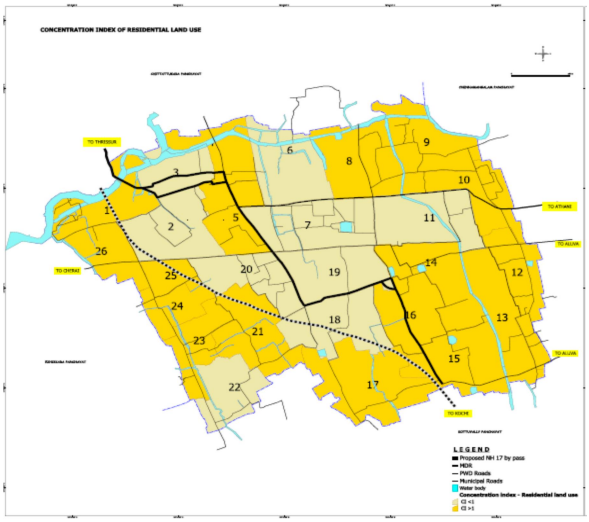


Figure 1-19: Concn. pattern of residential land use

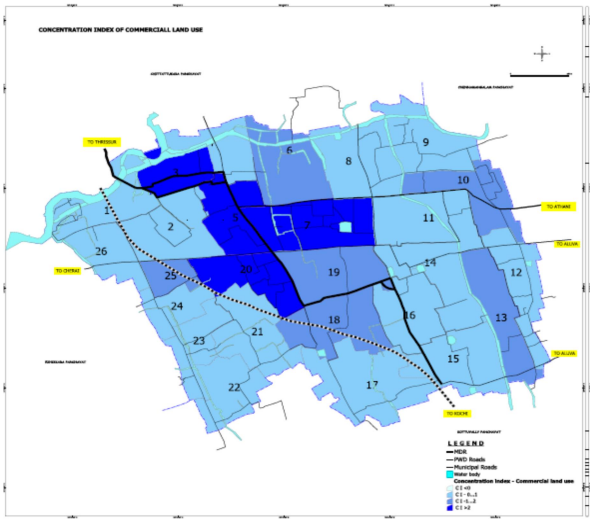


Figure 1-20: Concn. pattern of commercial land use

From fig.1.19 it is evident that except for central area and wards adjacent Paravur thodu all wards show concentration of residential uses. From the fig.1.20 it is observed that the commercial land use is concentrated in the central area of the town and along the major roads of the municipality. Market ward has the highest concentration of Commercial land use.

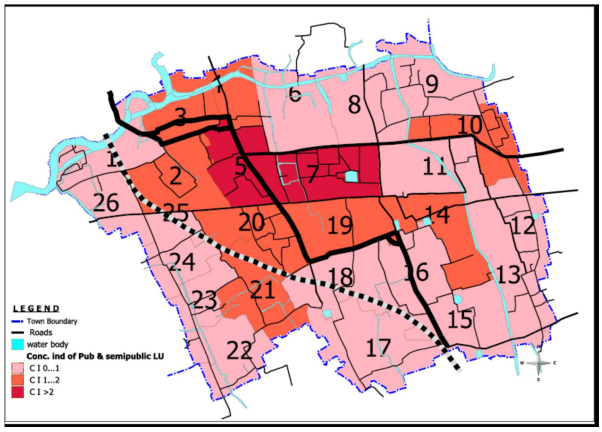


Figure 1-21: Concn. pattern of Pub & semi Pub land use

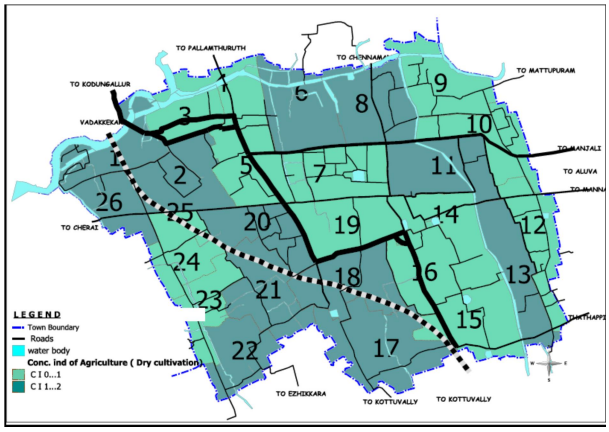


Figure 1-22: Concn. pattern of Agricultural land use

The maximum concentration of public and semi public land use is seen in ward 7 i.e.,in the centre part of the town. Major administrative & public buildings are concentrated here. The public and semi public land use is concentrated in wards along which NH passes. The concentration index of public and semi public land use is shown in figure.1.21.

Figure 1.22 shows the concentration indices of agricultural land use of different wards of the municipality. Agriculture land is distributed in all wards of the municipality. Agricultural land

use parcels are complementary to residential land land uses in the town. Some of the wards have the larger land holders with major portion of land with mixed crop activities .

1.2.7.3 Categorization of Residential Land use

In the land use survey and further analysis, a plot with residential building and agriculture activities together is designated as residential. The extent to which this plot can be used for agriculture purpose depends on the average size of plot. Residential land use or in other words mixed land use may be classified as urban, semi urban, rural or semi rural depending on the average size of plot as per the methodology developed by the town and country planning department to assess the character of settlements while preparing the integrated district development plans . According to this methodology if the minimum average plot size in the mixed land use area is 70cents, that area may be categorized as rural and if the maximum plot size is 25 cents,it falls under urban category.if the average size of plot is between 25centsto 50 cents,it may be classified as semi urban and for semi rural category,the average plot size may be 50-70 cents. The ward wise analysis of North Paravur Municipality shows that the residential areas of most of the wards in the Municipality fall in the fully residential category**.** Some wards shows residential agriculture mix land use as shown in fig.1.23

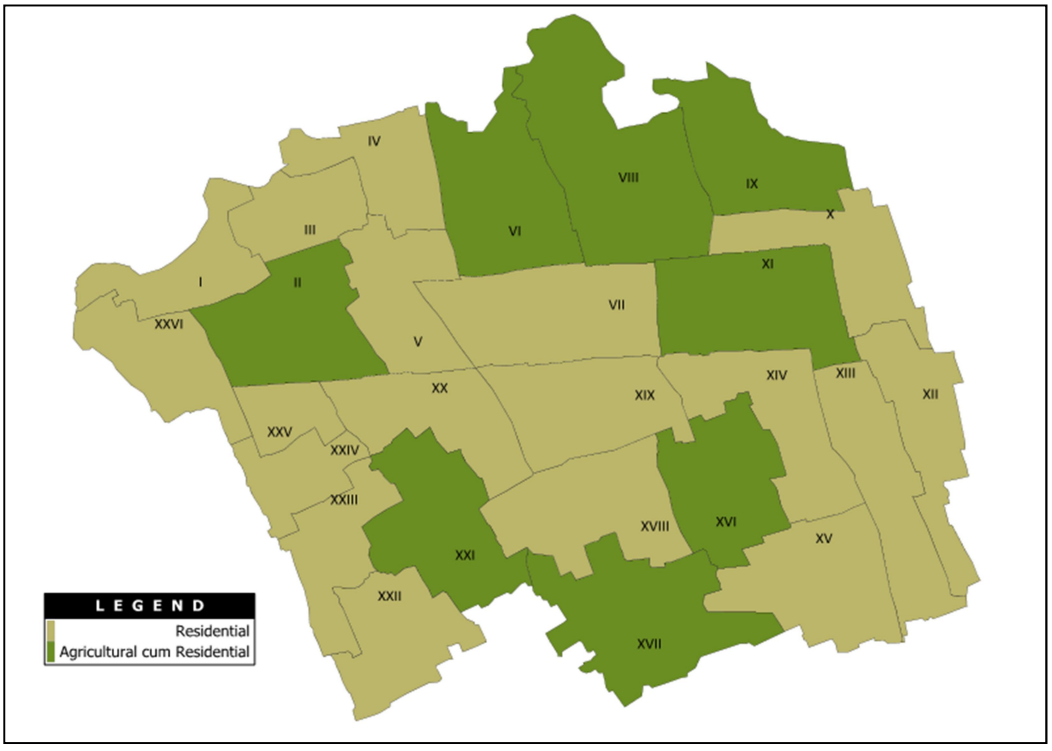


Figure 1-23: Categorisation of Residential Land use

1.2.7.4 Functional character of the wards of the town

The settlement pattern in Kerala is scattered homesteads with rural-urban-continuum. Residential buildings are seen in almost all areas .The functional character of an area is determined by the economic activity which can be brought into that area, based on the average size of land holdings in the area.

As mentioned in previous heading, based on the per capita availability of land holdings in residential area, the functional character of any settlement of Kerala can be classified into four (Table 1.8).

Table 1-8: Functional Character based on average size of land holdings

Average size of land holdings in residential area	Categorisation of residential area	Functional character
Below 25 cents	Fully residential area	Urban character
25-50 Cents	Agriculture cum residential area	Semi urban character
50-70 Cents	Agricultural activity is predominant with residential area	Semi rural character
Above 70 Cents	Fully agricultural land with residential area	Fully rural character

Based on the land use analysis , the functional character of the North Paravur town has been determined. The ward wise land use analysis of the town shows that, 18 wards shown urban character and 8 wards shown semi urban character. The functional character of each ward is shown in table 1.9 & figure 1.24 .The functional character of the town shows the predominance of urban & semi urban activities and these shall be the major economic base.

Table 1-9 : Ward wise functional character of North Paravur

Sl. No	Name of wards	Functional Character
1	Mattummel Neendoor	URBAN
2	Kurunthotti Parambu	SEMIURBAN
3	Market	URBAN
4	Kannan Kulangara	URBAN
5	Town Hall	URBAN
6	Pallanthuruth	SEMIURBAN
7	Kottakkakam	URBAN
8	Paravoothara	SEMIURBAN
9	Vedimara	SEMIURBAN

10	Santhi Nagar	URBAN
11	Pallithazham	SEMIURBAN
12	Nandikulangara	URBAN
13	Vaniyakkad	URBAN
14	Peruvaram Kizhakkepram	URBAN
15	Vazhikulangara	URBAN
16	Kizhakkepram	SEMIURBAN
17	Nandiyattukunnam	SEMIURBAN
18	Kesari	URBAN
19	Stadium	URBAN
20	Samooham High School	URBAN
21	Thonniyakavu	SEMIURBAN
22	Kannanchira	URBAN
23	Thyvyppu	URBAN
24	Kedamangalam	URBAN
25	Chandrapura	URBAN
26	Perumpadanna	URBAN

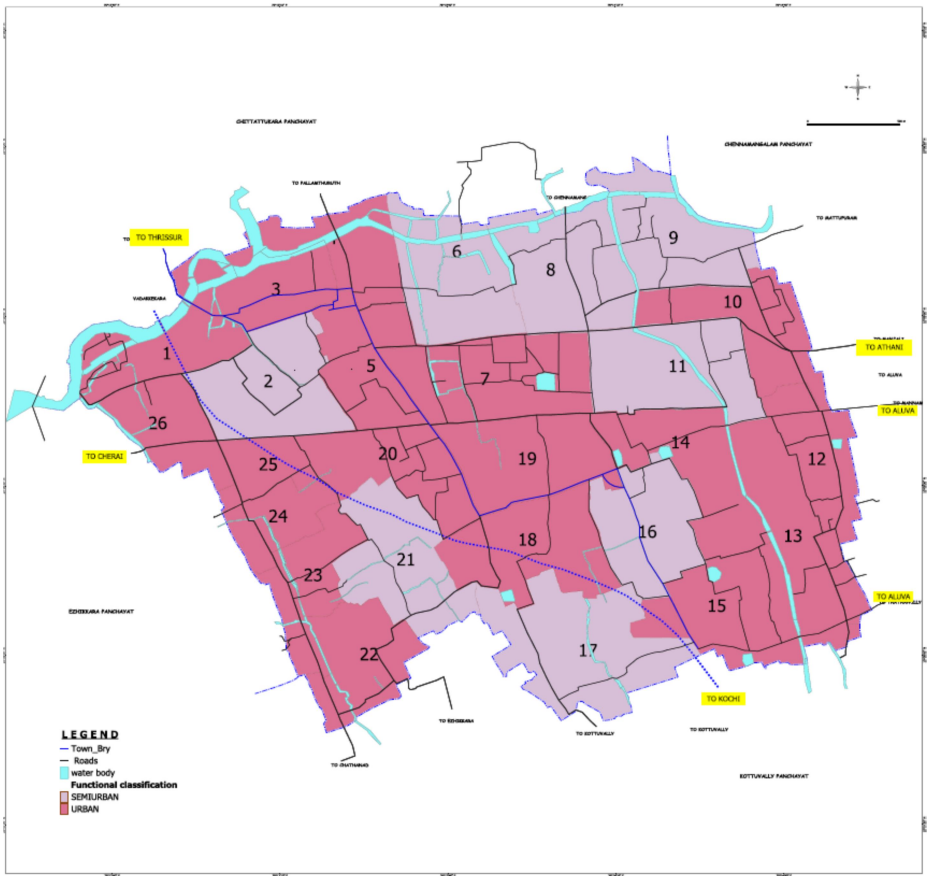


Figure 1-24: Functional character of wards of North Paravur Municipal Town

The ward wise analysis of North Paravur Municipality shows that the residential areas of most of the wards in the Municipality fall in the fully residential category. Eighteen wards

show urban character and eight wards show predominant urban character at the same time they show rural character.

1.2.8 Traffic and Transportation

As the transportation sector is a vital component of any city, planning of transportation infrastructure commensuration with the increased travel demand and vehicle population is an essential requirement. The transportation system of the town is evolved as a result of the interaction between the various land use functions. To plan for the same it is imperative that necessary planning inputs like inventory of existing road network, vehicle ownership, traffic volume, travel characteristics, capacity utilization of roads should be identified.

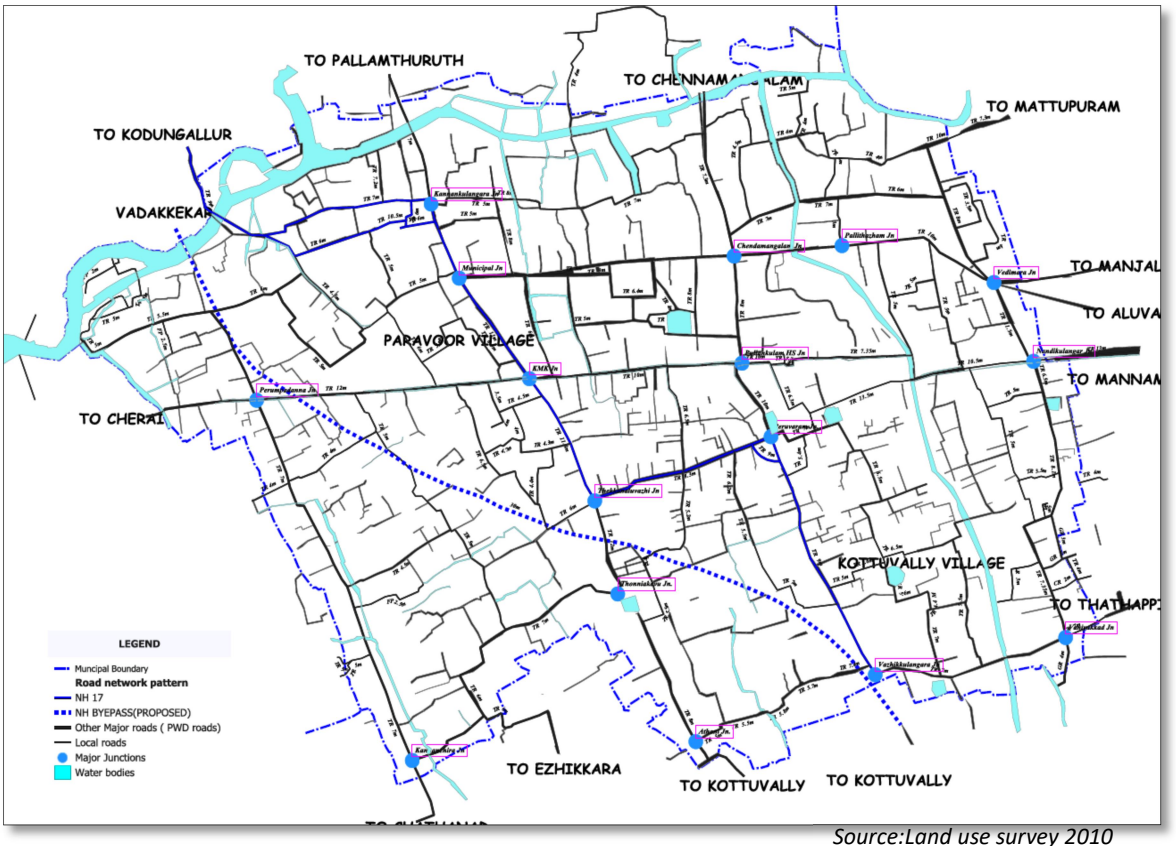
As part of preparation of Master Plan for North Paravur municipality, the study on Traffic and Transportation was entrusted with the National Transportation Planning and Research Centre (NATPAC) and the study was conducted in the year 2010. Study about vehicle population, road network, speed and delay, traffic volume, parking, pedestrian, Origin and destination of traffic etc were carried out.

There is a KSRTC Sub depot, Private Limited Stop bus stand and a Private bus stand in the town conducting services to all important places of Kerala. There are frequent bus services to Ernakulam, Aluva, Kodungallore, Guruvayur, Thrissur etc. from here. There is also a night service from and towards Kottayam, Pala; Hilly areas of Kannur and Kasaragod districts, Wayanad operated by private buses. The nearest railway station is Aluva which is about 16 km away. The Cochin International Airport at Nedumbassery is only 21 km away from the town.



1.2.8.1 Existing Road network

An understanding of the extent and quality of road network is very important to formulate improvement plans. With this objective, an inventory survey of all major roads in the town has been carried out to evaluate the road network characteristics. North Paravur has an excellent network of roads which connects it to the nearby towns and cities. The road network pattern of the town is more of grid pattern. The Existing Road network of the town is shown in Figure 1.25



Source:Land use survey 2010

Figure 1-25: Existing road network of North Paravur town

N H 66 (old NH 17) & its bye pass

The National Highway 66 (Old NH 17) starts from Edappally and passes through the town provides connectivity to Kodungalloor having a length of nearly 4.2km within the town, which is the spinal chord of the road network and divides the town into two halves. This road is forced to carry both intra town and inter town traffic. A bypass for the NH 66 which was already proposed for North Paravur, by the NH authority. The proposed width of the NH bye pass is 45m and the fixing of alignment and acquisition process was already completed and the work has yet to be start.

Other major roads

Aluva – Paravur road having a length of 2.3km within the study area is the other major road passing through the North Paravur town. Traffic volume of almost all the major roads especially the roads in Kodungalloor- Ernakulam route, stretch between SK Temple Jn. to KMK Jn. and KMK Jn. To Vazhikkulngara Jn. had exceeded their capacity.

Other major road sections in the study area are KMK junction - Perumpadanna junction (1.2 km), KMK -Pullankulam road and Vedimara - Fire station road (1.3 km). There are many other roads in the town, which provide inter connectivity to these major roads and growth centers in the city. In addition to the major roads and roads under PWD, the municipality is also maintaining a network of roads.

1.2.8.2 Road network characteristics

For the purpose of carrying out road inventory survey, speed and delay survey, link volume survey etc., major roads in the study area were divided into various homogeneous sections. Broad characteristics of these sections were obtained based on reconnaissance survey. The details of homogeneous sections on major roads and its characteristics in North Paravur town are shown in Table 1.10 and Figure 1.25.

The National Highway 66 has nearly 4.2 kms length of road within the study area. Carriageway width of this highway section has 7m except one way to Kodungalloor which has width 4.5m. The road stretch between Municipal town hall **(Figure 1.26)** and KMK junction **(Figure 1.27)** has a length of 0.55 kms with carriageway width of 7m. This road section has 2 lane carriageway with 1m shoulder on either side. Intensive commercial activities are found all along the road section. The road stretch between Thekkenaluvazhi Junction and Vazhikulangara has a length of 1.9 km. Land along the stretch of the road has built up area.



Figure 1-26: View of Municipal Townhall Junction



Figure 1-27: View of KMK Junction

Aluva – Paravur road has a length of 2.3km with in the study area. This road has two-lane carriageway of 7m upto Chennamangalam Junction beyond which, the road has intermediate lane width of carriageway upto Vedimara junction (Figure 1.29). Major land use along the stretch are the commercial and residential activities



Figure 1-28: View of Vedimara Junction

Other major road sections in the study area are KMK junction - Perumpadanna junction (1.2 km) , KMK - Pullankulam road and Vedimara - Firestation road (1.3 km). There are many other roads in the town, which provide inter connectivity to these major roads and growth centers in the city. These road together have a length of around 12 km with carriageway width ranging between 4m and 6m.

Table 1-10: Characteristics of major roads in North Paravur town

Inventory details of major roads in Paravur town						
Sl No.	Chainage	Length (km)	Width (m)		Adjoining land use	
			CW	ROW	L	R
I	**NH-17 Vadakkekara Bridge - Vazhikulangara**	4.20				
1	Vadakkekara Bridge - Sreekrishna Temple	1.00	7	15.0	Resi/Agri	Resi/Agri
2	Sree krishna Temple - Municipal Town hall Jn	0.25	7	10.0	built up area	built up area
3	Town hall Jn - KMK Jn	0.55	7	12.0	built up area	built up area
4	KMK Jn - Naluvazhi Jn	0.50	7.0	12.0	built up area	built up area
5	Naluvazhi Jn - Peruvaram temple	0.80	7.0	12.0	built up area	built up area
6	Peruvaram temple - Vazhikulangara	1.10	7.0	12.0	built up area	built up area
7	NH one way To Kodungalloor	0.80	4.5	8.0	built up area	built up area
II	**Aluva- Parur Road(PWD)**					

8	Vedimara Jn -Chennangalam Jn	1.20	6.0	12.0	built up area	built up area
9	Chennamangalam jn - Municipal Townhall Jn	1.10	7.0	10.0	built up area	built up area
III	**Other PWD Roads**					
10	Vazhikulangara jn - Vaniyakkad(PWD)	0.90	5.5	8.0	mixed	mixed
11	Vaniakkad-Nandikulangara Jn (PWD)	1.30	4.5	8.0	mixed	mixed
12	Nandikulangara Jn - Vedimara	0.4	4.5	8.0	mixed	mixed
13	Nandikulangara - Peruvaram temple	1	5.5	10	mixed	mixed
14	Vedimara Jn - Firestation Jn	1.3	4	10	mixed	mixed
15	Chennamangalam Jn - Vadakumpuram municipal limit	0.6	6	12	mixed	mixed
16	Chennamagalam Jn - KM hospital PWD	1.40	5.0	8.0	built up area	built up area
17	KMK Jn - Perumpadanna Jn	1.20	7.0	12.0	built up area	built up area
18	Perumpadanna Jn - NH Link Road	0.90	4.5	8.0	mixed	mixed
19	Perumpadanna jn -Chethanad	1.70	4.5	8.0	mixed	mixed
20	Kandachira - Thoniyakkavu	1.40	4.5	8.0	mixed	mixed
21	Thekkenaluvazhi - Municipal Limit	1.25	4.0	8.0	mixed	mixed

Source : Traffic and transportation studies ,2010 by NATPAC

1.2.8.3 Traffic analysis

Traffic analysis includes growth of vehicles, speed and delay characteristic and traffic volume.

1.2.8.3.1 Growth of vehicles

The trend in vehicular growth has been phenomenal all over the country and the State and Paravur Municipality is no exception to this. The growth of motor vehicles in Ernakulam district during the period from 2000 to 2009 is given in **Table1.11**. It can be seen that the vehicle population in Ernakulam district has grown by more than 1.38 times during the last nine years.

Table 1-11: Growth of motor vehicles in Ernakulam district and their Index

Sl. No.	Year	Total Number of Vehicles	Index
1	2000-01	592536	100.00
2	2001-02	734717	124.00
3	2002-03	787086	132.84
4	2003-04	838100	141.45
5	2004-05	896933	151.38
6	2005-06	953249	160.88
7	2006-07	1041205	175.72
8	2007-08	748605	126.34
9	2008-09	815863	137.69

Source : Traffic and transportation studies ,2010 by NATPAC

1.2.8.3.2 Speed and delay characteristics

As part of the study conducted by M/s NATPAC, speed and delay survey was carried out along major road stretches within the North Paravur town. The road sections included parts of National Highway and PWD road. The speed and delay characteristics of major roads in North Paravur study area is given in **Table 1.12**.

Table 1-12: Speed and delay characteristics of major roads in North Paravur Town

Sl No.	Chainage	Length (m)	Average journey time (sec)	Delay (Sec)	Delay cause	Speed (km/ hr)	
						With delay	Without delay
I	**Kodungallore – Ernakulam Road (NH 66)**						
1	Vadakkekara Bridge (Municipal Limit) - Sree Krishna temple Jn(Paravur)	1.00	84	8	intersection, congestion	39.13	42.86
2	Vadakkekara Bridge (Municipal Limit) -Sree	0.80	74	8.52	intersection, congestion	34.90	38.92

	Krishna temple Jn(Kodungalloor)						
3	Sri Krishna Temple Junction - KMK Jn	0.80	82	42	intersection congestion signal	23.23	35.12
4	KMK Junction - Vazhikulangara Jn	2.20	212	23	intersection congestion signal	33.70	37.36
II	**Aluva – Paravur Road**						
5	Municipal Office Junction - Chennamangalam Jn	1.10	89	15	Bus stop,conjestion ,intersection, slow moving vehicle	38.08	44.49

Source : Traffic and transportation studies ,2010 by NATPAC

An analysis of the delays and causes of delay has revealed that traffic congestion, intersections, signals, busstops, slow moving vehicles, parking of vehicles and heavy vehicle movements were the major causes of delay for traffic flow on major roads in North Paravur town area. It could be seen that the major delay of 42 seconds was observed between Sree Krishna Temple Junction and KMK Junction due to signal, intersection, traffic congestion etc. On NH17, the maximum average journey speed of about 39km/hr was observed between Vadakkekara Bridge and Sree Krishna Temple Junction. The speed, however, was quite minimal between SK temple - KMK Junction due to delays at intersection and signal. In this section the speed was 23 km/ hr. At all other section average speed was above 33km/ hr.

1.2.8.3.3 Traffic volume

The details traffic volume on various homogeneous sections of the roads in North Paravur are given in **Table 1.13.** Map showing the density of traffic on these sections in North Paravur town are shown in **Fig . 1.30**.

Table 1-13 : Volume capacity ratio of major roads in North Parur

Sl No.	Location Selected		Total vehicles/day (nos)	Volume(PCU/hr)	capacity	V/C
I	**Kodungallore – Ernakulam Road (NH 66)**					
	From	**To**				
1	Vadakkekara Bridge (Municipal Limit)	Sri Krishna Temple Junction(paravur)	9508	10058	24000	0.42
2	Sri Krishna Temple Junction	Municipal Office Junction	31728	27622	15000	1.84

3	Municipal Office Junction	KMK Junction	26589	26254	15000	1.75
4	KMK Junction	Thekke Naluvazhi Junction	22220	21121	15000	1.41
5	Thekke Naluvazhi Junction	Peruvaram Junction	17692	16645	15000	1.11
6	Peruvaram Junction	Vazhikulangara Junction	17692	16645	15000	1.11
II	**Aluva – Paravur Road(PWD)**					
7	Vedimara Junction	Chennamangalam Junction	8353	7184	12000	0.60
8	Chennamangalam Junction	Municipal Office Junction	7577	9990	12000	0.83
III	**Chennamangalam - Peruvaram Road**					
9	Chennamangalam Bridge	Chennamangalam Junction	11974	8694	12000	0.72
10	Chennamangalam Junction	Pullankulam Junction	5804	6960	12000	0.58
11	Pullankulam Junction	Peruvaram Junction	8293	8832	12000	0.74
IV	**Fire Station Road**					
14	Chennamangalam Junction	Vedimara Junction	3124	2904	12000	0.24
V	**Vaniyakkad Road**					
15	Vedimara Junction	Nanthikulangara Junction	4565	3765	9000	0.42
16	Nanthikulangara Junction	Vaniyakkad Junction	2732	2578	9000	0.29
VI	**Thathampilly - Paravur Road (Vaniyakkad Bypass)**					
17	Vaniyakkad Junction	Vazhikulangara Junction	4102	3372	9000	0.37
VII	**Mannam – Peruvaram Road**					
18	Nanthi Kulangara Junction	Pashnithodu Bridge	1240	863	9000	0.10
19	Pashnithodu Bridge	Peruvaram Junction	1240	1488	9000	0.17
VIII	**KSRTC Road**					
20	Pullankulam Junction	KMK Junction	2822	4893	12000	0.41
IX	**Cherai Beach Road**					
21	KMK Junction	Perumpadana Junction	7334	9903	12000	0.83
22	Perumpadana Junction	Cherai Beach Road Bridge	5119	4011	9000	0.45
X	**Chakkarapoovu Road**					
23	Perumpadana Junction	Kedamangalam Junction	5119	0	9000	0.00

XI	**Ezhikkara - Paravur Road**					
24	Kedamangalam Junction	Thoniyakavu Junction	3666	2784	9000	0.31
XII	**Paravur - Kottuvally Road**					
25	Thekke Naluvazhi Junction	Thoniyakavu Junction	6071	4952	9000	0.55
26	Thoniyakavu Junction	Athani Junction	3974	3102	9000	0.34

Source : Traffic and transportation studies ,2010 by NATPAC

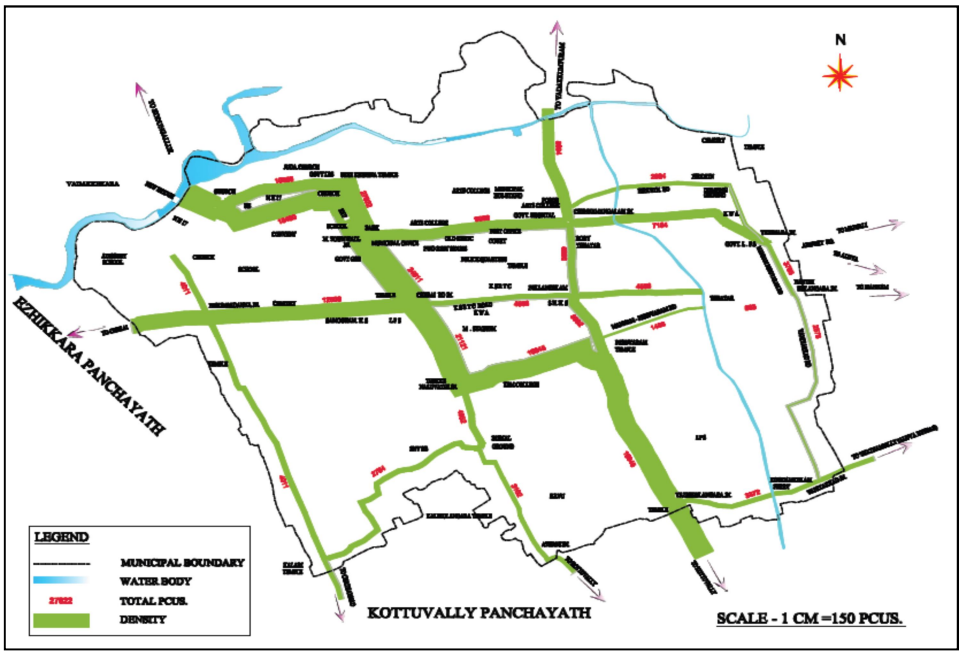


Figure 1-29: Density of traffic in selected section of roads

From the table it is observed that, on National Highway 17, the average daily traffic volume varied between 16,645 PCU (observed at Thekkenaluvazhi Junction to Vazhikulangara section) and 27,622 PCU (at SK Temple to Municipal townhall Junction section). Between Municipal Town Hall Junction and KMK junction, the average daily traffic volume observed was about 26,254 PCU. The section between Vadakkekara bridge and SK temple junction (towards Paravur) is having oneway system and has a traffic volume of 10,058 PCU and the road towards Kodungalloor has a traffic volume of 15,490 PCU.

On North Paravur - Aluva road, the section from Municipal Townhall to Chennamangalam junction has a density traffic volume of 9990 PCU and Chennamangalam-Vedimara junction has7,184 PCU. On Mannam - Peruvaram road, the average daily traffic volume ranged between 1488 and 863 PCU. Vaniyakkad road has the volume between 3765 and 2904 PCU. From Thekkenaluvazhi to Athani, the volume ranged between 4952 and 3102 PCU. The lowest traffic volume among PWD roads was observed at Firestation road.

1.2.8.4 Capacity utilisation

Capacity utilization of the road stretches was measured by volume-to-capacity ratio (V/C Ratio). It is the ratio of volume of traffic plying on the road stretch to the capacity of the road stretch. For working out the capacity of different road sections, the information compiled during the road inventory survey was compared with the specifications of IRC-106-1990 (Guidelines for capacity on urban roads). The traffic volume observed at different road stretches were compared with the capacity of road sections, to calculate the volume-capacity ratio (V/C ratio) of different road sections within the study area.

On NH 66 the road sections between SK temple junction and KMK junction was having traffic almost twice their carrying capacity. The traffic volume on the stretch between KMK junction and Vazhikulangara junction is also found to be exceeded their capacity. The volume-capacity ratio of major roads within the North Paravur town area is given in Table 1.13.

1.2.8.5 Traffic volume at major intersections

Based on the reconnaissance survey, turning movement surveys were at 5 major intersections in the study area to ascertain the peak hour demand. Major intersections selected for volume count survey are shown in Table 1.14.

Table 1-14: Details of intersections identified for turning movement surveys in North Paravur Town

Sl.No	Name of road	Type of intersection
I	**NH 66 (Edapally -Kodungalloor)**	
1	Municipal Townhall Junction	Three-arm
2	KMK Junction	Four-arm
II	**PWD Roads**	
3	Vedimara junction	Four arm
4	Chennamangalam Junction	Four-arm
5	Thoniyakkavu Junction	Three-arm

Source : Traffic and transportation studies ,2010 by NATPAC

It could be seen that Municipal Town hall Junction witnessed the maximum peak hour traffic flow of 6,613 PCU, followed by 6,151 PCU at KMK Junction. Chennamangalam Junction and Vedimara Junction handled peak hour flow in the range of 5,992 and 4,310 PCU. The lowest peak hour flow observed at Thoniyakkavu Junction in the range of 985 PCU. Summarised Traffic Volume flows at major intersections are shown in figure 1.30.

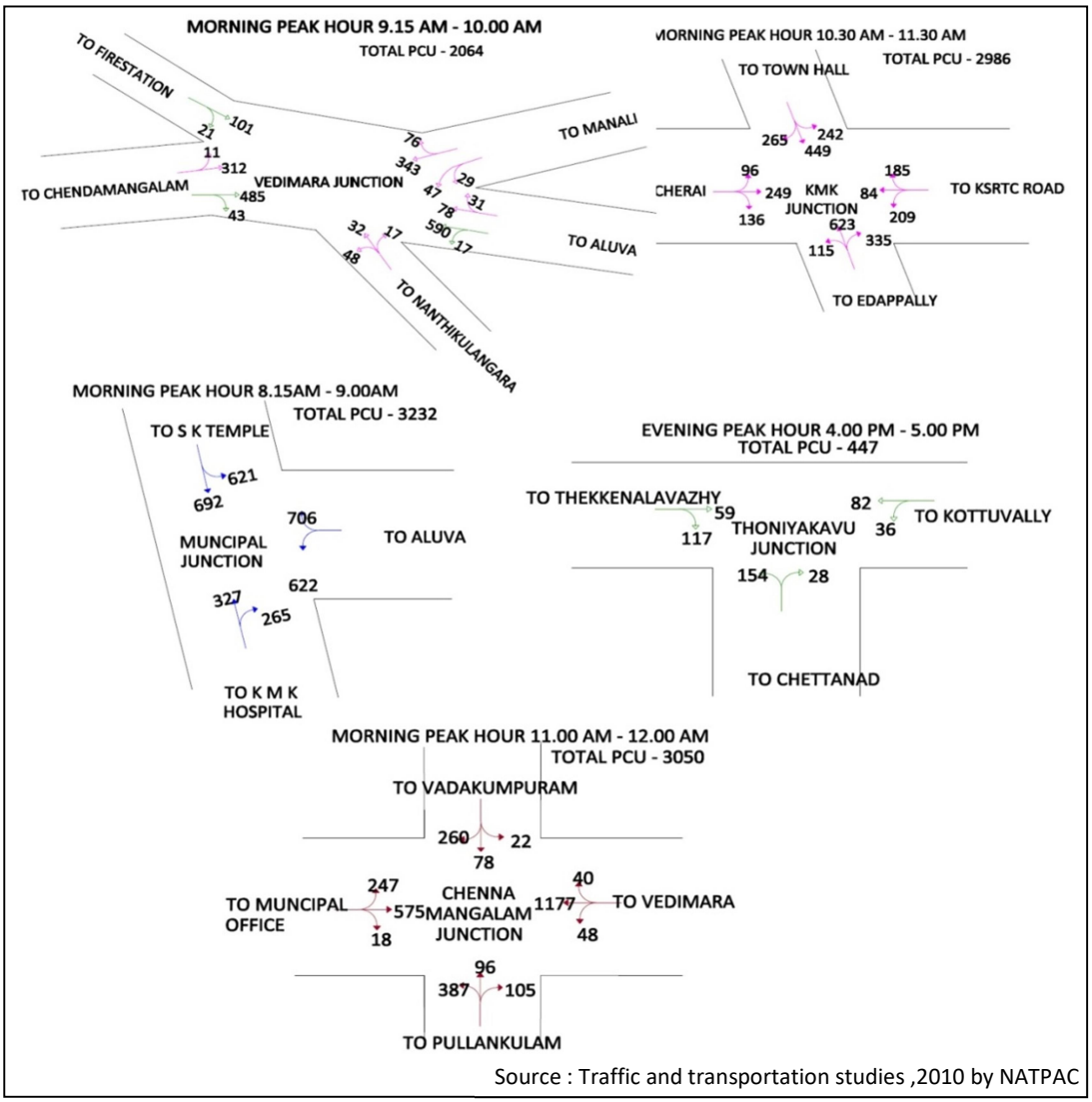


Figure 1-30: Traffic Volume flows at major intersections

1.2.8.6 Parking demand

Parking accumulation and duration of parking are observed at various locations in North Paravur town area as shown in fig. 1.31 and in table 1.15. The summary of peak hour parking accumulation is given in table 1.16 .

Table 1-15: Locations identified for parking demand survey in North Paravur town

Sl No.	Road section
I	Kodungallore – Ernakulam Road (NH 66)
1	Muncipal Office - PWD Rest House
II	Aluva – Paravur Road(PWD)
2	Muncipal Jn - Govt Hospital
3	Hospital - Chennamangalam

Source : Traffic and transportation studies ,2010 by NATPAC

Table 1-16 : Parking accumulation of vehicles on major roads in North Paravur study area

Time	Bus	bus/tempo	Car/Van/jeep	autorikshaw	Two wheeler	Truck	MT	Goods auto	Total
POINT 1	**NH.17: Muncipal Office - PWD Rest House**								
01.30 PM	0	0	6	0	7	0	1	0	**14**
02.00 PM	0	0	4	1	4	0	0	0	**9**
02.30 PM	0	0	4	0	6	0	0	0	**10**
03.00 PM	0	0	1	2	6	0	0	0	**9**
03.30 PM	0	0	1	0	0	0	0	0	**1**
Total	0	0	16	3	23	0	1	0	**43**
POINT 2	**Muncipal Jn - Govt Hospital(PWD)**								
01.30 PM	0	0	4	2	41	0	0	0	**47**
02.00 PM	0	0	33	2	10	0	0	0	**45**
02.30 PM	0	0	10	2	16	0	1	0	**29**
03.00 PM	0	0	2	4	17	0	0	0	**23**
Total	0	0	49	10	84	0	1	0	**144**
POINT 3	**Hospital - Chennamangalam**								
01.30 PM	0	0	10	1	7	0	0	0	**18**
02.00 PM	0	0	9	2	9	0	0	0	**20**
02.30 PM	0	0	8	1	1	0	0	0	**10**
03.00 PM	0	0	7	3	4	0	0	0	**14**
03.30 PM	0	0	6	1	0	0	0	0	**7**
Total	0	0	40	8	21	0	0	0	**69**

Source : Traffic and transportation studies ,2010 by NATPAC

Table 1.16 gives the summary of peak parking accumulation observed on major parking corridors in North Paravur. Of the 3 corridors where parking accumulation survey was conducted, it was found that the main road between Municipal Junction and Government

hospital had the highest parking accumulation of 144 vehicles parked between 13.30 pm and 15.00 pm on a normal working day. 84 of these vehicles were found to be two wheelers, followed by 49 cars and 10 passenger autos. 47 vehicles were found to be parked at 1.30 pm.

Hospital Junction – Chennamangalam section had peak parking accumulation of 20 vehicles at 14.00 pm. Municipal office – PWD Rest house section on NH 66 witnessed peak parking accumulation of more than 14 vehicles at 13.30 pm. Majority of the vehicles parked at most of parking corridors were found to be for short duration of less than 30 minutes. 97 to 100 per cent of the vehicles parked on selected parking corridors were found to be parked for duration less than 30 minutes. 1 to 2 per cent of the vehicles were parked for a period ranging between 30 minutes and one hour.

1.2.8.7 Pedestrian traffic

Pedestrian volume survey was conducted at major locations where the pedestrian cross movements were found to be high. Locations selected for pedestrian survey are given in Table 1.17 and shown in figure 1.31. Analysis of the pedestrian cross movement at major activity/traffic generation areas revealed that a volume of 117 pedestrian cross movements occurred across Main Road - Post Office during the time period between 13.45 and 14.00 pm. Peak hour pedestrian cross movements observed at major locations in North Paravur town are given in Table 1.17.

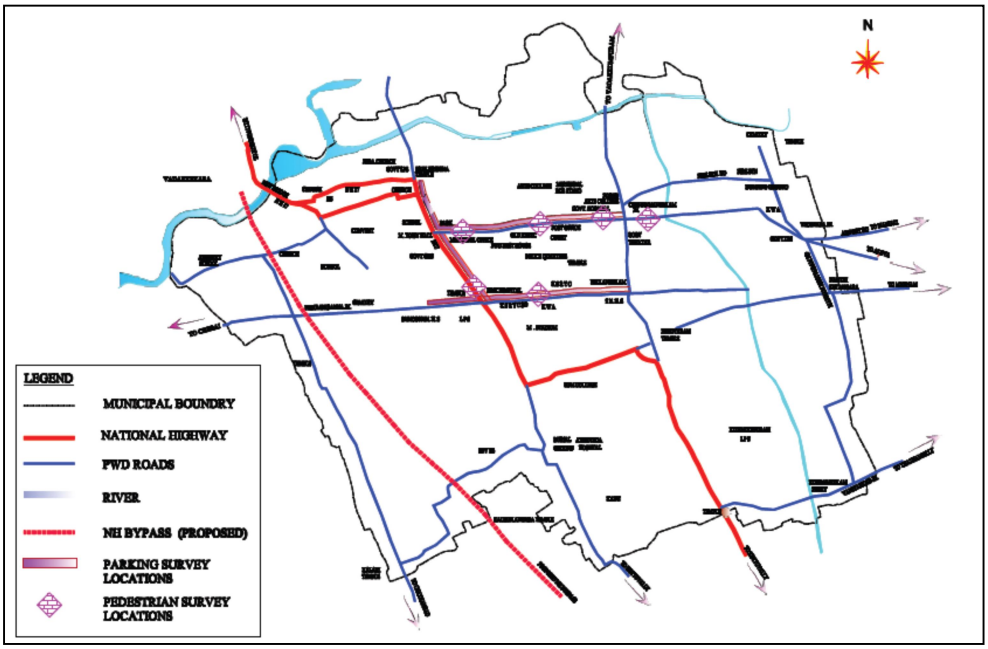


Figure 1-31 : Parking and pedestrian survey locations

Table 1-17 : Peak hour pedestrian cross movements at major locations in North Paravur Town

Sl No	Name of Location	Peak Time(hours)		No. of pedestrians		
		From	To	Up	Down	Total
I	**Kodungallore – Ernakulam Road (NH 66)**					
1	Muncipal Jn	9.45	10.00	22	55	77
2	KMK Jn	11.00	11.15	60	32	92
II	**Aluva – Paravur Road(PWD)**					
3	Govt.Hospital	14.30	14.45	66	47	113
4	Main Road - Post Office	13.45	14.00	45	72	117
5	Chennamangalam	15.00	15.15	42	39	81

Source : Traffic and transportation studies ,2010 by NATPAC

1.2.8.8 Intercity travel characteristics

Intercity travel characteristics are studied based on sample O-D survey (Origin-Destination survey) at major three outer cordon points of the study area. The cordon points selected for O-D surveys are shown in figure 1.32 and the distribution of inbound and outbound traffic at outer cordon survey points is shown in table 1.18

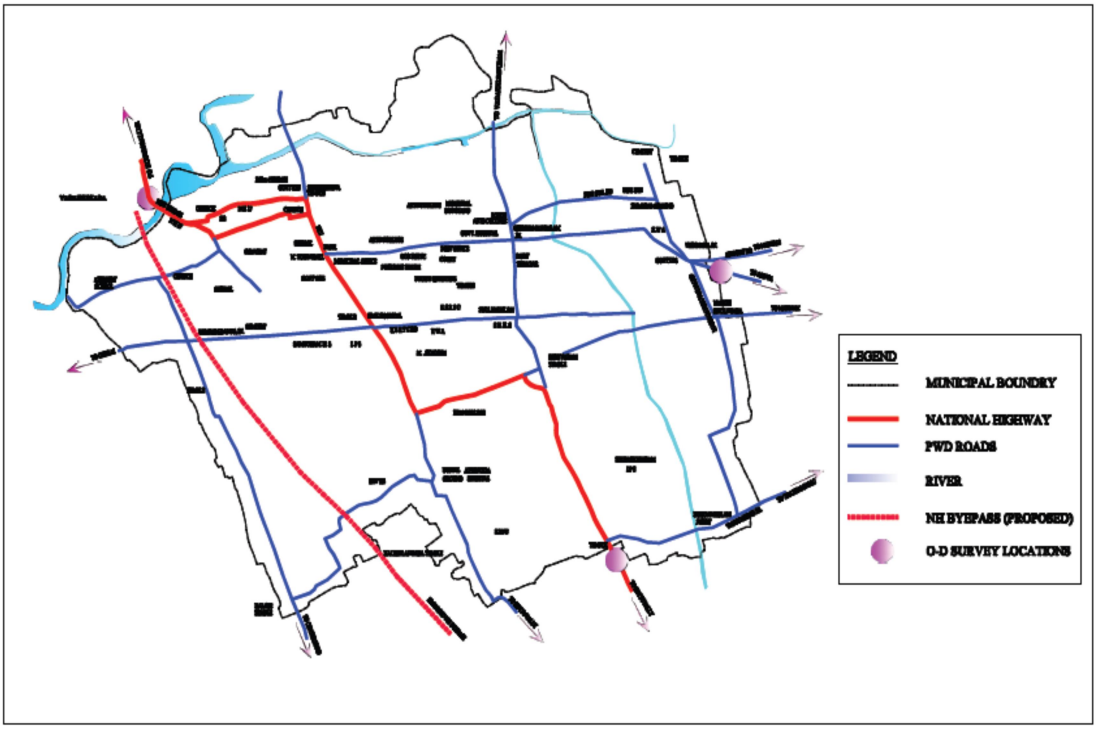


Figure 1-32: O D Survey Points in North Paravur town

The maximum daily traffic volume of 20663 PCU was observed at Vedimara survey point on PWD road, which included 10,737 PCU of inbound traffic and 9,926 PCU of outbound vehicles. Two wheeler constituted the maximum traffic volume followed by car and buses. As many as 18,691 PCU of vehicles were observed at Vadakkekara survey location on NH 66. There were 9,577 PCU of inbound and 9114 PCU of outbound vehicles at this survey station. Of the 16,564 PCU of vehicles passing through Vazhikulangara survey point on NH 66, 8,114 PCU of inbound and 8419 of outbound vehicles traffic.

Table 1-18 : Distribution of vehicles passing through outer cordon points in North Paravur

Location Selected						
Vehicle Type	Vadakkekkara Bridge(NH 49)		Vazhikulangara (NH 49)		Vedimara(PWD)	
	inbound	outbound	inbound	outbound	inbound	outbound
	Kodungalloor - Paravoor	Paravur - Kodungalloor	Edapally-Paravoor	Paravoor - Edappally	Vedimara - Paravoor	Paravoor - Vedimara
KSRTC Bus	172	138	165	195	295	265
Private bus	270	335	254	275	205	225
Other buses	211	150	62	54	93	93
Mini-bus/tempo	129	104	81	90	141	93
Car/Van/jeep	2997	2805	2596	2602	2577	2343
Pass. autorikshaw	930	780	518	668	1188	1107
Two wheeler	3051	2884	4073	3962	4960	4712
MAT	44	28	6	17	24	25
Truck	260	217	208	191	286	266
Mini-truck/tempo	332	456	345	334	669	560
Goods autorikshaw	238	322	152	195	318	302
Bi-cycle	515	524	216	203	299	295
Hand cart	0	4	0	2	12	8
Others	0	0	0	2	4	0
Total vehicle	**9149**	**8747**	**8676**	**8789**	**11071**	**10294**
Total PCU/hr	**9577**	**9114**	**8144**	**8419**	**10737**	**9926**
Total of inbound and outbound	**18691**		**16564**		**20663**	

Source : Traffic and transportation studies ,2010 by NATPAC

At the outer cordon points, at Vadakkekara survey station, the sample size of vehicles interviewed varied from 1.54 per cent of auto rickshaw to 13.85 per cent of truck. The variation was from 1.79 per cent of two wheeler to 29.19 per cent of MAT at Vazhikulagara survey station. The sample size at the Vedimara survey station varied from 1.92 percent in the case of two-wheeler to 15.74 percent of truck.

In order to conduct the detailed analysis of OD survey , the town area is divided into 24 traffic zones, which included the immediate surrounding areas, adjoining districts and neighbouring States. The traffic-zoning pattern adopted for the study geographically shown in figure 1.33.

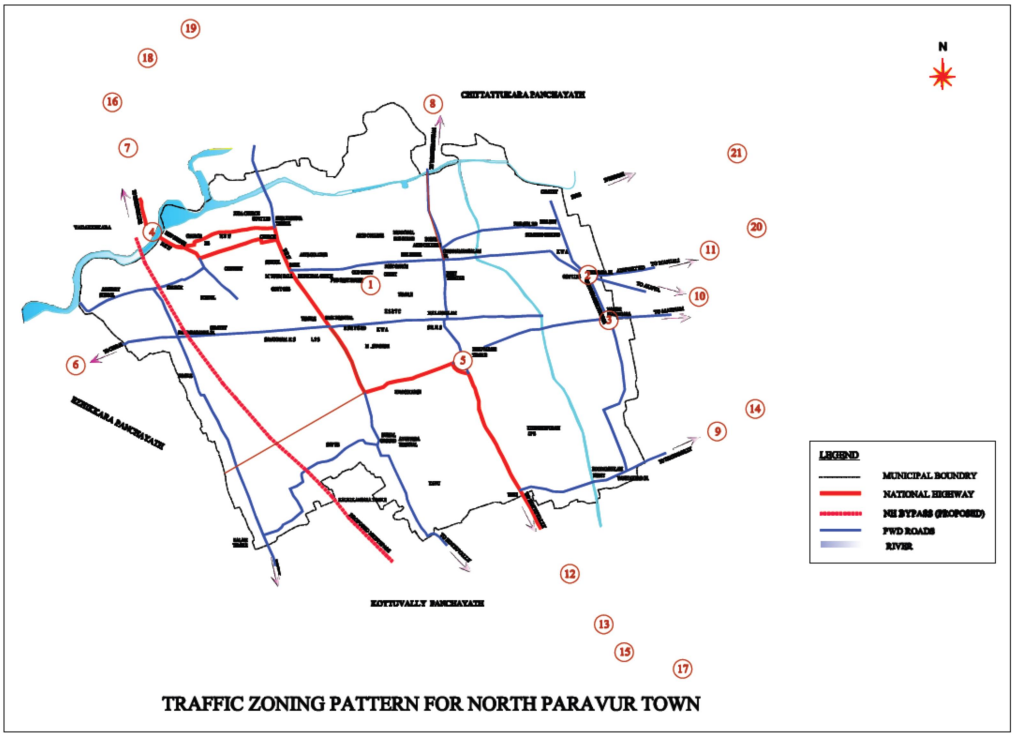


Figure 1-33: Inter city travel charecteristics – traffic zones in town area & its outside

Modal split of intercity daily passenger trips conducted in North Paravur town is as shown in table 1.19 and in fig .1.34.

Table 1-19 : Modal split of inter-town daily passenger trips in North Paravur Town

Sl.No.	Mode of travel	No.of passengers	% of passengers
1	Bus	99,464	59.22
2	Mini-bus/ tempo	5,608	3.34
3	Car/ van/ jeep	28,955	17.24
4	Autorikshaw	7,699	4.58

5	Two wheeler	26,242	15.62
	Total	**167,967**	**100.00**

Source : Traffic and transportation studies ,2010 by NATPAC

Modal split of intercity daily passenger trips according to mode of travel in North Paravur

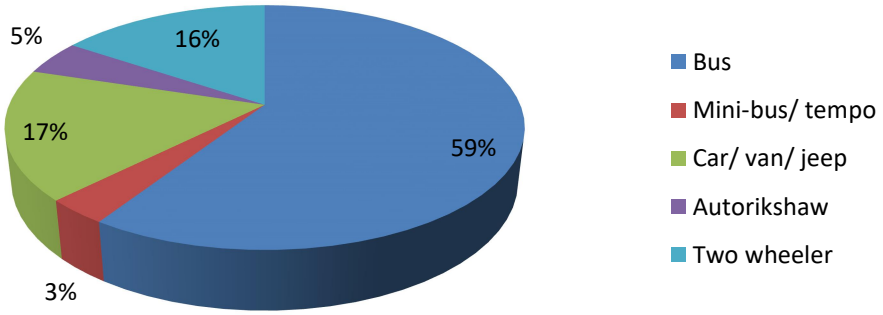


Figure 1-34 : Distribution of inter city passenger trips for different purposes

An analysis of the O-D survey data collected from outer cordon survey locations revealed that an estimated 1,68,669 inter-town passenger trips were performed in the study region on an average day consisting of 99,464 bus passenger trips (59.22%), 28,955 car passenger trips (17.24%), 26,242 two-wheeler passenger trips (15.62%), 7,699 auto passenger trips (4.58%) and 5,608 mini-bus passenger trips (3.44%). It could be inferred that public transport had a significant role in meeting the inter-town passenger demand.

The major traffic generating zone within the study region was the CBD area with 44,729 trips. In case of external zones within Ernakulam district, the major traffic generating zone were Guruvayur (15,202 tonnes), Angamaly (14,120 tonnes), and Cochin (14090 tonnes). A total of 9105 intra state trips were made mostly from Thrissur, 4,952 tonnes from Southern districts and 3874 tonnes from Northern districts.

An estimated 54.65% inter-town passenger trips were performed in North Paravur town, for work or related purpose (table.1.20). This was followed by social purpose constituting 16.28 percent and shopping purpose 10.30 percent. Nearly five per cent of the total trips were performed for medical purposes. Educational trips were about three per cent of the total passenger trip.

Table 1-20: Distribution of inter town daily passenger trips according to mode of travel and purpose of trip

Sl. No.	Purpose of trip	Type of vehicle						
		Bus	Mini-bus	Car	Auto	Two wheeler	Total	Per cent
1	Work	9,634	0	2263	1122	3294	16,313	**9.71**
2	Part of work	17,644	2078	3379	2481	4295	29,877	**17.79**
3	Personal business	26,936	876	8514	1043	8242	45,611	**27.15**
4	Shopping	4,310	0	1323	135	1530	17,298	**10.30**
5	Recreation	7,399	1581	1910	479	1160	12,529	**7.46**
6	Social	22,322	753	8056	875	5792	27,342	**16.28**
7	Education	2,654	0	988	288	564	4,494	**2.68**
8	Back home	1,588	320	318	43	420	2,689	**1.60**
9	Serve passenger	1,251	0	0	867	0	2,118	**1.26**
10	Medical	4,314	0	1773	451	767	7,305	**4.35**
11	Others	1,412	0	711	92	176	2,391	**1.42**
	Total	**99,464**	**5,608**	**29,235**	**7,876**	**26,240**	**167,967**	**100.00**

Source : Traffic and transportation studies ,2010 by NATPAC

The occupational characteristics of passengers were ascertained from the O-D survey. It could be seen that persons working as casual labourers constituted the major segment (36.25 percent) of the inter-town travelers. This is followed by business personnels (27.51 percent) and service personnels (19.54 percent) of whom 3 percent working in government and 14.84 percent in private service. Dependant population like unemployed, housewife, student and retired hands together constituted 7 per cent of the total inter-town passengers. (Table 1.21)

Table 1-21: Distribution of intercity daily passenger trips according to mode and occupation of trip maker

Sl. No.	Occupation of trip	Type of vehicle						
		Bus	Mini-bus	Car	Auto	Two wheeler	Total	Per cent
1	Government service	3,277	0	924	457	886	5,544	**3.30**
2	Private service	14,733	3718	2235	617	3622	24,925	**14.84**
3	Industry service	1,388	195	474	135	156	2,348	**1.40**
4	Business	27,315	351	10599	658	7288	46,211	**27.51**
5	Professional	9,025	0	2627	490	3126	15,268	**9.09**
6	Cultivator	747	0	221	46	250	1,264	**0.75**
7	Casual labourer	36,386	652	10202	5160	9157	60,881	**36.25**
8	Retired	2,861	320	588	129	942	4,840	**2.88**
9	Unemployed	-	0	0	0	0	-	**0**
10	Housewife	974	0	490	184	0	1,648	**0.98**
11	Student	831	0	48	0	527	1,406	**0.84**
12	Others	2,147	372	827	0	286	3,632	**2.16**
13	Gulf		0	0	0	0		**0**
	Total	**99,684**	**5,608**	**29,235**	**7,876**	**26,240**	**167,967**	**100.00**

In the case of intercity goods traffic, a maximum number of 1896 goods vehicles passed through Vadakkekara survey point on NH 66 road comprising 72 MAT, 477 trucks, 788 mini-trucks and 560 goods autos. At Vazhikulangara survey point on NH 66, a total of 1447 goods vehicles were observed on the reference day, of which 24 were MAT, 378 were trucks, 679 were mini trucks and 347 were goods autos. At Vedimara survey point on PWD road, 49 MAT, 552 trucks, 1229 mini-trucks and 620 goods autos; totaling 2450 goods vehicles passed on the reference day. The maximum number of 2450 goods vehicles passed through Vedimara survey point on Aluva- Parur road.

A total of 4,107 goods vehicles were found to be involved in carrying goods traffic to and from the study region, consisting of 88 MAT, 806 trucks, 2088 mini-trucks and 1,126 goods autos. The quantum of goods handled by these goods vehicles was to the tune of 6,416 tonnes. Mini trucks carried the maximum volume of goods traffic (46.55%), followed by trucks (36.54%), MAT (8.21%) and goods auto (8.69%) Table1.22

Table 1-22: Modal split of inter-town daily goods traffic (in tonnes) in North Paravur town

Sl No.	Mode of travel	No of vehicles		Quantity carried	
		Number	Percent	Tonnes	Percent
1	MAT	88	2.13	527	8.21
2	Truck	806	19.63	2,345	36.54
3	Mini Truck	2088	50.84	2,987	46.55
4	Good auto	1126	27.40	558	8.69
	Total	**4,107**	100.00	**6,416**	100.00

A further study of the goods traffic pattern observed within the study region vis-à-vis the outside study region revealed that 931 tonnes of traffic originated from the study region and 1745 tonnes of traffic terminated in the study region. There were 3791 tonnes of goods traffic which were bypassing the town.

Out of the 6382 tonnes of inter-town goods traffic observed through outer cordon survey stations, maximum volume of 844 tonnes movements were observed in the case of brick and tiles which amounted to 13.23 %, followed by earth and gravel to the tune of 503 tonnes (8%) and LPG 375 tonnes (6%).

1.2.8.9 Parking facilities

There are no parking facilities in the town. Vehicles are parked along the sides of the roads which results in traffic congestion. A large number of vehicles are parked on the roads between municipal junction and government hospital, hospital Junction and Chendamangalam, municipal office and PWD rest house etc.

1.2.8.10 Truck Terminals

There are no truck terminals in North Paravur.

1.2.8.11 Issues

The major traffic problems in North Paravur are listed below.

- There is inter-mixing of intra-town and inter-town traffic in the absence of adequate bypasses.
- The width of roads in the central part of the town is inadequate which causes congestion.
- There is heavy movement of vehicular and pedestrian traffic.
- There is unorganized on-street parking since there are no proper parking bays.
- The intercity bus stand is located within the central area of the city which causes heavy congestion due to the movement of intercity buses.
- There is encroachment of Right-Of-Way on roads.

1.2.9 Housing

1.2.9.1 Household Size

The average household size of the town is 4.4 & no of households are 6834. North Paravur has the lowest household size compared to Paravur Taluk and the district. Household size of Paravur has decreased from 5.1 (1991) to 4.4(2001) as given in table 1.23

Table 1-23: House hold size of State, District, Taluk & Town

Description	Average House Hold Size		
	1981	1991	2001
Kerala	5.8	5.3	4.7
Ernakulam	5.7	5.1	4.5
Paravur Taluk	5.8	5.1	4.5
Nort h Paravur(M)	5.8	5.1	4.4

1.2.9.2 Overview of housing sector

According to the secondary data (2009)available from muncipality, out of a total of 6607 houses, 4193 (63%) are pucca, 2248(33%) are moderate and 266 (4%)are kutcha. 91% of the households have buildings of their own while 8.9% of the households live in rented houses & 0. 1% are houseless.

When this is taken into account, there is a shortage of about 550 houses in the town. But more importance should be given to improve the existing housing conditions. 79% of households have drinking water with in premises, 19% have drinking water near the premises and for 2% households drinking water is away from premises.

There are 27 un-notified slums in the municipal limit. The total area under slums is 13.44 hectares and the number of houses in the slums is 1281. The majority of people in slums are backward classes and below poverty line. The housing conditions are substandard.

There are many schemes undertaken by the Municipality to stimulate housing such as IHSDP scheme, EMS Bhavana Scheme, Janakeeyasuthranam, Valmiki Ambedkar Awas Yojana (VAMBAY) etc. The schemes envisage to tackle the problems in a holistic and definitive way adopting a multi pronged approach of improving the living conditions and enabling construction of affordable housing. In the Eleventh Plan the State has attempted to put in place a scheme for ensuring 'Housing for All' through a major Flagship programme being implemented by the Local Self Government Department and housing department as EMS Housing and M.N.Lakshamveedu Punarnirmana Padhathi respectively. The municipality accorded the highest priority to housing for the economically weaker sections. The continuing problem of housing among the poor indicates the need for effective intervention from the State / LSGI on the issue of sustainable housing.

1.2.10 Environment

About 3% of the total town area is covered under water bodies. Since there is no proper drainage system, water logging exists in the Municipality. The wastes are dumped in water bodies which results in water pollution. Except this issue the town environment is quite satisfactory for comfortable residential settlement with the old shadow trees, greenery, water front and fresh air. Land, air and noise pollution are not as much serious as water logging . Proper planning and awareness to public is needed to keep clean urban environment. Conservation efforts are taken to preserve temples and ponds as a part of Muziris Heritage Project.

1.2.11 Economic Aspects

1.2.11.1 Industry

In North Paravur municipality as well as Paravur block there is no large scale and medium scale industries. In Paravur town there are only 6 small scale industries like metal

based service industries and engineering industries. As per existing land use only 0.19% of total land area is used for industrial purpose which was 0.26% as per land use survey in 1991.

Though this place is blessed with all the necessary infrastructure facilities for the development of an industrial area, medium and large-scale industries are yet to come in this block. Through an integrated development strategy, the SSI sector could be saved from its present plight. But formidable strategies and concentrated efforts are required from the part of the agencies and Industries department to materialize this aim.

1.2.11.2 Trade and Commerce

Paravur was once a bustling town with many commercial establishments and trade links. There are 3 markets in North Paravur Town. Shopping complexes, textiles, electrical and allied goods, bakeries, household utensils etc. are the major commercial activity areas. The commercial places in North Paravur are not reflecting any hierarchy and an unplanned haphazard development is taking place all around which is spread over a large area and along the major transport corridors to serve the localized population. Existing land use map of North Paravur shows that 2.23% of total area is under commercial use. Market ward has the highest concentration of commercial activities.

1.2.11.3 Tourism

Tourism sector development is one of the major income generating scheme for the town. The North Paravur town has potential for domestic and international tourism because of various important historic and religious places and presence of water bodies in the town and its surroundings. But the town is under developed in terms of tourism infrastructure.

Kerala Draft Tourism Policy 2011 has listed out various types of tourism which can be developed in the State. In view of the regional context, Department of Tourism has identified few tourism circuits as a part of Muziris Heritage Project. The North Paravur town with major tourist locations within a range of 15-25 kms can also be viewed in this context, as it can be an important tourist circuit. The heritage sites and temples identified for Muziris Project Figure1.35 and 1.36 shows heritage sites & temples in North Paravur town identified for Muziris Project.

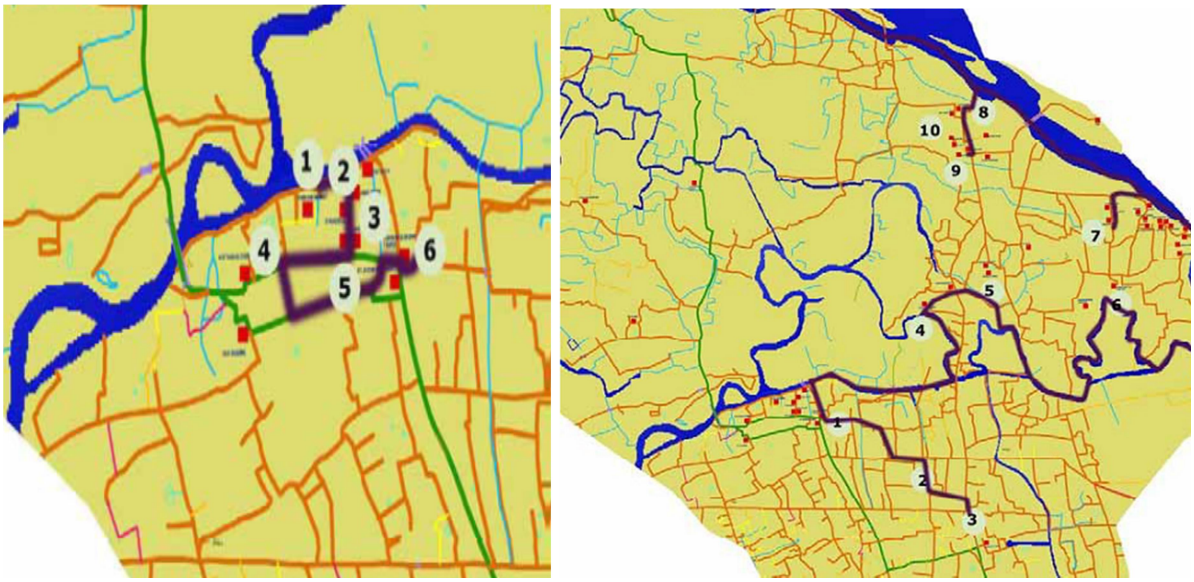


Figure 1-35: Heritage Sites & temples identified for Muziris Project

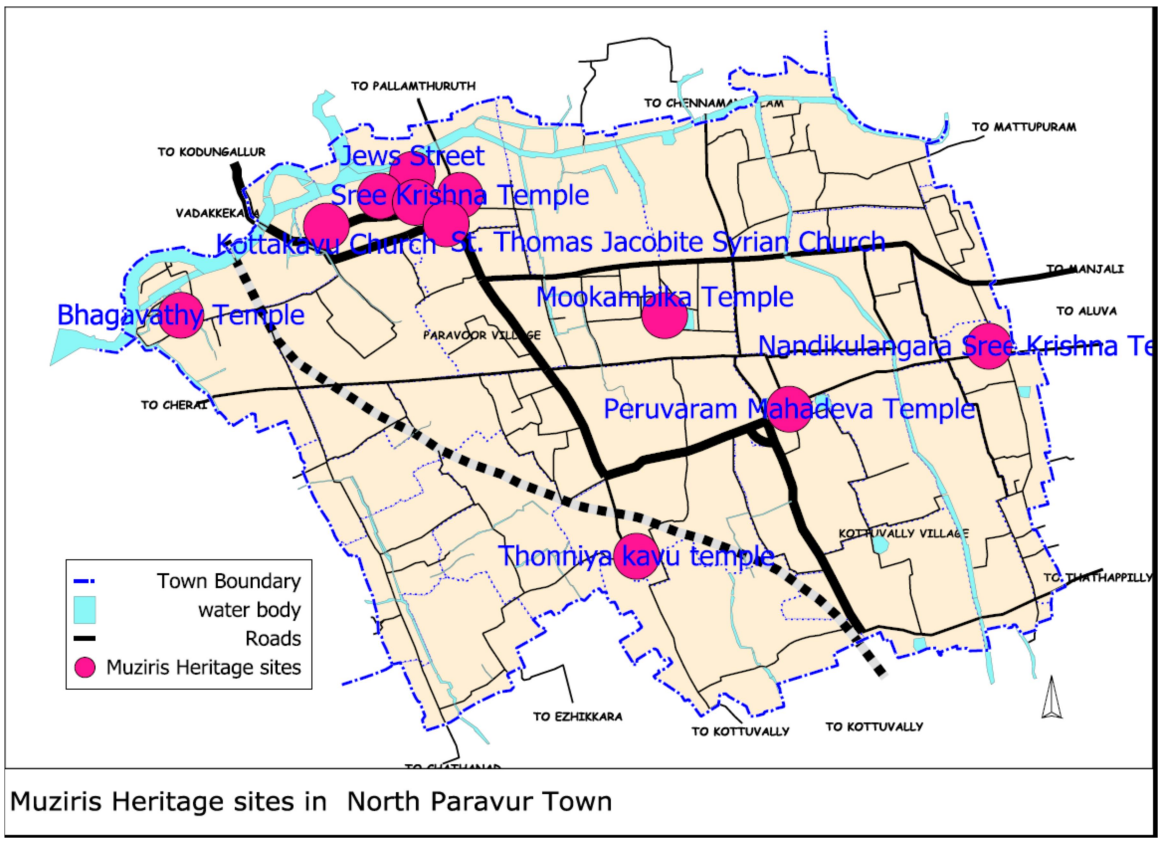


Figure 1-36 : Location of Muziris Tourism Locations in the Town

1.2.11.3.1 Places of Tourist interest

a) Jewish Street:

The Jews who came here in search of new lands settled in this area. They flourished in business and established their community here. The entrance to Jews Street, from the main road to Paravur is guarded on either side by two tall pillars. One of the pillars has fallen and is in a damaged state. There are old Jewish houses standing in the street and some of them have been modified.



b) Jewish Synagogue:

This was the place of worship of the Jewish community that settled close to the Paravur Market. There are two rooms at the entrance and the Synagogue is beyond the small courtyard. The balcony is supported by decorated pillars and gilded beams. The entrance to Jews Street, from the main road to Paravur is guarded on either side by two tall pillars.



c) Paravur Market:

Paravur market is situated on the bank of the back waters, making it a very important market of its time. In olden days, there was major trading, using Vanchis in the Puzha close to the market. During the week, Mondays and Thursdays



were and still are Chanda days. Some of the old shops have been retained along with their rolling shutters, giving us an insight into the past of this commercial centre.

d) Kottakavu Church:



Kottakavu Church is said to be one of the seven churches founded by St. Thomas during 52 AD. It is also known as Valiyapally or Big Church, indicating that it was a mother church. In the 191h century, due to the lack of space in the old church for conducting Holy Mass and community functions, the new church was built. The parishioners have preserved the old church, which is behind the new one, the elephantine wall, called Anamathil, on the adjacent western side and the Pilgrim Pond where the Apostle baptized the devotees and they continue to maintain them.

e) St. Thomas Jacobite Syrian Church:



St. Thomas Jacobite Syrian Church was founded in AD 1566. It is said to have been constructed by the Big Bazaar Tharakan families in North Paravur on the land given free of tax by the Ruler of Paravur. It is named after St. Thomas, the apostle and is also known as Kizhakkeppally or Cheriapally. Records show that famous historians, the Whitehouse Priest, Dr. Buchanan and others visited it. The tomb of St. Gregorios being here has made it a major pilgrim centre of the Malankara Syrian Christians.

f) Kannankulangara Temple:



It is the temple for Lord Krishna and is about 600 years old. There is a belief that those who are childless will be blessed after they tie a cradle from the temple roof and worship Lord Krishna. Those, whose marriages are delayed, come and pray in this temple.

g) Mookambika Temple:



A temple for Goddess Saraswathi - the goddess of art and learning is rare in Kerala. It was built by a local ruler, the Thampuran of Paravur, with a Shrikovil in the middle of a lotus pool. The famous annual Navaratri festival is celebrated in grandeur, over ten days during the month of Kanni, which falls between September and October. On Durgashtami, books are placed before Goddess Saraswathy and on Vijayadasami morning, the 'Ezhuthinirithu' or 'Vidyarambham' ceremonies are done at a special mandapam, when thousands of children utter the word "harishree" for the first time, and write it on rice, seeking the blessing of the goddess.

h) Peruvaram Mahadeva Temple:



This temple is located a few meters from the National Highway. Four small temples of Shree Raman, Hanuman, Shree Krishna and Ayyappa are near it. The annual festival is conducted during Medam month, which is during April and May. The temple has idols of Shree Parvathy, Lord Ganapathy, Lord Ayyappa and Yakshi.

i) Bhagavathi Temple:



The annual temple festival lasts seven days, from the first day after Kodikayattam. This Balabhadrakali shrine stands near the Chendamangalam Panchayat office. Many people find the "Swayamvara Pushpanjali" performed here, to gain a suitable partner in life yields results. The "Vidyarambha" for children done here is also considered to be propitious.

1.2.11.3.2 Problems and Potentials

Even though North Paravur has a high potential for tourism, it is not utilised much. About 200 foreign and 10000 domestic tourists visit North Paravur a year. Still there are no 4 star or above hotels or home stays. Traffic congestion badly affects the tourism development in the town. There are no tourist information centres. There is no facility for house boats.

1.2.11.4 Agriculture

On analyzing Agricultural sector, there is no distinctive agriculture development pattern in the municipality. The agricultural activities are deteriorating in the town. There is no paddy field in town. Coconut is the main cultivation in North Paravur at present. Even though the town has 12% of active and non-active dry cultivation land, due to the unavailability of labourers and diseases affecting coconut trees, agriculture production is uneconomical.

1.2.11.5 Animal Husbandry

Because of the lack of infrastructure facilities, the animal husbandry sector is not much developed in the town. The municipal town has large extent of dry cultivation area which can be utilized for potential development of this sector. About 150 families in the Municipality are engaged in fishing sector. Old and outdated techniques are used for fishing.

1.2.12 Physical Infrastructure

1.2.12.1 Power

Electric power availability is sufficient for the present needs. Total consumption of electric power is 1471.798 MKWH. There is a 66kV sub station at Mannam. Electricity is distributed via 83 transformers. Any cause of power failure is natural calamities only.

1.2.12.2 Water Supply

The main source of water is Periyar River and Plant at Chowwarahaving capacity of 60 MLD. Water supply facilities are provided by Kerala Water Authority covering almost all the area of the Muncipality. No. of connections are 5372 houses & 659 street taps with

3MLD supplied/day. There are various schemes available for municipality, assuring "Drinking water for all "within recent years.

1.2.12.2 Sewerage & Drainage

There is no proper drainage facility in the town. Insufficient drain width and improper connectivity has made the whole scene stagnant and dirty. A Drainage Master Plan for the entire town is recommended for improving the drainage system. North Paravur town doesn't have any sewerage system at present. Septic tanks are common in the urban area.

1.2.12.3 Solid Waste Management

Solid waste includes domestic and commercial waste, industrial waste, hospital waste, e-waste and construction debris. No hospitals have their own methods for disposal of hospital waste. The markets also don't have any method for the disposal of waste. 9 tonnes wastes is generated per day. Major portion of Solid Waste is generated from the central area of the town and it is disposed off in Vedimara land fill area without segregation. Market waste is effectively utilized for the preparation of Vermicompost at Vedimara solid waste plant. Decentralized waste management system should be promoted.

1.2.13 Social Infrastructure

1.2.13.1 Education

Educational institution in and around the town satisfactorily serve the purpose. There are 21 schools out of which 7 are higher secondary schools (8 Govt., 7 Aided & 6 Un-aided). There is No VH schools & Professional Colleges in the town. But these facilities are available in nearby area. The town also lacks the skill training and industrial training institutes.

1.2.13.2 Health

Health facilities available in the town serve the purpose of common man's daily needs. There are 12 Allopathic hospital (1 Govt. & 11 private), 2 Ayurvedic hospitals (1 Govt. & 1 private) and 4 homeopathic hospitals (1 Govt. & 3 private) in the town. There is no super specialty hospital in or around the municipal area with advanced facilities like CT scan, EEG etc. Health facilities need to be improved, in the above field.

1.2.13.3 Recreational facilities

The recreational facilities in North Paravur are not adequate to cater to the needs of the town as well as its service area population. Only 2.30% of total area is used for recreational facilities. The existing area available under this category is very low when compared to the extent of town and the density of population. The town badly lacks in the provision of recreational spaces, which requires special attention.

1.2.14 Other civic amenities

Other civic amenities like burial ground, fire station, police station, petrol pumps etc. are adequately available in the municipality.

1.3 S.W.O.T Analysis

Based on analytical study, a SWOT analysis has been carried out for the town of North Paravur, illustrating its inherent strength and weaknesses, opportunities offered and threats faced both from within and outside, which has been used as a framework for redefining future growth and development of the town.

Strengths

The strength of North Paravur can be defined in terms of:-

- One of the important urban centers of the District having historical and heritage significance
- Road transport connectivity with major urban settlements of the district and State, for flow of goods and passenger traffic
- Well connected to nearby local bodies
- Nearness to rail, road and air accessibility with all major destinations of the State
- Suitable for human habitation
- Assuring water supply to all within short period.
- Emerging Administrative centre as one of the taluk head quarters of the Ernakulam district
- Potential for tourist destination as it is included in Muziris Area and Cherai beach is nearby North Paravur town.

- Market is located on the periphery of the town, which does not obstruct the surrounding population and is easily accessible from all the adjacent Panchayats
- Government hospital in the town acts as a major health institution, which serves the entire Taluk population.
- Presence of water resources of backwater, ponds and various heritage monuments

Weaknesses

The town has number of weaknesses, which can be enumerated in terms of:-

- Infrastructure issues
  - Inadequate Storm water drainage .
  - Lack of sewer system
  - Inadequate parking space.
  - Inadequate regional/town level open and recreational spaces in and around the town.
- Lack of job opportunities & movement for job from town.
- Unplanned commercial development along the major road network without provision of adequate parking
- Bottlenecks in roads within the Town
- Poor solid waste management in the town.
- Absence of tourism related quality infrastructure
- Encroachment of water bodies and water logging problems

Opportunities

The town offers enormous opportunities in terms of:-

- River use – a potential for new recreational & tourism opportunities
- Attracting large investment and generating considerable employment
- Emerging as major tourist destination with increased flow of tourists, both from within and outside India
- Tourism opportunities related to heritage importance and presence of water body
- Excellent road network (regionally & locally)

- High literacy rate &comparatively high percentage of working age population.
- Emerging growth of value added industries and hub of IT and ITES industries
- Major demand for growth of quality infrastructure in terms of education, health,tourism, trade & commerce, entertainment, housing etc
- One of the towns in Kochi urban agglomeration which is part of Kochi Urban Cluster as per delineated urban profile for the state for 2021 and part of Alappuzha-Ernakulam-Thrissur-Palakkad urban corridor as per delineated urban profile for the state for 2031(Ref SUR)

Threats

Despite the inherent strength, existing weaknesses, available opportunities, the town faces numerous threats which can be identified in terms of:-

- Increasing land value
- Absence of strong economic base for municipality
- Water logging problems
- Delay in developing appropriate infrastructures for tourism, trade & commerce

1.4 Development Issues

In order to evolve Development Concepts and Development Strategies, it is necessary to reiterate here the major development issues which necessarily shall be reflected in Development Strategies. Key development issues identified based on various studies and analysis are summarised below:-

- **Infrastructure issues:** -Deficient Sewerage, drainage and solid waste management facilities.

  Sewage disposalremains a major issue since the existing situation pollute the water bodies. Because of the flat terrain, lack of adequate slope of land and missing links in the existing water networks, surface water drainage problem contribute to water logging of drains. Inefficient solid waste collection and disposal arrangement.
- **Inadequacy of Parks & recreational facilities:** - Open spaces&recreational facilitiesin the town are quite inadequate.

- **Water bodies :-**Nearly 3% of the town area is covered with water bodies. However, these water bodies are not put to optimum use for the benefit of the town, say as navigable water ways,as recreational areas or as water fronts to enhance the quality of urban life .
- **Economic potential: -**The town do not have strong economic base. Many of the small industrial units are getting deteriorated. Medium and large scale industries are yet to come to this town or even in the Paravur taluk.Quality infrastructure required for promoting tourism sector are not available at present in North Paravur.
- **Traffic and Transportation: -** Road is the only mode of transportation in the town. The main problem in this sector is traffic congestion and bottle neck in roads due to inadequate width of roads. Organised parking spacesarenot available in municipal area. Pedestrian facilities are rather poor.
- **Heritage and conservation:** - Lack of development guidelines for heritage areas and its conservation.

CHAPTER – 2

DEVELOPMENT CONCEPT

CHAPTER-2

Development Concept

2.1 Development Vision and Mission

The development Vision for North Paravur Town has been framed on the basis of the discussions held with various stakeholders, professionals, elected members and officials of the Muncipality, professionals from the Town and Country Planning Department, detailed study and analysis made on the existing and historical growth and development of the town etc. The frame for development vision is as shown in figure 2.1.



Figure 2-1: Development vision for North Paravur Town

2.1.1 Vision

The Vision is to ensure planned development of North Paravur into livable, economically vibrant and productive, sustainable and efficient entities with provision of

adequate durable public infrastructure and amenities such as drinking water supply, sanitation, roads, drainage, solid waste management, transportation, public parks, recreation areas including preservation of water bodies and heritage sites, and affordable housing for all sections of society.

2.1.2 Mission

The missions to achieve the vision will include the following;

- Generate higher service facilities for attracting various developmental activities, investors and industrial
- Improve the transport network system
- Provide decent housing for all sections of people living in the town
- Manage the natural and human resources for followed development.
- Frame development policies and development proposals for eradicating bottlenecks for future development.
- Provide high levels of physical and social infrastructure ensuring safe drinking water, improved sanitation, health, recreation and cultural facilities.
- Enable achievement of an overall hygienic environment
- Transform the town to a hub of tourism through preserving and promoting the rich heritage, natural resources with high standard facilities and convenience
- Design an effective development control mechanism with a high value of public serviceability.

2.2 Development Goals

The development goals of the North Paravur town are formulated based on the findings and conclusions derived from the various sectoral analysis, local level analysis and spatial analysis. The following are the major goals:

1. Master Plan should be within the frame work of policy for the development of Kochi City Region.

2. North Paravur as a sustainable residential town ensuring, basic amenities to all the inhabitants of the municipality.

3. Promote and provide quality services and facilities which focus on the needs of the community;

4. Protect, enhance and promote our natural, Heritage and cultural environment

5. Enhance economic base of municipality.

6. Plan for open space areas in consideration of opportunities

2.3 Development Objectives

1. Develop North Paravur municipality with higher order infrastructure facilities and job opportunities in order to arrest the floating population towards Kochi.
2. Develop North Paravur with higher order facilities in order to serve the nearby local bodies also.
3. Enhance the economic base of the municipality by promoting industries and tourism sector.
4. Develop a proper transportation plan by integrating local road network to the regional network.
5. Ensure availability of basic housing infrastructure to all the inhabitants
6. Conserve the heritage buildings, water bodies and other environmentally sensitive areas of the town.
7. Ensure distribution of open space and recreation settings matches the current and future population characteristics;
8. Promote home stead cultivation and cultivation in the dry agricultural areas
9. Develop viable options for disposal of solid waste and sewerage.
10. Design an effective development control regulations

2.4 Development Concept

2.4.1 Introduction

Evolving development concept of the town is essential for determining the direction of development of the town. It has to be evolved considering the development goals and objectives of the Plan, formulated based on the problems and potentials for the

development of the town. Development objectives when spatially located, taking into account the existing spatial structure, provides the development concept of the Plan. Major governing factors like regional setting including connectivity, physical/environmental aspects, economic aspects etc are considered in this respect. The development concept will clearly indicate how the plan area will develop in future and also will give an overall idea of the location of determinant development proposals.

2.4.2 Concept on Development of the Town

The Development Concept evolved for the town considering various determinant aspects is: ***'North Paravur Town shall be planned as a self-contained residential town with a healthy, vibrant residential environment that provides amenities, sense of place and security to the residents meanwhile strengthening its economic base through promoting tourism and small scale industrial sectors and equipping to serve a wider service region with complementary commercial, recreational and institutional activities.'***

The evolution of development concept is described hereunder:

2.4.2.1 Concept of Development of SUR

North Paravur Municipality is part of the Kochi Urban Agglomeration, which as per the State Urbanization Report of Kerala,is the first order urban centre of the state. As per the future urban profiles of the State delineated in the State Urbanization Report (SUR) for 2021 North Paravur forms part of the delineated urban cluster of Kochi. Also, as per the delineated urban profile for 2031,North Paravur forms part of the delineated urban corridor of 'Alappuzha-Ernakulam, Thrissur-Palakkad'. It is thus evident that the town is part of thriving urban development corridor of the state.

2.4.2.2 Concept of Development of Major Urban Centres in Kochi Region as per DUR and Master Plan for Kochi Region

Kochi is the fastest growing region in the State. The influence of the developments in the city of Kochi and the immediate surroundings is experienced in a wider region around, extending even beyond the District boundary. Studies on the developments that have taken place in the above wider region around Kochi, during the last two decades, show that the influence region around the city (depending on the activities in the area which have

immediate dependence on the city and the activities that directly affect the development of the city and the area around) extends up to the towns of North Paravur and Kodungallur in the north, Angamali town (transcending the towns of Kalamassery and Aluva) in the north-east, Muvattupuzha town (including Kothamangalam town situated close to Muvattupuzha) in the east and Cherthala town, in Alappuzha district, in the south. Major towns around Kochi City are shown in figure 2.2.



Figure 2-2: Major Urban Centres around Kochi Region

One of the broad development concepts of the region around Kochi city is that major urban centres in the district other than Kochi city shall be given impetus for development to arrest the influx of floating population to Kochi city and also to provide opportunities for the other towns in the region to develop. This points to the need for stimulating the growth of

'Higher order ' urban settlements around the city to provide the much needed facilities and better job opportunities to reduce the stress of the floating population within the city.

In the urbanization study for Ernakulam district, North Paravur has the status of higher order urban settlement. The Higher order settlements of the region are to be strengthened by promoting higher order facilities and services to enhance the job opportunities in that settlement and thereby reduce the influx of floating population to Kochi. Figure2.3 shows the higher order settlements in Ernakulam district.

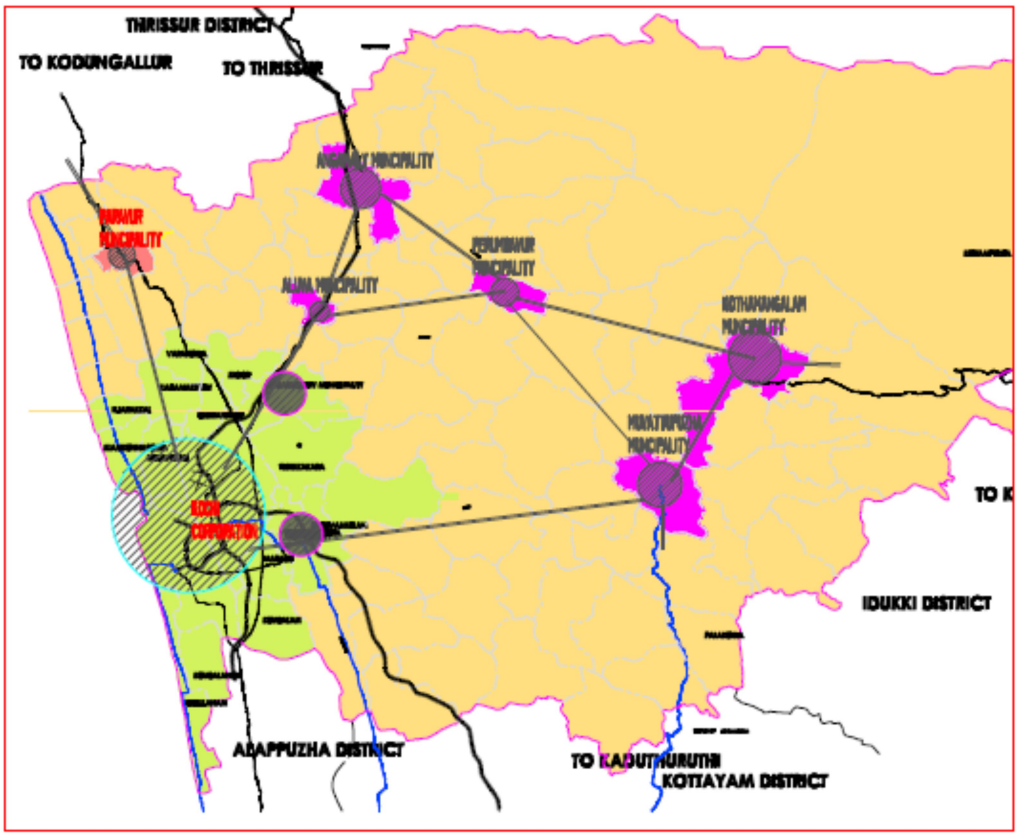


Figure 2-3: Higher Order Settlements in Ernakulam District

2.4.2.3 The spatial structure of the town

The spatial structure of the has to be evolved first for formulation of the concept plan. The spatial structure is decided by the geography of the area, the existing spatial distribution of activity, spatial distribution of population ,network of roads and spatial distribution of environmentally sensitive areas.

a) Geographical aspects

The development activities in an area are decided by the geography of the area. The slope of the area is an indicator of the geography of the area. A slope between 0^0 and 15^0 is

suitable for human settlements, between 15^0 and 30^0 is suitable for agriculture activities and between 30^0 and 50^0 is suitable for horticultural activity. Above 50^0 is forest land.

North Paravur is situated in the lowland region of the District near the coast. The average elevation of the Municipality is 10 metres. The slope varies from 0° to 15°. It is suitable for human settlement and other development activities. Hence the slope of the area is suitable for normal urban development activity and semi urban activity. The topographical map of North Paravur is shown in figure 2.4.



Figure 2-4: Topography of North Paravur

b) Spatial distribution of activities

In North Paravur four types of activity areas are seen namely agricultural mixed residential, public – semi public mixed commercial, public – semipublic mixed residential and purely residential activity areas. It is determined from the concentration indices of different land use in a particular ward. The pucca residential areas and agriculture mixed residential areas are spatially separated from intensive mixed use areas. The commercial activities are concentrated in the town centre and along the major travel corridors of the town ie NH 66, Cherai beach road & Aluva – Paravur road . Even though the settlements are there in all part of the town, more concentration is there in the area around the central core of Commercial and Public activities. The spatial distribution of activities of the town is shown in figure 2.5.

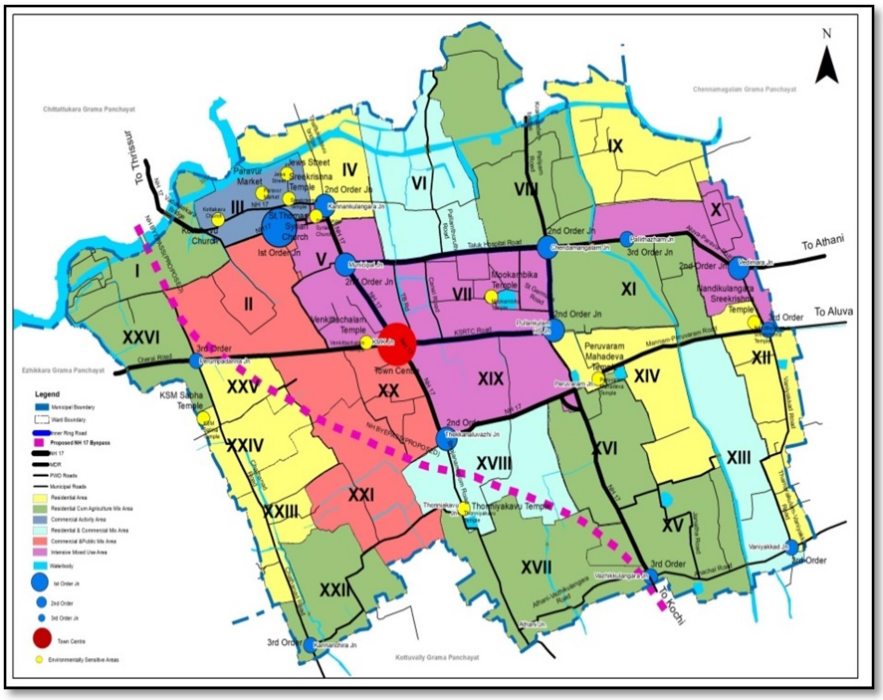


Figure 2-5: Spatial distribution of activities

c) Environmental sensitive areas

In North Paravur, water bodies , Dry cultivation (Active) areas, the ancient temples& churches etc. identified as heritage sites are the environmentally sensitive areas. The environmentally sensitive areas and heritage sites in North Paravur are shown in figure 2.6.

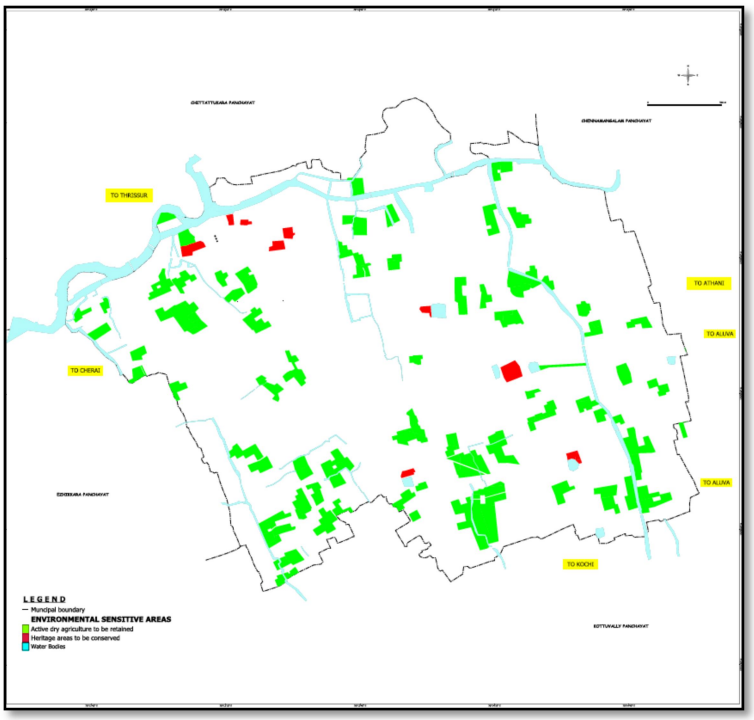


Figure 2-6: Environmentally sensitive areas

d) Spatial distribution of population

The population of North Paravur as per 2001 census is 30059. The population is concentrated on the eastern part of the town. The spatial distribution of population is shown in figure 2.7. The wards in these area occupies about 1/3rd of the town population.

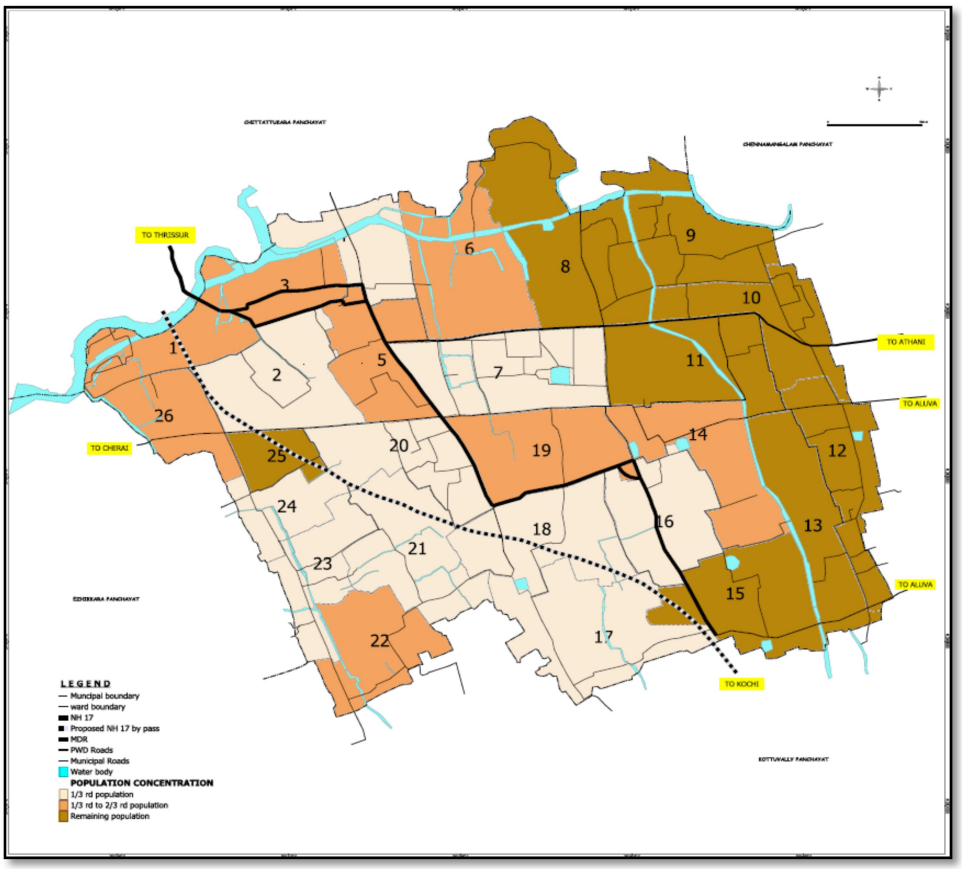


Figure 2-7: Spatial distribution of population

e) Proposed Major Road Network

The proposed developments and distribution of population are decisive criteria for the proposed road network of an area. The proposed road network for North Paravur consists of road widening and an inner ring road. The proposed NH 66 bye pass shall contribute in the future development of the town. It is shown in figure 2.8.

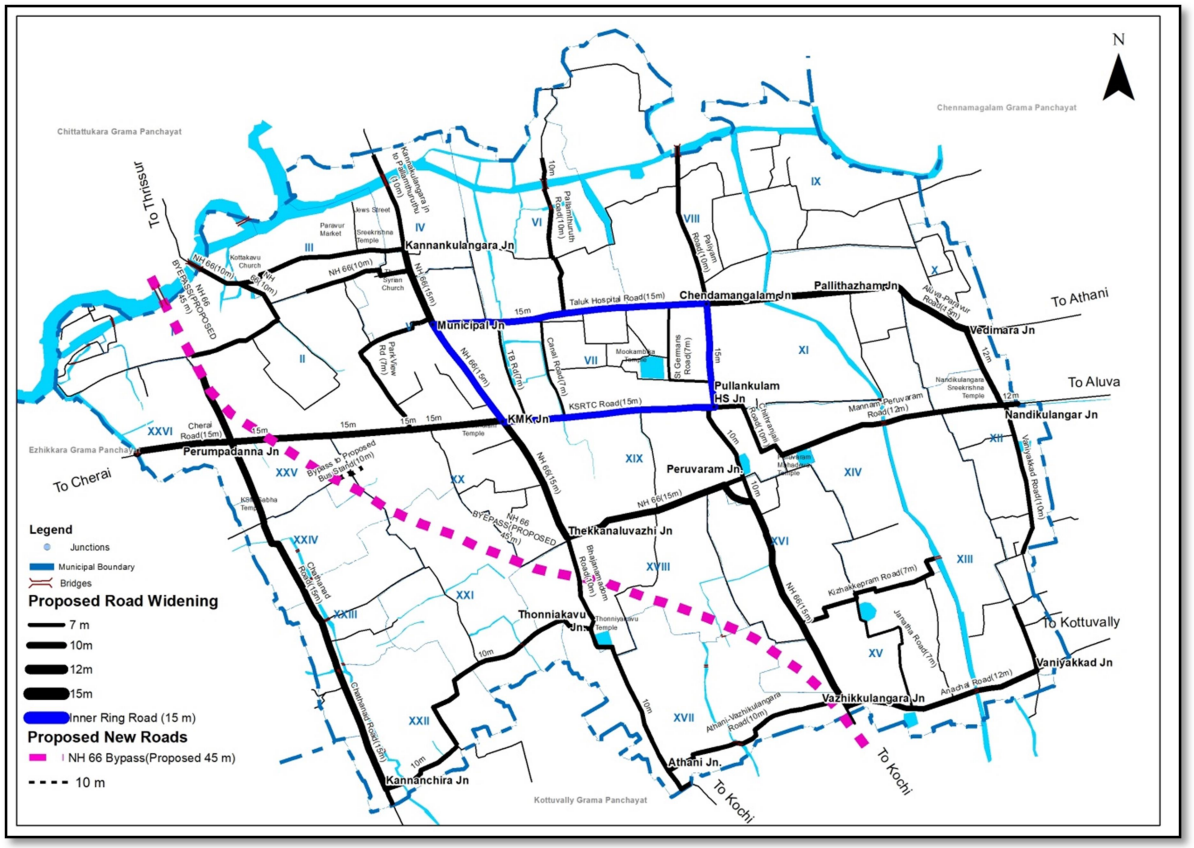


Figure 2-8: Proposed major road network

The spatial structure for the town is evolved by integrating all the factors and is shown in figure 2.9. The town area is suitable human settlement as the town has about 15^0 slope.

While considering the spatial distribution of existing developments, intensive mixed use activities are more concentrated in the center of the town and mixed uses of residential cum public and public cum commercial are seen by the sides of major roads passing through the town. The agriculture areas includes only dry cultivation, the areas having intensive cultivation are to be retained for dry agriculture activities. The environmentally sensitive areas which mainly consist of water bodies, active dry cultivation land of larger parcels and Muzris heritage sites are to be conserved. Adequate park, recreational & open spaces are to be proposed to provide the lung space for the town. The adequate projects are to be proposed as a part of providing the infrastructural facilities and to enhance the economic activities, as developable land is available in the town as per the spatial structure of the town. The spatial structure is shown in fig. 2.10

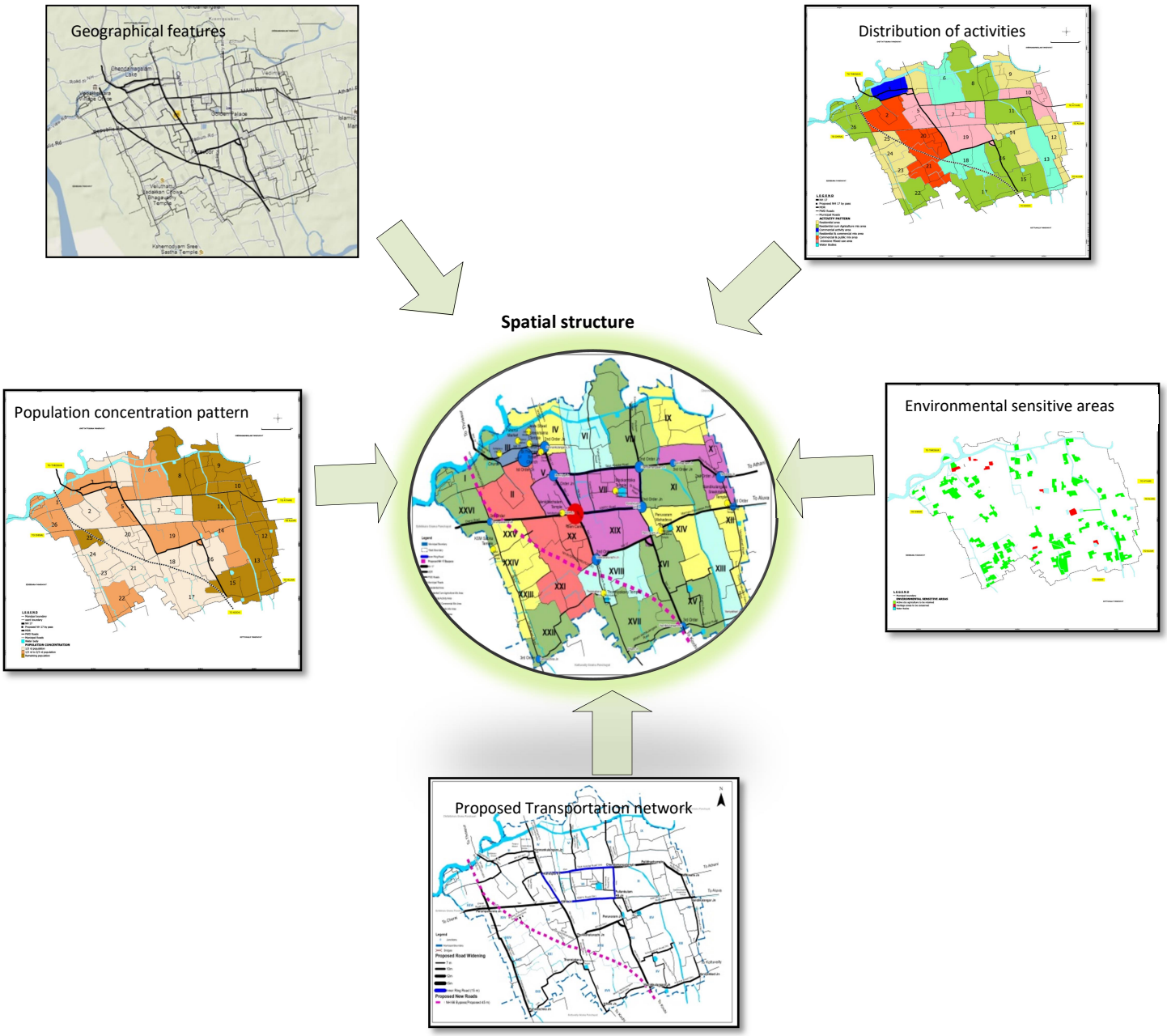


Figure 2-9: The evolution of spatial structure of the North Paravur town

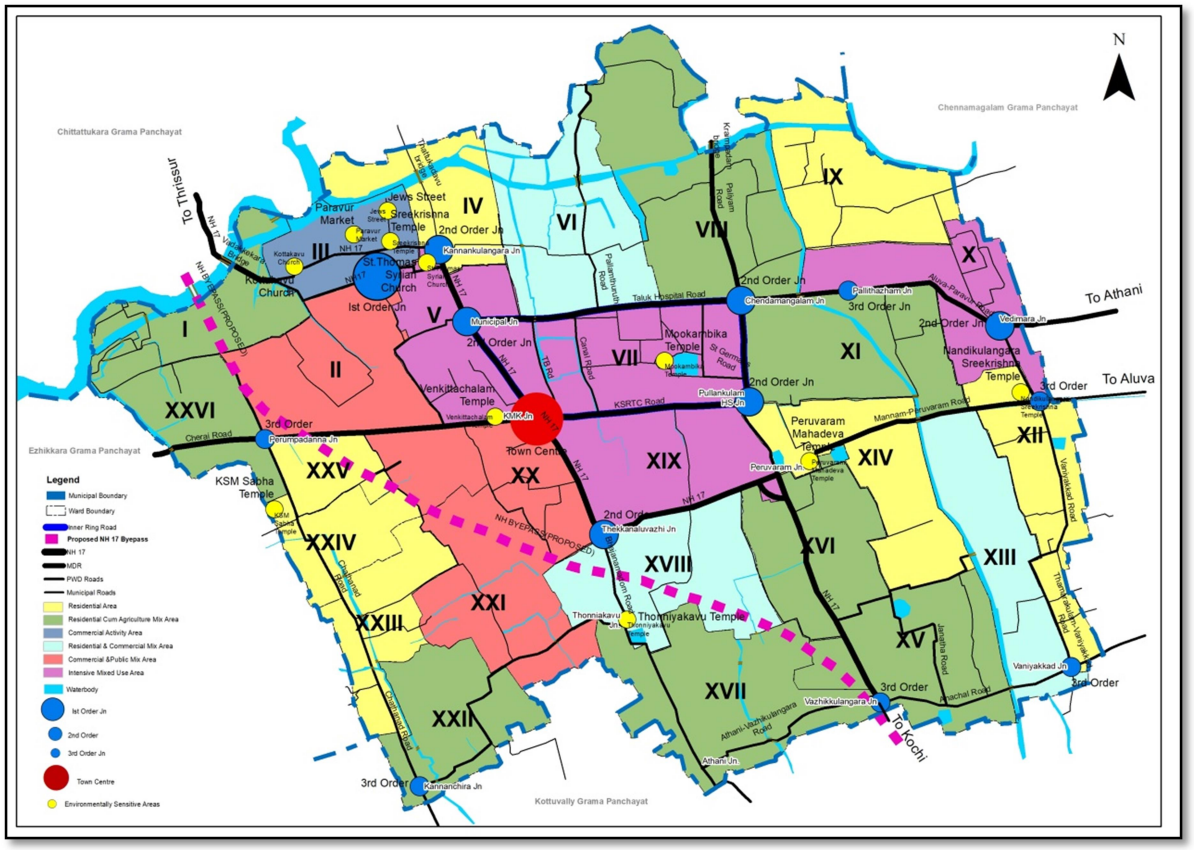


Figure 2-10: The spatial structure of the North Paravur town

Along with the spatial structure of the town, those factors influencing the development of the town have considered for the formulation of development concept.

2.4.2.4 Concept on town center

Create a town centre which will be a strong central focus for the entire town. Central area of North Paravur town shall be treated as a special area. Compact development in Town centre with commercial and administrative activities as a focal point. Concept on town center is shown in figure 2.11.

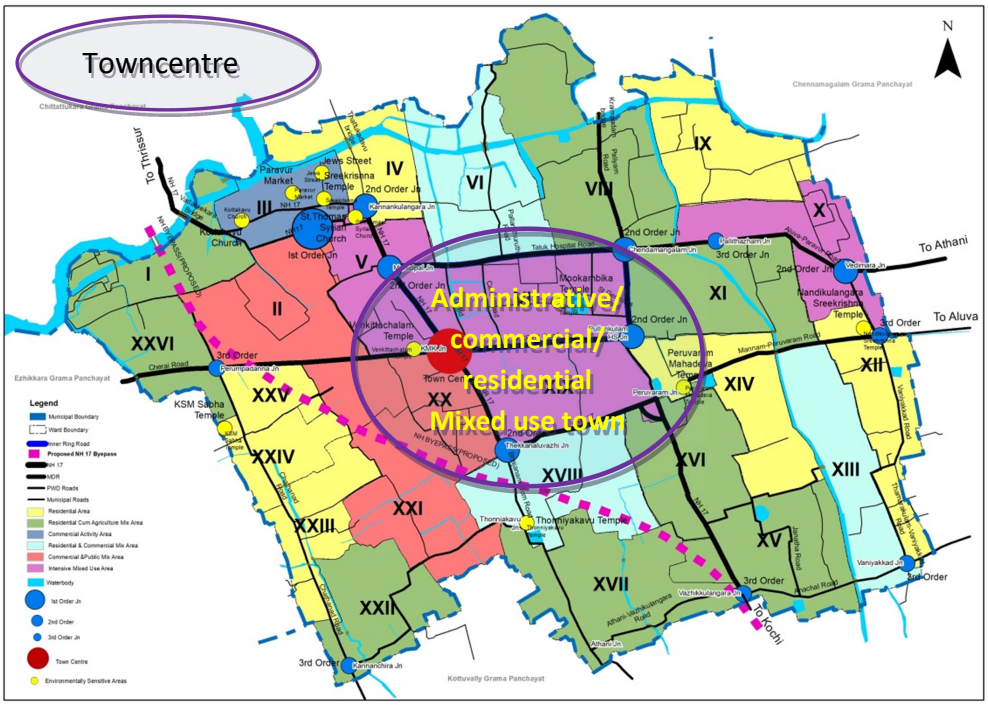


Figure 2-11: Concept on Town Centre

2.4.2.5 Concept on Sustainable Residential Activity

Provision of mixed use residential in town centre and predominant residential areas outside the town centre. Concept on sustainable residential activity is shown in figure 2.12.

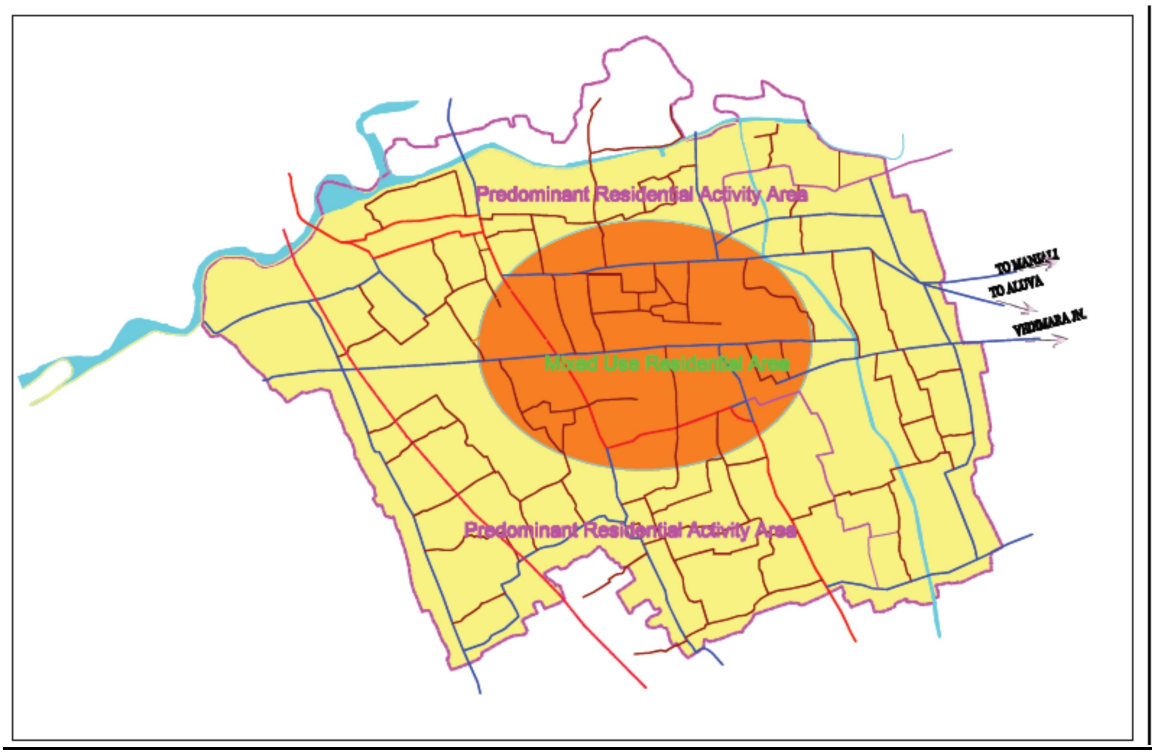


Figure 2-12 : Concept on Sustainable Residential Activity

2.4.2.6 Concept on Future Economic Development

The major economic activities in the town are tertiary comprising of trade and commerce laborers. Considering the potential of high literacy rate & high percentage of working age population, diversification of economic base in the town in terms of small scale industrial activities can be suggested. Concept on future economic development is shown in figure 2.13.

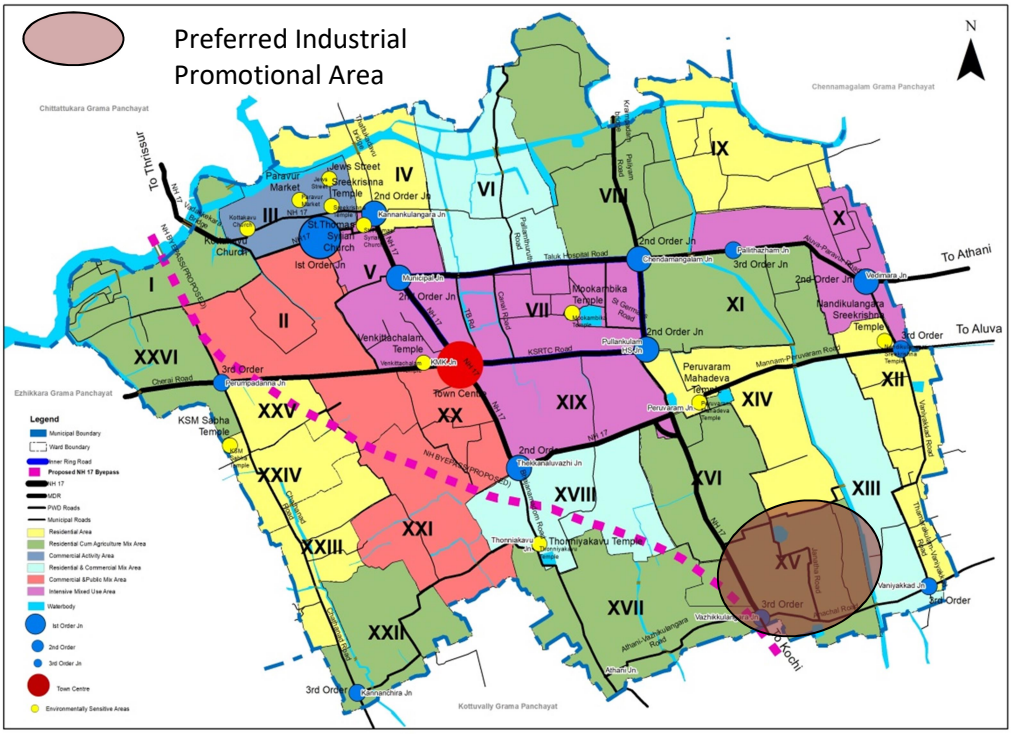


Figure 2-13 : Future Economic Development

2.4.2.7 Concept on Heritage and Tourism Development

Analysis of tourism sector reveals that the historic buildings and monuments within Muziris Heritage sites and water bodies in the North Paravur are highly potential .As a part of circuit -towns for visitors, the Paravur circuit covers the Paravur market, the Jewish street with Synagogue, Mookambika temple, Residence of Kesari Balakrishna Pillai, Residence of P.Kesava Dev, St.Thomas Kottakkavu Ferrona church and the Kannankulangara temple along with the St.Thomas Syrian Jacobite church are considered as the future tourism centres in the town . Development of tourism infrastructure and conservation of built heritage resources will be a priority area. Concept on heritage and tourism development is shown in figure 2.14.

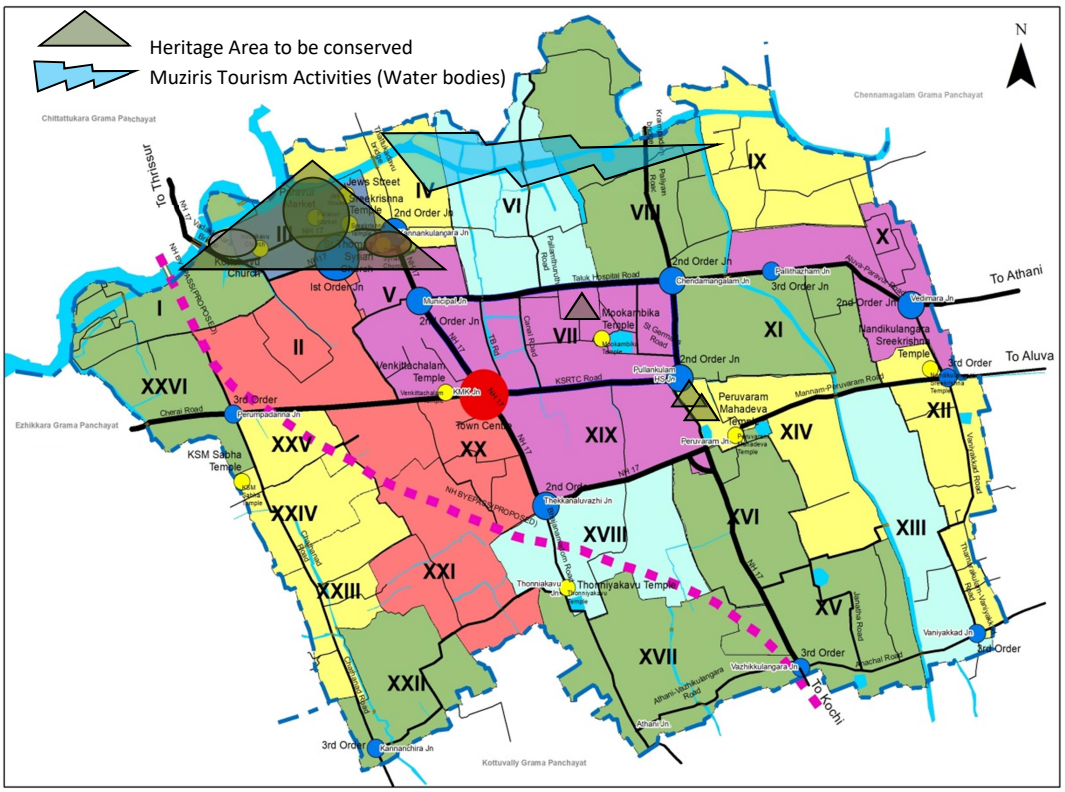


Figure 2-14 : Heritage and Tourism Development

2.4.2.8 Concept on Open Spaces, Parks and Recreational activities

Recreation is an integral part of human life and it finds in many different forms. Public places such as parks & recreational spaces are essential ventures for many recreational activities. From the concept of creating a diversity of recreation experiences, rather than just provide standard recreational facilities. Planning standards in this regard help to 'benchmark' or quantify current practice against future plans. Those being , new mini parks, multi functional indoor stadium, oper air stadium , active sporting/recreational open space and facilities, natural areas, ancillary open space and improving and expand the current recreational facilities in order to meet the needs of residents and visitors in the best way possible. Concept on open spaces, parks and recreational activities is shown in figure 2.15.

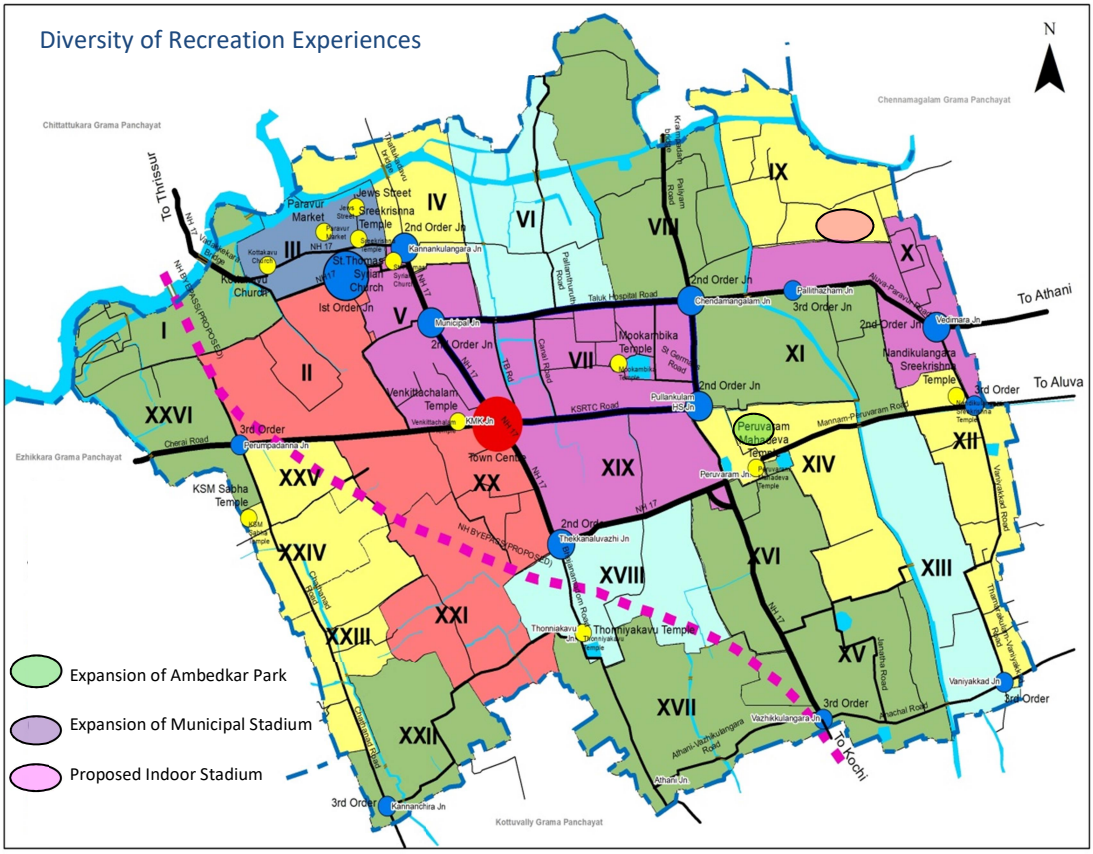


Figure 2-15: Open Space, Park and Recreational Activities

2.4.2.9 Concept on Environment & heritage conservation

Environmentally sensitive areas in the town includes water bodies, ponds, large parcels of active dry agricultural land , which are to be conserved and the future activities in these areas are to be regulated by law and regulations in order to minimise the environmental impact.

New construction activities in heritage precincts are to be implemented in consideration with the existing heritage building and alterations to heritage buildings shall be restricted, with due regard to conservation practices. Sustainable heritage tourism shall be promoted as a part of Muziris heritage project. The sustenance of heritage tourism lies in conservation of heritage, whether man made or natural. Concept on environment & heritage conservation is shown in figure 2.16.

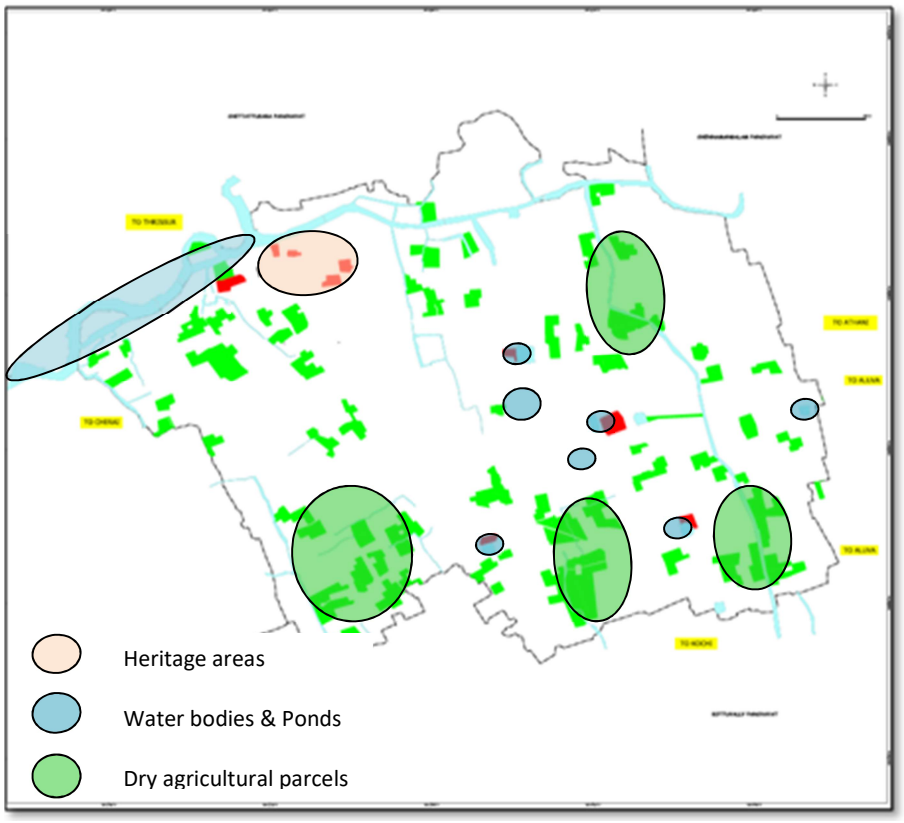


Figure 2-16: Environment & Heritage Conservation

2.4.2.10 Concept on Traffic & Transportation

North Paravur has an excellent road network of grid iron pattern, which connects it to the nearby towns and cities. The road network available in the study area is more of grid pattern. The National Highway-17 starts from Edappally and passes through the town to Kodungallore and divides the town in to two halves.

On the basis of ongoing and proposed development schemes and the projected volume of traffic, an alternative road development plan has been formulated for the town. It conforms to a ring and radial road network configuration. The circulation system has been planned judiciously in such a way as to cater to the traffic demand for the horizon year. There will be an inner ring road insulating the CBD area and The other inter regional roads will be radiating from the CBD inner ring area to the periphery.

a) Inner ring road

The proposed inner ring road begins at Muncipal Town Hall Junction and proceeds along Chennamangalam, Pullankualm and joins KMK Junction on NH-17. All parts of the inner ring road already exist. However, many sections have to be widened. This inner ring road will integrate the main activity areas of the town with the existing CBD area. This ring

road would also inter-link existing major residential and activity centres within the town without causing multiple movements through the CBD area.

b) Radial roads

There are five radial roads originating from the CBD area of the town. All the radial roads will connect the inner ring road at two points.

d) Link roads

In addition to inner and the radial roads, road widening of link roads connecting the ring and radial roads for inter connectivity are also proposed. Road improvement schemes, junction improvements and terminal facilities, parking & pedestrian facilities also shall be provided & hence proposed.

Concept on traffic & transportation is shown in figure 2.17 .

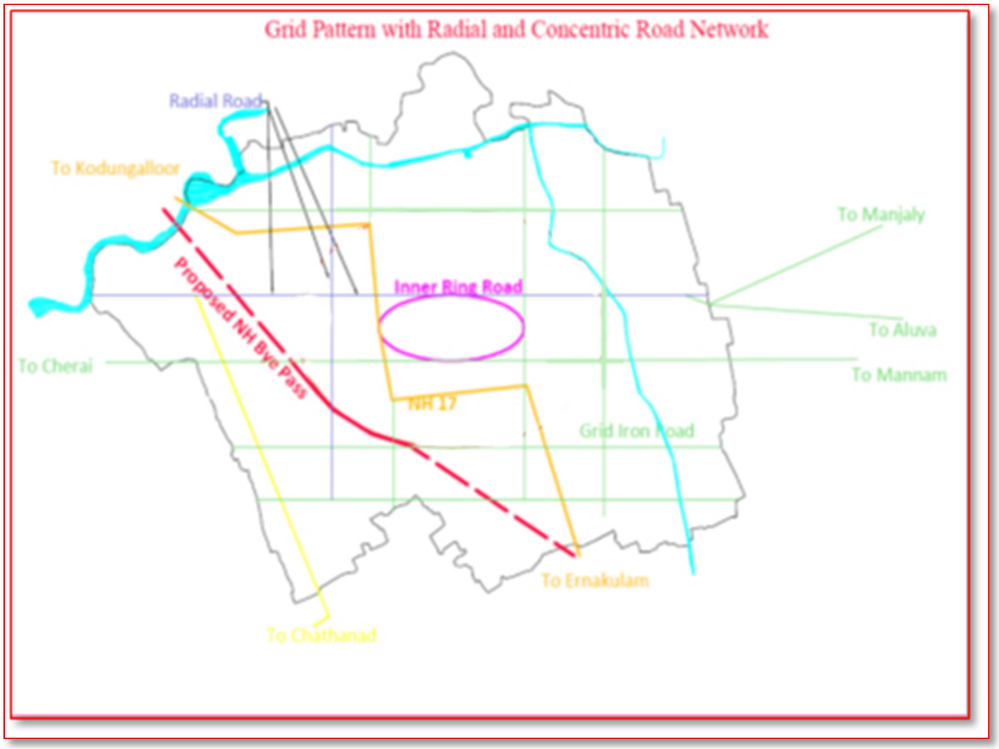


Figure 2-17: Concept on Traffic & Transportation

The development concept of North Paravur Town is formulated by physically overlying all the above concepts on the existing spatial structure as shown in figure 2.18

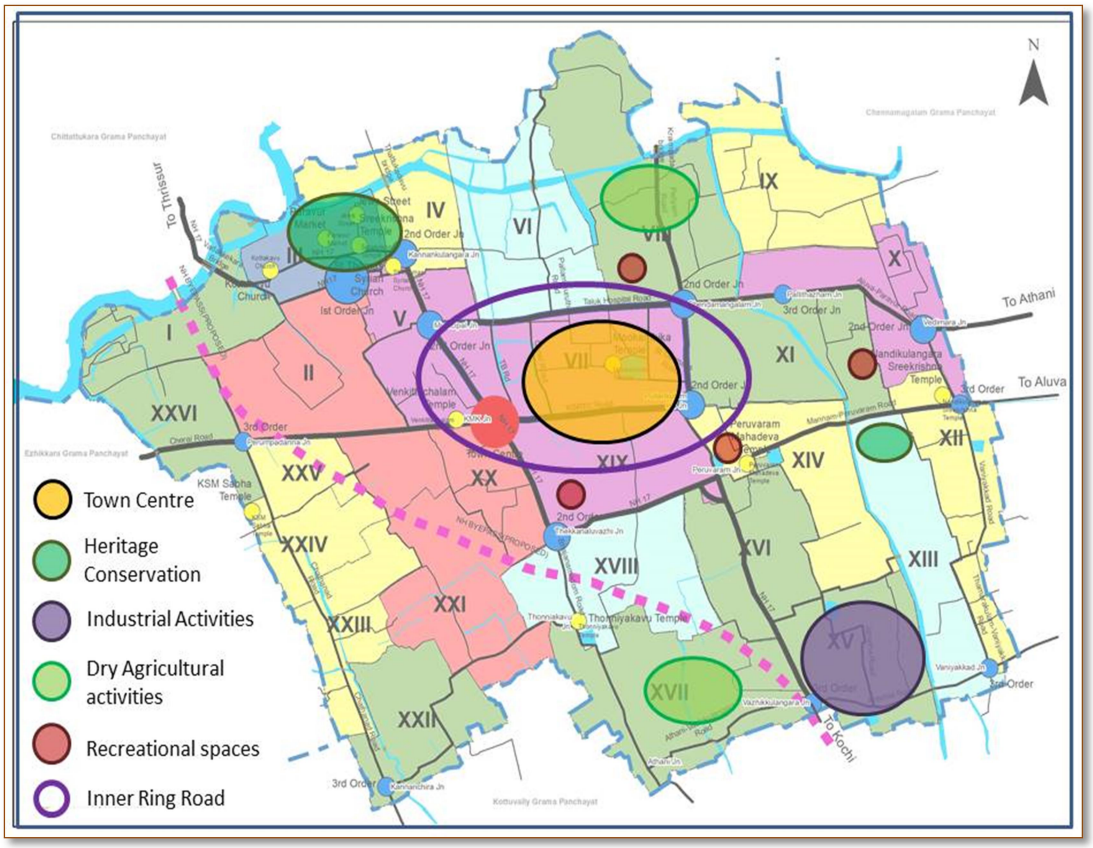


Figure 2-18: Development concept of North Paravur

North Paravur, a satellite town of Kochi is to be developed as a sustainable Residential Town, exploiting the development potential.

2.5 Development Policies and Strategies

The development policies and strategies are evolved for the implementation of the development concept formulated.

2.5.1 General Development Policy

The general policy of this Master Plan is *"a comprehensive development plan that will facilitate the growth of North Paravur the Satellite Town of Kochi."* North Paravur Town shall be planned as a self contained residential town with complementary industry, commercial, tourism, recreational and institutional development and to create a healthy, vibrant residential environment that provides amenities and security to accommodate and attract residents in to the town.

2.5.2 Sectoral Policies and Strategies

a. Strategies for industrial development

Develop and promote Medium & Small scale industrial development in the town for income generation, employment promotion and economic development with environment friendly ventures and investor friendly guidelines.

- To develop industrial base by providing sufficient infrastructure for various developments which shall be ensured through this Master Plan.
- Encourage private investments in industrial sector
- Create an effective single window clearance mechanism for speedy approval and statutory clearance to new enterprises.
- Create conducive environment for promoting new micro and small industrial units

b. Development strategy for tourism sector

The water bodies (approx. 3%) available in North Paravur Town shall be fully utilised as a part of Muziris Heritage tourism project. Environmentally safe tourism developments are envisaged in the Master Plan, with intention:

- To provide infrastructure facilities required for tourism development.
- To protect the environment and reduce river pollution.

c. Development strategy for Traffic and Transportation

- Design a hierarchical road network
- Bypassing the congested town centre by bypass and ring road
- Tourism sector, commercial centre and industrial sector, which are the future economic base of North Paravur, are to be connected by a planned network.
- Improve Parking facilities, Pedestrian facilities, Junctions etc.

d. Development strategy for Housing Sector

- Specific action plan would be prepared by municipality to meet the housing needs of the landless based on a habitat based approach. This can be integrated with Poverty Alleviation Schemes / Government projects.

- Housing programmes promoted should be cost effective and with environment friendly technologies and the concept of green building will be propagated

f. Development strategy for Health

- Facilitate the Taluk hospital in order to serve North Paravur and nearby Panchayats.
- Infrastructure improvement in Ayurveda and Homeopathy hospitals.

g. Development strategy for Education

- North Paravur town has enough number of educational institutions in the town to cater the needs of the resident population as well as of the students from the neighbouring areas. The higher education sector faces a setback. Professional education facilities and training institutes are absent in the town but are available in the near to towns / City of Kochi.

2.6 Projected Requirements

After detailed study and analysis of North Paravur municipal town, the SWOT analysis has been worked out in terms of strengths, weaknesses, opportunities and threats. Further, all issues related to different sectors have been worked out. Now it becomes important to project the future population, which would be the basis for working out the land use and infrastructure requirements.

2.6.1 Population projection

The population will have to be estimated with due regard to all factors governing future growth and development of the town in the industrial, commercial, educational, social and administration spheres. Population projections are necessary for planning different aspects like employment targets, manpower, productivity, medical/educational facilities, supply of goods and services of various types, providing inputs to agriculture and industry, financial services, distribution system, energy supply needs, housing needs, transportation facilities etc. Special factors causing sudden immigration or influx of population should also be foreseen to the extent possible. The structure and vitality of the urban economy and the employment opportunities, which the economy generates, are the means of gauging the growth potentialities of an urban area. Considering the population of town in 1971, 1981, 1991, 2001 it is assumed that the growth of population will follow the

same pattern as that in the past two decades and there will not be any sudden spurt or extraordinary growth.

2.6.1.1 Population growth by different methods

Arithmetic and Geometric projections are not considered appropriate for projecting the future population of North Paravur municipality, as a constant growth rate is not anticipated in this town. The logistic method is also not utilized, as there are no obvious special local factors, which would indicate that the population would reach a saturation limit ultimately. After examining the various populations forecast methods outcomes and examining the existing scenario of economic development, the forecast based on *incremental increase method* is perceived to be appropriate. The population of the town depends upon the growth of the district in which it is located. Hence Ratio method also has to be considered. Since the rate of increase in population goes on reducing in cities, Decreasing Rate of Growth Method is also considered for the projection of population.

(a) Incremental increase method

(b) Ratio method

(c) Decreasing Rate of Growth Method

Incremental increase method:- In this method, the per decade growth rate is not assumed to be constant as in the arithmetic or geometric progression methods; but is progressively increasing or decreasing, depending upon whether the average of the incremental increases in the past data is positive or negative.

Ratio method:- This proceeds on the assumption that the population of the town depends upon the growth of the district in which it is located. Thus, if the future population estimates of the district are available, then by examining the trend of past ratios of the town population to that of the district the required projections for the town can be made.

Decreasing Rate of Growth Method:- In this method , the average decrease in the percentage increase is worked out, and is then subtracted from the latest percentage increase for each successive decade.

On comparing the three methods, it would be better to take the future population as the average of the population by three methods shown in table 2.1

Table 2-1: Projected Populations

Year	Incremental increase method	Ratio method	Decreasing growth method	Average
2011	32077	33051	32370	**32499**
2021	34223	36702	34850	**35258**
2031	36499	41014	37511	**38341**

2.6.2 Projected work force

The estimate of prospective work force structure has been based on certain assumptions. The projected WPR is 38.8 for 2021 and this value is nearly 40 which is a fair rate of workers participation for a town. So the same rate of workers participation for 2031 is assumed and the number of workers was calculated for the assumed WPR. Table 2.2 & figure 2.19 shows Projected Work participation rate of North Paravur Town.

Table 2-2: Projected Work Force & WPR for North Paravur

No. of workers	Total population	WPR	Year
6871	26288	26.14	1981
8401	27906	30.1	1991
9369	30059	31.17	2001
11261	32564	34.58	2011
13762	35463	38.81	2021
15042	38757	38.81	2031

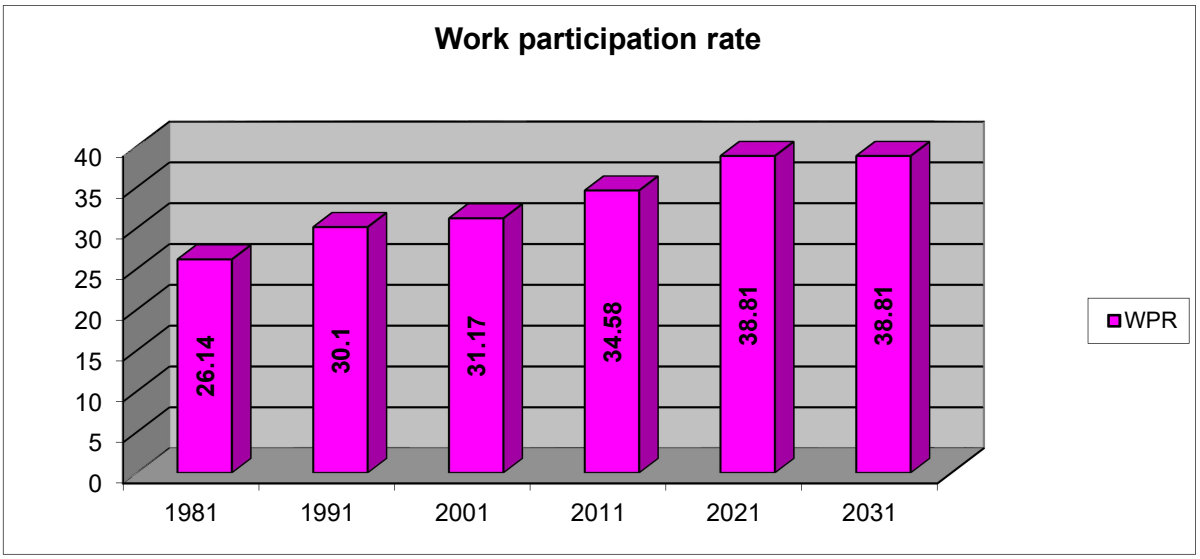


Figure 2-19: Projected work participation rate of Paravur Town

i) Primary Sector

The primary sector which constitutes mainly agriculture and horticulture is projected to engage 6.79% of total workforce by 2031 as shown in Table2.3 & Figure 2.20 .The share of work force in absolute numbers in this sector is also projected to increase marginally from 741 in 2001 to 816 in 2031 as shown in figure.

ii) Secondary Sector

The Master Plan proposes to increase the percentage of workers in Secondary sector from 2281 workers to 4480 workers by 2031 as given in Table2.3 & Figure 2.20 .There is scope for increase in this sector. There is a boom in construction sector now. We can expect considerable increase in the percentage of house hold and other industrial workers (Small scale and IT &ITES) during the plan period.

iii) Tertiary Sector

Tertiary sector will continue to play an important role in the economy of North Paravur town. The share of workers in tertiary sector was 61.82 % of the total labour force in 2001. The percentage of the workers engaged in tertiary sector mainly in Trade & commerce is expected to be 55.93% in 2031.

Table 2-3: Projected Work Force for North Paravur

Category of Workers	2011		2021		2031	
	Number	%	Number	%	Number	%
Primary workers	**720**	7.66	**771**	7.24	**816**	6.79
Secondary workers	**2878**	30.65	**3628**	34.10	**4480**	37.28
Tertiary workers	**5794**	61.69	**6240**	58.65	**6720**	55.93
Total main workers	**9391**	**100.00**	**10639**	**100.00**	**12016**	**100.00**

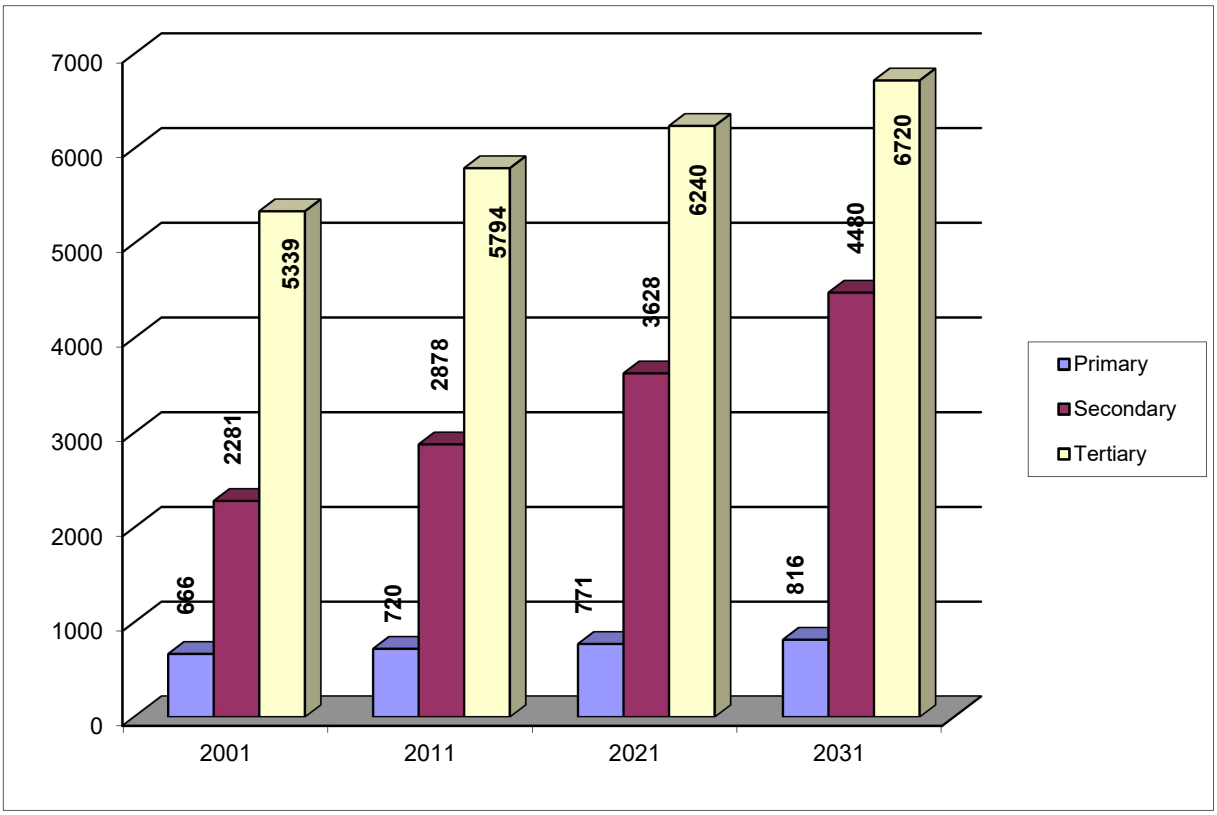


Figure 2-20: Projected work force for North Paravur

2.7 Housing Requirements

2.7.1 Demand for Housing

Housing shortage is estimated in terms of excess households over houses including houseless households, congestion, replacement/up gradation of kutcha/unserviceable kutcha houses and obsolescence/replacement of old houses.

Table 2-4: Estimation of demand for housing

Estimation of demand for housing	
Households	**6834**
Housing Stock	**6607**
Pucca	4193
Semi Pucca	2248
Kutcha	266
Excess Households over housing stock	**227**
Congestion factor (%)	0.2
Congestion in Hhs	**13.5**
Obselence in Housing Stock (2.5%)	**165**
Upgradation of Kutcha (10%)	**491**
Total Shortage	**896.5**

Source: Census of India 1981,1991, 2001

Estimates in table 2.4 show that there is a numerical shortage of 227 housing units in North Paravur. Taking in to account the dilapidated houses which need reconstruction, obscelence and congestion factor there is a shortage of 897 dwelling units.

Existing trend in new addition to housing stock reveals construction activities are decreasing per year. On an average 120 dwelling units were added per year. Considering this, additional housing shortage is 897 dwelling units. Population increased from 27906 in 1991 to 30059 in 2001. Increase in population creates additional demand for houses. In order to meet the needs of the population 615 dwelling units are to be constructed. Considering obsolescence rate of 2.5% houses to be replaced every year and congestion factor of 0.2% houses, dilapidated buildings and future requirement total housing shortage on 2011 accounts to 5599 dwelling units. Considering the recent trend 700 new units are assumed to be added to the housing units by 2011. This results in a backlog of 4899 dwelling units in 2011. Housing shortage for 2021 and 2031 considering only the increase in population and shortage for 2011 accounts to 6127 and 6812 dwelling units.

2.7.2 Requirements of Housing units in North Paravur Town

The housing requirements for 2011,2021 & 2031of the town have been calculated with the base year of 2005, as shown in table 2.5, on the basis of their respective projected populations. Average family size has been assumed to be of 4.5 persons, which is also the existing household size of the town.

Table 2-5: Requirement of housing units

Year (person)	Projected Population 2031	No. of Houses Required
2011	32499	5599
2021	35258	6127
2031	38341	6812

2.8 Physical Infrastructure Requirements

2.8.1 Water Supply

2.8.1.1 Quantity of urban water supply

The estimated water demand for a town or city is broadly classified as domestic and non-domestic. The domestic water demand includes per capita consumption and system losses, while non domestic water demand includes industrial and commercial consumption, institutional consumption and fire fighting demand. The domestic water requirement up to the year 2031 for North Paravur town have been calculated by taking the desirable norm of 135 LPCD for medium town as given in URDPFI guidelines. As per CPHEEO (Central Public Health and Environmental Engineering Organisation) norms, the domestic water requirement is 135 LPCD. Future domestic water demand and requirements have been calculated as 135 LPCD, based on existing scenario along with standards assigned as per URDPFI & CPHEEO norms.

Considering the non domestic demand, the quantity of water is taken as 20% of the domestic demand. An additional 1% is taken for fire demand and 15% uncounted water losses shall be made as per CPHEEO norms.

Design period: For water supply project, a thirty years design period is assumed. The population forecast for this period is derived taking into consideration the potential of various sectors of urban economy and regional physical and economic linkages.

Per capita rate of water supply: As a general rule, the following per capita rates are recommended as the minimum for design of public water supply in India.

(a) For design population upto 10000: 70-100 litres per day

(b) For the design population 10000 to 50000; 100-125 litres per day

(c) For design population above 50000; 125-200 litres per day

2.8.1.2 Demand of water: A general standard of 200 lpcd (including drinking and non-drinking purpose) is found acceptable for urban areas and 150 lpcd for rural areas. Considering all the factors, in North Paravur municipal area the requirement of water per persons per day is taken as 200 lpcd. Accordingly, the demand comes out to be 7.2 MLD for 2021 and 8 MLD for 2031, thus indicating a shortage of 4.2 MLD and 5 MLD respectively. The table 2.6 shows the projections and requirements of Water Supply in North Paravur town.

Table 2-6: Projections and Requirements for water Supply in North Paravur Muncipality.

	Existing/ desired level			Service Levels, Demand and Gaps					
	Indicator	Current level	Desired level	Unit	Existing (2011)	By Year 2021		By Year 2031	
						Demand	Gap	Demand	Gap
Daily Supply	Per-capita supply (lpcd)	95	200	MLD	3	6.6	3.6	7.2	2.4
Distribution Network	Distribution Network Length against road length (%)	85%	100%	Kms.	102	120	18	Nil	Nil
Elevated Storage capacity	Elevated Storage capacity w.r.to Supply (%)	20%	100%	MLD	1.5	8	6.5	Nil	Nil

Source: KWA

b) Water treatment: There is no water treatment plant in the town. The nearby available treatment plant is at Chowra in Kalady panchayath having 60MLD capacity.

a. **Distribution network:** While comparing the existing length of water supply lines with that of the road length, the network complies with the desired standards i.e.85% in comparison to the existing level of 100%.

b. **Elevated storage capacity:** The demand in case of overhead water tanks are of 8 MLD for 2031, whereas current level is 1.5 MLD.

2.8.2 Sewerage

At present there is no sewerage system and Sewage Treatment Plant (STP) in the town. By 2031, 6.4 MLD of sewerage water has to be treated and this is calculated as 80% of the water supply as per CPHEEO norms.

2.8.3 Solid waste treatment

Waste generation: At present approximately 6.5 metric tonnes waste is generated in the town per day. By 2031 it is expected to increase 12 metric tonnes for the population of approx. 40000, taking a standard of 300 gms./capita/day of solid waste generation for a medium town like North Paravur Town.

a) **Collection performance:** Existing collection performance is only 80% against desired collection efficiency of 100%.

b) **Waste transportation and disposal:** Number of vehicles required for transportation shall be 10 in 2031. The existing area for landfill site is 2 acres and is proposed to be retained for segregation unit and plastic shredding unit, since the waste collected is shifted to the Waste power plant in Kochi Corporation. Hence no additional area is required. Also waste disposal at source is being encouraged in the town.

2.8.4 Traffic and Transportation

2.8.4.1 Projected link volume on existing network

Table 2.7 shows the estimated daily traffic for the horizon year 2030 on various road stretches in North Paravur town. Volume-capacity ratio for the horizon year is also given in this table. It can be seen that all the major road corridors in North Paravur town would be severely congested in the horizon year as the anticipated traffic is more than the capacity of the roads under "do-nothing option". The capacity utilization of major corridors like NH 66,

PWD road from Paravur to Vedimara Junction has far exceeded their carrying capacity in the base year itself. The section of NH 66 between SK temple Junction to KMK Junction will be the worse affected section in the horizon years.

The projected traffic on the existing road network within the town area implies that the existing road network would not be able to handle the traffic in the horizon years without upgradation of the transport infrastructure facilities. Augmentation of the capacity of the existing road network by strengthening/widening and the construction of missing links, bypasses and link roads which is a must considering the dramatic increase in the traffic volume.

Table 2-7 : Volume - capacity ratio on major road links within North Paravur study area

Sl. No	Location Selected		2010			2015		2020	2030		
			Capacity (PCU/ day)	Volume (PCU/ day)	Volume-capacity ratio	Volume (PCU/ day)	Volume-capacity ratio	Volume (PCU/ day)	Volume-capacity ratio	Volume (PCU/ day)	Volume-capacity ratio
	Kodungallore – Ernakulam Road (NH 66)										
1	Vadakkekara Bridge (Municipal Limit)	Sri Krishna Temple Junction(paravur)	24000	10058	0.42	12837	0.53	16384	0.68	13467	0.56
2	Vadakkekara Bridge (Municipal Limit)	Sri Krishna Temple Junction kodungalloor)	24000	15490	0.65	19770	0.82	25232	1.05	20739	0.86
3	Sri Krishna Temple Junction	Municipal Office Junction	15000	27622	1.84	35253	2.35	44993	3.00	36981	2.47
4	Municipal Office Junction	KMK Junction	15000	26254	1.75	33507	2.23	42764	2.85	35149	2.34
5	KMK Junction	Thekke Naluvazhi Junction	15000	21121	1.41	26956	1.80	34404	2.29	28277	1.89
6	Thekke Naluvazhi Junction	Peruvaram Junction	15000	16645	1.11	21244	1.42	27113	1.81	22285	1.49
7	Peruvaram Junction	Vazhikulangara Junction	15000	16645	1.11	21244	1.42	27113	1.81	22285	1.49
	Aluva – Paravur Road(PWD)										
8	Vedimara Junction	Chennamangalam Junction	12000	7184	0.60	8740	0.73	10634	0.89	12327	1.03
9	Chennamangalam Junction	Municipal Office Junction	12000	9990	0.83	12154	1.01	14788	1.23	17143	1.43
	Chennamangalam - Peruvaram Road										

10	Chennamangalam Bridge	Chennamangalam Junction	12000	8694	0.72	10578	0.88	12870	1.07	14920	1.24
11	Chennamangalam Junction	Pullankulam Junction	12000	6960	0.58	8467	0.71	10302	0.86	11943	1.00
12	Pullankulam Junction	Peruvaram Junction	12000	8832	0.74	10746	0.90	13074	1.09	15156	1.26
	Fire Station Road										
13	Chennamangalam Junction	Vedimara Junction	12000	2904	0.24	3534	0.29	4299	0.36	4984	0.42
	Vaniyakkad Road										
14	Vedimara Junction	Nanthikulangara Junction	9000	3765	0.42	4365	0.48	5060	0.56	5586	0.62
15	Nanthikulangara Junction	Vaniyakkad Junction	9000	2578	0.29	2989	0.33	3465	0.38	3825	0.43
	Thathampilly - Paravur Road (Vaniyakkad Bypass)										
16	Vaniyakkad Junction	Vazhikulangara Junction	9000	3372	0.37	3910	0.43	4532	0.50	5004	0.56
	Mannam – Peruvaram Road										
17	Nanthi Kulangara Junction	Pashnithodu Bridge	9000	863	0.10	1001	0.11	1160	0.13	1281	0.14
18	Pashnithodu Bridge	Peruvaram Junction	9000	1488	0.17	1725	0.19	1999	0.22	2207	0.25
	KSRTC Road										
19	Pullankulam Junction	KMK Junction	12000	4893	0.41	5953	0.50	7243	0.60	8397	0.70
	Cherai Beach Road										
20	KMK Junction	Perumpadana Junction	12000	9903	0.83	12049	1.00	14659	1.22	16994	1.42

21	Perumpadana Junction	Cherai Beach Road Bridge	9000	4011	0.45	4650	0.52	5390	0.60	5951	0.66
	Chakkarapoovu Road										
22	Perumpadana Junction	Kedamangalam Junction	9000	4011	0.45	4650	0.52	5390	0.60	5951	0.66
	Ezhikkara - Paravur Road										
23	Kedamangalam Junction	Thoniyakavu Junction	9000	2784	0.31	3228	0.36	3742	0.42	4132	0.46
	Paravur - Kottuvally Road										
24	Thekke Naluvazhi Junction	Thoniyakavu Junction	9000	4952	0.55	5741	0.64	6655	0.74	7348	0.82
25	Thoniyakavu Junction	Athani Junction	9000	3102	0.34	3596	0.40	4168	0.46	4602	0.51

Source : NATPAC Study Report (2010) for North Paravur town

2.8.5 Energy

As per URDPFI norms, the recommended consumption is 1000 units per Capita per year or 2.74 kWh per capita per day demand. For the future population in 2031, with average household size of 4.5 the consumption of power worked out to be 18000 KW. Table 2.8 shows the projected requirement of consumption of power.

Table 2-8 : Projected Requirement of Consumption of Power

category	Existing Nos	Standards Recommended	Demand for 2031
11 KV	One substation with 66/11KV, 6 11 KV feeders	1 for 15000 population	Nil
LPG Godown	One with 500 cylinders or 8000 Kg capacity	1 for 40000 to 50000 population	Nil
Petrol pumps	Four	1/150 Ha of gross residential and 1/40 Ha of industrial area	1 No.

2.9 Social Infrastructure Requirements

2.9.1 Educational Facilities

Three Vocational Higher secondary schools are required for municipal area till 2031 will be of. This shall be well distributed in the town and shall be placed at strategic locations in the municipal limit. At higher level, there is a requirement of one Arts & Science College, one professional college and training institutes in municipal area. The details of projected requirement of educational facilities are shown in table 2.9.

Table 2-9 : Projected Requirement of Educational Facility

Details	Existing Numbers	URDPFI Standards recommends per population	Demand for 2031	Gap
LP school	9	1/4000 population	8	Nil
UP school	21	1/7500 population	6	Nil
High school	10	1/15000 population	3	Nil
HSS	7	1/15000 population	3	Nil
VHSS	0	1/15000 population	3	3
Arts & science college	0	1/30000 population	1	1
Polytechnic	0	1/30000 population	1	1
I T I/I T C	1	1/30000 population	1	1
T T I	0	1/30000 population	1	1
Professional college	0	1/50000 population	1	Available at nearby area

2.9.2 Health Care Facilities

Table 2.10 shows the projected requirement of health care facility of North Paravur town.

Table 2-10: Projected Requirement of Health Care Facility

Details	Existing Numbers	URDPFI Standards recommends per population	Demand for 2031	Gap
PHC	0	1/45000-100000	2	2
Taluk Head quarter hospital	1- Allopathy 1- Ayurveda 1- Homeo	1 in Taluk	0	

As per standards the municipality lacks two Primary Health Centres. But taluk hospital is functioning in the heart of the town which is easily accessible for people. So there is no further requirement of PHC's. Moreover other health facilities in the town level are satisfactory.

CHAPTER – 3

LAND USE AND SECTORAL PROPOSALS

CHAPTER-3

Land Use and Sectoral Proposals

The proposed land use plan represents a blue print for future growth and reflects both existing pattern of land uses as well as the desired use of land. It also represents the future demand of land based upon past trends and projections. The proposed land use plan for North Paravur Municipality has been prepared, based on the study & analysis of existing land use pattern, projected population & occupational structure, land requirement for different uses. The land requirement has been worked out for different uses guided by URDPFI Norms, existing and proposed growth pattern envisioned for the town.

As per URDPFI guideline, average gross population density of developed land in small town in plan area is 75 - 125 persons per hectare (PPH). Taking the average limit of 100 PPH, the requirement of developed land for accommodating 40,000 populations in 2031 is 400 Ha. The planning area consist of 902 Ha having the net area of 875 Ha. Hence as per URDPFI guideline the available area of the town in found sufficient for accommodating the population of 2031. For working on land requirement for town, the proposed gross development area density of 100 PPH for the target year of 2031 has been considered.

3.1 Land Use Proposals

The categories of land uses proposed are:

i. Residential use zone
ii. Commercial Use Zone
iii. Industrial Promotional zone
iv. Public and Semipublic use zone
v. Traffic & Transportation use zone
vi. Parks & Open spaces use zone
vii. Dry cultivation use zone
viii. Town Centre (Mixed use)
ix. Cremation/ Burial Ground

x. Heritage Sites

xi. Water bodies to be retained

In addition Special Use Zones are proposed where land is reserved for various essential projects.

3.1.1 Residential use Zone

The projected population of North Paravur municipality for the year 2031 is 38,341 rounded as 40,000. According to the development concept, North Paravur town is to be developed as a residential town.

As per existing land use pattern the residential land use comprises of 582 Ha which is 64.68% of total area of the town. As per URDPFI norm, the recommended percentage of residential land use for small town is 45- 50%. Considering the concept of Plan to develop the town as residential town, taking the upper limit of 50%, the total residential area proposed in the land use plan 2031 to accommodate the future population has been worked out as 456 Ha. The non –active dry cultivation area and the vacant lands (not included the marshy), can be used for residential purpose there by compensate the area required for future residential use of the municipal area. The entire residential component in the planning area is proposed to be developed on two category, i.e. the residential use within the mixed use town centre and in predominant residential areas outside the town centre as shown in figure 3.1.

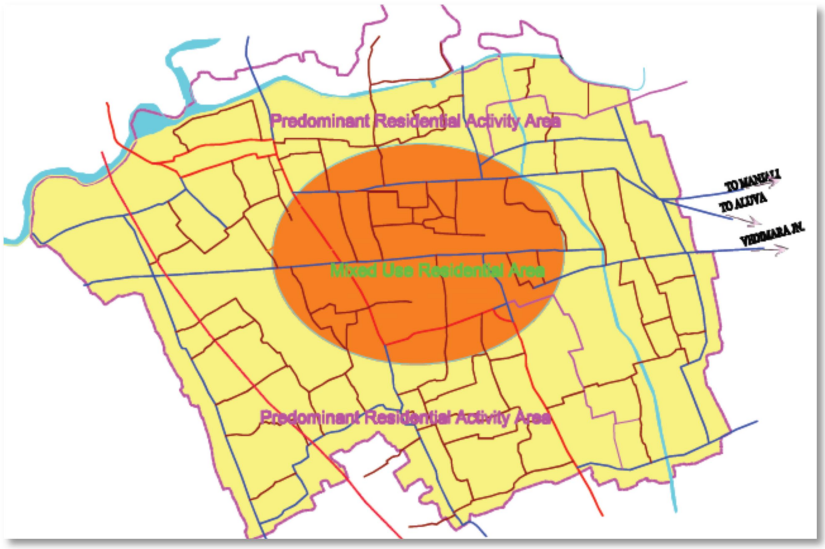


Figure 3-1: Residential use areas

The extent of residential land use zone alone is 556.29 Ha which is 61.67 % of total area.

3.1.2 Commercial use Zone

Commercial use is to be provided as an integral part of planning of residential areas proposed in the Master plan of North Paravur. The existing commercial land use covers area of 19.79 ha which is about 2.2% of the town area. These uses shall be provided on the norms and standards specified in the Master Plan in order to ensure their equitable distribution and making various residential sectors self contained and self sufficient in these basic needs. According to the development concept, the Town centre (Mixed use) and on either side of the major roads having 12m width and above has been identified for commercial uses by providing mixed uses. The location of commercial area permissible in subject to zoning regulations provided in the Master Plan including parking etc.

3.1.3 Industrial Promotional Zone

The existing land use pattern of the town shows the area under industrial use is only 1.7 Ha which 0.18 % of total area. The analysis reveals there is no potential for resource based industries or any large scale industrial development. In order to enhance the economic opportunities based on industry to the town population in the future, more area of land is to be identified for industrial activities. No major industries are proposed for the town. Considering the importance of MSME Sector to the economic growth & prosperity, an industrial promotional area of 26.04Ha is proposed at Vazhikkulangara. The proposed industrial promotional area is shown in figure 3.2.

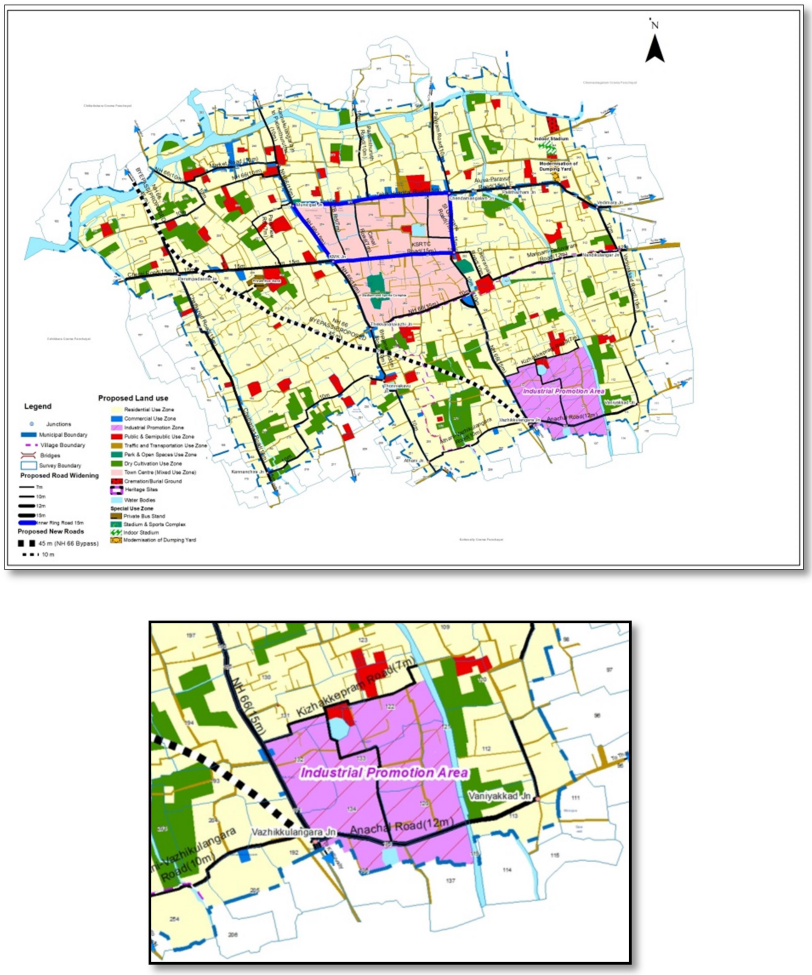


Figure 3-2: Proposed industrial promotional area

3.1.4 Public and Semi Public use zone

Being an old town & Taluk head quarter, the town has large extent of land under the public & semi public uses, i.e 5.13%. URDPFI recommends 6-8%. Most of the public and semi public uses are concentrated in the core area. The proposed mixed use town centre includes public and semi public uses .It is proposed to continue the same area mixed with residential, commercial and recreational activities. Redevelopment in the core area is also an option. Higher order activities under this category would be concentrated in the town centre. At the same time public and semi public uses, ie. religious, educational offices and health related facilities are also to be provided in the proposed residential areas proposed in the Master Plan . These facilities shall be provided as per the norms, standards and also

by imposing zoning regulations. Public lands or dry agricultural area available for these purposes can be used with certain regulatory measures.

3.1.5 Traffic and Transportation use zone

As a part to form better transportation network, major roads, ring roads & link roads are to be upgraded. The existing width of the roads is proposed to be increased according to the requirement and hierarchy. Road widening proposals, bus terminals, truck terminals, parking facility etc form part of the transportation proposals. Detailed Traffic and Transportation plan is given in section 3.2

The proposed land uses under this category in the land use plan in 90.23 Ha which is 10.00 % of total area.

3.1.6 Parks and Open Spaces use Zone

As per the existing land use, the town has only 3 ha land under this category .The area under this use is much less than prescribed URDPFI standard of 12 to 14 % reflecting that the town badly lacks in the provision of recreational open spaces. The vacant land contiguous to the municipal stadium with an extent of 1.21 Ha land is proposed for the expansion of municipal stadium as stadium & sports complex. In addition, another 1.05 Ha of land is proposed for indoor stadium, at Vedimara , acquisition proposal of which is under consideration of municipal council.

3.1.7 Dry cultivation use Zone

The agriculture area in the town comprises of mixed crop dry cultivation (active and non active). Coconut is the major cultivation, active dry cultivation area to be retained in the proposed land use plan. In order to promote productivity and value addition to the agro-products, agro based knowledge centres and marketing centres may also be set up along with Public libraries, Co-Operative Societies, Krishi Bhavan etc. The dry cultivation area to be retained comes to an area of 68.54 Ha which is 7.60% of total area.

3.1.8 Town Centre (Mixed use zone)

Looking at the existing pattern of growth and development, it has been observed that the major road network existing in the planning area has attracted a lot of unplanned and unregulated commercial growth in the shape of ribbon development .This pattern of development has resulted in numerous problems in the town in terms of infrastructure, quality of development and interruption for the smooth movement of the traffic and transportation.

This land use plan formulates a town centre which includes Mini civil station as the focal point and mixed use of residential, public &semipublic ,commercial and recreational uses are permitted. This town centre is proposed in the central core area which have the boundary of major road stretches connecting Municipal jn., Chendamangalam jn., Pullankulam jn., Peruvaram jn., Thekkenaluvazhy jn and KMK jn. and to Municipal jn.

The town centre in land use plan as shown in figure 3.3. Nearly 64.36 Ha of land is earmarked for town centre. This plan includes detailed zoning regulation for town centre. In this area around 500 numbers of small and medium scale establishments and administrative mini civil station are functioning. The existing land use in this CBD reveals that most of the commercial development is along the Aluva Paravur road and NH 66 road side. This necessitates a Detailed Town Planning Scheme for the area of North Paravur to have optimum utilisation of land and for the controlled & planned development

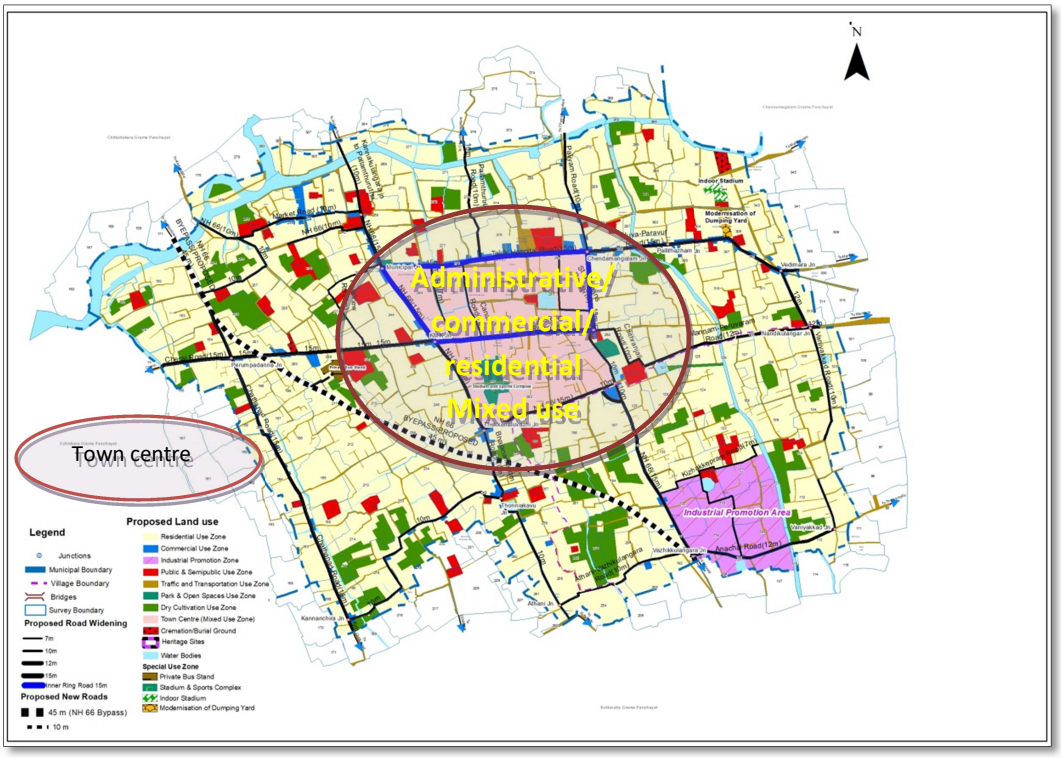


Figure 3-3: Proposed Town centre in North Paravur Muncipality

3.1.9 Heritage Sites

There are few sites or buildings which dates back to centuries such as churches, temples and sites associated with Muziris heritage. These sites are to be protected as they are possessing archeological importance. Hence the redevelopment or renovations of these sites are to be monitored by concerned agencies for conserving it in the future development process.

3.1.10 Special Use Zones

The following specific project areas are included in the special use zone.

- Proposed private bus stand near proposed NH 66 bye pass at Perumbadanna
- Stadium & sports complex by expanding the existing municipal stadium
- Indoor stadium/open air theatre at vedimara
- Expansion of dumping yard at vedimara

3.1.11 Project Identified

3.1.11.1 Private Bus Stand

An area of 1.09 hectare is proposed for new private Bus stand near proposed NH bypass. Once bypass is implemented, shifting of private bus stand from town centre will help in avoiding congestion in the town centre.



Figure 3-4: Proposed Private Bus Stand

3.1.11.2 Municipal Stadium

An area of 1.21 hectare is proposed for the expansion of municipal stadium as stadium & sports complex.

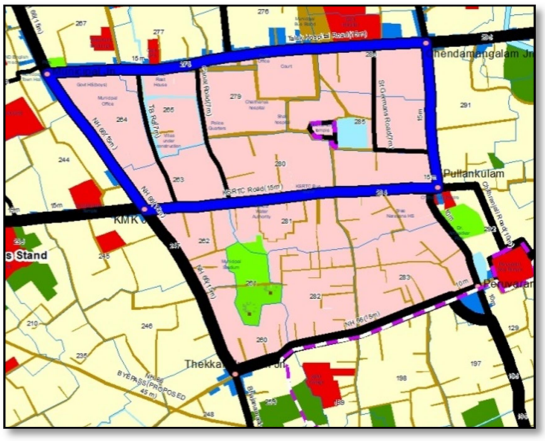


Figure 3-5: Proposed expansion of Municipal Stadium

3.1.11.3 Indoor Stadium

An area of 1.05 hectare of land is proposed for indoor stadium, at Vedimara.

3.1.11.4 Dumping Yard

A total area of 0.96 hectare extent is proposed including the expansion of the existing land fill site of at Vedimara, which is to be used as segregation unit and plastic shredding unit as the projected volume of solid waste will be transferred to Waste power plant of Kochi Corporation

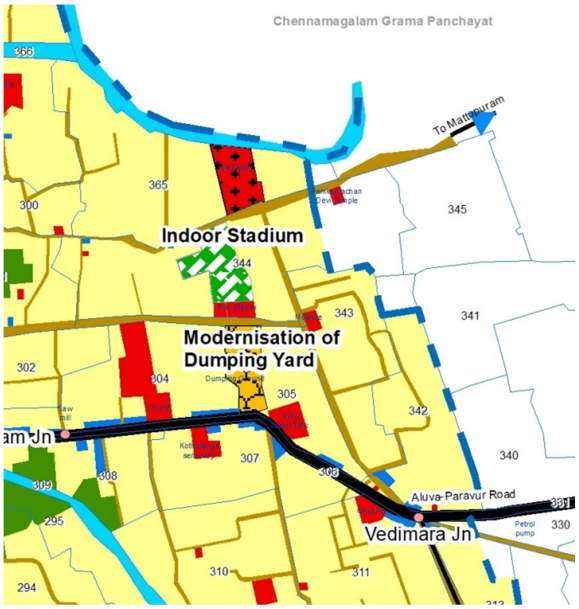


Figure 3-6: Proposed Dumping Yard and Indoor stadium location

3.1.12 Proposed land use map

The proposed land use map and the area break up of each of the above proposed land use zones are given in figure 3.5 & 3.6 respectively and in table 3.1.

Table 3-1: Proposed land use break up of North Paravur

Proposed land use -2031		
Land use category	Area in Ha	Percentage
Residential Use Zone	556.29	61.67%
Commercial Use Zone	11.57	1.28%
Industrial Promotional Area Use Zone	26.04	2.89%
Public & Semipublic Use Zone	31.59	3.50%
Traffic & Transportation Use Zone	90.23	10.00%
Park & Open Space Use Zone	2.66	0.29%
Dry Cultivation Use Zone	68.54	7.60%
Town Centre (Mixed use)	64.36	7.14%
Cemetery/Burial ground	1.13	0.13%
Water Bodies	45.28	5.02%
Special use zone	4.31	0.48%
	902	100.00%

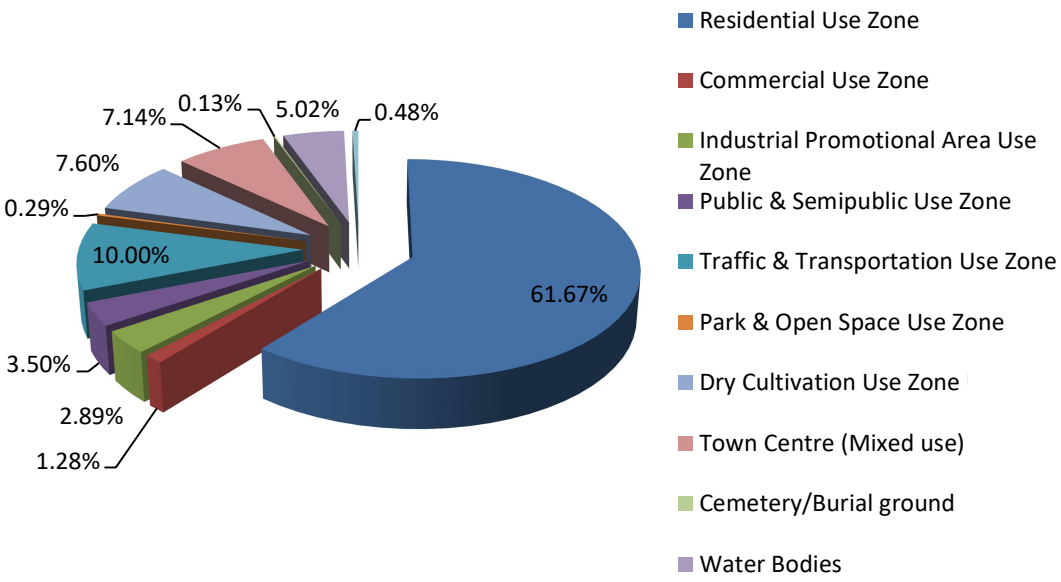


Figure 3-7: Proposed land uses break up of North Paravur

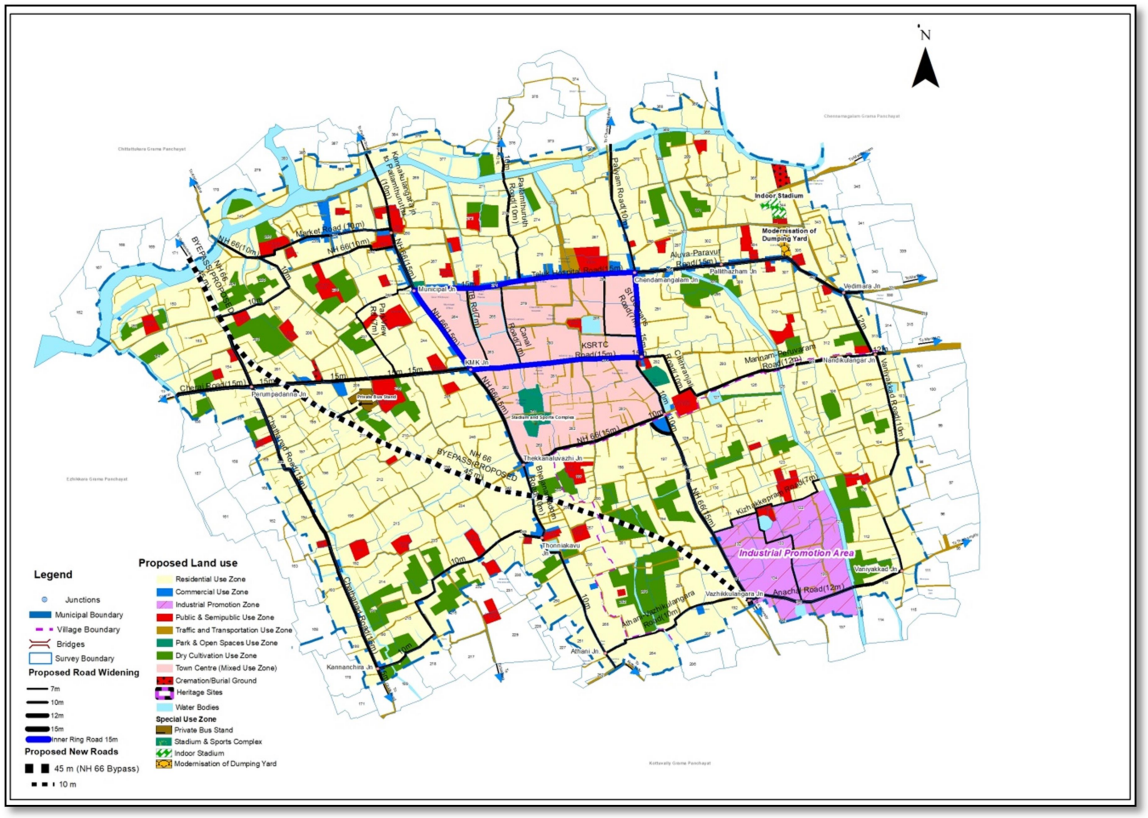


Figure 3-8: Proposed Land use map of North Paravur

3.2 Traffic and Transportation Plan

Traffic and Transportation is the most critical component of any town because it defines and determines both existing and future patterns, typology of growth and development of the town. Since, the traffic and transportation is the main function of land use, the road network would be required to be integrated with the land use in order to provide high degree of connectivity and travel options between various land uses. Accordingly, traffic and transportation plan of North Paravur town up to the year 2031 has been proposed based on the proposed land use plan for the town.

3.2.1 Proposed Road Network Plan

The configuration of the existing road network within North Paravur town does not reflect any regular form, although it resembles more like grid pattern with certain arterial roads serving as radial roads. The NH 66 towards Ernakulam and Kodugalloor, PWD roads

towards Aluva and Cherai, Vanniyakadu road etc form the radial roads emanating from central area of the town. These radial roads can be connected by suitable link roads to form an inner ring / main road system.

NH 66 which passes through KMK junction and Muncipal Town Hall junction is the spinal cord of city road network. This road is forced to carry both intra-town and inter-town traffic. Consequently, this road carries traffic far exceeding its capacity even today and is likely to bear the major burst of traffic in the horizon year as well. Muncipal Town Hall junction is the core part of the town, because of its concentration of activities like commercial, public and semi-public activities, location of bus stop etc. All the existing problems as well as the future traffic and transportation problems likely to arise in the town were taken into account while formulating the long term road development plan for the horizon year.

Since the most important problem of North Paravur town is chronic congestion in town centre, emphasis was given to develop alternative link to divert the traffic passing through the town centre area. This would also help to reduce the unwanted mix of intra-town and inter-town traffic on roads within the central part of the town. In order to reduce the number of private vehicle trips and intermediate public transport trips, the development strategy should give importance to provide an efficient public transport system for the town linking all major traffic generators, work centres, commercial activity centres. As the level of service of urban roads are dictated to a great extent by the capacity of intersections, the development proposals should give importance to increase the capacity of major intersections by proper planning and design of these junctions. Special emphasis should also be given to improve the pedestrian facilities and in developing off-street parking lots.

On the basis of proposed development activities and the projected volume of traffic, an alternative road development plan has been formulated for the town. It conforms to a ring and radial road network configuration. The circulation system has been planned

judiciously in such a way as to cater to the traffic demand for the horizon year. The other inter regional roads will be radiating from the town to the periphery.

a) NH 66 (Old N H 17) Bypass

The land acquisition process for NH 66 Byepass proposed by NHAI has already completed. The construction works along the stretch of this road in North Paravur yet is start. The proposed width is 45 m.

b) Inner ring road

The proposed inner ring road begins at Muncipal Town Hall Junction and proceeds to Chennamangalam, Pullankualm and joins KMK Junction on NH-66. All parts of the inner ring road are already exist. However, many sections have to be widened to make it to the required arterial/sub-arterial standard of 15 M right of way. This inner ring road will connect the main activity areas of the town. The main function of the ring road will be to facilitate safe and relatively unhindered movement of traffic within the town area. To facilitate this, appropriate restrictions on frontage access and on-street parking should be strictly enforced. On- street parking should be restricted on this road and multi layer parking facilities should be created at suitable locations.

To avoid congestion in the town center an outer ring road is required, but due to the density and size of municipality being small, outer ring road inside the municipal limit is not feasible, however a regional level ring road is suitable combining the roads in the nearby local bodies.

b) Other major roads

As per the proposed road network the width of main roads other than NH bypass & ring roads, varies from 7 M to 15 M. The table 3.2 shows the proposed width of the major roads on priority basis.

Those roads falling within the inner ring road circle should have a minimum width of 15 -21 m and future building permits along these roads should be restricted within this

right of way. All those roads outside the inner ring road except the radial roads should have minimum 10m-12m width.

The main transport corridor of the town is the NH 66. It has to be converted to four lane from SK Temple to KMK Junction for the free flow of traffic. Presently, Chennamangalam – Pullankulam road is a one way road, but it requires widening to convert it to a two way road. This will help to reduce traffic at Aluva - Angamaly road and divert it to Chennamangalam - Peruvaram Road to meet at National Highway.

Table 3-2: Proposed width of the major roads on priority basis

From	To	Existing Width (m)	Proposed Width (m)
	Priority 1		
	Inner Ring Road		
Municipal Jn	KMK Jn	12	15
KMK Jn	Pullankulam Jn	8	15
Pullankulam Jn	Chennamangalam Jn	8	15
Chennamangalam Jn	Municipal Jn	10	15
KMK Jn	Perumpadana Jn	12	15
	Priority 2		
NH Bypass			45
Vazhikulangara Jn	Vaniyakkad Jn	8	12
Vaniyakkad Jn	Nandikulangara Jn	8	10
Nandikulangara Jn	Vedimara Jn	8	12
KMK Jn	Thekke Naluvazhi Jn	12	15
Thekke Naluvazhi Jn	Peruvaram Jn	12	15
Peruvaram Jn	Vazhikulangara Jn	12	15
Muncipal Jn.	Kannankulangara	12	15
Vedimara Jn	Chennamangalam Jn	12	15
Pullankulam Jn	Peruvaram Jn	8	10
Kannankulangara Jn	Byepass	6	10
Market Road		7	10
NH Bypass	Proposed Bus Stand (including New Link)		10
	Priority 3		
Kannankulangara Jn	Pallamthuruth	8	10
Mannam	Peruvaram	10	12
Perumpadana Jn	Cherai Beach Road Bridge	12	15

Perumpadana Jn	Kannanchira Jn	8	15
Kannanchira Jn	Thoniyakavu Jn	8	10
Thekke Naluvazhi Jn	Thoniyakavu Jn	8	10
Thoniyakavu Jn	Athani Jn	8	10
Athani Jn	Vazhikulangara Jn	8	10
Pullamkullam Jn	Pervaram Temple	8	10
Chendamangalam Jn	Paliyam Road	6	10
Pallamthuruth Road		7	10
Kizhakkepram Rd		7	7
TB Road		4	7
Park View Road		5	7
Canal Road		5	7
St. German's Road		5	7
Janatha Road		5	7

c) Other Road improvement schemes

Feeder roads connecting the main roads in the town limit are suggested to be widened to a minimum of 6m wherever possible without much impact for developing a better road network pattern for the town. This can be implemented by the municipality as project based on the requirement and feasibility.

d) Junction improvement proposal

Traffic junctions are very complex areas of multiple traffic movement.

The following junctions should be improved for the efficient movement of traffic.

- Municipal Town Hall Jn.
- Vedimara Jn.
- KMK Jn.
- Perumbadanna Jn.
- Vaniyakkad Jn.
- Kannankulangara Jn.
- Chendamangalam Jn.

Can be improved as major junction.

If sufficient land is not available, to widen the approach roads to these junctions, steps may be taken to construct fly-overs at these junctions. Chendamangalam junction which is a minor junction at present has to be improved as a major junction in view of its importance.

d) Transport terminals

i) Bus terminals: North Paravur town has two bus terminals, the first one is near KWA from where KSRTC buses are operated. The second terminal, located near Govt. Hospital is used by private buses. A limited stop private bus Stand proposal near NH 66 by pass at Perumpadanna jn. is under consideration of Municipality.

ii) Goods terminals: At present, there is no goods terminal in North Paravur town. There is a need to provide goods terminal accomplishing the facilities like offices and godowns of transport companies, easy loading and unloading facilities, weigh bridge, large parking areas for idle parking of trucks and other related facilities like petrol / HSD pumps, repair, workshops etc. It is suggested that at least 5 acres of land is required to construct a Goods terminal to be located preferably near the stadium ground.

e) Pedestrian facilities

(i) Sidewalks or walkways: Sidewalks and walkways are "pedestrian lanes" that provide people with space to travel within the public right-of-way, that is separated from roadway vehicles. Sidewalks are associated with significant reductions in pedestrian collisions with motor vehicles. For North Paravur Town, considering the scarcity of land, sidewalks with a width of 1.5m to 2.5m shall be provided for all types of roads including arterial, sub-arterial, collector and local roads.

(ii) Marked crosswalks and enhancements: Marked crosswalks indicate optimal or preferred locations for pedestrians to cross and help to designate right-of-way for motorists to yield to pedestrians. For North Paravur Town, cross walk markings are desirable at all arms of the major intersections and at major high pedestrian volume locations.

f) Parking facilities

Considering the parking demand observed at many of the road stretches, a combination of commercial cum automated parking system is proposed for North Paravur Town. The tentative locations for provision of these facilities are given below:

- Muncipal Junction – PWD Rest House
- Muncipal Junction – Govt Hospital
- KMK Junction – Pullankulam

Also on implementation of proposed Municipal bus stand near byepass, part of existing bus stand can be converted as parking area of the private vehicles.

The proposed traffic and transportation map is shown in figure 3.7

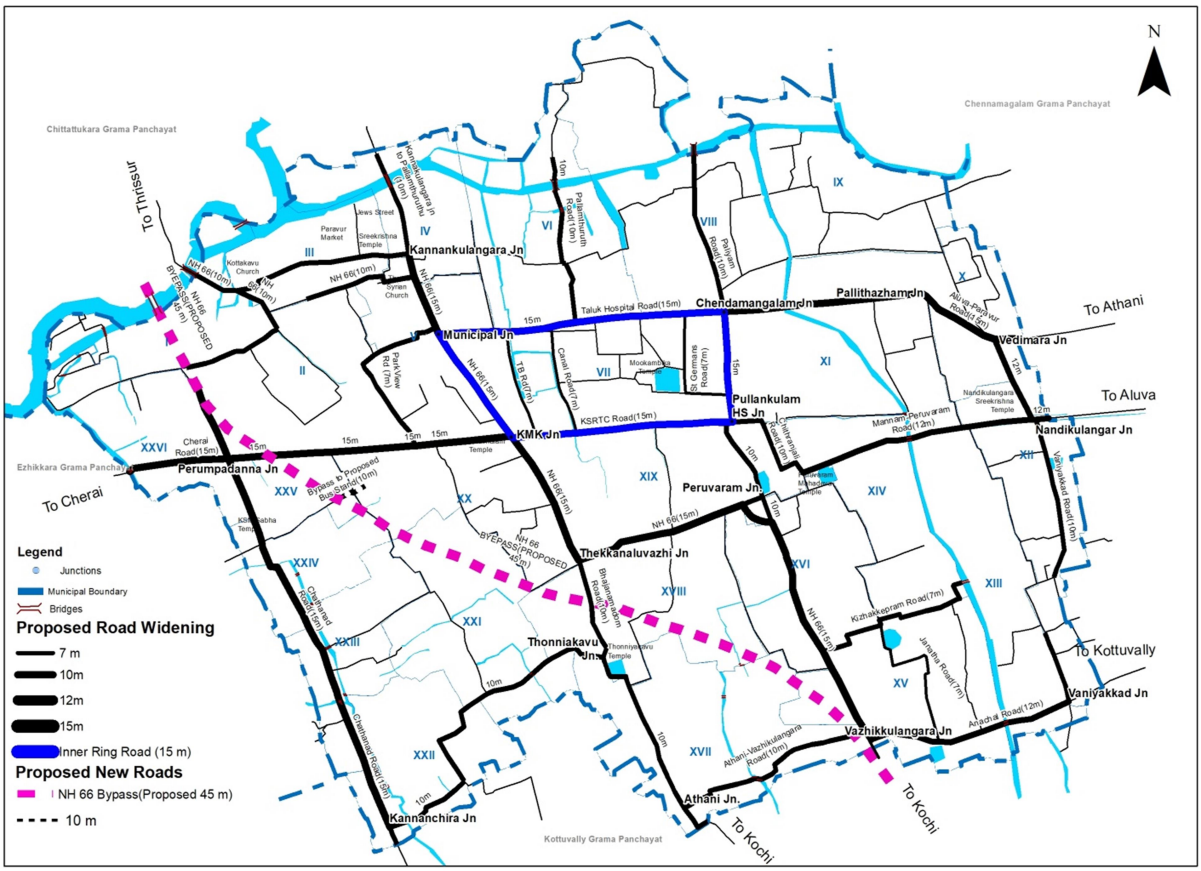


Figure 3-9: The proposed traffic and transportation map

3.3 Housing

Housing provision should be linked with other programs such as sanitation, potable drinking water and waste disposal etc. There is a need for having holistic development management solution with cost-effective use of natural resources, land being one of them. Inadequate and inequitable supply of serviced land has been the most significant bottleneck for the promotion of housing activities.

The shortage of housing in the North Paravur town is 227 in 2001 and is to be met in future through various schemes undertaken by the Municipality such as IHSDP Scheme, EMS Bhavan Scheme and Rajiv Awaz Yojana.

The reform measures are:-

- Measures to control the continuing spiral of land prices, speculation and shortage of developed land.
- Increased availability of developed land through measures such as reservation of land in larger layouts as land bank for economically weaker sections and low-income groups, land pooling, land readjustment, etc.
- Restructuring of Housing Finance Institutions (HFIs) to meet the housing finance needs of the formal sector as well as the poor and the informal sector.
- Increased involvement of NGOs/CBOs/Co-operatives to promote self-help, mutual-help, thrift and credit, self-management, community empowerment, etc.
- Forging strong partnerships between private, public and co-operative sectors to enhance the capacity of the construction industry to participate in every sphere of housing.
- Implement Central and State sector schemes and programmes pertaining to housing and infrastructure sector.
- Feasible alternatives like land sharing and land pooling arrangements, particularly in the urban fringes, through public and private initiative with appropriate statutory support.

- Negotiated purchase of land between the owner(s) of land and the project proponents would be an ideal way to acquire land to give right value to the land owners.
- Land being a limited and costly resource needs to be planned to provide for rationalized and optimum density use.
- The land policy and land-use regulations concerned should provide statutory support for land assembly, land pooling and sharing arrangements.
- The land or shelter provided to the poor / slum dweller would as far as possible be made non-transferable for a minimum period of ten years.

Design of public housing programmes has to be done taking in to account the land use concerns. Development agencies, private sector etc. could be directed to ensure 20 to 25% land in new housing colonies / projects for the housing needs of EWS/LIG household. Municipality can also prepare action plan to eradicate landlessness and houselessness during plan period with the help of Kerala State Housing Board and Kerala State Nirmithi Kendra.

3.4 Tourism

"The enjoyment of our heritage depends upon its conservation. World Heritage demonstrates that the industry, craftsmanship, love and care of past civilizations were given to make their surroundings meaningful. This should never cease to fill us with wonder. The past can speak to us and help us realize where we are going in the future."

-By B M Feiden and J Jokilehto in their book titled Management Guidelines for World Cultural Heritage Sites

The development of this sector ensures the sectoral policy of "Tourism becomes a vibrant and significant contributor to the sustainable development of the North Paravur Town". The development proposals in tourism sector will be one of the future economic bases of North Paravur.

3.4.1 Environmental improvement of the market

The following proposals are made

- Pedestrian priority streets - with paving
- Spill out spaces with elements like a clock tower has been designed in the open market area
- Improvement of the existing townscape

3.4.2 Waterfront Development

The following proposals are made

- The upcoming boat jetties will encourage the trade of goods through the water way. Tourist information centres and associated facilities are also being planned.
- The waterfront will be developed so as to facilitate seating along the waterfront with a view of the river as a part of Muziris Tourism Project.
- Open air theatre

3.4.3 Open Market Square

The following proposals are made

- The market square will be completely pedestrianized. The entire area be paved and sheds provided within the square for vendors
- A central clock tower to be built with steps around it, which can be used by visitors and vendors

3.4.4 Widening the width of canal and protection of the canal

The Paravur canal and Pashnithodu is to be deepened and the sides may be protected for motor boat and ordinary country boat services.

3.4.5 Construction of boat jetty/boat service for tourist

A country boat service connecting Kodungalloor back water and water bodies in the North Paravur Town using speed boats and pedal boats services may be started to attract tourists. The renovation works of boat jetties in Paravur canal near market is in progress.

3.5 Environment

In the environment sector, water body's protection measures have prime importance in the town. Proper Solid Waste Management System and Sewage Treatment System will reduce the water Pollution to some extent. Waste dumping into the canals in the town can also be avoided by the above measures. Proper drainage system shall also reduce this problem. A Storm Water Drainage Plan of Rs 5 crore was submitted for sanction under UIDSSMT by the Muncipality.

The proposed Muzris Heritage Tourism project shall be implemented without affecting the environmental quality. As a part of water front beautification scheme, river bank can be protected by toe wall up to 2m height and turfing upto top level. Construction of connecting walkways along the bank of the Paravur thodu and Pashni thodu is helpful for avoiding encroachment and contamination of these canals. There is no paddy and wet land in the town.

The concept of Groundwater Recharge Technology has to be adopted in the new private building constructions to raise the level of declined water table. It should be made mandatory to adopt this technology in large buildings.

3.6 Infrastructure

3.6.1 Physical Infrastructure

a. Water supply

Almost 85% the houses depend on piped water and others use local source (well water) for water. The demand for water supply of North Paravur is to be calculated keeping the potential of local resources and future demand .With the Annual Project proposal of the Paravur Municipality, it is expected to make the water supply system adequate in coverage and to meet the future demand for water. It has been planned to provide 100% piped water connection to all the households.

The Master Plan proposed to provide

- Rainwater harvesting system for new construction
- Assure the quality of water / potable water
- Proper distribution system to ensure the sufficient pressure on the distribution line.

b. Drainage

The major issue in the municipality is local flood due to lack of proper drains or due to the encroachment of drains. No waste water is being permitted to enter across the border or these are stagnant at number of places in the drains. To improve the sanitary condition in the town:

- Micro drainage would be the responsibility of Municipality and the drainage system would need to be fully and effectively integrated
- Municipality has submitted a Storm Water Drainage Plan for sanction under UIDSSMT.

c. Sanitation & Sewerage

Generally the sewage generated in a town is considered to be 80% of the water supply. Thus the sewage to be generated in 2031 will be 6.4 MLD. In the absence of sewerage system, waste water outlet is connected to open or partially covered/covered drain. Since there is no sewerage system existing in North Paravur town, traditional methods of sanitation facilities like water closets/ septic tanks, pit latrines etc. are in practice. Estimated quantity of sewage generate shows that there is no urgent need of a sewerage system. Construction of sewage treatment plant for the taluk hospital has started as a part of development of facilities in the hospital.

d. Solid Waste disposal

Solid waste management is one among the basic essential services provided by municipal authorities in the country to keep urban centres clean. Approximately 9 metric tonnes of waste is generated in North Paravur town in a day. For 2031 the generation is

projected as 10 metric tonnes for the population of approx. 40000, taking a standard of 250 gms/capita/day of solid waste generation for a small town like North Paravur town.

Solid Waste Management is obligatory functions of municipality. Pollution Control Board is responsible for enforcing the following rules in all towns.

- Municipal Solid Waste (management & handling) rules 2000 which envisages segregated storage of waste at source, collection from source, protected transportation to the treatment facility, establishment environmentally safe treatment system and its operation and maintenance and safe disposal of inert rejects.
- Hospital Waste (Management & Handling) rules
- A comprehensive solid waste management action plan is to be prepared in municipal level taking into account.
- the mechanism to be introduced for segregation of wastes at the source
- reducing extent of waste to be handled for landfill through local and neighbourhood level composting and recycling facilities
- developing decentralized common waste treatment facilities
- instituting an education and awareness programmes for children, youth and citizens on scientific solid waste management
- providing incentives to private sector to participate in the collection, segregation, transport, recycling and final disposal of all types of solid waste
- the specific responsibility to be assigned to stake holders in the implementation of the plan

Biomedical wastes shall be disposed off in accordance with the Bio-medical Wastes (Management and Handling) Rules, 1998 and hazardous wastes shall be managed in accordance with the Hazardous Wastes (Management and Handling) Rules, 1989, as amended from time to time. The North Paravur Municipality has initiated providing the vermicomposting units for 100 households as a part decentralized waste management. Anyway it is proposed the existing land fill site of 2 acre extent at Vedimara to be retained

and used as segregation unit and plastic shredding unit as the projected volume of solid waste will be transferred to Waste power plant of Kochi Corporation. Slaughter house and disposal unit at market area, a plastic recycling unit, a paper bag manufacturing unit and production of bins are also suggested near solid waste treatment plant.

e. Energy

Since there are no large or medium scale industries in North Paravur, the consumption of electricity is generally less. As there is no major establishments proposed in the town, KSEB shall adequately cover the electricity demand in future.

3.6.2 Social Infrastructure

a. Education

School level educational institutions are sufficient in North Paravur. As per standards to cater the future population, a vocational higher secondary school, a Polytechnic college and an Arts and Science College are required. The total number of students in the existing Govt Girls & boys school is only hundred because of the dropout of the students.

- The Govt Girls and Boys school are to be combined and one of the school lands can be used for the proposed polytechnic college
- A vocational higher secondary school is suggested at Thoniakavu
- Arts & Science college is available in nearby area.

b. Health

As per Urbanisation study of Ernakulam District North Paravur Municipality is classified as a higher order urban settlement. Higher order health facilities are not available in North Paravur. Higher order facilities to be provide in North Paravur to cater the threshold population of its service area and even to the surrounding Panchayats. Being the Taluk head quarters a taluk hospital is in this town. The major beneficiaries are people from the adjacent local bodies. The health facilities are to be decided based on the population of surrounding Panchayats.

- The taluk hospital is to be upgraded as a Sub District hospital. Municipal council have initiated for the expansion of the hospital and to provide facilities under NRHM scheme.
- As per standards the municipality lacks two PHC's which is to be provided in the town.

c. Recreation

It is proposed to expand the Municipal stadium as stadium & sports comlex by acquiring the adjoining vacant land of about 3 Acres. This proposal is under consideration of North Paravur municipality. Dr. Ambedkar Park is also proposed for expansion by the Municipality. One more mini park near Kannankulangara & a recreational centre near Municipal Town Hall are also proposed so as to increase the recreational facilities in the town. A multifunctional Indoor stadium in about 2 Acres of land is proposed at Vedimara. A Indoor shuttle court in about 25 cents of land near Municipal Bus stand is also proposed.

3.7 Economic Aspects

3.7.1 Industry

The analysis of the economic base of North Paravur indicates that it has no major large scale industrial development potential. The micro and small enterprises play an important role in the balanced and holistic industrial development of the State including the small towns. It generates employment and value to products and services through utilizing available resources of the area.

3.7.1.1 Micro, Small and Medium Enterprises

The importance and contribution of the MSME sector to the economic growth and prosperity shall be well established in North Paravur Town. It is suggested to establish a Industrial Promotion zone at Vazhikkulangara to facilitate the growth of industries considering land availability and connectivity. It is suggested that Paravur municipal council with the help of the small scale industrial development corporation, can conduct the feasibility study for starting small scale industrial enterprises and select the prospective

entrepreneurs to start small scale industries in Paravur town. Infrastructure like buildings, internal roads, electricity lines, water supply facilities etc are to be developed for the mini industrial estate.

3.7.1.2 Trade and Commerce

The commercial activities/establishments are permissible at areas specified in zoning regulation of the Development plan. It is proposed to permit mixed land use development in the town centre. Extent and facilities of Paravur general market are proposed to be increased, considering its locational advantage of both water and road transport facilities.

3.7.2 Agriculture

Coconut is the main crop in North Paravur. The soil of North Paravur is suitable for coconut cultivation. Thrust should be given in using bio fertilizers in agriculture. The source of bio fertilizers can be from the solid waste collected at Municipality level. House hold composting of solid waste also should be encouraged. Measures should be taken to eradicate disease affecting the crops. Disease affected trees and low yielding trees should be cut down and new coconut trees needs to be planted. Problem related to water logging and drainage facilities should be solved immediately. It is proposed to retain the active dry cultivation lands in the town. In order to promote productivity of agricultural product the followings are proposed.

3.7.2.1 Agricultural Labour Bank

For getting agricultural labourers in time, an agricultural labour bank may be set up. The agricultural labour bank may supply agricultural labourers to the people who are engaged in the cultivation activity. This may be implemented by the agricultural officer with the cooperation of the municipality.

3.7.2.2 Homestead Cultivation Plan

Comprehensive homestead cultivation plan includes identification of plots suitable for homestead cultivation and identifying and listing of the activities starting from selection of suitable crops up to their cultivation. The wards suitable for homestead cultivation are Kuronthottiparambu, Paravoothara, Pallithazham & Nandyattukunnam. From the above

wards, land above 25 cents may be listed. From this list, people who are interested in agricultural activity may be identified. These lands may be listed as model agricultural area.

3.7.3 Animal husbandry

The suggestions in animal husbandry sector includes

- Establishment of a modern veterinary polyclinic with all modern facilities at Taluk level. For this the non-functioning cooperative college and campus in the Pallanthuruth ward may be utilised
- Subsidised cattle and poultry feeds should be distributed via. Milk cooperating society.
- Establishment of hatchery for the availability of good quality chicks
- Projects implemented by Animal Husbandry Department should be made known and available to the local people of the municipality

3.7.4 Fisheries

The following are the proposals in fisheries sector,

- Facilities for storage of fish so that it can be retained for a longer time
- Fish market should be made hygienic
- Modernisation of Perumpadanna mini market and Paravur fish market
- Pattinithodu, Kalathodu, Aavootithodu etc. can be used for fish farming.

CHAPTER – 4

ZONING REGULATIONS

CHAPTER-4

Zoning Regulations

1. All future developments shall be in conformity with the provisions of the Master Plan for North Paravur Town 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 frame work of this Plan.
2. For the implementation and enforcement of the proposals envisaged in this Master Plan areas have been zoned under various categories such as:
    - i. Residential Use zone
    - ii. Commercial Use Zone
    - iii. Industrial Promotional Zone
    - iv. Public and Semipublic Use Zone
    - v. Traffic and Transportation Use Zone
    - vi. Parks & Open spaces Use Zone
    - vii. Dry cultivation Use Zone
    - viii. Town Centre (Mixed Use Zone)
    - ix. Heritage Sites
    - x. Cremation /Burial Ground
    - xi. Water bodies
    - xii. Special Use Zones

    Details regarding the nature of uses 'permitted', uses 'restricted' and uses 'prohibited' 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 plan and in accordance with the other statutes applicable.

    Uses 'permitted' in a zone cover the uses that can be normally accommodated in the relevant zone. Such uses may be permitted by the Secretary, North Paravur Municipality, hereinafter referred to as the Secretary.

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". Uses Restricted – 1 category deals with the uses that shall be restricted by the Secretary, with the concurrence of the District Town Planner. Uses Restricted – 2 category deals with the uses that shall be restricted by the Secretary with the concurrence of the Chief Town Planner of the Department of Town and Country Planning, Kerala.

"Used prohibited" enlists the various objectionable uses in each zone which shall not be permitted under normal circumstances.

3. If any part/portion of a zone is put to a "Use Prohibited" as stated in Para 2, before the sanctioning of the Master Plan, such use shall be termed as non-conforming use. A non-conforming use may be allowed to continue in its existing location 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, alternation 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 Chief Town Planner concerned.
4. Existing areas and structures of archaeological importance, agriculture uses and religious uses shall be permitted to continue in all the zones and shall not constitute non-conforming uses.
5. Regulation of constructions and/or land development on the sides of new roads/roads proposed for widening as per the plan shall be governed by the distance from the centre line of the road, unless otherwise specified in the plan or in any detailed road alignment approved by the Chief Town Planner concerned.
6. Constructions and/or land developments, if any, in paddy lands and in wet lands, shall be in conformity with the Paddy land and Wetland Act in force in the state.

7. The Government shall have the power to issue clarifications in respect of technical interpretations, if any, required in any of the provisions of the plan in consultation with the Chief Town Planner concerned.
8. Any use not specified either in the 'uses permitted' or 'uses restricted' category of a particular use zone, but which is of a similar nature to any use permitted or restricted in that particular use zone, can be considered by the Secretary, with the concurrence of the Chief Town Planner concerned.

Para No.	Uses permitted	Uses restricted-1	Uses restricted-2	Uses prohibited
9	**Residential Use Zone**			
9.1	Residential buildings consisting of single or multifamily dwellings, residential flats /apartments, residential quarters, night shelters, orphanages, old age homes, dharmasala	Ashram /mutt, places of worship	Fuel filling stations	Any other use not specified
	Shops, professional offices, commercial offices, banks & other financial institutions, restaurants, canteen, hotels – floor area up to 200 Sq.m.	Public utility areas and public utility buildings other than those included in the permitted use		
	Cottage Industries, Service Industries of non-nuisance nature (See Annexe-I), with number of workers limited to 6 without power or 3 workers with power limited to 5 HP			

	Transmission/ Telecommunication towers, Wireless stations		Cremation ground/crematoriums, burial ground/ common vault	
	Educational institutions essentially serving the needs of residential community such as Day care, creche, nursery schools, kindergartens and schools offering general education (up to high school level).			
	Health institutions essentially serving the needs of the residential community such as dispensaries, clinics, Diagnostic Centres, nursing homes etc. and having floor area upto 200 Sq.m.			
	Community facilities such as community halls, recreational clubs, Social welfare centres, gymnasium/yoga centers, swimming pool, libraries etc. – floor area upto 200 Sq.m.			
	Utility installations and civic amenities essentially serving the needs of residential community such as post office, police station, telephone exchange, electric substation, fire station, tot lots, parks, play grounds,			

	water treatment plants below 5 MLD.			
	Plant nurseries, pump house, wells and irrigation ponds incidental to community needs			
9.2	**Provided that the access road has a width of 5m minimum.**			
	Shops/professional offices, banking and financial institutions – floor area limited to 500 sq m, Automobile workshops for two/ three wheelers – floor area upto 200 Sq.m.			
9.3	**Provided that the access road has a width of 7m minimum.**			
	i. Hospitals with 5 beds ii. Convention Centres/ Auditorium/ Wedding Halls/ Community halls/Exhibition Centers and Art Gallery-floor area upto 1000 Sq.m. iii. Educational institutions upto Higher secondary schools.	LPG distribution centers (excluding bottling plants and bulk storage) limiting the floor area to 50 m^2.	Educational institutions of Higher order such as colleges/ universities/ general education institutions/ research and development institutions	
10	**Commercial Use Zone**			
10.1	All shops including shopping complexes, shopping malls, multiplex, hypermarkets, restaurants, hotels, markets.	Places of worship	Fuel filling stations	Any other use not specified

	Professional offices, commercial offices & establishments, banking and financial institutions, IT soft ware units, Community halls, Movie halls, recreation clubs/ wedding hall, Auditorium etc.	Outdoor games stadium		
	Social welfare centres, exhibition centres, art gallery, museum, convention centres, library & reading room	Hospitals & health centers above 50 beds, Higher educational institutions		
	Godowns/warehouse/storage of non-hazardous materials, stacking yards.			
	Cottage industries, automobile workshops, automobile service stations, cold storage, service industries of non-nuisance nature with number of workers limited to 19 without power or 9 workers with power limited to 30HP (See Annexe I), saw mill, weigh bridges, printing press, IT hardware / electronic industries, marble and granite storage / cutting centres.	Dairy & dairy farms, poultry farms, Smoke houses,		
	Expansion of existing residential buildings, Single Family Residences, Residential buildings floor area upto 300 m^2, residential flats/apartments	Slaughter houses		

	with lower floors for commercial use, night shelters, orphanages, old age homes, Dharmasala, hostels and boarding houses, lodges and guest houses, ashram/mutts.			
	Govt.(local/ state/ central) or public sector offices			
	Gymnasium, yoga centres, Day care, Creche, Nursery/ Kindergarten, schools up to higher secondary level, expansion of existing educational institutions			
	Transmission & telecommunication towers and wireless stations			
	Clinics, diagnostic centres, hospitals up to 50 beds.			
	Tot lots, Parks & playgrounds, fair ground, open air theatre, indoor games stadium			
	Parking plaza, transport terminals			
	Public utility areas & public utility buildings, comfort stations			
	Plant nursery, storage of agricultural produces and seeds, pump house, wells and irrigation ponds			
11	**Industrial promotion zone**			
11.1	Zoning Regulations of Residential use zone shall be applicable. In addition, following uses also shall be permitted /restricted as the case may be.			

	Information Technology buildings (Information technology building refers to building occupied by industries and other business establishments, whose functional activities are in the field of information technology, information technology enabled services (IT/ITES) and communication technology	dairy farm, poultry farm		Any other use not specified
	Cottage industries, service industries of non-nuisance nature (See Annexe - II), Automobile showrooms, automobile workshops & automobile service stations, spray painting workshops, saw mills, timber yard, ice factory, cold storage, printing press, water treatment plants, marble and granite storage / cutting centers,			
	Industrial estates & industrial parks of non obnoxious and non nuisance type industries			
	Storage of non-nuisance nature/ sale of goods/ commercial and business offices incidental to the manufacturing activity Godowns/Warehouses/Storage of non hazardous material, stacking yards, weigh bridge.	Transport terminals, Parking plazas, other parking areas		

	Markets	LPG distribution centres excluding bottling plants and bulk storage go down.		
12	**Public & Semipublic Use Zone**			
12.1	Local/State/Central Government/Public Sector Offices and Other Related Public Buildings, Educational institutions, library and reading rooms, social welfare centers and art gallery, public utility buildings, places of worships	Transmission/ Telecommunication towers	cremation ground/ crematorium, burial ground.	Any other use not specified
	Residential Quarters incidental to public and semi public use.			
	Public Utility Areas and Buildings.			
	Additions and alterations to the existing public and semi public buildings including addition of new blocks without altering the use.			
	Buildings for incidental uses with floor area limited to 500 m^2.			
13	**Traffic and Transportation Use Zone**			
13.1	Transport terminals including	Public Utility	Fuel Filling	Any other

	constructions that form an integral part of the terminal	Areas and Buildings	Stations	use not specified
	Any incidental uses to the transport terminals such as Retail Shops, Restaurants, Canteen etc. with floor area limited to 100 m^2.		Container terminals provided that the access has a width of 18m minimum	
	Staff Quarters, Offices, Night Shelters, Guest Houses etc incidental to the transport terminals			
	Parking Plazas, Transmission Towers and Wireless Stations.			
14	**Park & Open Spaces Use Zone**			
14.1	Any construction/land development essential for the development/improvement of open air recreational facilities	Public Utility Areas and Buildings which will not affect the character of the area.		Any other use not specified
15	**Dry Cultivation Use Zone**			
15.1	Agriculture, horticulture and fodder cultivation, pastures, grazing ground, and other types of cultivation including social forestry	Places of worship	Cremation ground / crematorium, burial ground, common	Any other use not specified

			vault	
	Dairy farms, fish farms, seed farms, poultry farms, Plant nursery, pump house, wells and irrigation ponds.	Transmission/ Telecommunication towers and wireless station.	Gas Godowns Fuel filling stations	
	Residential building floor area upto 500 Sq. m.	Piggery farm, smoke house	Storage of explosive and fire works	
	Orphanages, old age homes, dharmasala , ashrams/ mutt	Public utility areas and buildings like water supply and electrical installations, sewage treatment plant etc.	fish /meat processing centers	
	Clinics(Outpatient) and diagnostic centres- floor area upto 200 Sq.m.	Saw mills		
	Shops, professional offices, commercial offices and establishments, banking and financial institutions, Gymnasium, Yoga Centres, restaurants, canteens – floor area upto 200 sq.m			
	Police Post/Police Station, Post and Telegraph office, Fire Post / Fire station, Telephone Exchange			

	Day care and Creche, Nursery / Kinder Garten / Primary & Upper primary schools		
	Library and Reading Rooms		
	Godowns/warehouses/ Storage – non hazardous – floor area upto 200 Sq.m.		
	Cottage industries, Service industries of non-nuisance Nature (See Annexe-I) engaging not more than 6 workers without power or 3 workers with power limited to 5HP		
	Automobile workshops for 2/3 wheelers		
	Tot lots/Parks/Play Grounds		
	Storage of agricultural products		
15.2	**Provided that the access road has a width of 5m minimum**		
	Stacking yards, Godowns / Warehouses/Storage -non-hazardous upto 500 sq m	Stacking yards, Godowns / Warehouses/Storage -non-hazardous	
	Residential flats / Apartments		
15.3	**Provided that the access road has a width of 7m minimum**		
	Auditorium/Wedding Halls/Community halls floor area upto 500 Sq.m.	Higher education/ health care facilities	
	Hospitals & Health Centres – floor		

	area upto 500 Sq.m.			
	Markets			
16	**Town Centre (Mixed Use Zone)**			
16.1	Zoning Regulations of Residential, Commercial and Public and Semi-Public use zones shall be applicable. In addition following uses also shall be permitted:			
16.2	**Provided that the access road has a width of 7m minimum**			Any other uses not specified
	Industrial Estates & Industrial Parks of non-obnoxious and non-nuisance type			
16.3	**Provided that the access road has a width of 18m minimum**			
			Container Terminal	
Regulations as per clause 16 above, shall also be applicable in land to a depth of 100m on either sides of roads having an existing or proposed width of 12 m & above and in land to a depth of 50m on either sides of roads having existing or proposed width of 10 m except for Heritage sites, water bodies, Park & Open Spaces Use zone and special use zones.				
17	**Heritage Sites**			
	No development, re – development, 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 this area shall be allowed except with the prior written recommendation of the Art & Heritage Commission			

	constituted by the Government in accordance with the Rule 154 & 155 of the Kerala Municipality Building Rules 1999 in order to conserve the heritage character of the site.			
18	**Cremation/Burial Ground**			
	Cremation/burial activities and Buildings/ structures incidental to the zone			
19	**Water bodies**			
	All existing water bodies shall be conserved. Bridges, side protection walls, bathing ghats, floating jetty and facilities related to river tourism may be permitted.			Any other use not specified
20	**Special Use Zones**			
Special use zones include the areas specifically demarcated for certain projects. No other activity unless otherwise specified should be permitted in such zones. If the project is not materialized or acquisition proceedings has not been initiated within a period of 7 years from the sanctioning of the plan, the area shall be deemed as part of immediate surrounding zone and constructions shall thereafter be allowed with the concurrence of the Chief Town Planner concerned.				
1	**Private Bus Stand -** Proposed private bus stand near proposed NH 66 bye pass at Perumbadanna	Buildings/structures which are integral part of the bus stand. A commercial complex of 10% of the total area may be permitted along with or after the construction of the bus stand. Incidental uses like waiting		

		sheds, toilets, canteen, restaurants, retail shops etc. Shall also be accommodated in this area.
2	**Stadium & Sports Complex** - By expanding the existing municipal stadium	Acquisition of additional land and completion of Stadium and sports complex near existing municipal stadium. Stadium for sports activities and incidental buildings.
3	**Indoor Stadium** - Indoor stadium/open air theatre at Vedimara	Stadium for sports activities and incidental buildings. Organized park and Open space and Fair ground
4	**Modernisation of Dumping yard**	Buildings/structures incidental to the main use only are permitted

GENERAL NOTES

1. Zoning regulations of the Master Plan will prevail over the provisions in Kerala Municipality Building Rules in Force.

2. The provisions of Kerala Conservation of Paddy land and Wetland Act and Coastal Regulation Zone notifications will prevail over all the provisions in the Master Plan.

3. Subject to the Zoning Regulation of the respective zones, more than one uses may be combined in a building, provided that the total floor area on all floors of such a building shall not exceed the maximum floor area permitted for any of such use in that zone. Also the floor area of the individual uses shall be limited to that prescribed by the Zoning Regulation for the zone.

4. For availing mixed use based on road width, if the plot under a survey number/ numbers falls in two different use zones, zoning regulation of major portion of land use (more than 50%) will be applicable for the whole plot.

5. Irrespective of Zoning Regulations, Public utility areas and buildings can be implemented anywhere in the planning area except at Special Zones.

6. Future expansion of existing public and semipublic uses in adjacent plots shall be considered as uses permitted in all zones subject to restrictions imposed under other acts and rules.

7. For the purpose of these regulations, floor area means the total floor area of the building on all floors.

GENERAL GUIDELINES FOR LARGE SCALE PROJECTS

Large scale development proposals in an area not less than 2 hectares, exceeding an investment of Rs.50 crores, 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 Heritage and Park & Open space, subject to the recommendation of a committee to be constituted by the Government for this purpose, under the Chairmanship of the Secretary, Local Self Government Department, consisting of Chief Town Planner concerned of Kerala State Town and Country Planning Department and the Secretary, North Paravur Municipality as members and the District Town Planner, Ernakulam District of the Town and Country Planning Department as convener and satisfying the following conditions:-

a) The developer shall produce project cum feasibility report and environmental impact assessment report, if required, of the project to the convener of the committee, 15 days in advance of the committee meeting.

b) The developer shall produce before the committee, all required clearances from the State and Central Government agencies concerned.

c) Adequate provision shall be made for supporting infrastructure such as water supply, Sewerage, Solid Waste Management etc. Separate sewage treatment plant and solid waste management measures shall be provided and maintained by the developer at his /her cost.

d) Adequate Memorandum of understanding between the developer and Secretary North Paravur Municipality shall be undertaken to bring this into effect.

e) Maximum floor area ratio shall be 2 and minimum access width shall be 12 metres.

f) The project shall be completed within a period of 3 years if not specified otherwise.

ANNEXE I

Type of non-obnoxious and non-nuisance type of service or light industries permissible in Residential Use Zone, Commercial Use Zone & Dry Cultivation Use Zone

1. Flour Mills
2. Embroidery and Lace manufacturing
3. Gold and silver smithy
4. Watch, pen and Spectacle repairing
5. Laundry, dry cleaning and dying
6. Photo and picture framing
7. Manufacture and repair of musical instruments
8. Automobile servicing (excluding repair)
9. Radio servicing and repairing
10. Cotton and silk printing
11. Bakeries
12. Confectioneries
13. Cold storage
14. Aerated waters and fruit beverages
15. Manufacture of tobacco products
16. Garment making/tailoring
17. Electroplating
18. Bamboo and cane products
19. Sports goods
20. Card-board box and paper products
21. Domestic electrical appliances
22. Toy making
23. Furniture without machinery
24. Wooden electrical accessories
25. Copper, brass and metal utensils
26. Small foundries
27. Padlock
28. Sanitary fittings and other similar industries

ANNEXE II

List of non-obnoxious and non-nuisance type of service or light industries

1. Aerated water and fruit beverages
2. Apparel making
3. Assembly of air coolers and conditioners
4. Assembly of bicycles, baby carriage and other small non motorized vehicles
5. Atta – chakkies
6. Ayurvedic medicinal formulations, Ayurvedic health club
7. Bakery products , biscuits, confectionaries
8. Bamboo and cane products(only dry operations)
9. Block making for printing
10. Card board or corrugated box and paper products (paper or pulp manufacturing excluded)
11. Carpet weaving
12. Cement and concrete products(where crusher is not used)
13. Chilling plants and cold storage
14. Coir(without bleaching / dyeing)
15. Concrete batching plants
16. Cotton and woollen hosiery/ Cotton and silk printing
17. Electro plating
18. Electronics and electrical goods
19. Electronics equipment(Assembly)
20. Engineering workshop and general fabrication works (without any chemical treatment)
21. Embroidery and lace manufacturing
22. Flour mills(job work only)
23. Foam bed, latex thread
24. Foot wear(Rubber and PVC)
25. Furniture making
26. Fountain pens
27. Garment stitching , tailoring
28. Gold and silver smithy

29. Gold and silver thread saree work
30. Ice cream or ice making
31. Insulation and other coated papers(paper or pulp manufacturing excluded
32. Jobbing and machining
33. Light engineering
34. Laundry, dry cleaning and dyeing
35. Manufacturing of formulated synthetic detergent products
36. Manufacture of soaps involving process without generation of trade effluents (saponification of fat and fatty acids only)
37. Mineralized water
38. Musical instruments manufacturing
39. Oil ginning /expelling
40. Optical frames
41. Paint(by mixing process only)
42. Paper pins and U-clips
43. Power looms/ handlooms(without dyeing and bleeching)
44. Photo and picture framing
45. Pressure testing units
46. Printing Press
47. Rice mullors
48. Rope(Cotton and plastic)
49. Rubber gloss other than that for surgical and medical purpose
50. Rubberized coir mattresses
51. Scientific and mathematical instruments
52. Sports goods
53. Steeping processing of grains
54. Small foundries
55. Tissue culturing
56. Toys
57. Water softening and demineralization plants
58. Watch, Pen and spectacles repairing