

**INTERSECTION IMPROVEMENT AT THIRUVANMIYUR ALONG
LATTICE BRIDGE ROAD IN CHENNAI**

Submitted in partial fulfilment of the requirements for the award of

**Bachelor of engineering degree in
Civil Engineering**

By

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**DEPARTMENT OF CIVIL ENGINEERING
SCHOOL OF BUILDING AND ENVIRONMENT**

**SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
Accredited with Grade “A” by NAAC**

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

MARCH 2021



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BONA FIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of Nithish.S (Reg. No. 37200048) and Velpandian.M (Reg. No.37200074) who carried out the project entitled **“INTERSECTION IMPROVEMENT AT THIRUVANMIYUR ALONG LATTICE BRIDGE ROAD IN CHENNAI”** under my Supervision from January 2021 to April 2021.

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DECLARATION

We **Nithish.S (Reg. No. 37200048)** and **Velpandian.M (Reg. No.37200074)** hereby declare that the Project Report entitled **“INTERSECTION IMPROVEMENT AT THIRUVANMIYUR ALONG LATTICE BRIDGE ROAD IN CHENNAI”** done by us under the guidance of Dr. V.SAMPATHKUMAR at Sathyabama University, Chennai is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Civil Engineering.

1.

2.

DATE :

PLACE:

SIGNATURE OF THE CANDIDATE

TABLE OF CONTENT

CHAPTER NO	TITLE	PAGE NO
1	INTRODUCTION	6
	1.1 General	6
	1.2 Road	6
	1.2.1 Types of Roads	7
	1.3 Intersections	7
	1.3.1 Types of Intersection	7
	1.4 Intersection Improvement	7
	1.4.1 Traffic	7
	1.4.2 Traffic Improvement	7
	1.5 Methodology	8
2	OBJECTIVE AND SCOPE OF STUDY	9
	2.1 Objective	9
	2.2 Scope of the Study	9
	2.3 Review of Literature	9
3	STUDY AREA AND PRIMARY DATA COLLECTION	14
	3.1 Study Area	14
	3.2 Data Collection	16
	3.2.1 Geometric Surveying	15
	3.2.2 Traffic Volume Count Surveying	17
	3.3 Passenger Car Equivalent(PCE)	19

4	DATA COLLECTION AND TRAFFIC ANALYSIS	20
	4.1 Definition	20
	4.2 Data	20
	4.2.1 Traffic Volume Count	20
	4.2.2 Traffic Flow Diagram	26
	4.3 Traffic Analysis	27
	4.3.1 Peak Hour	27
	4.3.2 Peak Hour Factor	30
	4.3.3 V/C Ratio	30
	4.3.4 Mode Share	31
5	TRAFFIC FLOW MANAGEMENT	34
	5.1 General	34
	5.2 Cotton House Intersection	34
	5.3 Police Booth Intersection	35
	5.4 V/C Ratio	36
6	SUMMARY AND CONCLUSION	37
	6.1 Summary	37
	6.2 Conclusion	37
	6.3 Scope of the Project	38
	REFERENCES	39

CHAPTER 1

INTRODUCTION

1.1 General

With the high growth of city traffic, the conflict between traffic demand and supply has increased, and the traffic becomes congestion. Traffic congestion can be characterized by the decline in speed, the rise in travel time and the increase of vehicle's queue on the road. In addition, traffic congestion happens when the road demand exceeds the road capacity. The road intersection is not sustainable if its capacity exceeds the volume, but this condition exists only in certain intersections and it has dominated over entire city. L.B.Road and ECR Road, Chennai seems to be talk of the town, specifically from Cotton house intersection to Ecr. The volume of traffic on the IT corridor is more than 3.5L vehicles on weekdays. In this paper we discuss more about how to reduce the traffic volume at Thiruvanmiyur junction

1.2 Road

A long narrow path with a smooth and paved surface, especially for traveling by motor vehicles, carriages, etc. between two or more points; Road or highway.

1.2.1 Types of roads

- Freeways,
- Express ways,
- Highways,
- Arterials,
- Local streets,
- Collector streets

1.3 Intersections

An intersection is a road junction where two or more roads either meet or cross. An intersection must be maintained by most traffic lights, roundabouts or an island.

1.3.1 Types of Intersection

Intersections are classified as

- 3-way intersection
- 4-way intersection
- 5-way intersection
- 6-way intersection

1.4 Intersection Improvement

Intersections are important for road traffic; They control the speed, safety, cost and efficiency of a road. The turning movements of vehicles directly reduce safety and efficiency, making left turns the most important design factor in intersection development and operation, hence deducing congestion on the road. The most used methods include improvising signal timing, eliminating the factors that reduce sight distance, making drivers know that they are nearing an intersection, and improving bicycle or pedestrian facilities at the intersection.

Prohibited right turning schemes:

i. T turn

Diversion of the right turning traffic to an alternative intersection further along the road where there is more capacity for dealing with a right-turn. It is often useful for dealing with a difficult right turn for a minor road into a major road. The right turn gets shifted to a minor-minor junction.

ii. G turn

Diversion of the right-turning traffic to the left before the junction. It is useful for a right-turn from a major road, since it is converted to a left turn from major road and a straight-over movement at the original junction.

iii. Q turn

Diversion of the right turning traffic beyond the junction .This entails three left turns and requires the driver to travel twice through the original junction, thus increasing the total volume of traffic handled by the junction. Since only left turns are involved in it is considered the least obstructive.

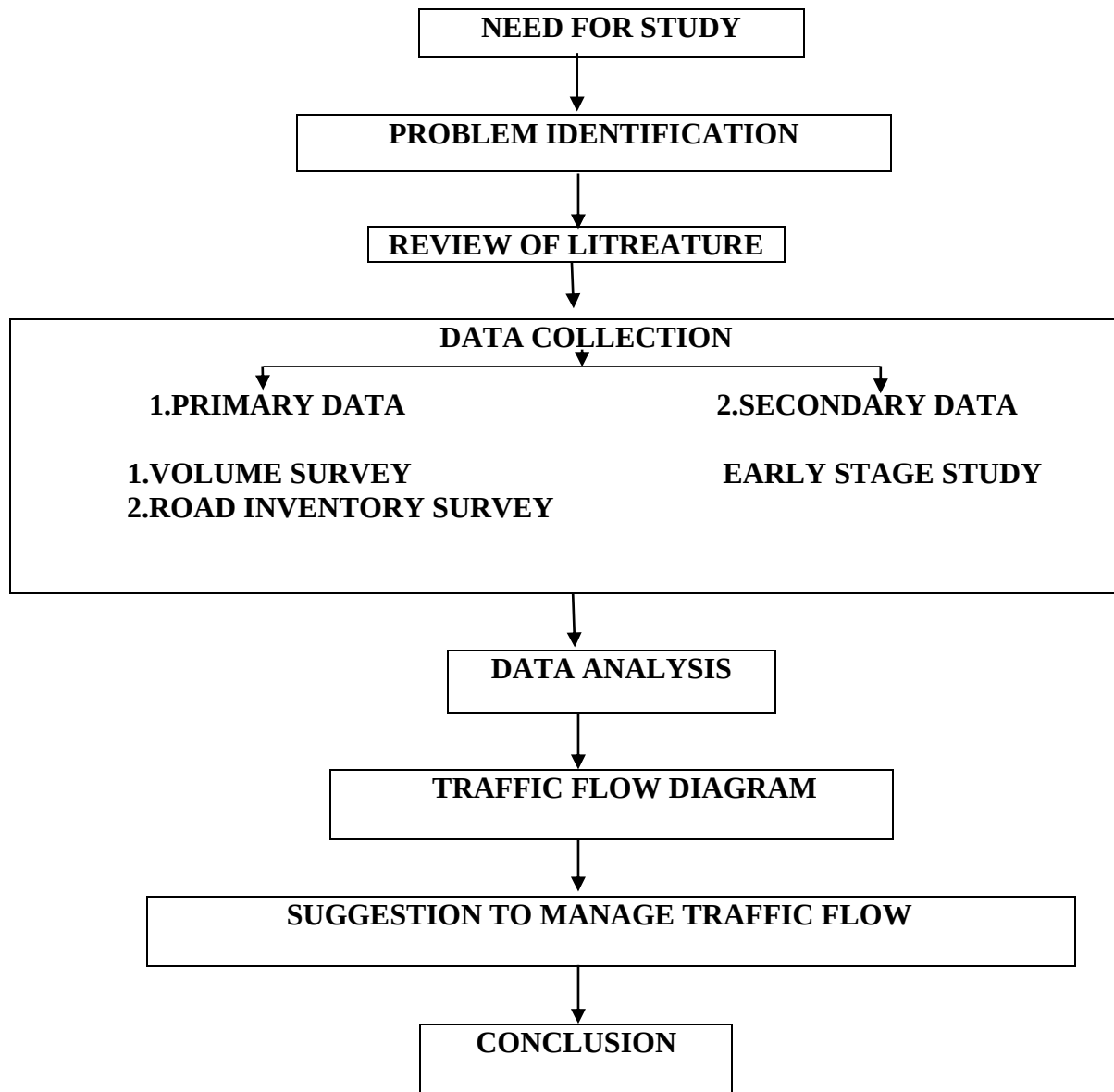
1.4.1 TRAFFIC:

Road traffic includes pedestrians, animals, vehicles, buses, and other communications such as road users, using public avenues for travel purposes. Whereas Traffic flow is the study of the interlink between road users (pedestrians, cyclists, drivers and their vehicles) and infrastructure (highways, signs, and traffic control equipment), understanding and creating an optimal traffic network with efficient movement of traffic is aimed at. And minimum traffic congestion issues.

1.4.2 TRAFFIC IMPROVEMENT:

Temporary solution-free road capacity that is soon filled with induced demand: people adapt their lifestyles to the prevailing road conditions.

1.5 METHODOLOGY



CHAPTER 2

OBJECTIVE AND SCOPE OF STUDY

2.1 Objective of the project

- ❖ To collect traffic volume at study area.
- ❖ To Assess volume to capacity ratio.
- ❖ To suggest traffic flow improvement measures.

2.2 SCOPE OF THE STUDY

- To minimize the traffic accidents and traffic congestion.
- The safety, as well as the smooth flow of traffic.
- To ensure the safety of passengers, drivers and pedestrians.
- To build and execute a model which would allow vehicles to reach their destination in the shortest possible time using the fullest road capacity.

2.3 REVIEW OF LITERATURE

[1] Velmurugan S, Reddy TS, Prasad Rao I (2005), Traffic operational characteristics and its impact on urban air pollution - A case study of Chennai, India. Proceedings of the East Asia Society for Transport Studies.

Traffic in urban areas of India is growing rapidly and managing traffic operations on the limited road network of cities has become a major task for the authorities concerned. Finally, a major study was conducted by the Government of India to determine the amount of urban travel of road and allied air pollutants coming from automobile exhaust in eight cities such as Delhi, Mumbai, Kolkata, Chennai, Bangalore, Hyderabad, Kanpur and Agra. The main objective was to correctly estimate the total number of vehicles and to develop a database and technique for estimating road traffic and pollution load in each city. This paper describes the characteristics of the operation and volume of traffic and air pollution loads on the major road network of Chennai city.

[2] Phillips S. Strengthen road transport research cooperation between Europe and the emerging international market; 2006.

The Intelligent Transport System (ITS) has evolved with Chinese social and economic change. In the 1990s, China began building large-scale road infrastructure, and ITS was considered a futuristic and expensive tool box. It was important for the Chinese government to know when and how to integrate new technologies into transportation systems and to formulate an appropriate development strategy, especially with the ITS. Through more than 20 years of development, the Chinese ITS has achieved remarkable achievements. This paper will first review the policy, strategy and experience of the development and deployment of ITS in China, then illustrate its

import as well as international cooperation and cases, and finally the findings and experience especially to other developing countries. Will be presented, on its development.

[3] Manuj Darbari, Sanjay Medhavi and Abhay Kumar Srivastava (2008), "Development of effective urban road traffic management using workflow technology for upcoming metro cities like Lucknow (India)", *Hybrid Information Technology*, Vol. 1, No. 3, pp. 99–107

Unless attention is immediately given to designing and implementing an optimal system and efforts are made on an ongoing basis to build continuous carrying capacity, we will never be able to overcome the congestion, Lucknow of India. The eight most ensuing cities are the ones that have seen a sudden increase in population during the last five years. According to the estimated survey. Lucknow's population will double in 2013. The main areas in and out of the city are inadequate, with no smooth flow of traffic. The absence of rail-based transport system and inadequate city buses leads to frequent use of private vehicles leading to congestion.

[4] Issac I. (2008) Comparison of preliminary analysis measured FWD and traffic data measured responses.

The purpose of this paper is to present the findings where the measured suboptimal stress and falling weight deflectometer (FWD) from the vehicle movement are compared. Both loading techniques were employed on a heavy instrument pavement under similar conditions in the period immediately after construction. The presented analysis clearly showed that there was a difference in pressure response in the narrow suburb of the thin flexible pavement. Statistically significant with the movement of vehicles producing high values in every instance. FWD readings, on average, will need to increase the factors of 3.73 and 2.39 for the front and rear axles, respectively, so that statistical differences can be detected. Such a large difference in pressure response is important because FWD is routinely used, among many other functions, to perform back strain softening soil layer measurement calculations.

[5] Gong Yan (2009) Fusion Framework of Urban Traffic Control and Route Guidance based on Cyber Traffic System.

The cyber-physical system provides a new principle for the application of information to improve the performance of traffic control systems. This paper, oriented to the integration of information and transport processes, discusses the information gateway role of information flow, control command, behavior control utility and control instruction of behavioral control and reconstruction of traffic control system model. Also, this paper analyzes the information flow between passengers in computer systems, traffic sign systems and traffic control systems. The integration of information and transport processes can be realized by cyber the traffic control process. Finally, this paper discusses the application of new technologies in computing and communication in traffic control cyber-physical systems.

[6] Gethu Lal, Nitin KJ, Divya LG (2010): "Permanent traffic improvement for urban road intersections in developing countries".

This paper examines traffic problems and permanent improvements in Ettumanoor, India. The spatial and temporal formation of vehicles as well as pedestrian traffic at intersections was investigated and the characteristics of the junction inducing delay problems were identified. Data about traffic volume, land use and walking activities are collected through a direct field survey. Analysis of the data collected revealed that improper planning of junctions, lack of traffic signals and unauthorized parking are the major factors contributing to traffic congestion. Various remedial measures are also proposed, focusing on junction correction, alternative operation planning and junction signalisation.

[7] Bhargavi PS And N. Kannaiya Raja (2011), "A Study on Effective Traffic Management of Roads to Reduce Road Accidents in Tamil Nadu", Enterprise Innovation Management Study, Vol.2. No. 2, pp. 172–190.

The main objective of this study is to identify and analyze the causes of road traffic accidents in Tamil Nadu. Also, this study investigates various causes of accidents in Tamil Nadu in the past years. Tamil Nadu had the highest rate of road accidents in one of the accident prone area in India. This study examines why Tamil Nadu reported the number of top accidents. What are the causes of accidents and how do they resist accidents.

[8] Amudupuram Mohan Rao and Kalaga Ramachandra Rao (2012), "Measuring Urban Traffic Congestion - A Review", for Traffic and Transport Engineering, 2012, 2 (4): 29308-305, available at [http / web. ITD. Ac.In/~ Rrkalaga / Pubs / Ijtte_2012-Congestion.Pdf](http://web.itd.ac.in/~Rrkalaga/Pubs/Ijtte_2012-Congestion.Pdf)

A systematic review is carried out based on measurements such as speed, travel time / delay and level of service. The review definition covers various aspects such as; Measurement criteria by various countries / organizations. The strengths and weaknesses of these measures are discussed. In addition, a small criterion of the measurement criterion is presented.

[9] Anastasios Kallianiotis and Dimitrios Kaliampakos (2012) : “Evaluation of Underground Spaces evacuation Effectiveness.

The purpose of this paper is to evaluate underground spaces in relation to the effectiveness of their emptying and to compare them with similar buildings on the same ground. To accomplish this, on the one hand the factors influencing withdrawal effectiveness have been defined and on the other hand a tailor made deduction assessment system has been developed. Among the factors affecting evacuation effectiveness, the location of the exit gates / routes is of primary importance. Therefore, the exit evaluation method is based on the location of the exit door design. The developed software assesses and evaluates all possible combinations of exit door space based on an evaluation system, in addition to checking compliance with a given underground location with evacuation rules regarding exit door location.

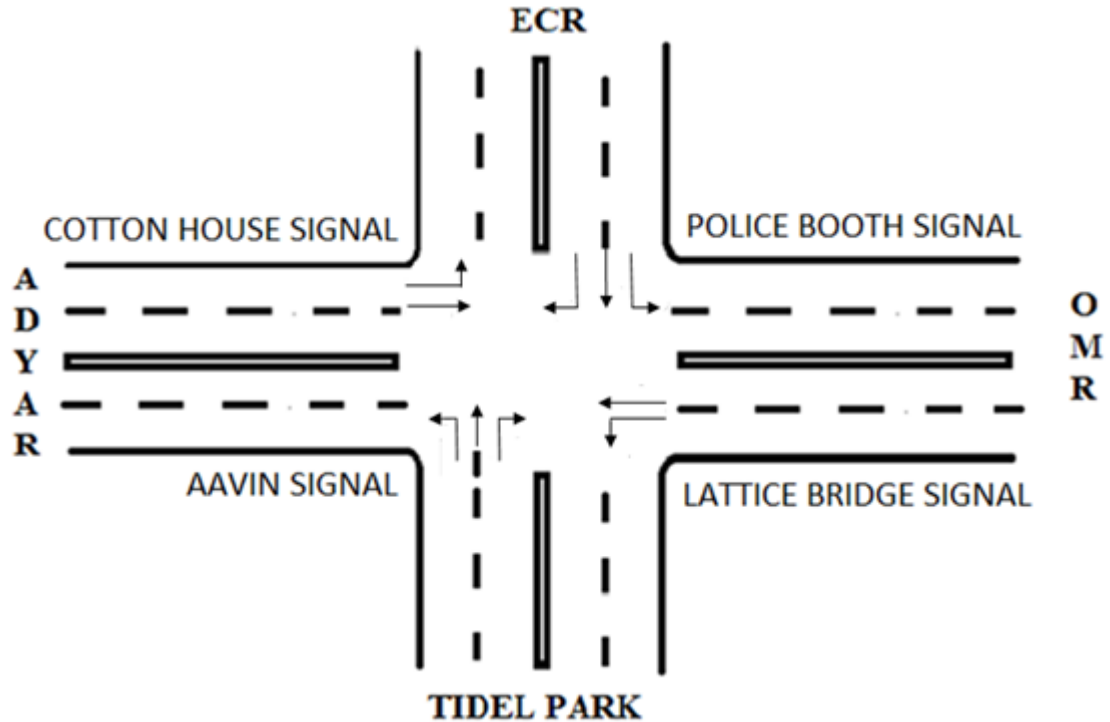
[10] Abrar Alam. And Faisal Ahmed (2013), "Urban Transport Systems and Congestion: A Case Study of Indian Cities", Transport and Communications Bulletin for Asia and the Pacific.

This paper studies the traffic landscape in selected Asian cities and the policy measures taken by their governments. It revisits relevant policies in India and assesses gaps that prevent the desired impact of such policies on reducing traffic congestion. It also suggests policy measures to overcome these gaps and the way forward.

CHAPTER 3

STUDY AREA AND PRIMARY DATA COLLECTION

3.1 STUDY AREA



Intersection is as an area where two or more roadways cross each other. This area is meant for the vehicles to turn to different directions to reach their destination. The study of intersections is very important for the traffic engineers especially in the case of urban scenario. The study is from Thiruvannamiyur intersection.

1. Towards North : ADYAR
2. Towards East : ECR
3. Towards South : OMR
4. Towards west : TIDEL PARK

To consist the intersection vehicle traffic flows and the volumes consider.

Thiruvannamiyur is a large residential neighborhood in South Chennai, Tamil Nadu, India. Thiruvannamiyur saw its economy grow with the construction of the Tidel Information

Technology Park in neighboring Taramani, Chennai's first dedicated technology office space.

The subsequent uplift of many information technology businesses, research centers and offices around Tidel Park proved fortunate for Thiruvananthapuram, as many of the workers in these offices often made Thiruvananthapuram their home. The Marundeshwar temple dedicated to Shiva first defined the region, due to which it was mentioned in the Sangam Tamil epics. It is also commonly referred to as the MICO layout of the city of Chennai. Other famous temples are Ashtalakshmi Temple and Arupadai Murugan Temple.

Experiencing Modes:

The area is easily accessible by **Metropolitan Transport Corporation (MTC) buses** and has a large bus terminus. The MTC bus stop in the area is Jeyanthi Theater, Thiruvananthapuram Bus Stand, Marundeeswarar Temple, R.T.O Office and Tidel Park. SETC buses heading towards Pondicherry pass through the area and have a bus stop.

Thiruvananthapuram railway station, in front of Tidel Park, is on the Mass Rapid Transit System railway line that connects Velachery and Beach via Chennai Central (Park Station). STPI, also known as Software Technology Park of India, located near Tidel Park, is another hub of information technology companies.

Existing Roads:

The East Coast Road starting at Thiruvananthapuram leads to Mahabalipuram and Pondicherry. The main post office is located about 100 meters east of Lattice Bridge (LB) Road from Old Mahabalipuram Road.

Thiruvananthapuram beach or RTO beach is a popular attraction and the beach line is 1 km from the East Coast Road. The beach walk is very popular with local residents. The beach is clean and tidy with the active support of the local community.

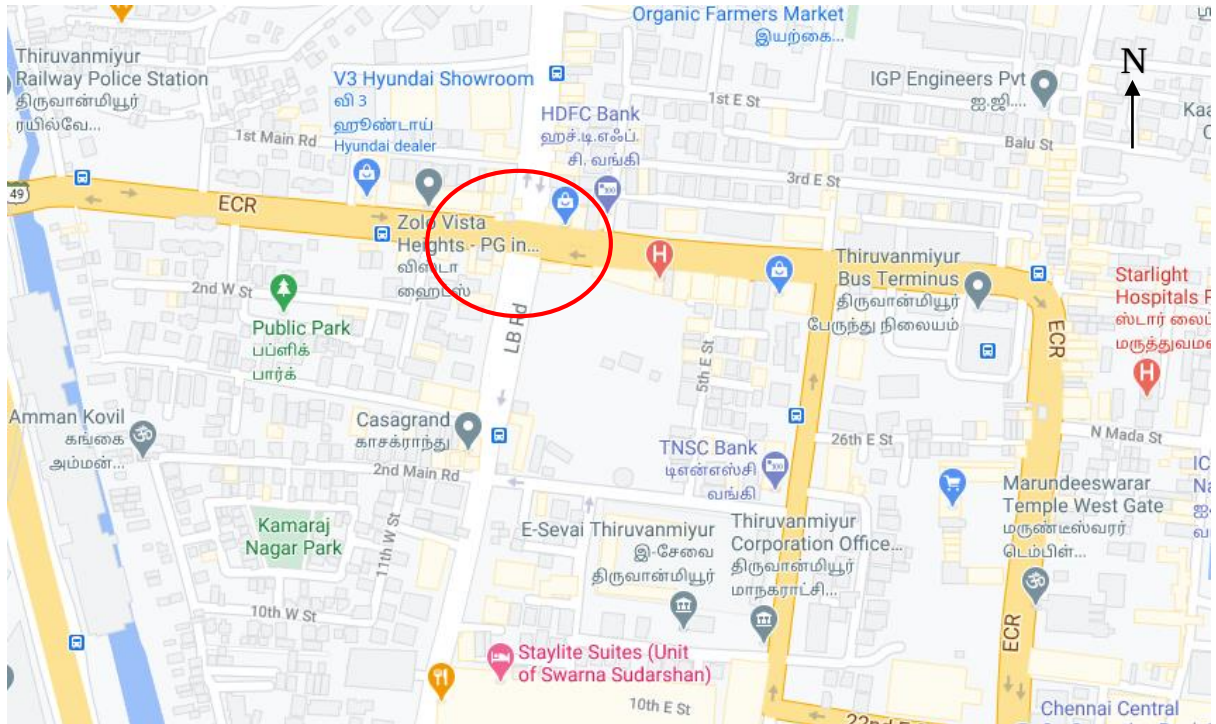


Fig. 3.1: Location of Thiruvananthapuram intersection

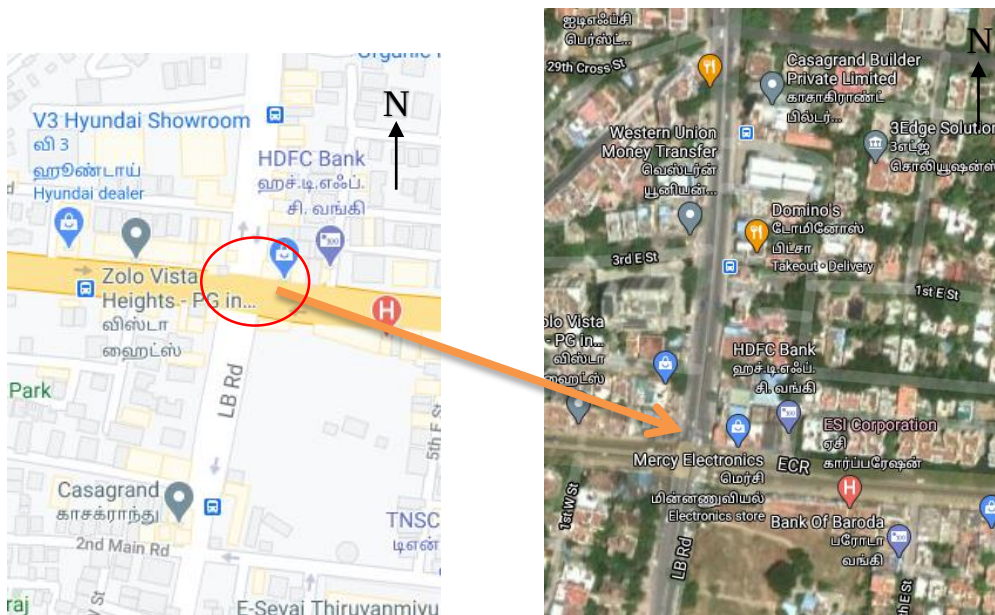


Fig. 3.2: Cotton house signal at Thiruvananthapuram intersection.



Fig: 3.3: Traffic Congestion at Thiruvananthapuram intersection

3.2 DATA COLLECTION

Data collection is the process of collecting and measuring information on target variables in an established systematic fashion, which then enables one to answer relevant questions and evaluate the results.

The data needed for the analysis of the traffic flow at the study area is done by:

- **Geometric Surveying**
- **Traffic Volume Count Surveying**

3.2.1 GEOMETRIC SURVEYING

This surveying is used to find the dimensions of the place which has to be surveyed, length and breadth of road lanes, dividers, foot path, bus stops, pedestrian path, parking space etc., are measured.

At Thiruvananthapuram intersection the vehicles moving in different directions want to occupy same space at the same time. 1800 pedestrians per hour also seek same space for crossing. Cotton house road with **21.6m** wide, Police booth signal Road with **25.3m** wide, L.B Road with **21.3m** wide and Aavin signal road with **20.1m** wide make the intersection.(Representing in Fig 3.4; Geometry of Thiruvananthapuram intersection.)

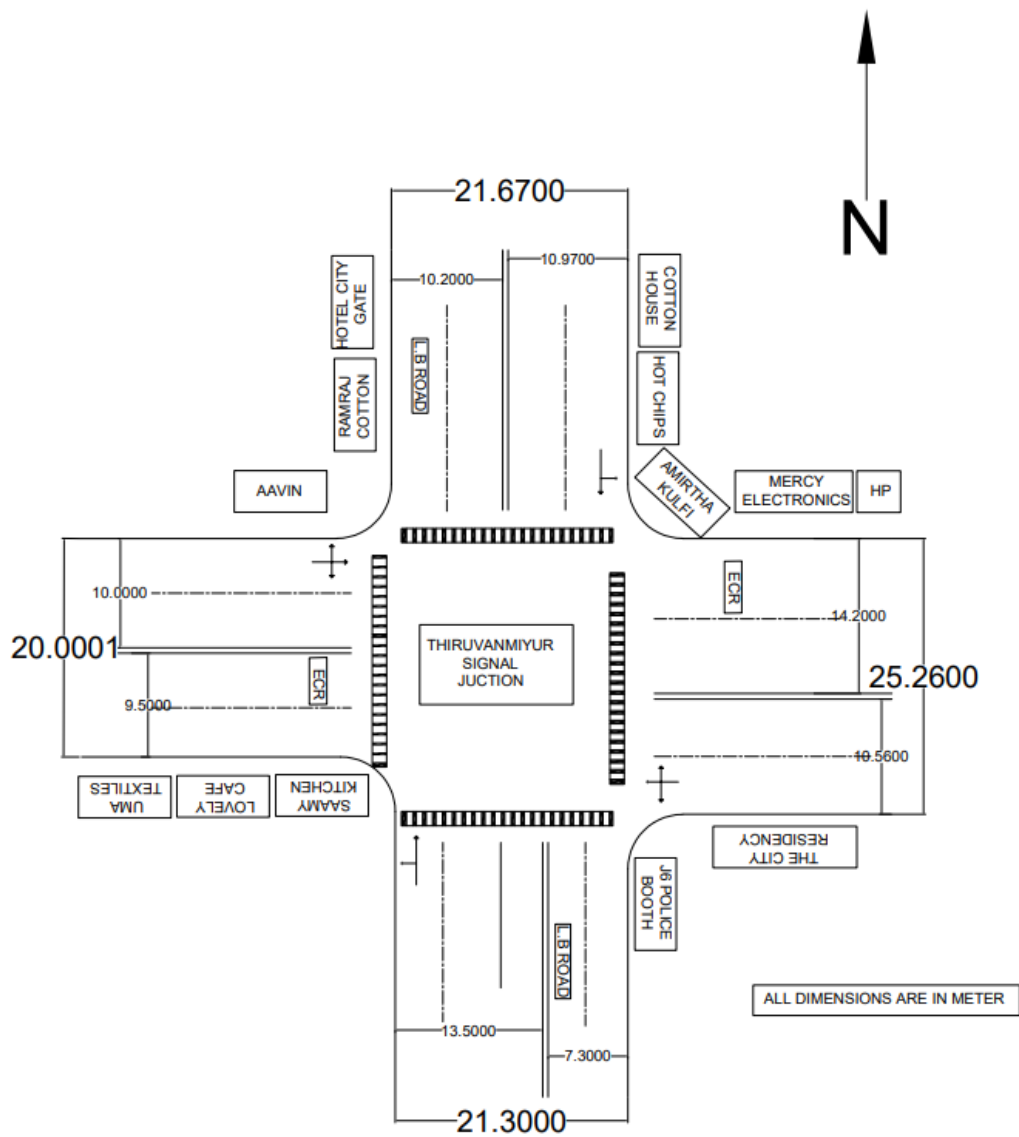


Fig: 3.4: ROAD GEOMETRY AT THIRUVANMIYUR SIGNAL INTERSECTION

3.2.2 TRAFFIC VOLUME COUNT SURVEYING

Traffic Surveying is carried out to analysis the traffic characteristics. It helps in geometric design and traffic control, which tends to a safe and efficient traffic movement.

The traffic studies for collection of data is also known as **Traffic Census**.

Types of Traffic Studies:

- Traffic Volume Study
- Speed Study
- Origin and Destination study
- Traffic flow characteristics study
- Traffic capacity study
- Accident study

➤ **TRAFFIC VOLUME STUDY:**

- • Traffic volume study is the volume of vehicles crossing a portion of the road per unit time in any selected period.

❖ The uses of traffic studies are as follows:

- Planning
- Traffic operation and control
- Traffic pattern
- Structural design of pavement
- Regulatory measures

➤ **METHODS OF TRAFFIC VOLUME STUDY:**

- Automatic Volume study
- Manual volume study

➤ **Automatic Volume study:**

- Automatic counters are also known as mechanical counters. They can automatically record the total number of vehicles crossing a portion of the road in the desired time.

- **Advantages:**

- It can work throughout the day and night for the desired duration, which is impractical in the manual.

- **Disadvantages:**

It doesn't give the detail of the traffic like various classes, stream and turning movement.

Manual Volume Study:

- Manual method is the method in which a group of people are trained to record the total number of vehicles crossing a section of road in a desired period on a record sheet manually.

- Advantages:**

It gives the full detail of the traffic like various classes, stream and turning movement etc., of the vehicles.

- Disadvantages:**

It cannot work throughout the day and night for all days of year.



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FIELD DATA SHEET FOR TRAFFIC CENSUS

Date: _____ Location: _____
Time: From: _____ To: _____
Road Junction: _____ Place : Sterling

Types of Vehicles Hour Count	CARS, JEEPS, VANS & Three Wheelers	BUSES	TWO WHEELERS
1	2	3	4
VEHICLES TURNING LEFT			
VEHICLES PROCEEDING STRAIGHT			
VEHICLES TURNING RIGHT			
TOTAL			

Table 3.1 TRAFFIC VOLUME SURVEY DATA SHEET

Traffic volume count survey is done on a sheet in which the volume of traffic is being counted and written at specific time duration at equal interval of time.

- Details about the direction of road, intersection of road and number of two wheelers, autos and cars, buses and trucks going in that particular direction is counted and written on this sheet. Signal time cycle is also noted.
- The traffic flow at particular section will increase with time and decrease after a particular time interval.
- The time where the traffic flow is most, is known as PEAK TIME.
- Traffic volume count survey is done for all directions and mean traffic volume is calculated.

TRAFFIC COUNT SURVEYING

The traffic count surveying is done at each direction at each intersection and the flow of traffic is written on the traffic count data sheet, respectively graphs are made according to the values.

This fig 3.4 consists of overall view of Thiruvanniyur junction, which shows Cotton house road, Police booth signal Road, L.B Road and Aavin signal road. The traffic control have been studied for an hour to hour from morning 8a.m to 9p.m. The study were made for 2wheelers, 3wheelers, 4wheelers, Buses and Trucks.

3.3 PASSENGER CAR EQUIVALENCE (PCE)

In British practice it is usual to express capacity in terms of “**passenger car Equivalent**”. This system is also being followed in India. The basic consideration behind this practice is that different types of vehicles offer different degrees of interference to other traffic and is necessary to bring all types to common units. The common unit adopted is the passenger car unit (PCE) as shown in bellowtable 2.1

Vehicle type	PCE Equivalency factor
Two-wheeler	0.5
Three-wheeler, Car	1
Bus , Truck	3.0

Table 3.2 Conversion Factors of Car Equivalent (PCE)

CHAPTER 4

DATA COLLECTION AND TRAFFIC ANALYSIS

4.1 DEFINITION

One of the important functions is to organize and implement various services and studies aimed at collection of data pertaining to traffic characteristics. Such study include origin and destination survey, volume count, speed , travel time and delay measurements, accident statistics, parking characteristics, pedestrian behavior and use of streets, capacity studies , economic loss caused by inferior traffic facilities etc.

4.2 DATA

- Traffic volume count
- Traffic Flow Diagram and Road Geometry
- Plan of intersection

4.2.1. TRAFFIC VOLUME COUNT

One of the fundamental measures of traffic on a road system is the volume of traffic using the road in a given interval of time. It is also termed as flow and it is expressed in vehicles per day. When the traffic is composed of a number of types of vehicles it is the normal practice to convert the flow into equivalent passenger car per unit (PCE), by using certain equivalency factors. The flow is then expressed as PCE per day as shown in table 4.1, 4.2, 4.3 and 4.4.,

Table 4.1 Traffic Volume Survey along LB road (North) Cotton house
(On Date: 27/01/2021)

Hour	Two wheeler	Car / Auto	Bus /Truck	Volume In PCE
7.00 -7.30	803	297	97	989
7.30-8.00	901	381	110	1161
8.00-8.30	1014	459	117	1317
8.30-9.00	1119	549	130	1500
9.00-9.30	1220	591	138	1615
9.30-10.00	1227	620	131	1625
10.00-10.30	1143	574	128	1531
10.30-11.00	1064	470	113	1342
15.00-15.30	1013	484	131	1384
15.30-16.00	1116	552	146	1549
16.00-16.30	1129	561	153	1584
16.30-17.00	1148	609	163	1672
17.00-17.30	1246	644	171	1779
17.30-18.00	1300	661	178	1845
18.00-18.30	1316	696	189	1922
18.30-19.00	1287	725	181	1912
19.00-19.30	1182	622	165	1708
19.30-20.00	1096	532	155	1545
20.00-20.30	966	433	133	1315
20.30-21.00	840	339	116	1108

Table 4.2 Traffic Volume Survey along Ecr (East) Police booth signal
(ON Date: 27/01/2021)

Hour	Two wheeler	Car / Auto	Bus /Truck	Volume In PCE
7.00 -7.30	577	213	70	711
7.30-8.00	648	274	79	835
8.00-8.30	729	330	84	947
8.30-9.00	804	395	94	1078
9.00-9.30	877	425	99	1160
9.30-10.00	882	446	94	1168
10.00-10.30	822	413	92	1100
10.30-11.00	765	338	81	965
15.00-15.30	728	348	94	995
15.30-16.00	802	397	105	1113
16.00-16.30	812	403	110	1139
16.30-17.00	825	437	117	1202
17.00-17.30	896	463	123	1278
17.30-18.00	934	475	128	1326
18.00-18.30	946	500	136	1381
18.30-19.00	925	521	130	1375
19.00-19.30	850	447	118	1228
19.30-20.00	788	382	112	1111
20.00-20.30	695	311	95	945
20.30-21.00	604	244	83	796

Table 4.3 Traffic Volume Survey along Lattice bridge road (South)
(ON Date: 27/01/2021)

Hour	Two wheeler	Car / Auto	Bus /Truck	Volume In PCE
7.00 -7.30	376	139	45	464
7.30-8.00	423	179	51	544
8.00-8.30	475	215	55	617
8.30-9.00	524	258	61	703
9.00-9.30	572	277	65	757
9.30-10.00	575	291	61	762
10.00-10.30	536	269	60	718
10.30-11.00	499	221	53	629
15.00-15.30	475	227	62	649
15.30-16.00	523	259	69	726
16.00-16.30	529	263	72	743
16.30-17.00	538	285	77	784
17.00-17.30	584	302	80	834
17.30-18.00	609	310	83	865
18.00-18.30	617	326	89	901
18.30-19.00	603	340	85	896
19.00-19.30	554	292	77	801
19.30-20.00	514	249	73	724
20.00-20.30	453	203	62	616
20.30-21.00	394	159	54	519

Table 4.4 Traffic Volume Survey along Ecr (west) Aavin signal**(ON Date: 27/01/2021)**

Hour	Two wheeler	Car / Auto	Bus /Truck	Volume In PCE
7.00 -7.30	752	278	91	927
7.30-8.00	845	358	103	1089
8.00-8.30	951	430	110	1235
8.30-9.00	1049	515	122	1406
9.00-9.30	1143	554	129	1514
9.30-10.00	1150	581	122	1524
10.00-10.30	1072	539	120	1435
10.30-11.00	998	441	106	1259
15.00-15.30	950	453	123	1297
15.30-16.00	1046	518	137	1452
16.00-16.30	1059	526	143	1485
16.30-17.00	1076	571	153	1568
17.00-17.30	1169	604	160	1668
17.30-18.00	1218	620	167	1730
18.00-18.30	1233	653	178	1802
18.30-19.00	1207	680	170	1793
19.00-19.30	1108	584	155	1601
19.30-20.00	1028	499	146	1449
20.00-20.30	906	406	125	1232
20.30-21.00	788	318	109	1039

Table 4.5 Total traffic Volume Survey at Thiruvannmiyur intersection
(ON Date: 27/01/2021)

Hour	Two wheeler	Car / Auto	Bus /Truck	Volume In PCE
7.00 -7.30	2508	928	303	3091
7.30-8.00	2817	192	343	3630
8.00-8.30	3169	1433	366	4116
8.30-9.00	3496	1717	407	4686
9.00-9.30	3811	1847	431	5046
9.30-10.00	3833	1938	408	5079
10.00-10.30	3573	1795	401	4785
10.30-11.00	3326	1470	354	4195
15.00-15.30	3167	1511	410	4325
15.30-16.00	3488	1725	457	4840
16.00-16.30	3529	1752	478	4951
16.30-17.00	3586	1902	510	5225
17.00-17.30	3895	2012	533	5559
17.30-18.00	4061	2067	556	5766
18.00-18.30	4111	2175	592	6007
18.30-19.00	4023	2267	566	5977
19.00-19.30	3694	1945	515	5337
19.30-20.00	3425	1662	485	4830
20.00-20.30	3020	1353	415	4108
20.30-21.00	2626	1060	363	3462

4.2.2. TRAFFIC FLOW DIAGRAM

- The traffic volume in terms of PCE from each leg is dissipated in in PCE at Peak hour (18.00-19.00hrs) at **Thiruvanmiyur signal intersection**.

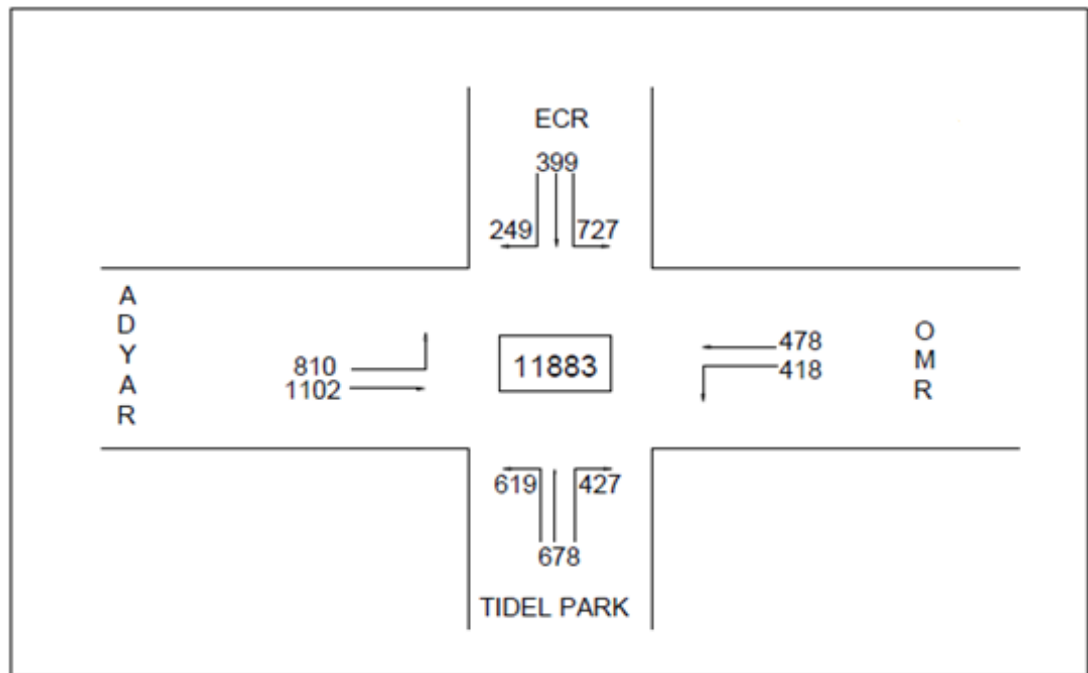


Fig 4.1 Traffic flow diagram at Thiruvanmiyur signal intersection.

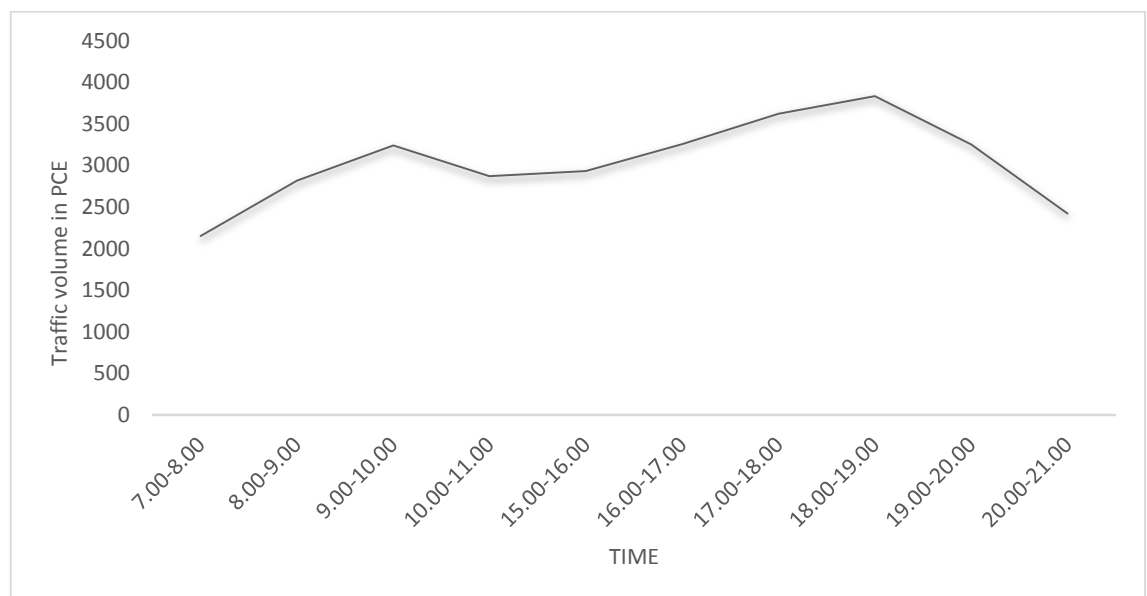
4.3 TRAFFIC ANALYSIS

The various survey and studies aimed to collection of data retaining to Traffic characteristics. Such studies include. Origin destination survey, volume count, accident statistics,

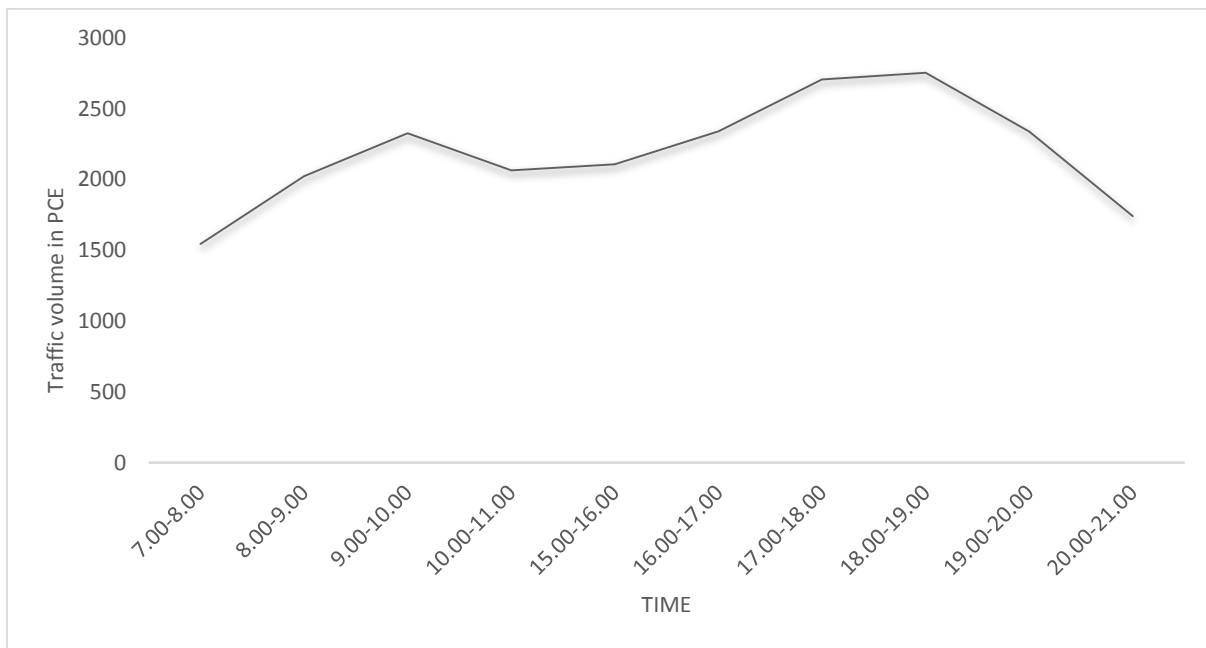
- Peak hour
- Peak hour factor
- V/C ratio
- Mode of share

4.3.1 Peak hour

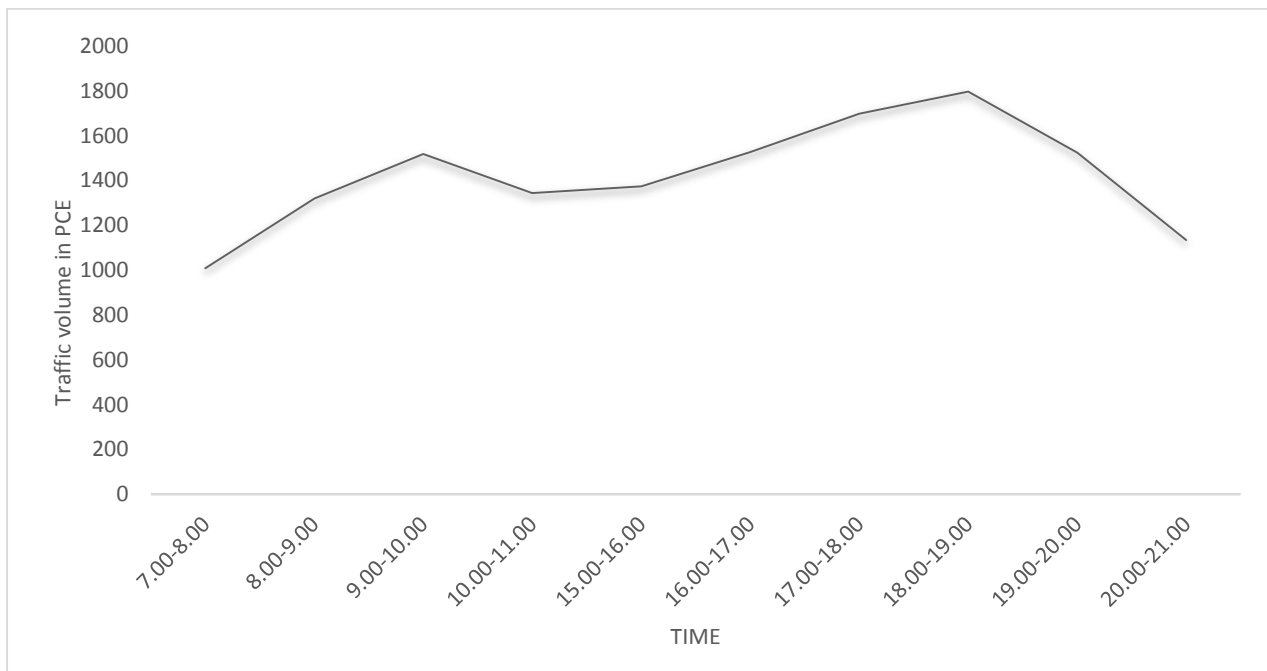
The max PCE value in the hour per day.



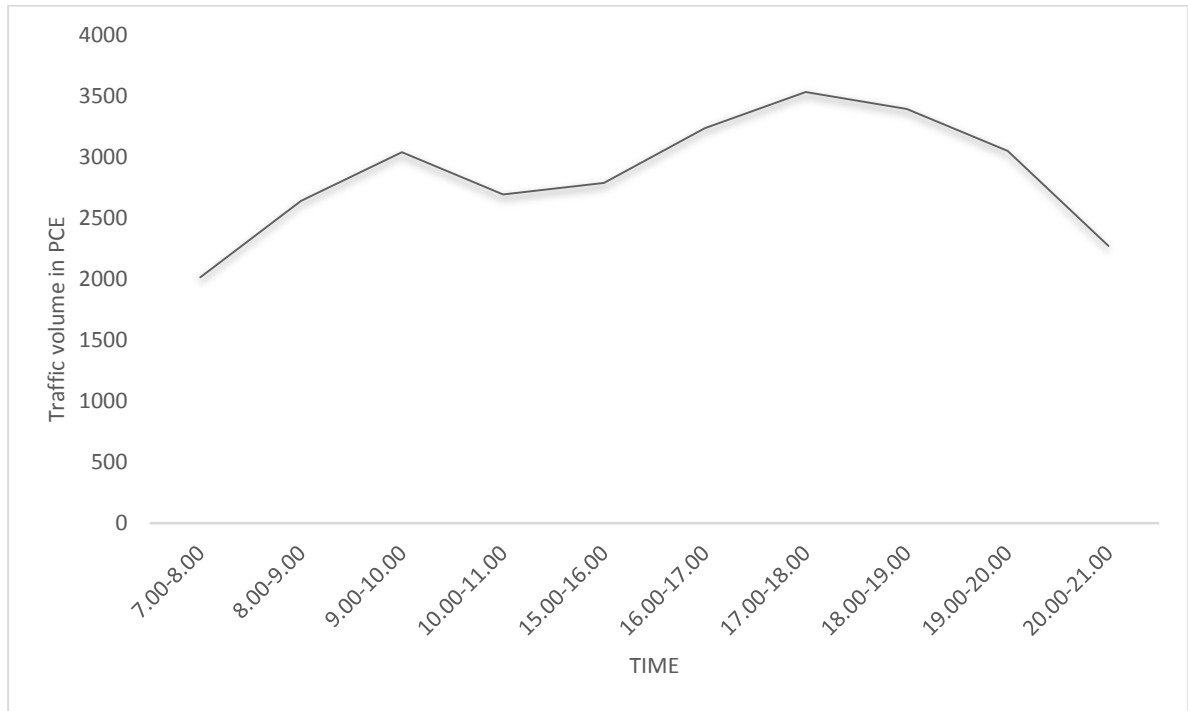
► **Figure 4.2 Volume Accumulation along LB road (North) Cotton house in PCE**



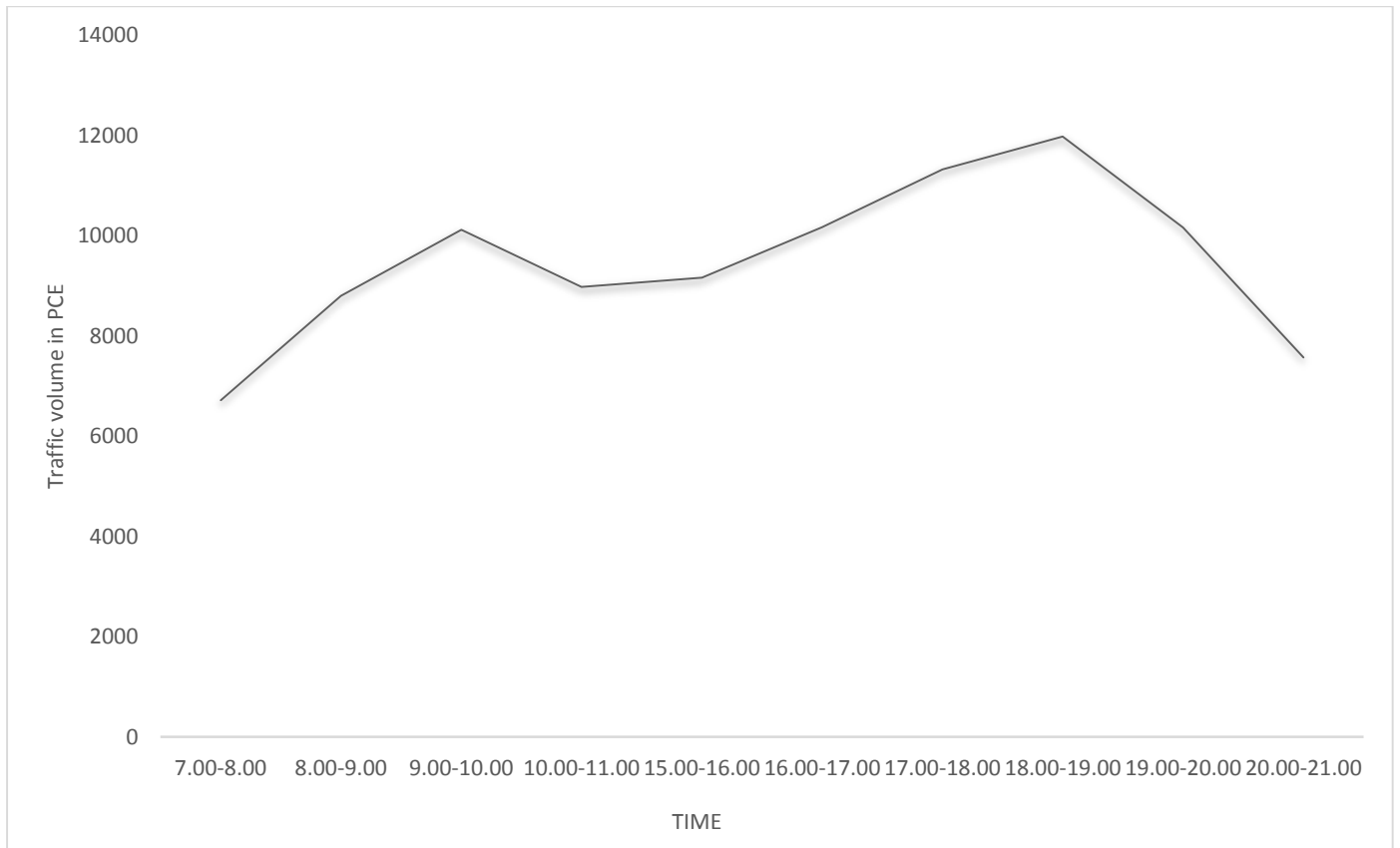
► **Figure 4.3 Volume Accumulation along Ecr (East) Police booth signal in PCE**



► **Figure 4.4 Volume Accumulation along Lattice bridge road (South) in PCE**



► **Figure 4.5 Volume Accumulation along Ecr (west) Aavin signal in PCE**



► **Figure 4.6 Volume Accumulation at Thiruvannmiyur intersection in PCE**

4.3.2 Peak Hour Factor

It is a measure of the variation in demand during the peak hour and defined as the ratio between the number of vehicles counted during the peak hour and fourtimes the number counted during the highest 30 consecutive mins. It can range from 0.25 to 1.00

4.3.3 V/C Ratio

The ratio of the service volume to capacity.
Peak of peak time: (18.00 to 19.00hrs)

Table 4.6 Volume of Capacity at Study Intersection

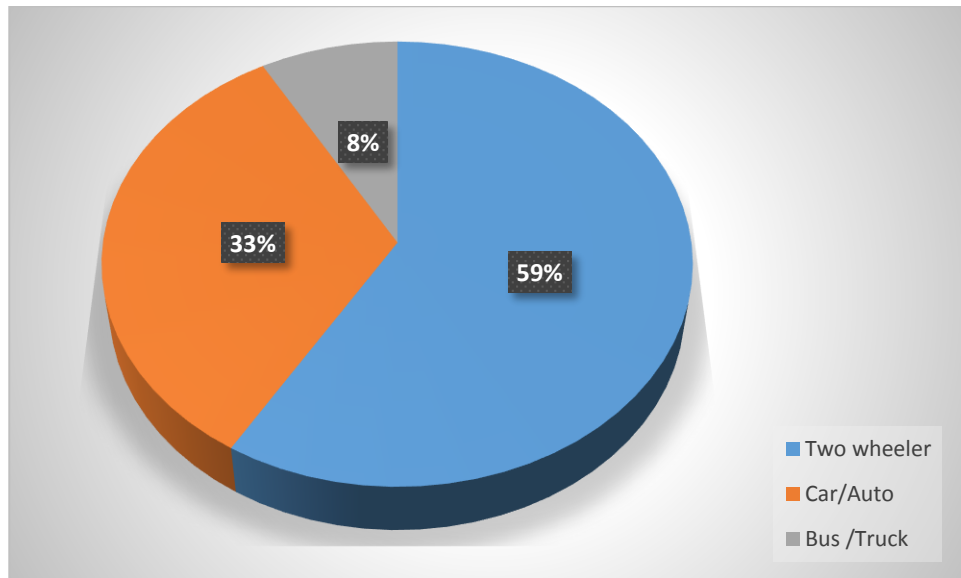
S.No	Intersection	Volume (V) in PCE	Capacity (C) in PCE	V/C
1	Cotton house signal	3258	2800	1.16
2	Police booth signal	2863	2800	1.02
3	Lattice bridge road signal	3152	2800	1.12
4	Aavin signal	2610	2800	0.93

Source:

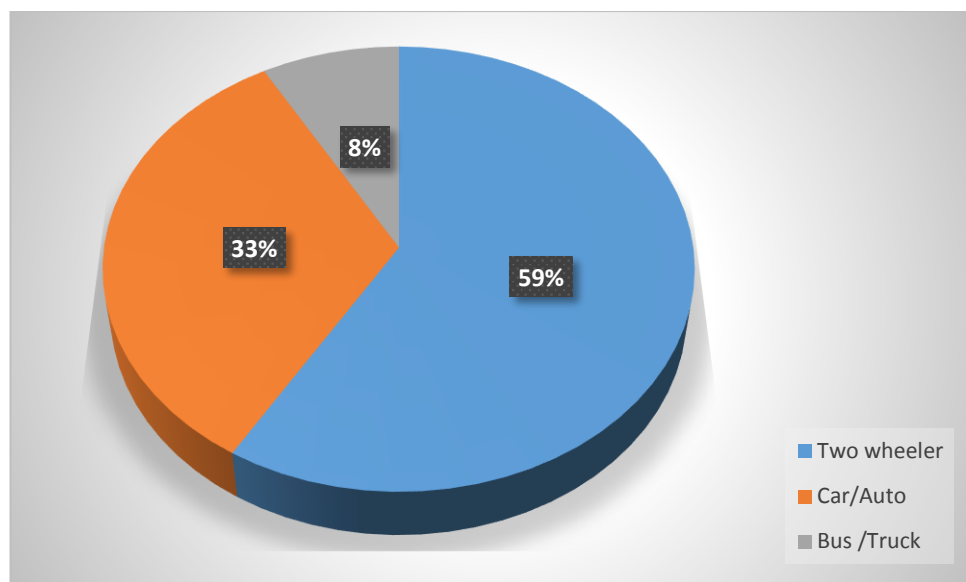
- For capacity ref: Table 21.19 Practical capacities of two-way roads, p535, Chapter 21, Section 11, Highway capacity, “Traffic engineering and transportation planning” by L.R.Kadiyali, Khanna publishers, 8th Edition 2013, ISBN 81-7409-220-X.

4.3.4 Model Share

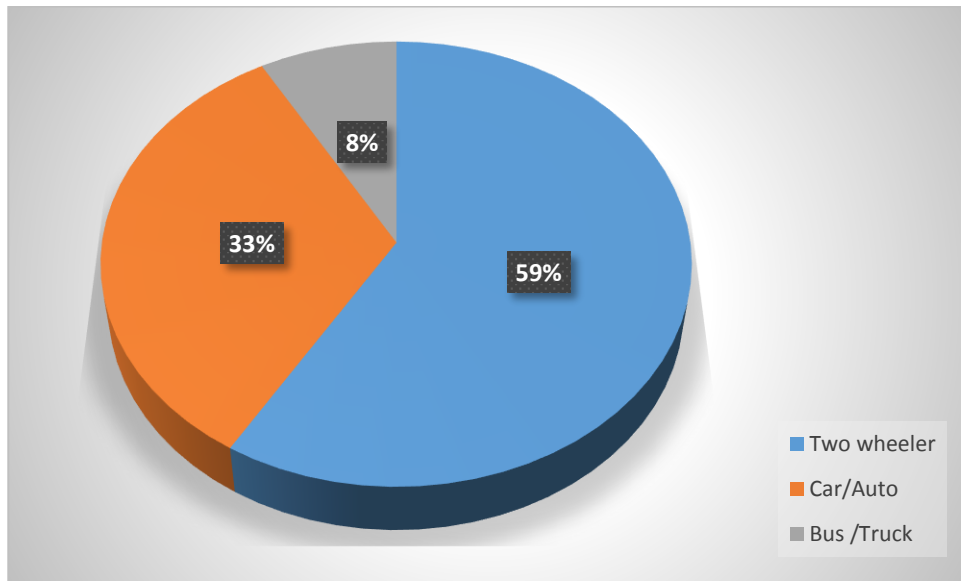
Process of separating the person-travel by the mode of travel in Peak hours



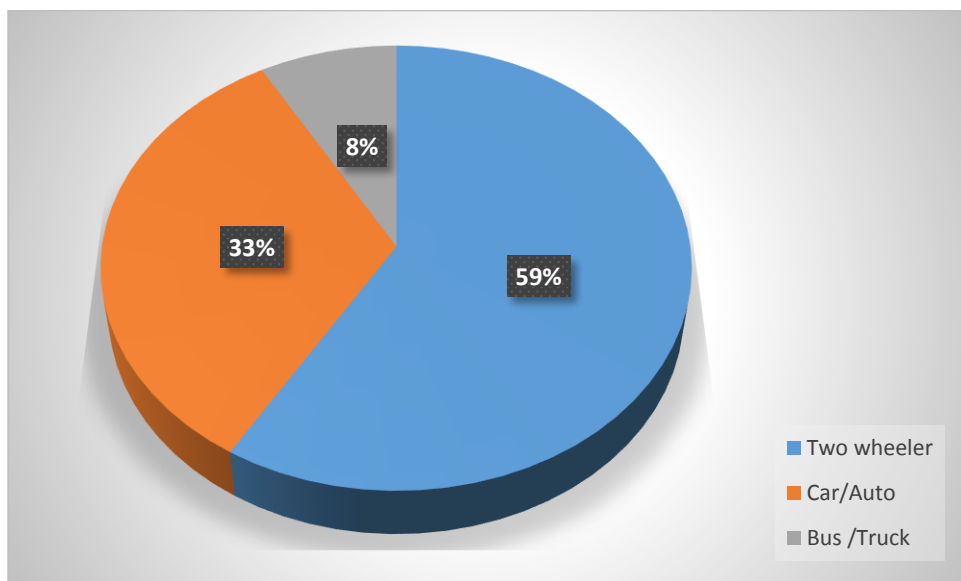
Vehicle composition towards LB road (North) Cotton house between 18.00-19.00hrs



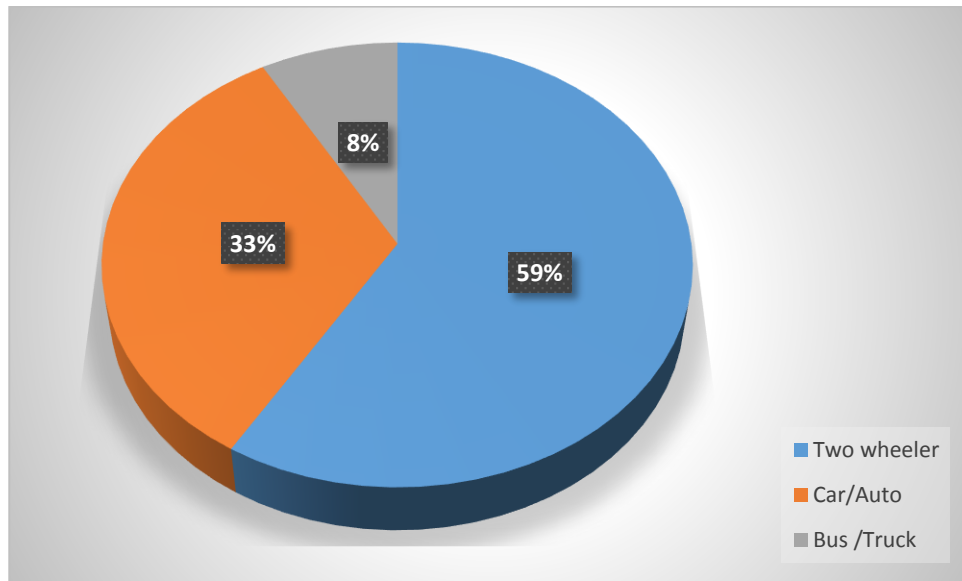
Vehicle composition towards Ecr (East) Police booth signal between 18.00-19.00hrs



Vehicle composition towards Lattice bridge road (South) between 18.00-19.00hrs



Vehicle composition towards Ecr (west) Aavin signal between 18.00-19.00hrs



Total vehicle composition towards **Thiruvannmiyur intersection** between 18.00-19.00hrs

CHAPTER 5 TRAFFIC FLOW MANAGEMENT

5.1 GENERAL

As the traffic on the existing road system in cities grows, congestion becomes a serious problem. Medium and long term solution like widening roads, providing elevated fly overs and constructing bypasses and urban expressways are costly. Simple and inexpensive solution can tide over the crisis for some time.

- ☐ Cotton house Intersection
- ☐ Police booth Intersection

5.2 COTTON HOUSE INTERSECTION SCENARIO 1:

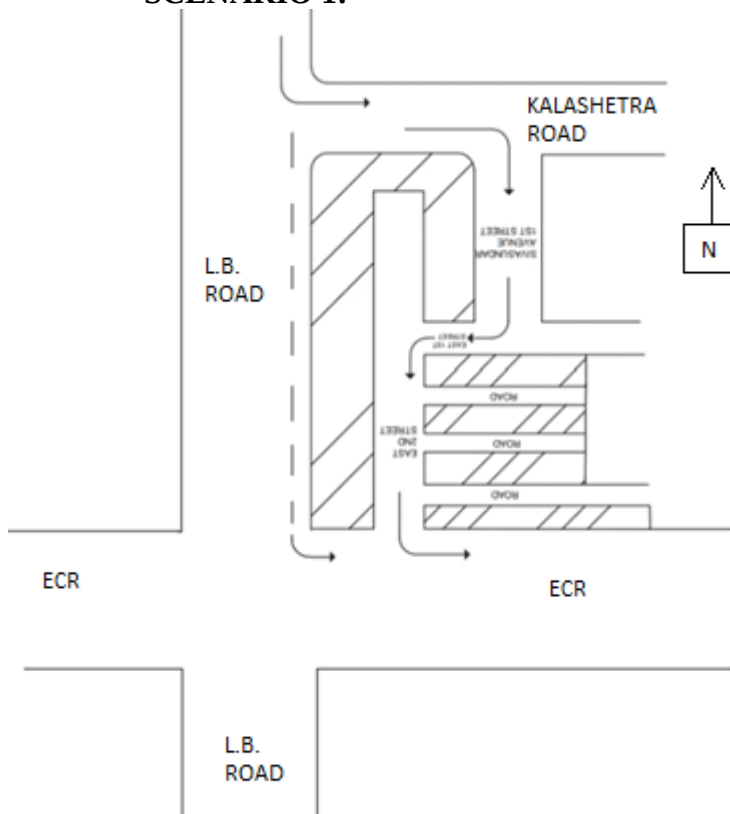


Fig 5.1 Flow Improve at cotton house intersection

As a short-term management measure, by allowing a left turn at kalakshetra road intersection will further drags 3258 PCEs and the peak volume will comes down to 2598 PCE. Diversion of the flow towards north to east direction at the cotton house intersection

has to go forward (south), left (east) and no right turn.

As a management measure, by diverting the vehicles north to east direction through **kalakshetra road** and then taking **sivasundar avenue** (right) which connects to **East 2nd street** that leads to Ecr.

5.3 Police booth Intersection SCENARIO 2:

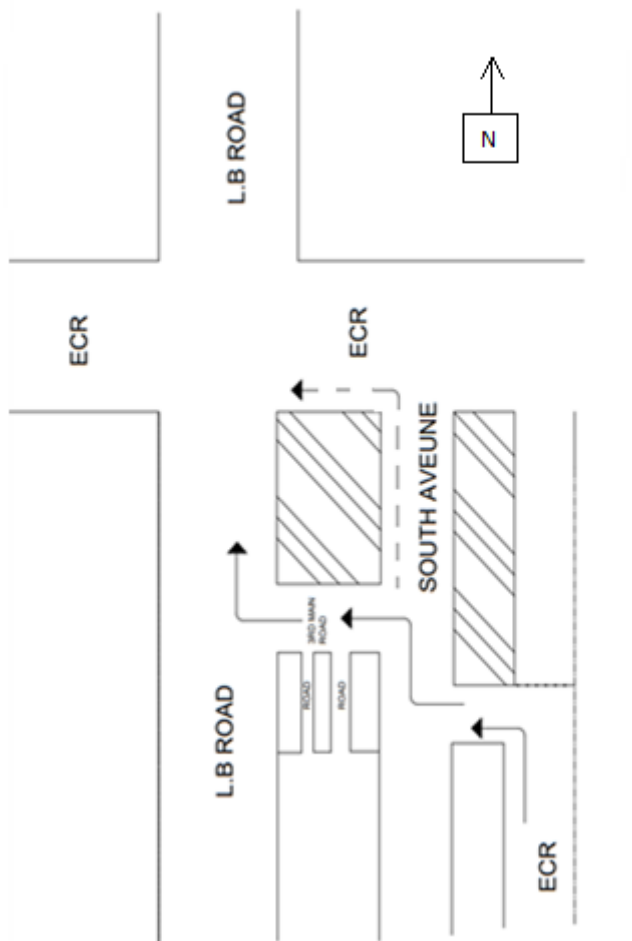


Fig 5.2 Flow Improve at police booth intersection

As a short-term management measure, by allowing a left turn at LB road,3rd main road intersection will further drags 2863 PCEs and the peak volume will comes down to 2657 PCE. The flow at the police booth intersection has to go forward (west), left (south) and right turn (north)

As a management measure, by diverting the vehicles east to north direction and east

to west direction in the Police booth intersection, **through 3rd main road** that connects to L.B road.

5.4 V/C RATIO

The ratio of the service volume to capacity **after** traffic Management
The ratio of the service volume to capacity, Peak of peak time: (18.00 to 19.00hrs)

Table 5.1 Volume of Capacity at Study Intersection

S.No	Intersection	Volume (V) in PCE	Capacity (C) in PCE	V/C
1	Cotton house signal	2598	2800	0.92
2	Police booth signal	2657	2800	0.94

Source:

- Capacity(C) in PCE is taken from L.R.KADIYALI Book (pg.no:520)
- Table 21.4 (Uninterrupted flow capacities under Ideal Conditions)

SCENARIO 3: (Combination of scenario 1 & Scenario 2)

Thiruvannmiyur is a highly congested area in traffic flow., where on 27.01.2021 as our per survey and further calculations the Volume in PCE is identified as 3258 passenger car equivalence (PCE), 2863 PCE, 3152 PCE and 2610 PCE at four intersections during the peak hour. In which the four intersection gets the Total **V/C ratio** as to be **1.06** with total volume of 11883 PCE, whereas the average be 2970 PCE.

Thus by introducing scenario 1, the volume in PCE listed as **3258 PCE has been dragged to 2598 PCE** and by **scenario 2**, the volume in PCE listed as **3152 PCE has been dragged to 2657 PCE** respectively.

Which furtherly concludes that the **V/C ratio** at the intersection be **0.98** with total volume of 10997 PCE, whereas the average be 2749 PCE.

CHAPTER 6

SUMMARY & CONCLUSION

6.1 SUMMARY

Traffic intersections are problem spots on any highway, which contribute to a large share of accidents. For safe operation, these locations should be kept under some level of control depending upon the traffic quantity and behavior. Based on this, alternative routes were suggested at intersections and interchanges. This is studied and analyzed at Thiruvanniyur intersection.

6.2 CONCLUSION

The conclusion of this work is to provide congestion less traffic movement. This is done by diverting.

- Thiruvanniyur is highly congested area which has a four way intersection present with two lane roads.
- In this project, from the above survey of traffic volume for an each area, the highest peak traffic volume was attained at the area of Thiruvanniyur intersection from Adyar to Ecr.
- According to scenario 1, the V/c ratio obtained was found to be 2970 PCE in peak hour (18-19.00) where the volume per capacity ratio reaches above 1, hence for improving the traffic flow at the intersection, long term measures can be suggested as flyover in the particular intersection. As a short term measure, by restricting straight and right turn traffic from Ecr near **Police Booth Signal** permitting them as left turn to connect towards Tidel park and straight to connect L.B road towards Adyar, the intersection we are suggesting is about 450m, diverting 2 and 4 wheelers to alternate routes to reach Adyar and Tidel park in short period of time. From scenario 1 we are able to reduce the passenger car equivalence from 3258 PCE to 2598 PCE.
- Similarly in scenario 2, by restricting traffic flow from Adyar near **Cotton House Signal**, we are suggesting a left turn through Kalakshetra road which is 300 mts before the intersection and diverting 2 and 4 wheelers to alternate routes to reach Ecr with less traffic and time. Thus reducing the passenger car equivalence from 3152 PCE to 2657 PCE.
- Therefore by implementing the above mentioned solution for two scenarios, we conclude that the **V/C ratio** at the intersection was found to be **0.98** with total volume of 10997 PCE, whereas the average was found to be 2749 PCE, which leads the heavy traffic flow to run with less congestion for upcoming years.

6.3 SCOPE OF THE PROJECT

- The alternate routes has given much advantage, where they can reach destination at an specific time without any troubles like traffic or any obstacles occur on the main road. By the use of these routes we are suggesting, the traffic can be reduced, transport can be increased, time can be saved and most importantly the accident can be avoided.
- The solutions stated in the project are only short term local solutions.
- In a larger perspective the root of the problem has to be identified, analyzed and solution should be formulated.
- The intersection may be receiving more traffic in future years due to the rapid urban development in its neighborhood areas.
- The ultimate solution to the intersection would only be an multilevel interchange.
- But it is to be clearly understood that the solution is only for this particular intersection and not to the entire area (police booth and cotton house junction).
- This in turn triggers the necessity to analyze the transportation planning of the whole area.
- The study can be further extended as an area level traffic and transportation planning project.

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