

**15 -ാം കേരള നിയമസഭ**

**8 -ാം സമ്മേളനം**

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**21-03-2023 - ൽ മറുപടിയ്ക്ക്**

**ഉഴവൂർ ബൈപ്പാസ് റോഡ് നിർമ്മാണം**

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(എ)	ഉഴവൂർ ബൈപ്പാസ് റോഡ് നിർമ്മാണത്തിനായി കിഫ്ബിയിൽ നിന്നും ആവശ്യപ്പെട്ടതനുസരിച്ച് വീണ്ടും ട്രാഫിക് സർവ്വേ നടത്തി 09.11.2022-ൽ റിപ്പോർട്ട് സമർപ്പിച്ചതിന്മേൽ സ്വീകരിച്ച തുടർ നടപടികൾ അറിയിക്കാമോ; പ്രസ്തുത റിപ്പോർട്ടിന്റെ കോപ്പി ലഭ്യമാക്കാമോ;	(എ)	ട്രാഫിക് സർവ്വേ റിപ്പോർട്ട് പ്രകാരം 2 ലൈൻ റോഡിനുള്ള നിശ്ചിത ട്രാഫിക് ഡെൻസിറ്റി ലഭിച്ചിട്ടില്ല. ആയതിനാൽ 12/01/2023 ലെ കത്ത് പ്രകാരം പ്രോജക്ടിന് ഫണ്ട് അനുവദിക്കാൻ സാധിക്കില്ല എന്ന് കിഫ്ബിയിൽ നിന്നും അറിയിച്ചിട്ടുണ്ട്. പകർപ്പ് അനുബന്ധമായി ചേർക്കുന്നു.
(ബി)	വിശദമായ പദ്ധതി രേഖ തയ്യാറാക്കിയ ഏജൻസിയെക്കൊണ്ട് തുടർ പഠനം നടത്തിക്കുന്നതിന്റെ ഉദ്ദേശ്യലക്ഷ്യം എന്തെന്ന് വിശദമാക്കാമോ; പുതിയൊരു ഏജൻസിയെക്കൊണ്ട് പഠനം നടത്താൻ നടപടി സ്വീകരിക്കുമോ;	(ബി)	ഈ പ്രോജക്ടിന്റെ കൺസൾട്ടന്റായി KITCO-യെയാണ് നിശ്ചയിച്ചിരുന്നത്. Traffic survey report പ്രകാരം ബൈപ്പാസ് രൂപകല്പനയ്ക്കുള്ള നിശ്ചിത traffic density രേഖപ്പെടുത്തിയിട്ടില്ല. കിഫ്ബിയിൽ നിന്ന് അനുമതി ലഭിച്ചാൽ പുന:പരിശോധന നടത്താവുന്നതാണ്.
(സി)	പ്രസ്തുത പദ്ധതി യാഥാർത്ഥ്യമാക്കുന്നതിന് ആവശ്യമായ നടപടി സ്വീകരിക്കുമോയെന്ന് വ്യക്തമാക്കാമോ?	(സി)	കിഫ്ബിയിൽ നിന്ന് അനുമതി ലഭിക്കുന്ന മുറയ്ക്ക് മാത്രമേ പദ്ധതിയുമായി മുന്നോട്ട് പോകാൻ സാധിക്കുകയുള്ളൂ.

സെക്ഷൻ ഓഫീസർ



# ROADS AND BRIDGES DEVELOPMENT CORPORATION OF KERALA LTD

## DETAILED TRAFFIC STUDY REPORT FOR CONSTRUCTION OF UZHAVOOR BYPASS IN KOTTAYAM DISTRICT



OCTOBER 2022



**ROADS AND BRIDGES DEVELOPMENT CORPORATION  
OF KERALA LTD**

**DETAILED TRAFFIC STUDY REPORT  
FOR**

**CONSTRUCTION OF UZHAVOOR BYPASS,  
KOTTAYAM**

**OCTOBER 2022**

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## **INTRODUCTION**

The Govt. of India through the Roads and Bridges Development Corporation of Kerala Ltd. has embarked on a programme of proposed Highways to provide a safer, more comfortable and faster journey on the national road network. The Roads and Bridges Development Corporation of Kerala Ltd. has decided to make a 2 lane bypass for Uzhavoor town starting near the K.R. Narayanan Memorial Speciality Hospital and traversing via N.S.S. Karayogam Junction to finally meet the Koothattukulam – Marangattupilly road near Ottathengadi Junction

The present report details out the detailed traffic assessment study and outcome conducted for the Uzhavoor junction of Kottayam District

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## **PROJECT BACKGROUND**

Uzhavoor is a village in Meenachil Taluk belonging to the Kaduthuruthy constituency of Kottayam district and is 32 km away from Kottayam town. Uzhavoor town is connected with other major towns of Kottayam and Ernakulam district through roads. Public transport in the town is largely dependent on buses, run by both private operators and the Kerala State Road Transport Corporation (KSRTC). Uzhavoor is located about 6 km from Kudakkachira, 7 km from Kurichithanam, 6 km from Monipilly, 7 km from Kurianad and 15 km from Pala town. Uzhavoor is one of the routes for Sabarimala and Idukki and a passing point to the hilly regions of Central Kerala. It also connects major pilgrim and tourist destinations in the district and state. The nearest KSRTC bus stations are situated in Koothattukulam and Pala. The nearest railway station is Kottayam railway station which lies on the busy rail route between Thiruvananthapuram and Ernakulam and is served by several long distance trains. Kottayam Port, India's first multi-modal Inland Container Depot (ICD) and a minor port using inland water way, is situated at Nattakom (near Kodimatha), on the banks of Kothoor river. Cochin International Airport Limited (CIAL) at Nedumbassery is situated 60 km from Uzhavoor.

Uzhavoor is a developing town and comes under Uzhavoor taluk in Kottayam district of Kerala and is 32 km away from Kottayam town. Uzhavoor town is connected with other major towns of Kottayam and Ernakulam district through roads. Some of the surrounding towns and villages are Koothattukulam, Marangattupilly, Monipally, Kidangoor, Pala etc.

The land use in Uzhavoor town is of built up nature, while adjacent areas have mainly agricultural type of land use with farms, rubber plantations and paddy fields. The terrain is plain and rolling in nature.

Figure 2.1 shows the project location and Figure 2.2 shows the proposed Uzhavoor bypass alignment.



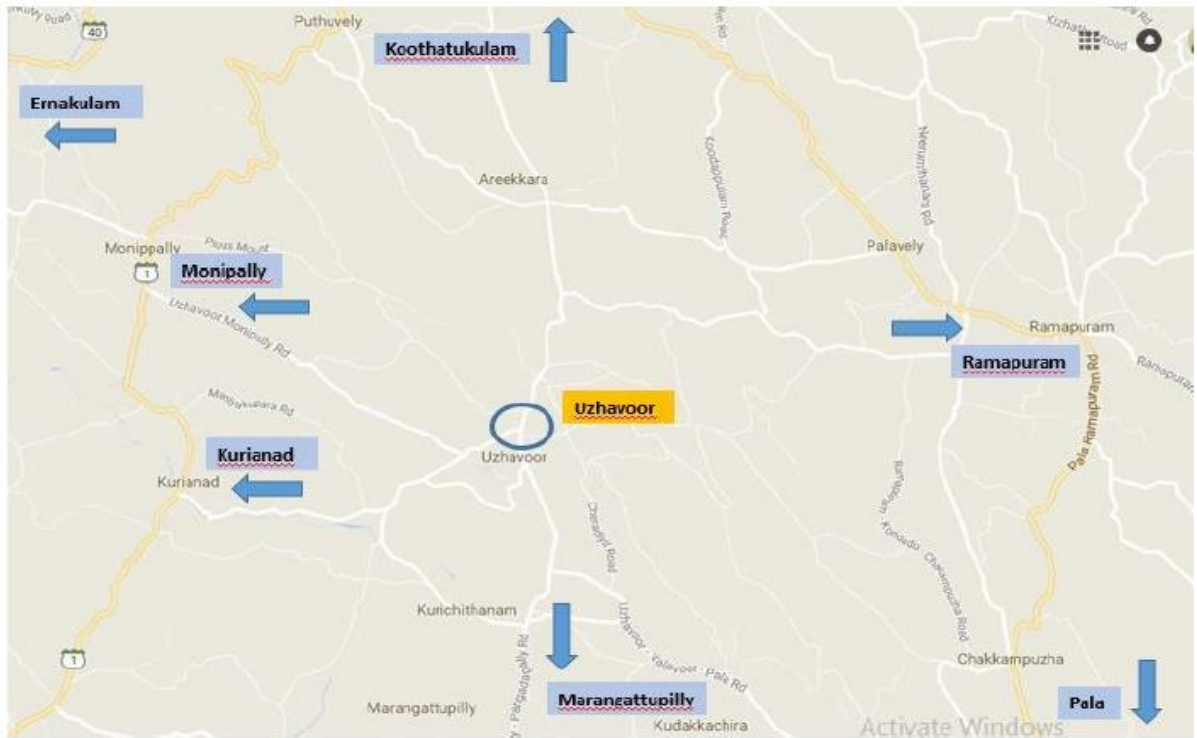


Figure 2.1: Location map of Uzhavoor

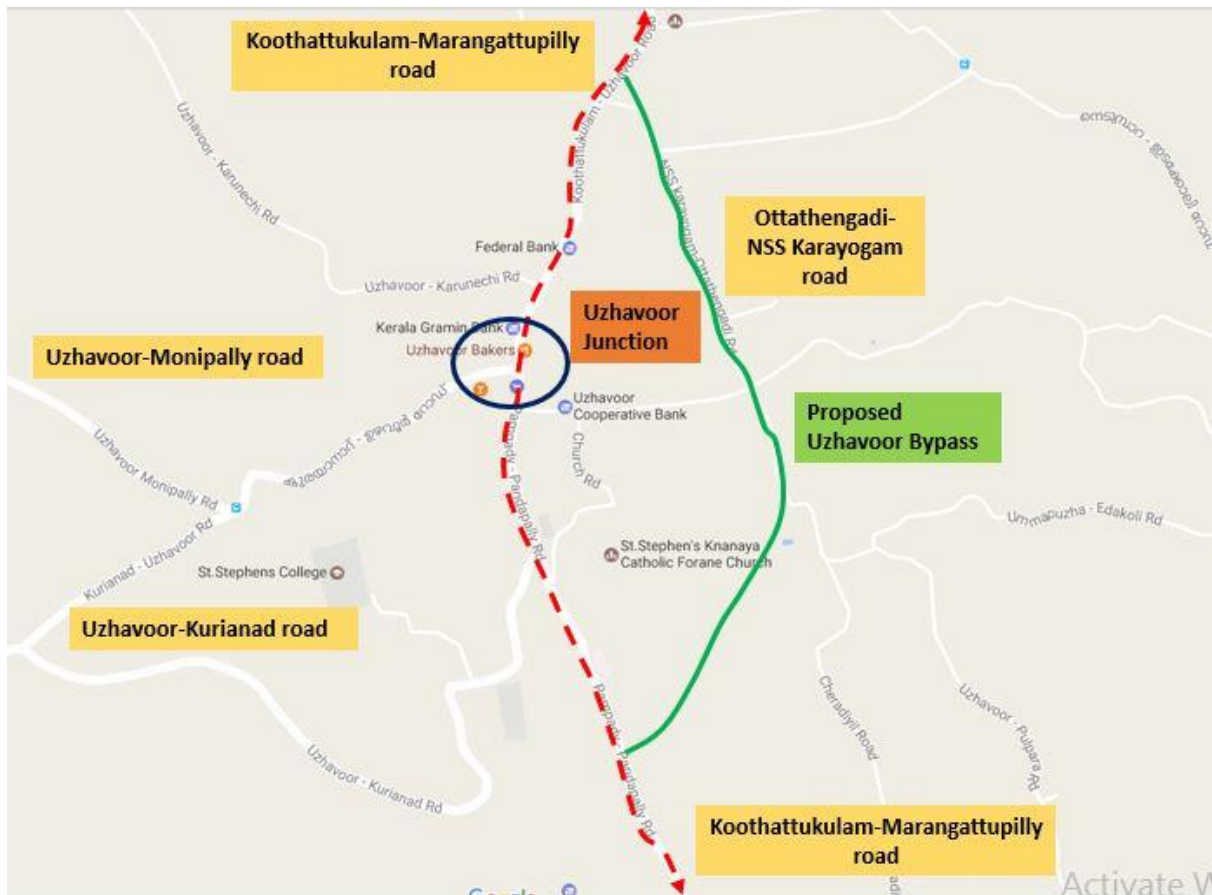


Figure 2.2 Proposed Alignment of Uzhavoor Bypass.

## 2.1 Existing Road network

The Uzhavoor Junction is well connected by major district roads and other district roads. It's a 3-legged Junction connecting to the major location Pala on the southwest through Uzhavoor-Valavoor-Pala Road. It's connected to Koothattukam on the North through Uzhavoor Koothattukulam road and it connects Monippally on the north east through Uzhavoor Monippally Road. The State highway 1 (SH 1) is running parallel to the east of Uzhavoor junction with a distance of 5km from Uzhavoor 3-legged Uzhavoor Junction. The major Road connecting Pala –Ramapuram and Koothattulum is running parallel to the west of Uzhavoor Junction at a distance within 8km. All the roads connecting Uzhavoor Junction are of two way configuration with an approximate available ROW of 8-15m.

The Uzhavoor Town is interconnected by many internal and village roads to the major district roads and State Highways.



Figure 2.3 Existing roads connecting Uzhavoor junction

## 2.2 Objective and Scope of Work

The traffic characteristics on the project road for the base year are essential for formulating improvement programs and in estimating the economic/commercial viability of the project. The objectives of the traffic study are:

- Traffic estimation in terms of volume on existing and proposed road
- Capacity Assessment based on traffic forecasting for next 20years.
- Capacity Assessment of Uzhavoor Junction

## 2.3 Purpose of Traffic Studies

Traffic surveys have been carried out on the project corridor in order to identify present and likely future scenarios so as to devise suitable remedial measures and to evolve appropriate design method. The primary objectives of these traffic surveys are to determine the characteristics of traffic movement on

the project corridor, determine the travel pattern determine the turning movement pattern of traffic at road intersections and determine traffic bottlenecks.

## 2.4 Traffic Surveys

The primary surveys were intended to estimate the traffic scenario on the project corridor and to identify necessary requirements to provide a better facility primary traffic surveys listed here under were conducted on the project corridor.

- Turning Movement Survey (3 day, 24Hours) - 1 Location (Uzhavoor Junctions)

The location indicating the traffic survey location at Uzhavoor Junction is represented in Figure 2.4 below.

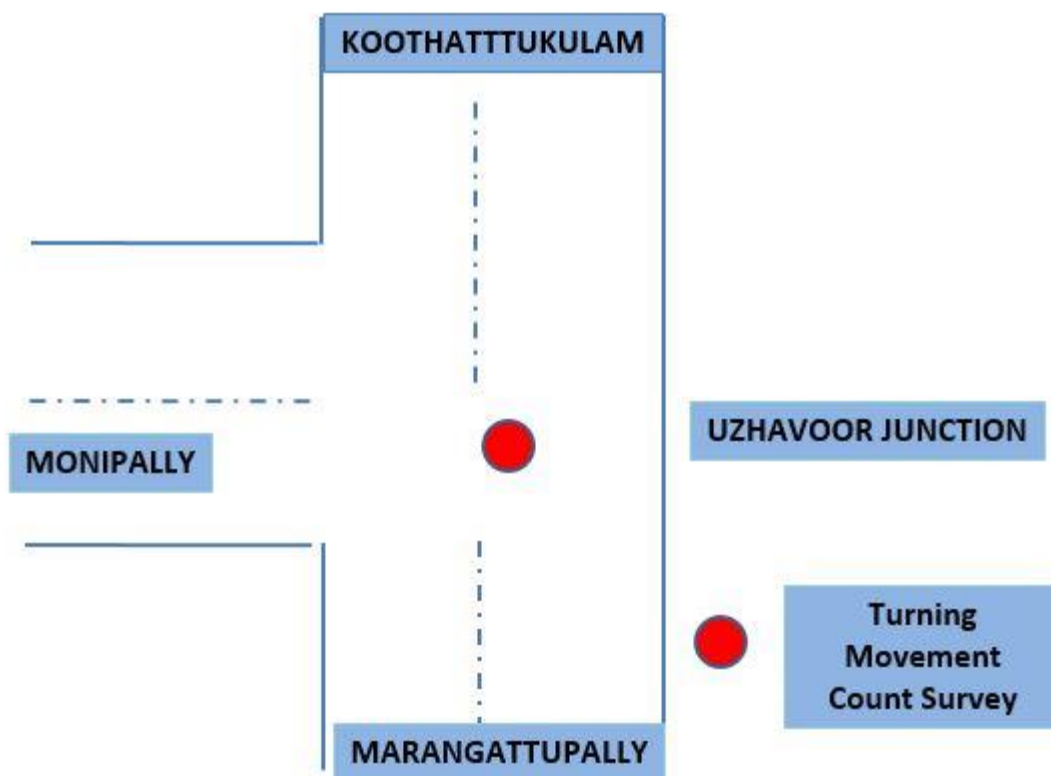


Figure 2.4 Line Diagram represented Uzhavoor junction

## 2.5 Traffic Survey Schedule

The list of the traffic survey along with their schedule and location is presented in Table 2.1. The traffic survey schedule was prepared as per the requirements of the study. All these traffic surveys have been carried out in accordance with the guidelines specified by IRC: 9-1972 and IRC: 102-1988. The methodology adopted for the traffic study is detailed below.

Table 2.1. Proposed Benchmarks for Comparison and Reasons for their Selection

Item No.	Type of Survey	Survey Location	Duration	Date of Survey
1	Turning Movement Count Survey (TMC)	Uzhavoor Junction	3 Days, 24 hours	30th September to 2th October 2022

The screenshots of survey conducted at Uzhavoor Junction is represented in Figure 2.5 below.





**Figure 2.5 Screenshots of traffic Survey Conducted at Uzhavoor Junction**

## 2.6 Methodology Adopted for traffic survey

For carrying out the counts, the vehicles were grouped under the following categories as given in Table 2.2. Video graphic counting method was adopted for conducting the traffic Survey. The count data was recorded at 15-minute intervals for each vehicle group for each direction of travel separately later. Trained enumerators were deployed for counting and recording. This traffic data is used for working out traffic characteristics analysis and forecast and economic and financial analyses.

### 2.6.1 Turning Movement Count (TMC) Survey

The Turning Movement Count Survey (TMC) was conducted at Uzhavoor junction where Koothattukulam – Marangattupilly road meets Uzhavoor – Monipally road. The objective of the Turning Movement Count Survey is to obtain information on peak hour direction wise movement of the traffic at major intersections along the project road. The survey was conducted for 3 days 24 hours, by placing camera on standby to record the video of traffic at the Junction. The peak hourly directional movement is used for deciding the improvement schemes and design of intersections.

### 2.6.2 Vehicle Classification

The Turning Movement Count Survey was conducted at Uzhavoor junction. For carrying out the counts, the vehicles were grouped under the following categories.

**Table 2.2: Vehicle Classification System (Fast & Slow)**

Fast Moving Vehicles	
2 Wheelers: scooters, bikes, motor cycles, mopeds etc.	
3 Wheelers including Auto rickshaw	
Passenger Car	Car, jeep, taxi & van (Old & New technology vehicles)

Bus	Mini bus
	Govt. bus
	Private bus
Truck	Light commercial vehicles (LCV)
	2 – Axle truck
	3 – Axle truck
	Multi axle truck
Other Vehicles	Agriculture Tractor, Tractor & Trailer
Slow Moving Vehicles	
	Bicycle
	Cycle rickshaw
	Animal drawn
	Hand cart

### 2.6.3 PCU VALUES

The vehicle classification as generally used in the traffic surveys in MORTH studies along with their PCU values, as suggested in IRC: 64 -1990, are presented in Table 2.3.

**Table2. 3: Vehicle Classification and PCU Factors**

Vehicle Type	PCU
Motorized Vehicles	
Car, Jeep and Van	1.0
Two Wheeler	0.5
Three Wheeler( Auto – Rickshaw)/ Mini LCV	1.0
Mini Bus	1.5
Govt Bus	3.0
Private Bus	3.0
School Bus	3.0
Light Commercial vehicle(LCV)	1.5
2 – Axle Truck	3.0
3- Axle Truck	3.0
Multi Axle Vehicle(MAV)	4.5
Agricultural Tractor	1.5
Agricultural Tractor with Trailer	4.5
Non-Motorized Vehicles	
Cycle	0.5
Cycle Rickshaw	2.0
Animal Drawn Cart	6.0

- In addition to the above, the counting of toll exempted vehicles, which include government vehicles etc., was carried out separately to estimate their composition.

## 3

**DETAILED SURVEY AND ANALYSIS****3.1 Data Analysis****3.1.1 Classified Traffic Volume Count.**

The Following traffic characteristics have been presented in the following sections:

- Average Daily Traffic (ADT) volume
- Average hourly variation of traffic volume
- Daily variation of traffic volume
- Average Composition of traffic
- Directional distribution of traffic.
- Divertible traffic.

**3.1.1.1 Average Daily Traffic (ADT) volume**

The traffic volume data collected during the surveys was averaged out to arrive at the Average Daily Traffic (ADT) on the project road and surrounding network. The summary of ADT in terms of vehicles and PCU for the locations is presented in Table 3.1.

**Table 3.1 Average Daily Traffic**

Type of Vehicle		ADT in Nos.	PCU	ADT in PCUs	
Fast Moving Vehicle	Car/ Van	4955	1	4955	
	Jeep	113	1	113	
	Bus	Mini Bus	120	1.5	180
		Standard Bus	261	3	783
	LCV	LCV	540	1.5	810
	Trucks	2 Axle Trucks	157	3	471
		3 Axle Trucks	95	3	285
	MAV	4-6 Axle Truck	21	4.5	94.5
		>=6 Axle	0	4.5	0
	Tractor	Tractor without Trailer	14	1.5	21
		Tractor with Trailer	1	4.5	4.5
	Ambulance, Fire , Police, Army, Postal		13	1	13



Type of Vehicle		ADT in Nos.	PCU	ADT in PCUs
	Scooter/Motor Cycle	5216	0.5	2608
	Auto Rickshaw	1733	1	1733
	JCB	16	3	48
Slow Moving Vehicles	Cycle	10	0.5	5
<b>Average Daily Traffic in numbers</b>		<b>13265</b>	<b>-</b>	<b>12124</b>
<b>Average Daily Traffic in PCUs</b>		<b>12124</b>	<b>-</b>	<b>-</b>

### 3.1.1.2 Hourly Variation of Traffic Volume

3 days average hourly variation of traffic for survey locations is shown in Figure 3.1. Generally peak flow occurs during 10:15 Am to 11; 15 AM (Total 1102 no of vehicles) in the morning, while the evening peak hour is observed during 5:15Pm to 6:15 PM (Total 974 no of vehicles). The peak hour depends on local activities viz. office timings, commercial activity, and school timings etc. which are more during the peak periods. Traffic flow during night time is lower than that of day time at the count location.

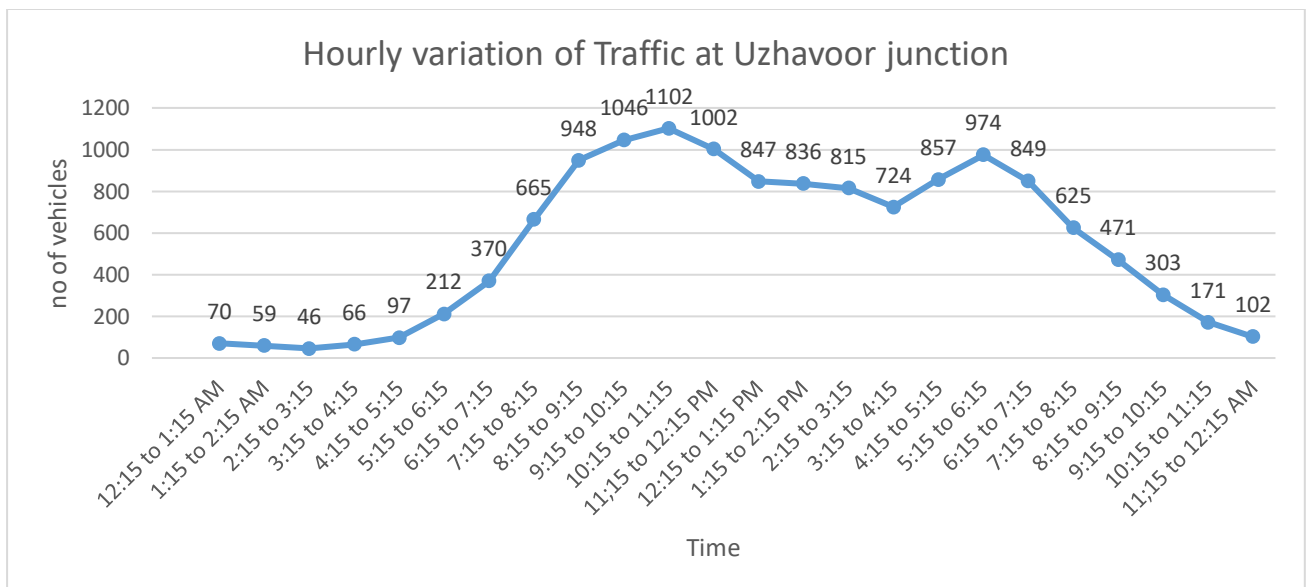


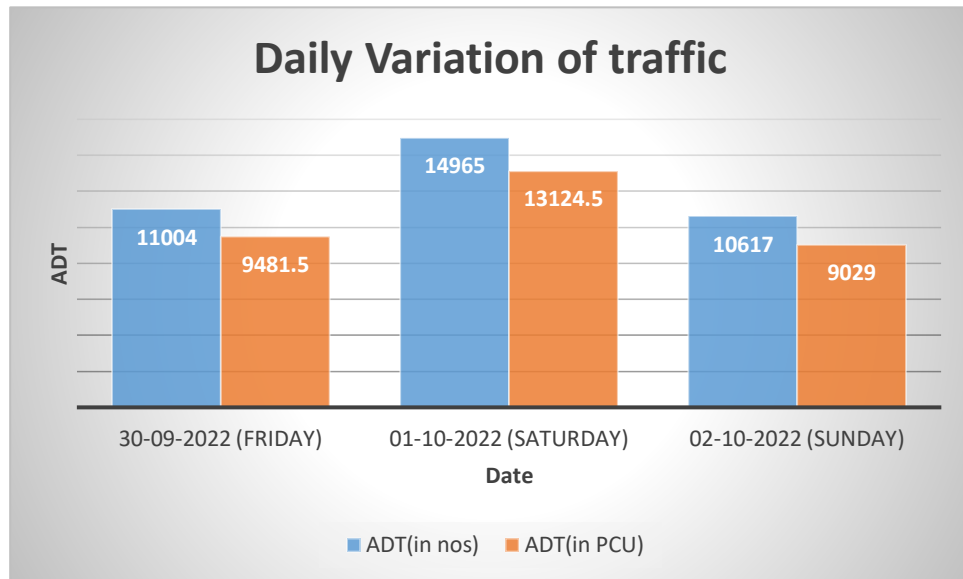
Figure 3.1: Hourly Variation of Traffic at Uzhavoor junction

### 3.1.1.3 Daily variation of traffic volume

Daily variation of traffic at the count location is presented in Table 3.2 and illustrated in Figure 3.2. At the location, daily variation of traffic with respect to ADT is generally not noticeable as most of the daily volume being near to ADT volumes. The maximum traffic is observed on Saturday 01.10.2022 compared to other days at the count location.

**Table 3.2 .Daily Variation of Traffic Volume at survey location**

Date	Day	Uzhavoor	
		Vehicles in Nos	Vehicles in PCU
30.09.2022	DAY 1	11004	9481.5
01.10.2022	DAY 2	14965	13124.5
02.10.2022	DAY 3	10617	9029

**Figure 3.2: Daily Variation of Traffic at Uzhavoor**

#### 3.1.1.4 Traffic Composition

An analysis was carried out to find the composition of traffic both for fast and slow moving traffic. The vehicular composition distribution for the two location is shown in below.99% of vehicles crossing the count location are fast moving passenger vehicles which includes Cars, Buses and Bikes. 42% of the total traffic comprises of Scooter/ Motor cycle traffic while Car/Van comprise of 33%. Share of Non-motorized traffic like cycle is less than 1%. Auto rickshaws constitute 15% of the traffic. 33% of four wheelers, 42% of two wheelers and 15% of three wheelers confirm the presence of local people and short distance travelers. Figure 3.3 shows the traffic composition observed at the count location.

The percentage of commercial vehicles comes less than 8% of the total traffic. Share of buses along the project location is also low. The total percentage of local traffic comes around 90% of the total traffic which implies majority of the traffic are local traffic.

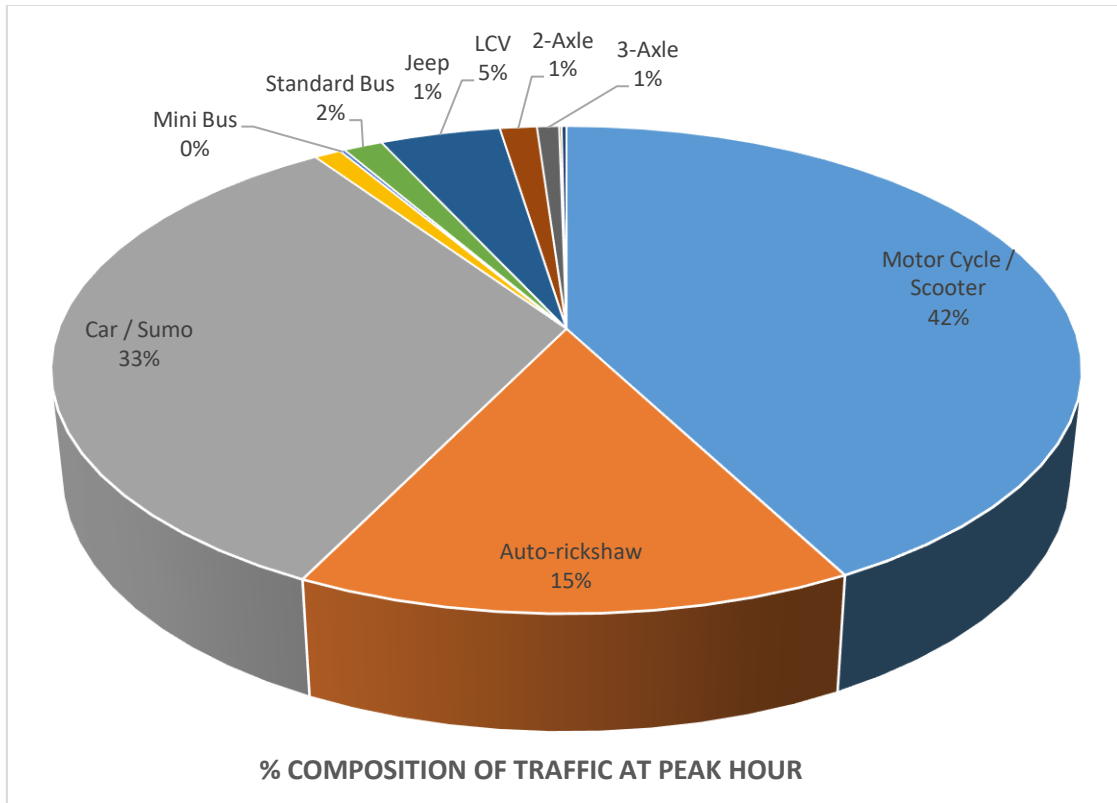


Figure 3.3: Traffic Composition at Uzhavoor

**3.1.1.5 Annual Average Daily Traffic (AADT)**

The Traffic plying on any road generally varies over different periods of the year depending on the cycle of different socio – economic activities in the region through which it passes. Therefore, in order to have a more realistic picture of the traffic on the project road, it is required to assess seasonal variation in traffic to estimate the Annual Average Daily traffic (AADT). Therefore, the ADT observed during the survey duration is multiplied by Seasonal Correction Factor (SCF) to derive an AADT. The seasonal correction factor is generally derived from secondary data sources such as past month –wise traffic data on the project road, monthly toll revenue from existing tolled highway in the immediate influence area, sales of fuel at different filling stations along the project highway, arrival of vehicles at establishments like Truck terminals, railway goods stations, etc.

For buses as they generally ply on fixed and scheduled routes, a uniform SCF of 1.0 was considered. The Seasonal Correction Factor for the project Road is given in Table 3.3. The AADT estimated for the project road are presented in Table 3.4.

**Table 3.3: Seasonal Correction factor**

SCF	Car	Bus	Trucks
	1	1	1

Table 3.4: Annual Average Daily Traffic (AADT)

Type of Vehicle		ADT in Nos.	PCU	ADT in PCUs	
Fast Moving Vehicle	Car/ Van		4955	1	4955
	Jeep		113	1	113
	Bus	Mini Bus	120	1.5	180
		Standard Bus	261	3	783
	LCV	LCV	540	1.5	810
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	MAV	4-6 Axle Truck	21	4.5	94.5
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	Tractor	Tractor without Trailer	14	1.5	21
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	Ambulance, Fire , Police, Army, Postal		13	1	13
	Scooter/Motor Cycle		5216	0.5	2608
Auto Rickshaw		1733	1	1733	
JCB		16	3	48	
Slow Moving Vehicles	Cycle		10	0.5	5
<b>Average Daily Traffic in numbers</b>		<b>13265</b>	-	<b>12124</b>	
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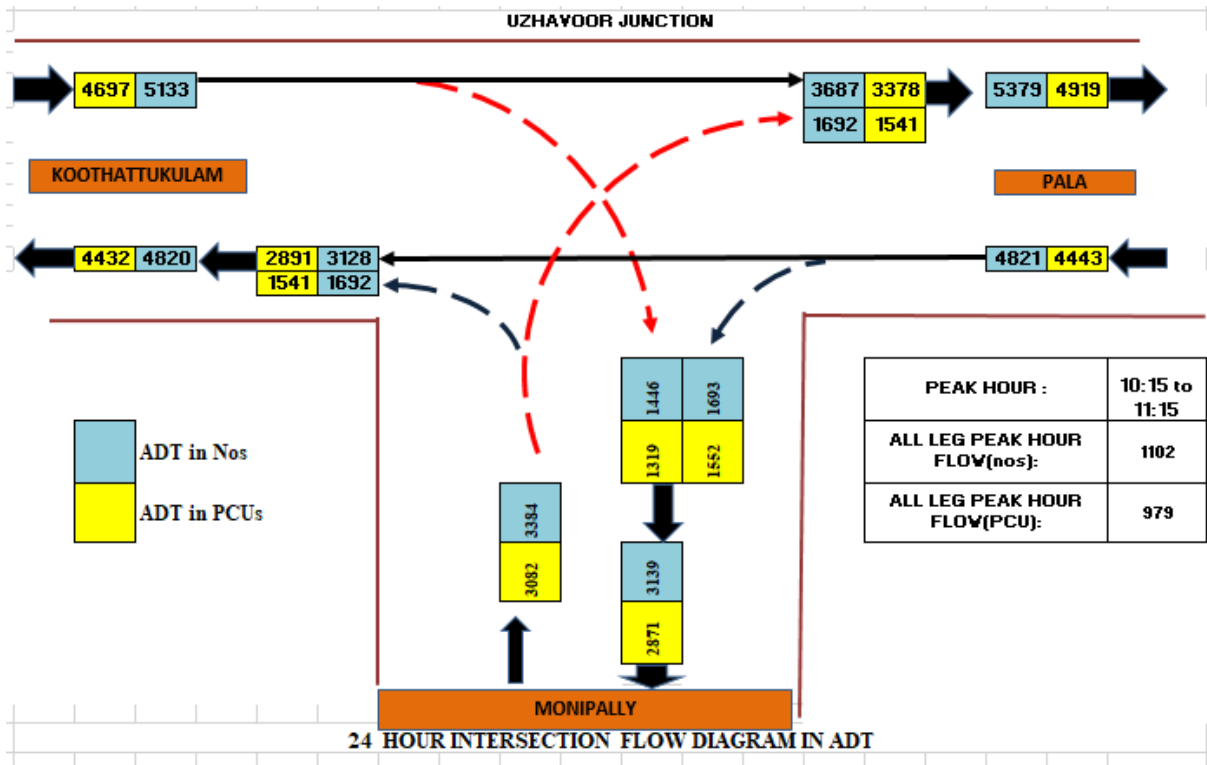
### 3.1.1.6 Turning Movement Count Survey

Intersection is a critical element and causes traffic conflicts on the road and dictates the smooth flow of traffic on a road. Improvement of important intersections is one of the significant components for overall improvement of any road. Turning Movement Count Survey conducted at Uzhavoor Junction forms the basis of arriving at the percentage of diverted traffic from the existing road. This statement is also valid for the project road. Table 3.5 below shows the location and date of survey.

**Table 3.5: Location of Turning Movement Survey**

Sl. No	Name of Location	Date of Survey	No. of Leg	Type	Category of Cross Roads
1	Uzhavoor Junction	30.09.2022 TO 02.10.2022	3	‘T’ Junction	Koothattukulam – Marangattupilly road meets Uzhavoor – Monipally road

The 24 hour traffic flow diagram in ADT and PCU with Peak hour, Peak hour PCU and Cross road traffic (ADT) have been presented in Figure 3.4. The study shows that majority of the traffic is through the Koothattukulam – Pala Stretch during the peak hour.



**Figure 3.4: Traffic Movement at Uzhavoor Junction**

Table 3.6 gives location wise peak hour traffic observed at the intersection along with the Summary of 24 hour junction traffic volume.

**Table 3.6: Peak Hour Traffic**

Sl. No	Survey Location	No. of Legs	Peak Hour	Peak Hour PCU of All Legs
1	Uzhavoor Junction	3	10:15 TO 11:15 am	979

### 3.1.1.7 Projected Traffic Growth Rate

The traffic growth rate is normally established by studying the past trends in traffic growth and socio-economic parameters. Traffic growth rate shall be established for each category of commercial vehicles to be considered for design of pavement. An average annual growth rate of 5% is considered for the projection of traffic. The suggested growth rates are summarized in Table 3.7.

**Table 3.74: Suggested Traffic Growth Rate**

Type of Vehicle	2022-2027	2027-2032	2032-2037	Beyond 2037
2 Wheeler	5%	5%	5%	5%
3 Wheeler	5%	5%	5%	5%
Car/Van/Jeep	5%	5%	5%	5%
Bus	5%	5%	5%	5%
2 Axle	5%	5%	5%	5%
3 Axle	5%	5%	5%	5%
MAV	5%	5%	5%	5%

### 3.1.1.8 Capacity Analysis

Capacity analysis is an important aspect while planning, design and operation of roads and provides the basis for determining the carriageway width to be provided with respect to the volume and composition of traffic. Since the existing Koothattukulam – Pala road follows a two lane road configuration for most of its length, the guidelines given in the IRC: 64 - 1990 (Guidelines for capacity roads in rural areas) is followed:

**Table 3.85: Traffic Capacity (PCU/day) as per IRC 64-1990**

Terrain	Curvature (Degree/ Km)	Design service volume (PCU/Day)
Plain	Low	15,000
	High	12,500

**Table 3.9: Projected Traffic in PCU**

Year	AADT in PCU Koothattukulam – Pala road
2022	6269
2023	6582
2024	6911
2025	7257
2026	7619
2027	8000
2028	8400
2029	8820
2030	9261
2031	9725
2032	10211

Year	AADT in PCU Koothattukulam – Pala road
2033	10721
2034	11257
2035	11820
2036	12411
2037	13032
2038	13683
2039	14368
2040	15086
2041	15840
2042	16632
2043	17464
2044	18337
2045	19254

The traffic flow observed on Koothattukulam – Pala road crosses 15000 PCU by the 18th year i.e. 2040. As per the, IRC: 64-1990, 15000 PCU is considered as the capacity of 2 lane roads. So the exiting road has to be widened from 2 lane to cater the future traffic flow. However, since the exiting road is passing through built up areas of Uzhavoor town, upgradation of the exiting road would result in high land acquisition and would affect adjacent structures/properties. Hence, a bypass has been recommended for Uzhavoor town evading the built up areas and congested town and allowing smooth flow of traffic.

### 3.1.1.9 Diverted Traffic

The existing Koothattukulam – Pala road follows a two lane configuration and capacity of the road exceeds the design capacity by the 18th year itself, therefore, the consultant has recommended a Bypass for the stretch. From junction analysis it was found that around 52% of traffic plying on the existing Koothattukulam – Pala road may divert to proposed bypass. The public transport buses and two wheelers may not divert to proposed bypass since they will have to enter town for boarding and alighting of passengers and for local activities respectively. The tourist and pilgrim buses destined to tourist places and pilgrim centres like Munnar, Vagamon, Malayattoor, Sabarimala etc. may use the proposed bypass. Some of the Heavy goods and Commercial vehicles running on the highway can use the proposed bypass in order to avoid any traffic congestion at Uzhavoor town. Table 3.10 gives the percentage of diverted traffic from junction analysis and illustration of the diverted traffic is given in Figure 3.5. Table 3.11 gives the projected diverted traffic.

**Table 3.10: Percentage of Divertible Traffic from Junction Analysis**

Traffic Direction	Percentage of Directional Traffic	Percentage of Divertible Traffic	Total Divertible Traffic
Pala to Koothattukulam	24%	24%	52%
Koothattukulam to Pala	28%	28%	
Pala to Monipally	13%	-	

Traffic Direction	Percentage of Directional Traffic	Percentage of Divertible Traffic	Total Divertible Traffic
Monipally to Pala	13%	-	
Koothattukulam to Moniplly	11%	-	
Monipally to Koothattukulam	12%	-	

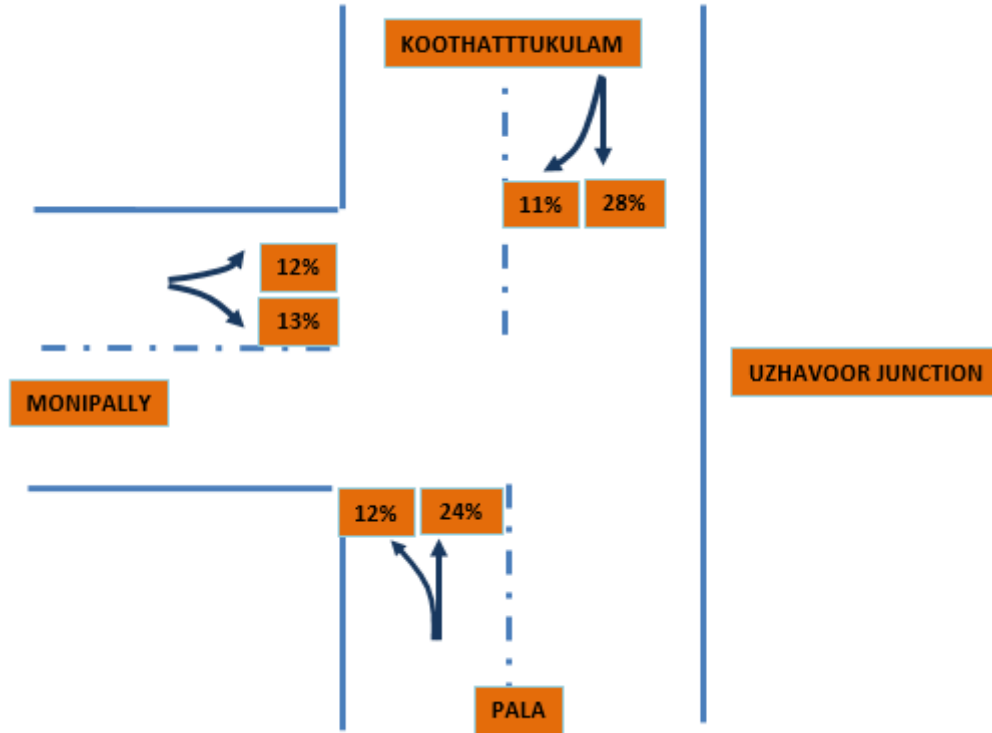


Figure 3.5: Percentage of Divertible Traffic

Table 3.11: Projected Diverted Traffic in PCU

Year	Bypassable Traffic (52% of Junction Traffic )
2022	3650
2023	3833
2024	4024
2025	4225
2026	4437
2027	4658
2028	4891
2029	5136
2030	5393
2031	5662



Year	Bypassable Traffic (52% of Junction Traffic )
2032	5945
2033	6243
2034	6555
2035	6883
2036	7227
2037	7588
2038	7967
2039	8366
2040	8784
2041	9223
2042	9685
2043	10169
2044	10677
2045	11211

### 3.2 Conclusion

The existing traffic at Uzhavoor junction is observed as 13265 vehicles per day and 12124 PCU/day.

Traffic on Koothatukulam-Pala Road, which is 6269 PCU per day, is reported to be the junction's busiest direction. According to traffic projections, existing road capacity will be insufficient to handle predicted traffic in FY-2040, necessitating the building of additional lanes.

The proposed bypass will divert around 52% of the existing traffic (excluding two wheelers and public transport) passing through Uzhavoor town. The divertible traffic at the end of design period FY-2045 is found to be 11211 PCU/day which is just crossing the capacity of two-lane configuration. Hence the proposed bypass can be considered under two lane configurations to cater the future traffic during the design period. According to KIIFB rules, the planned bypass needs a 7-meter roadway with a 1.5-meter paved shoulder and a 13.6-meter ROW.

# Annexure – I





