

**PRE-FEASIBLE STUDY FOR INTRODUCING BUS RAPID TRANSIT  
SYSTEM IN JALANDHAR**

**Submitted in partial fulfillment of the requirements  
of the degree of**

**MASTER OF TECHNOLOGY**

**in**

**CIVIL ENGINEERING**

**by**

**MUTYAM VIJAYA BHASKAR REDDY**

**(11610579)**

**Supervisor**

**Mr. AKASH VERMA**

**Assistant Professor**



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**LOVELY PROFESSIONAL UNIVERSITY, PHAGWARA**

**2017**

## **DECLARATION**

I, **MUTYAM VIJAYA BHASKAR REDDY** (11610579), hereby declare that this submission is my own work and that to the best of my insight and conviction, it contains no material beforehand distributed or composed by other individual or office. No material which has been acknowledged for reward of some other degree or certificate of the college or other organization of higher learning with the exception of where due affirmations have been made in the content. It was arranged and displayed under the direction and supervision of **Mr. AKASH VERMA** (Assistant Professor).

**Date:**

**M.VIJAYA BHASKAR REDDY**

**Place:**

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This is to certify that **MUTYAM VIJAYA BHASKAR REDDY** under Registration No. **11610579** has prepared the dissertation-1 report titled “**PRE FEASIBLE STUDY FOR INTRODUCING BUS RAPID TRANSIT SYSTEM IN JALANDHAR**” under my direction. This is a bonafide work of the above competitor and has been submitted to me in fractional satisfaction of the prerequisite for the honor of Masters of Technology in Civil Engineering.

Mr. Akash Verma  
**Supervisor**  
**Assistant Professor**

Mrs. Geeta Mehta  
**Research Coordinator**  
**School of Civil Engineering**

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I am also thankful to our teaching staff, non-teaching staff and all others involved in this Project.

Signature of student

**M.VIJAYA BHASKAR REDDY**

## **ABSTRACT**

This paper targets in improving public transport system in Jalandhar city located in Punjab State. Like most of the Indian cities, Jalandhar is one among them which is facing problems with increasing travel demand of a city and having an inefficient public transportation system. Though there is an availability of city bus service by Jalandhar City Transport Service Limited in 2008, it doesn't gain satisfactory results from the public, so the project has been shut down. There are various problems related to public transport such as rapid increase in a number of road accidents, Excessive vehicles emission issues, traffic congestion, more occupants on road are . The affects regarding the pollution, safety, comfort, and inefficiency have reached an alert level. Mostly the effect of pollution levels in the atmosphere can be mainly observed during the winter season. Fog in a combination of Smoke forms Smog and restrict wind speed and withholds the air particulate matter which is responsible for the increase in toxic level in the environment . Hence, there is an extraordinary need to ensure that we embrace a spotless, productive, reasonable, viable and safe open transportation framework and for this Bus Rapid Transit System could turn into a fitting arrangement. Transport Rapid Transit (BRT) Systems have developed as one of the imperative methods of open nowadays in major cities of India. This paper is about the implementation of BRTS in Jalandhar, Punjab and its impact on future transportation system by studying the existing traffic conditions, vehicle registration data, traffic volume study, selection of corridors, the layout of BRTS and Standards of BRTS in Indian conditions.

# Table of Contents

1.INTRODUCTION .....	8
1.1 BACKGROUND: .....	9
1.2OBJECTIVES OF STUDY .....	10
1.3 SCOPE OF STUDY .....	11
2. LITERATURE REVIEW .....	13
3. METHODOLOGY .....	16
3.1 COLLECTION OF MAP: .....	16
3.2 POPULATION GROWTH AND CHARACTERISTICS:.....	17
3.3 EXISTING TRAFFIC CONDITIONS .....	18
3.3.1 EXISTING PUBLIC TRANSPORT: .....	19
3.3.2 CITY BUS SERVICE:.....	21
3.4 VEHICLE REGISTRATION DATA:.....	22
3.5 INTENSITY OF ROAD ACCIDENTS: .....	23
3.6 CORRIDOR SELECTION:.....	24
3.7 SPEED DELAY SURVEY (FUTURE STUDY) .....	25
3.8 TRAFFIC VOLUME STUDY (FUTURE STUDY): .....	26
3.9 TRAFFIC PROBLEMS: .....	26
3.10 LAYOUT OF BRTS LANE (FUTURE STUDY):.....	27
3.11 STANDARDS OF BRTS (FUTURE STUDY): .....	27
4. CONCLUSION .....	27
REFERANCES: .....	28

## LIST OF TABLES

Table No.3.1: Population Growth Characteristics.....	17
Table No.3.2: Intensity of Public Transport .....	19
Table No.3.3: Vehicle Registration Data.....	22
Table No. 3.4: Road Accident Data.....	24
Table No. 3.5: Peak Hour Journey and Running Speed along with delay.....	25
Table No. 3.6: Standard PCU values.....	26

## LIST OF FIGURES

Fig 1.0. Rapid Growth in Private and Public Transport.....	8
Fig 1.1. Special lane for BRT system .....	10
Fig 1.2. Layout of bus stands in BRT lanes.....	10
Fig 1.3. Simple construction of BRT lane with in city.....	11
Fig 1.4: Image showing a full access of BTR system to Public.....	12
Fig 3.0. Development plan for Transportation Network.....	16
Fig 3.1. Graph Resembling the Growth of Population in JMC.....	18
Fig 3.2. Traffic pattern in and around the Jalandhar City.....	19
Fig 3.3. Pedestrians.....	20
Fig 3.4.Cycle rickshaw.....	20
Fig 3.5. Auto Rickshaw.....	20
Fig 3.6. E-Rickshaw.....	20
Fig 3.7. Bicycle Users.....	20
Fig 3.8. Mini Buses.....	20
Fig 3.9.Taxies.....	20
Fig 3.10. City Bus Service.....	21
Fig 3.11. Graph representing Vehicle Registration data.....	23

# CHAPTER-1

## INTRODUCTION

In India, due its rapid growth in population and industrialization the usage of both Motorized and Non-motorized mode of transportation also getting increased too rapidly. All developing cities are targeting for better mobility of public within city aiming with an ecofriendly and sustainable transportation system. Indian Cities like New Delhi, Mumbai, Kolkata and other places have already experiencing with Rapid growth of Transportation along with Industrialization .Awareness have been developed in people about the reasons for this situation and for this various suggestions from both government and public for finding better way of transportation for reducing the impact on ecology. Moreover controlling the usage of diesel and petrol engines which are more responsible for the CO<sub>2</sub> emissions and Preferring the alternative fuel sources like CNG, LPG, Solar, Electric, etc. An Initiative stating The National Urban Transportation Policy (NUTP) was approved by the Union Cabinet in 2006.This was formed to give more priority to public transport system over personal vehicles. This arrangement was supported financially by "Jawaharlal Nehru National Urban Renewal Mission (JNNURM) of Ministry of Urban Development (MoUD)", Government of India.



Fig 1.0. Rapid Growth in Private and Public Transport

Buses are the only mode in which high intensity of passengers are carried on road network. Mass Rapid Transit System (MRTS) is mode of transport in which group of passengers are carried in single mode like Buses, Metro, Mono rails at a faster rate in a systematic way. Bus Rapid Transit (BRT) system in one among them and it has developed as one of the vital method of open transport. One of the best example in



our country is New Delhi, Ahmedabad, Rajkot BRTS and Amritsar BRTS in Punjab which is near to Jalandhar city. They are Motorized Transport similarly adaptable, effortlessly available, and proficient and further more financially savvy as far as having the capacity to transport an extensive number of individuals (instead of vehicles). BRT frameworks can be effectively redone to group needs and that outcome in more travelers with less number of clog.

## BACKGROUND:

Jalandhar needs to build up a mass travel framework shielded from its expanding activity blockage due to increase in usage of motor vehicles as said earlier. Mass transit is best solution for this problem by approving them in certain corridors suggested. Among all three mass transit systems such as Bus rapid transit (BRT), metro, and monorail technologies, Bus Rapid transit system is more feasible to the traffic conditions in Jalandhar. This could provide a system with sufficient capacity and speed to improve mass transit ridership in the selected corridors.

While all 3 Mass Rapid Transit systems would save travel time and so help retain passengers on public transit, the metro and monorail system would require higher investment in construction and maintenance. By comparison of all the three mods of transit systems BRT system has reasonable fare price and can reach into all corridors of the city meeting the requirement of all the population of city. This could be the best solution after failure of City buses in Jalandhar as it is not funded by any local agencies but it is a part of JNNURM.

BRT can give successful mass travel without requiring an expansion in charge cost. Therefore, BRT has the most astounding potential to build open travel mode share and assuage blockage in Jalandhar. As indicated by Private form work exchange (BOT) or government venture for framework: Rs.115 crore (on a normal of Rs.5.0 crore/km) likewise it might changes from because of a few reasons in NHAI .Minimum cost for an ideal mass travel framework, the administration needs to enhance the right-of-route for the two Vehicles and people on foot, at an expected cost of Rs. 68 to 200 crore.



Fig 1.1. Special lane for BRT system



Fig 1.2. Layout of bus stands in BRT lanes

## OBJECTIVES OF STUDY

The main objectives of this study are as follows:

- For redesigning the existing road network in city and city structure.
- Conducting various Traffic surveys to know the local movement of people within Jalandhar City.
- Selecting various corridors across the city.
- Implement BRTS in Jalandhar City and monitoring its impacts on Public by taking feedback.
- Making sure that Journeys are fast, reliable and punctual will save travelers time.
- Attracting all Private mode users like Ahmedabad BRTS.
- BRT buses will follow a timetable and ensure a destination in time.
- Safe and secure travel provided by friendly staff.
- Less travel cost compared to other modes.
- BRT will reduce traffic in the city by making better use of existing road space with proper maintenance.
- A new traffic control system will be used to manage traffic across the whole city and to reduce congestion.
- The BRT system will support economic growth by providing greater access to jobs.
- The streets will be improved along the BRT route.
- Reducing the 3-wheelers and Private cars will reduce the cost of traffic congestion.



Fig 1.3. Simple construction of BRT lane with in city

### 1.3 SCOPE OF STUDY

Some of the main characteristics of BRT are:

- Separate bus lanes should be allotted
- Rapid boarding and alighting.
- Priority at traffic signal points
- Clean, secure and comfortable stations and terminals
- Smart ticketing and efficient pre-boarding fare collection
- Effective licensing and regulatory regimes for bus operators
- Attractive, high capacity and customer-friendly buses
- Clear and prominent signage and real-time information display
- Well maintenance of roads and buses Time to time
- Preferring Electric Buses over Conventional buses to minimize pollution levels
- Help desks at every bus stop
- Toll-free numbers for women Protection



Fig 1.4: Image showing a full access of BTR system to Public

## CHAPTER-2

### LITERATURE REVIEW

1. **“Pre-Feasibility Study for Bus Rapid Transit Hyderabad, Andhra Pradesh”** was studied by the Institute for Transportation and Development Policy with financial support from: US Agency for International Development **Draft Final March, 2005.**

Providing mass transit systems for Hyderabad City which was several problems with its traffic conditions as it was providing a lot of employment which also increase in usage of roads. By providing a well-planned BRT system Hyderabad City can overcome all these problems as it does not interfere with rest of traffic flow and also it was a laid in separate lanes on roads. It's also economical and requires less time and effort for its construction work.

2. **“The Institute for Transportation and Development Policy (ITDP)”** works with cities worldwide to bring about transport solutions that cut greenhouse gas emissions, reduce poverty, and improve the quality of urban life. [www.itdp.org](http://www.itdp.org)

The Oak Foundation, an international philanthropy seeking key activities for supporting Jharkhand in developing progressive transport policies and implementing demonstration projects in Ranchi, its capital city. The Institute for Transportation and Development Policy (ITDP) works with urban areas worldwide to achieve transport arrangements that cut ozone harming substance outflows, lessen destitution, and enhance the nature of urban life.

3. **“A summery on developing Master Plan for Jalandhar developed by Local Plan Area (LPA)”**

This included all the parameters of Jalandhar city for its development in all aspects on considering existing traffic condition, population, travel pattern, water supply, power supply, railways, bus terminals etc. are mentioned clearly.



4. **“Bus Rapid Transit System for Greater Cairo by Institution for transportation and Development in 2005.”**

During the week of May 3, 2015, the Institute for Transportation and Development Policy (ITDP) made its first mission to Greater Cairo to perform a pre-feasibility study for Bus Rapid Transit (BRT) in Cairo, New Cairo, and Giza. The ten-day mission, supported by UN-HABITAT Cairo, included meetings with relevant planning bodies and preliminary data collection on road segments with significant public transport demand.

5. **“Implementation of Bus Rapid Transit System for Aurangabad City” by Chetan Limkar, Kishor Bamboode**

Knowing the importance of Public transportation system in Aurangabad city and to get clear idea about new system of public transportation system model was created in AUTO CAD with BRTS lanes including in it. At first map of Aurangabad with the existing road network is taken from Google map. By setting this as background the total road network is drawn with exact dimensions in autocad2014. This file is imported in AUTO CAD 2DMODEL and whole model is drawn with exact Dimensions, position of bus station, intersection and end condition. Finally concluding with the implementation of BRTS in Aurangabad City, Maharashtra.

6. **“A Methodology for Selection of Bus Rapid Transit Corridors: A Case Study of Kolkata”, by Tuhin Subhra Maparu and Debapratim Pandit**

The paper aims at formulation of a methodology for selection of corridors for introduction of BRTS in urban areas in India and Kolkata in present challenges like increasing traffic congestion and car ownership, lack of road and transport infrastructure and find all the factors adopted in selection of corridor is discussed in this paper. Incorporation of feasibility constraints both for selection and phasing of BRT corridors would enable planners and decision makers to make more informed decisions about implementing BRTS in Indian cities.

7. **“Impacts of Bus Rapid Transit Lanes on Traffic and Commuter Mobility”** by Vaishali M. Patankar, Rakesh Kumar and Geetam Tiwari

The objective of the research reported in this paper was to determine the impact of BRT dedicated lanes over existing mixed lanes on traffic and commuter mobility. By using different traffic situations in a corridor, its impact was found to be positive on the mobility. By providing dedicated lanes for NMV movement, MV shorter trips will be reduced and that will minimize pollution and fuel consumption in the city. This analysis indicated that the benefits of modernization of urban transport can be realized only by providing separate lanes for NMVs.

8. **“Implementation of BRTS in Madurai City”** by V. Prakash, C. Raghul Aravind, K. Ramesh, P. Jagadeesh

All the studies required for the implementation of BRTS in second largest city of Tamil Nadu, Madurai are taken into considering the opinion of public is conducted during the process.

# CHAPTER-3

## METHODOLOGY

### 3.1 COLLECTION OF MAP:

The following map represents the Transportation Planning in Jalandhar City collected from Jalandhar Municipal Corporation.

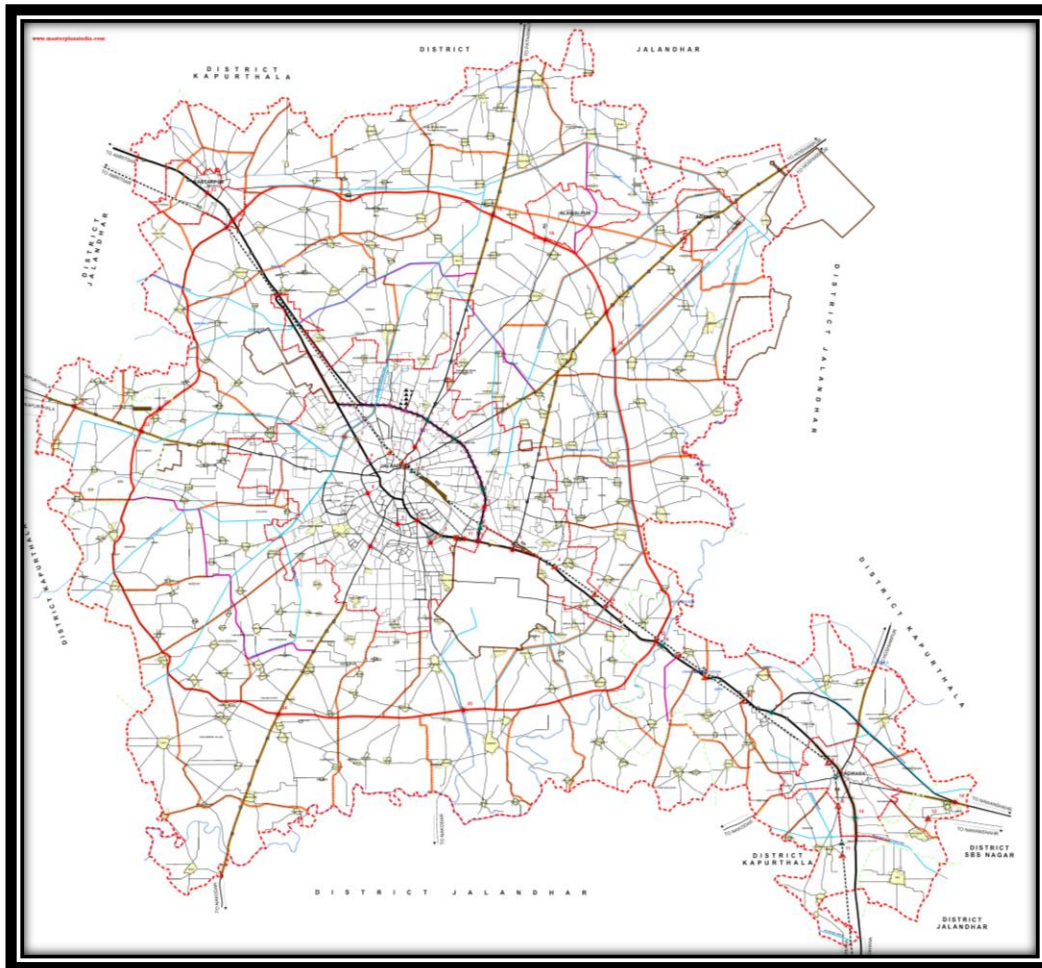


Fig 3.0. Development plan for Transportation Network

To have an overview of future development activities the above plan will be more helpful. Local Government in collaborating with various public and private agencies has setup some development to be taken place in city for its better movement of goods and passengers. During this process, evaluation of various other modes and services to the public will be suggested by the officials to get beneficial results.



Transportation planning includes in opting various multi-disciplinary activities by raising more importance to environment. Development of city lies between amount of services implemented by the Government and Service accepted by the public. If not there is no meaning of initiation. Transportation manages to bring a shape to the urban areas and for its future land use. By estimating the future demand based on the present scenario Transportation Planning helps in setup of new goals.

### 3.2 POPULATION GROWTH AND CHARACTERISTICS:

The populace considers on Jalandhar city is done decade savvy which helps in drawing out the patterns in the development rates in the city. The personality of the town relies on the character of the populace so; it is a vital part of town arranging. The accompanying investigations identified with statistic factors for Jalandhar city had a populace of just 135283 in the year 1941.

The city populace information speaks to that amid the times of 1941-1951 and 1951-1961, it enrolled a development of 49% while, in 1981-1991, the development in populace touched 31%. In any case, amid the time of 1991-2001, the development rate came up to 39.47 % due to standardized social and monetary conditions which are just about 2% of the urban populace of Punjab. The urban development is a dynamic and consistent process.

**Table No.3.1: Population Growth Characteristics**

Year	Urban population of Punjab	Population of Jalandhar Municipal Corporation(JMC)	Population of Jalandhar as percentage(%) in total Urban population of Punjab
1921	869526	71008	8.16
1931	1168413	88430	7.56
1941	1657414	135283	8.16
1951	1989267	201996	10.15
1961	2567306	264393	10.29
1971	3216179	329830	10.25
1981	4647757	441552	9.50
1991	5993220	541050	9.02
2001	8245566	754608	9.15
2011	27743338	862886	3.11

(Source: Provisional Report of Census India, Jalandhar)

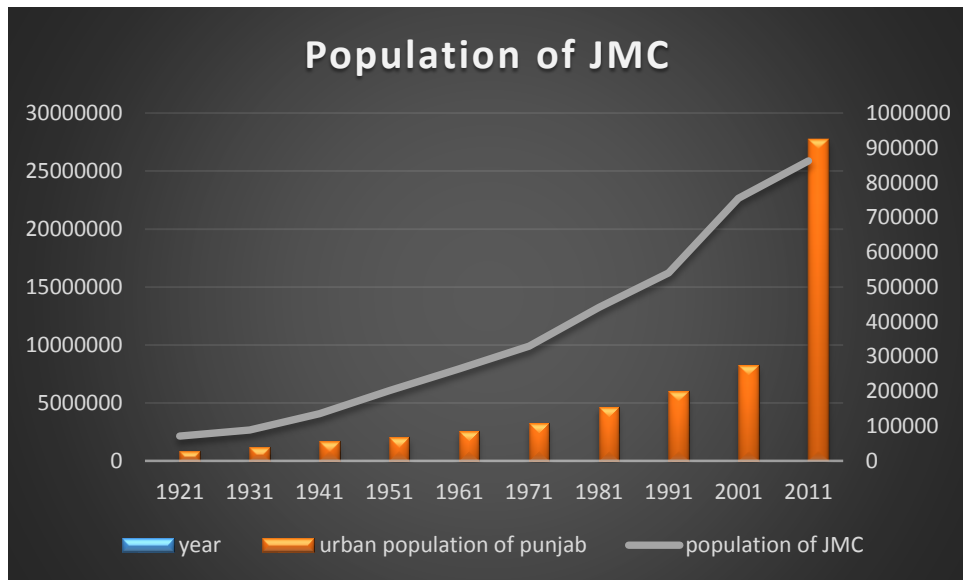


Fig 3.1. Graph Resembling the Growth of Population in JMC

As per Incremental increase method the future population by 2021, Punjab would be 16, 46, 26,462 and Jalandhar population would be 23, 67,379

### 3.3 EXISTING TRAFFIC CONDITIONS

**Jalandhar** is a city in Punjab with a population as per census report in 2011 is 862886, have density about 831 per km<sup>2</sup> with area of 3401km<sup>2</sup> (1,313 sq. mi) at an elevation of 228m. Due to its growth in all aspects such as Industrial, Educational, Sports, Political and Tourism it has been short listed for the second phase of the smart city by the Indian Government. Moreover, Jalandhar is also well connected with road network of bus services of Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir, Uttarakhand, and Rajasthan State Roadways apart from Private operators. At present Jalandhar City was facing several problems with increase in traffic along the different corridors of roads within city.

As the increase in private vehicles there is traffic congestion and delay in travel time. There are particular routes where more traffic flow was developed because of road users. As a result, there is increase in pollution level in city. The quality of life and economic life style of Jalandhar are seriously affected by the rapid growth in Private Vehicles.

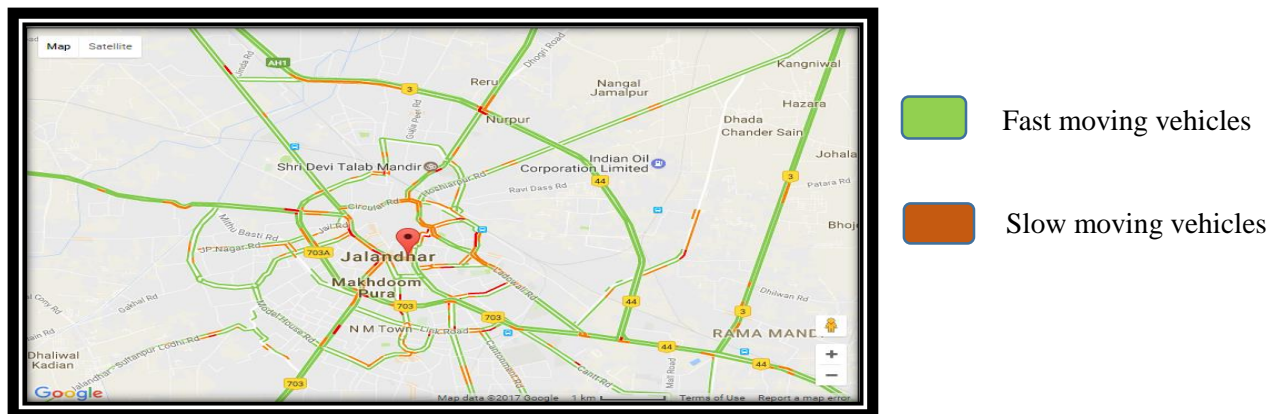


Fig 3.2. Traffic pattern in and around the Jalandhar City

As it displays the movement of traffic within the city as of mixed traffic conditions of both fast and slow moving vehicles which leads to traffic congestion. Red lines indicate the Congestion in City road also alert the road users to avoid particular route. The Grand Trunk Road is one of Asia's oldest and longest major roads which was passing from Jalandhar. It is also attracted by many motorists to travel as the condition of road and many pilgrims visiting Amritsar also pass by Jalandhar and contains many base camps for military in Jalandhar utilizes this road. Also many Educational and Industrial areas surroundings are attracted to life style of Jalandhar to stay near to their working place and responsible for increase in traffic volume during both working and non-working days.

### 3.3.1 EXISTING PUBLIC TRANSPORT:

Jalandhar city has a huge amount of public transport apart from the City Bus service. Although most the public knew the reason for the City Bus failure they have no other choice of modes except Para transit vehicles at greater price per trip next to the there is enormous increase in following table shows the number of auto rickshaws moving in the city.

**Table No. 3.2. Intensity of Public Transport**

Sr. No.	Intermediate Public Transport	Number of vehicles
1.	Auto – Rickshaws	Passenger = 7396 Goods = 5007
2.	Cycle – Rickshaws	13750

(Source: Review of the Master Plan Jalandhar, 2011)

The laying of the road infrastructure is being carried out by the private firm which is providing the Bus Shelter at different stoppages for the convenience of the people.

**Existing modes of transport in Jalandhar as of follows:**



Fig 3.3. Pedestrians



Fig 3.4. Cycle rickshaw



Fig 3.5. Auto Rickshaw



Fig 3.6. E-Rickshaw



Fig 3.7. Bicycle Users



Fig 3.8. Mini Buses



Fig 3.9. Taxis

### 3.3.2 CITY BUS SERVICE:

It has been observed that buses are the only mode of transport that can carry large number of passenger in urban area. Jalandhar City Transport Service Limited (JCTSL) has been initiated in 2008 to manage the public transport system of Jalandhar and provide services across different routes in Jalandhar at cheap priced service which can be affordable by all group of people. It is a SPV operates and manages the public partnership. It is a 10years concession period project under Built Operate Transfer (BOT).It is built by private company and operate by a private company up to its concession period and then Transfer to government. The organization picked ultra-current low-floor TATA Star transports having 2 x 2 seating office with an aggregate limit of 84 travelers (44 seating and 40 standing). A completely mechanized vehicle following framework with GPS empowered and constant following arrangements from the 22 control room.



Fig 3.10. City Bus Service

Monthly bus passes also introduced by providing smart card to streamline the process. Diesel buses are still under preference by the Punjab state with outdated buses have huge emissions of pollutants. Development in production of CNG and LPG has not yet started in Punjab. As a part of public transport usage of E-Rickshaws has more compared to other places also in Jalandhar City. Implementation before and after are divided into two cases for comparison

Case (1): Before implementation of City Bus there is no monopoly in other modes of public transport. No mode was provided for long distance travelers in city area and situations happen in changing multimode with investing huge fair to be invested. Illegal and Overloading of Auto-rickshaws ruling the city lanes. Public were suffered with the rough service and fluctuation in fair collected.

Case (2): After implementation of BRTS Service cost was reduced and it is less compared to private mode and more accessible throughout the City. Collection of extra fair was restricted by implementing strict rules. Approximately 8000 to 10000 passengers per day utilizes this service

But this service has stopped due to some unfortunate reasons such as narrow roads, protests by other modes influenced to shut down the service. Awareness in the public has to be brought regarding Public Transport.

### 3.4 VEHICLE REGISTRATION DATA:

Total Number of Vehicles registered in every year is getting increased with population .Fast moving and slow moving vehicles are getting mixed up and results in slow movement in traffic. The impact of growth in vehicles is ultimately effecting the public mobility. Every individuals are preferring their personal mode in this busy world. In case of middle income group households consist of minimum of two registered vehicles. Companies are attracting middle class people at low instalments to get a new Vehicles and this helps rise in more and more private vehicles .The following Data collected from the Jalandhar Region Transport Office(RTO) resembles the fluctuation took place in last 6 years.

**Table No. 3.3 Vehicle Registration Data**

Year	No. of 4-Wheelers	No. of 3-Wheelers	No. of 2-Wheelers	Others	Total
2011	13989	788	31024	34	45835
2012	16784	560	40105	140	57589
2013	13498	295	34111	300	48204
2014	13506	326	35448	234	49514
2015	12705	353	33496	214	46768
2016	11451	945	32611	250	45257

(Source: RTO Jalandhar, 2017)



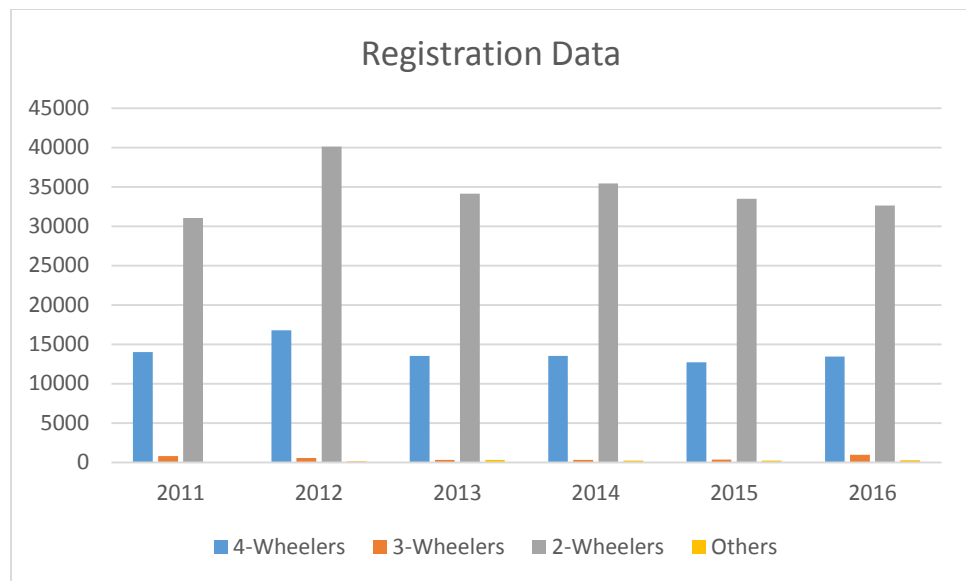


Fig 3.11. Graph representing Vehicle Registration data

The Percentage Growth rate for every is not at constant rate which results in witnessing number of vehicles in city but the roads remain same capacity and very less part of development taking place. Not only the Vehicles showing impact on city but also the vehicles from the outside also merges into city and disturb the regular moment of public. Problems in most of the roads are due to Vendors and illegal parking along the road sides also obstruct the smooth flow of traffic. Proper design of both On-street and Off-street parking in busy corridors helps a lot in reducing congestion and for this the data will be helpful. Also to study the traffic intensity

### 3.5 INTENSITY OF ROAD ACCIDENTS:

So as to survey the Safety in Jalandhar, it assumes an essential part to collect the street mishances in the city. The information gathered from the activity police in view of the quantity of street mishances recorded from recent years. In 2014 were 156 out of which 101 were deadly. The quantity of the mishaps has been dropped down to 147 of every 2015 in which 95 were deadly .if there should arise an occurrence of 2016 it has step by step expanded to 182 mishances out of which 125 were lethal.From the study we can observe that the rate of accidents has been raise and fall at every successive years. Measures to be adopted for reducing the accidents within city and this can be initiated by implementing a better road network in Jalandhar city

**Table No. 3.4: Road Accident Data**

Year	No. of Accidents	Fatal	Non-Fatal
2014	156	101	55
2015	147	95	52
2016	182	125	57
2017	128	75	53
<b>Total</b>	<b>613</b>	<b>396</b>	<b>217</b>

(Source: Traffic Commissioner Office, Jalandhar city)

### 3.6 CORRIDOR SELECTION:

The first phases of BRT in Jalandhar in areas in which there is high demand will help demonstrate the ability of BRT. Specific BRT corridors for Jalandhar were determined after evaluating a number of parameters including:

To implement BRTS, it is necessary to identify the feasible corridor which satisfies the requirement of BRTS with enough Right of Way (ROW). Once the road widths meet the requirement they will be selected in the list of BRTS corridors. Also selection of BRTS involves in two stages

- i. Finding all feasible corridors.
- ii. Ranking the corridors according to priority.

In case of finding a feasible corridor there must be availability of Right of Way to meet the future requirements and increase the Level of Service. These also involves in targeting the Land Use Pattern and predicting the future Ridership. After listing all the feasible corridors, ranking will be allotted to them based on following factors:

- Existing Right of Way.
- Level of Service.
- Number of Intersections.
- Signaling Systems.
- Availability of Existing Mode.
- Fare Prices.



**Following are the corridors selected in Jalandhar City:**

- PAP Chowk - BSF Chowk (Closed System).
- BSF Chowk - BMC Chowk (Open System).
- BMC Chowk - Dr. AMBEDKAR Chowk (Closed System).
- Dr. AMBEDKAR Chowk - FOOTBALL Chowk (Closed System).
- FOOTBALL Chowk - KAPURTHALA Chowk (Closed System).

Above mentioned corridors comes under the first phase of BRTS development in Jalandhar City. The length of corridor path from PAP Chowk – KAPURTHALA Chowk is 7.5kilometers which covers approximate about 28minutes journey.

**3.7 SPEED DELAY SURVEY (FUTURE STUDY)**

Speed and delay overviews were completed over the chosen corridor. The overviews depended on 'Floating Car Method', for private modes. This was led by the two bearings of activity development streams amid top (morning and evening) and off-crest hours on a reasonable climate working day. This review encourages the engineer to assess the power of movement. It is utilized as a device for finding the running rates, travel time, span and reason for delays at basic area length. The street arrange under study involved an aggregate length of around 7.4 km.

**Table No. 3.5: Peak Hour Journey and Running Speed along with delay**

Sr. No	Section Node		Length (km)	Peak Hour Journey for Private Mode				
	From	To		Running Time(Sec)	Delay Time(Sec)	Total Time(Sec)	Journey speed (km/hr.)	Running speed (km/hr.)
1								
2								
3								
4								

### 3.8 TRAFFIC VOLUME STUDY (FUTURE STUDY):

Classified Traffic Volume Surveys is carried out at the major intersection across the selected corridor and finding the amount of traffic following the route patterns by taking right turns, left turns, following straight path during the peak hours in morning time in between 8.30 am to 9.30 am and evening peak hours in between 4.30 pm to 5.30 pm. The vehicular checks were changed over into Passenger Car Units (PCUs). The received Values according to Indian Road Congress (IRC) are exhibited in the Table No. 6

**Table No. 3.6: Standard PCU values**

Sr. No	Vehicle Type	PCU
1	CAR / JEEP / VAN	1.0
2	3-WHEELER / AUTO RICKSHAW	1.0
3	2-WHEELER	0.5
4	BUS	3.0
5	MINI – BUS	1.5
6	TRUCK	3.0
7	LCV	1.5
8	TRACTOR	4.5
9	CYCLE	0.5
10	CYCLE RICKSHAW	2.0

### 3.9 TRAFFIC PROBLEMS:

Due to heavy traffic across all the corridors of Jalandhar, the following are the problems faced by motorist

- Absence of functional hierarchy of road network.
- Mixed traffic.
- Narrow roads present of the city with high congestion.
- Location of major traffic generators such as wholesale markets in the core of the city.
- Large scale intermixing of slow and fast moving traffic.
- Inadequate grade separators leading to number of traffic jams.
- Large scale encroachments of road leading to reduction in effective road width.
- Lack of parking.

### 3.10 LAYOUT OF BRIS LANE (FUTURE STUDY):

### 3.11 STANDARDS OF BRIS (FUTURE STUDY):

## CHAPTER-4

### CONCLUSION

BRT frameworks and monetary advancement in an expansive assortment of conditions can pull in new riders to travel and initiate travel arranged land utilize. BRT systems is an innovative, high capacity, lower cost public transit solution. Integrated BRT which improves the flow of transit system and extracts the efficiency from existing system.

In Jalandhar city it is observed that most of the roadway have right of way less than 30m. The pedestrian volume and the volume of two wheelers are high which require more right of way width. It is observed that the carriageway width is mostly 14-20m which occupies most of the right of way width that reduces the space required for pedestrian facility. It is observed that, there is no pedestrian crossing on the major road of the city. This creates the inference to through traffic.

In Jalandhar city the growth of private vehicle is high; there are no parking facilities for these private vehicles. The vehicles use the on street parking; this reduces the carriageway width for the traffic to flow. In Jalandhar city the peak hour is from 8 to 10am this is due to high population of students and employed persons. In Jalandhar city the movement of public transport is poor the maximum speed up to 18-25 kmph. This is due to increase in the volume of private buses and mini buses. The Delay time on various road of Jalandhar city is more than 60 seconds. This is due to lack of proper traffic management and congested roads.

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