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Traffic Management Plan for Bharuch City

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ABSTRACT:This paper is about Traffic congestion problem in Bharuch city. Bharuch is remains as undeveloped city between two developed cities, Surat and Vadodara. This research covers study of the population growth, vehicle growth, accidental data, growth of the city. Field survey ofthe city is conducted and identified the locations of traffic congestions and their causes. Also counted the traffic volume at nodes by manually and propose solutions for traffic congestions.

KEYWORDS: Population growth, vehicle growth, Traffic Study, Congestion, Traffic volume count,

I. INTRODUCTION

Traffic congestion is one of the common problems faced by nearly all the people in India. Most of the cities are undergoing multifaceted problem because of rapid urbanization. Traffic congestion is one of the intolerable problems of urban area emerging due to sudden increment in the private transport, affecting urban society, economy. Road traffic congestion poses serious challenge for all large and growing cities. Congestion prevents the movements of traffic, leading to the intolerable increase journey time. India has the second largest road networks in the world and it accounts for 10% of worldwide road fatalities. From this point of view, Road safety responsibility becomes essential for everyone.

Traffic congestion is a major urban transport problem. Due to traffic congestion, there is possibility of accidents because of poor traffic management. To eliminate road accidents and to save precious human life it is essential to find proper solution for traffic congestion. If you live in an urban area, traffic congestion can be a major daily problem. The number of vehicles is increasing day by day, because a growing middle class can now afford to buy cars and other vehicles. Traffic congestion is happened when saturation is happen means the road capacity is low and the demand of the vehicles is high. It is said that increasing number of vehicles which was caused by the population, the inadequate infrastructure and the irregular pattern of the development are main reasons for increasing traffic congestion.

Bharuch is well connected to the major cities of Gujarat like Surat Vadodara and Ahmedabad, etc by Indian National Highway 48. Also, Industrial areas like Dahej, Ankleshwar, Panoli, Zagadia, Saykha etc are located nearby city. Due to rapid Industrialisation, Urbanization, migration and employment, Population of Bharuch city has been increased. Old road networks of city cannot meet present requirement to efficiently handle traffic. So, road network of Bharuch city needs to be improved.

There is no Parking policy available in Bharuch city so vehicles are parked on road unevenly. Mostly in commercial area this kind of issue generate It creates traffic. There is also need to manage vehicular traffic because traffic signals are not located on preferable intersections. With increase population growth there is need to develop transportation network of Bharuch city.

II. OBJECTIVES

To study the present pattern of traffic and transportation within the city and its growth During Last few years. To analyze the cause of traffic congestion and to highlight the trend of traffic related problems.To examine the accessibility and connectivity of nodes in the study area. To study the impact of land use on transportation. To propose strategy for traffic management plan for Bharuch city.

III. METHODOLOGY

This paper is created on the basis of primary and secondary data.To carry out primary data the data has been collected through survey method-counting the vehicles movements from 8.00 am to 10.00 am, 12.00 pm to 2.00 pm and 6.00 pm to 8.00 pm, standing on the different meeting points of study area to show volume ofmovements. Snapping the images at peak hour and also non-peak hour to show comparison of different situationon different time.To know the actual situation and get possible suggestions about the problem no of listedquestions have been asked among random people. The secondary data have been collected from journals available on internet, R.T.O

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Office,BAUDA office, Bharuch Nagarpalika and Police Station of Bharuch. Themethods are carried out in such way first data collection, data processing, data analysis, inferences and proposal.

IV. STUDY AREA

The Bharuch district is situated between the parallels of latitude 21º 15' and 22o' and the meridians of longitude 15'72º 34' and 73º 18. It is bounded by Anand and Vadodara district in the north, gulf of Khambhat in the west, Surat district in the south and Narmada district in the east.

Bharuch nagarpalika was established in 6th July 1915 and Bharuch Ankleshwar Urban development Authority establish in 2012.Being close to one of the biggest industrial areas including Ankleshwar GIDC, it is referred to as the chemical capital of India. Gujarat's biggest liquid cargo terminal is situated 50 km to the west of Bharuch, in Dahej. It also houses many multinational companies, such as Videocon, BASF, Reliance, Safari Construction EquipmentsPvt. Ltd.

According to 2011 total population of Bharuch city is 169004 out of which male population is 86810 and female population is 82197. in 2001 total population is 167117 and population growth rate is 20.2 of Bharuch city. While, population growth rate of 2011 is 1.13 and Sex ratio is 947 oh Bharuch. 36064 is total household of Bharuch city. Literacy rate of Bharuch city is 81.51.

According to data shared by the state Home Department, over 21,000 people were killed, while more than 46,000 were injured in road accidents in Gujarat in the last three years, till September 2020, the Legislative Assembly was informed.

Here, fatalities compare with population. Valsad have maximum percentage 0.8% of fatalities. After Valsad, Bharuch have second Highest number fatalities 0.5% in Gujarat.Here, Injured number compare with population . Godhra have maximum percentage 1.2% of injured. After Godhra, Bharuch have second Highest number injured 1.06% in Gujarat. Surat has minimum injured Population percentage 0.06%.

The population of Bharuch are 1,69,007 and number of injured are 1801.

Overall growth rate of 2010 is 10.9% which increase 13.9% in 2015 and decease 9.85% in 2020.

Vehicle Types	2005	2010	Growth Rate % (2005-2010)	2015	Growth Rate % (2010-2015)	2020	Growth Rate % (2015-2020)
Motorcycle	27,000	39,000	8.88	71,000	16.4	1,10,000	10.9
LMV (Light Motor Vehicles)	4300	7600	15.3	10,300	7.10	14,000	7.18
ALR (Automatic Locking Retractor)	2200	4600	21.8	6300	7.39	7352	3.33
HGV (Heavy Goods Vehicles)	1700	2900	14.1	4600	11.7	6375	7.71
Bus	123	459	54.6	623	7.14	923	9.63
Construction	327	623	18.1	830	6.64	1153	7.78
Total	35,650	55,182	10.9	93,653	13.9	1,39,803	9.85

Figure 1 Vehicle data of Bharuch

Major accidents happen on Bharuch-Dahej by pass road. Because heavy vehicles moment are maximum on this road and also more intersections are located on this road. Narmada Chowkadi, ABC circle and Shravan Chowkadi are major accidental location in Bharuch city. Other location is Tulsidham area and the reason of accident location of this area is vegetable market. Railway station is also one of the accident locations because of intersection of three narrow roads with high traffic volume parked Ricksha

station road, sevashram road and netajisubhashchandra road are located in city core areas which are arterial roads. Soneri mahal road is located in old Bharuch area which is sub-arterial road.

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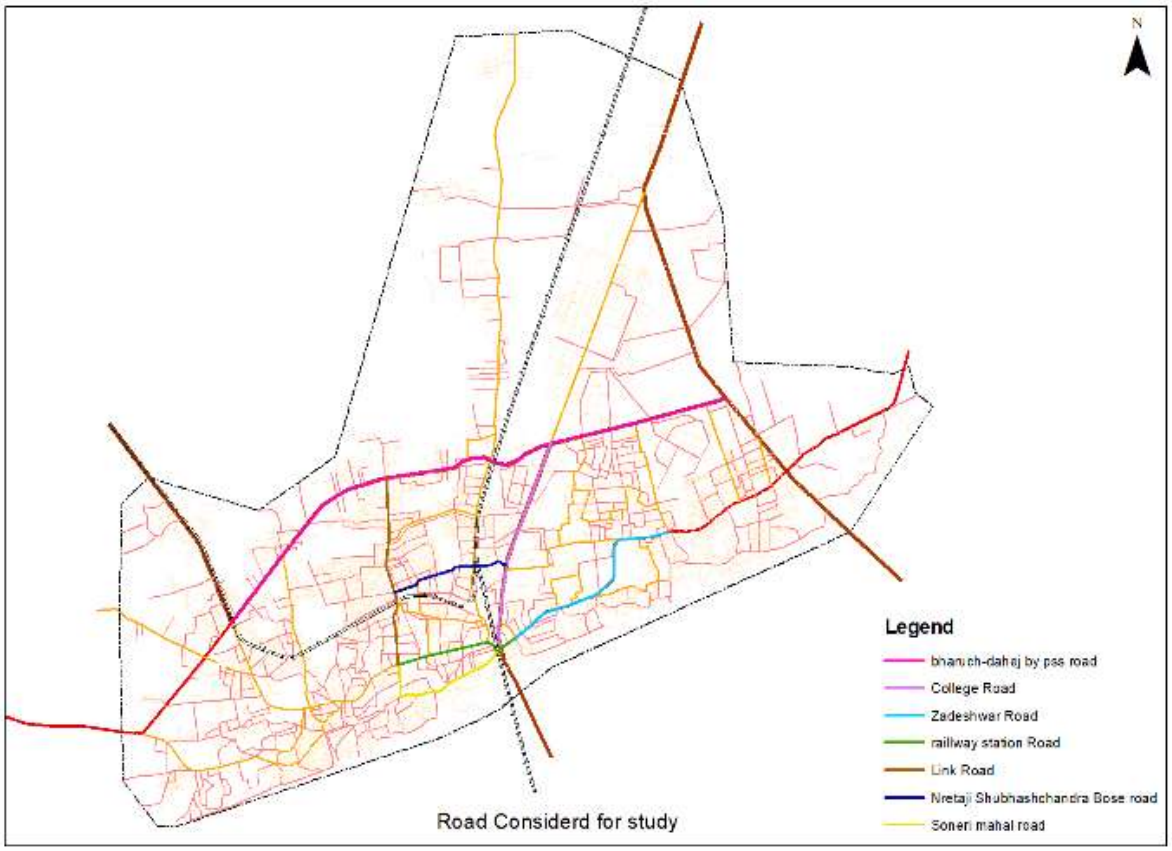

Figure 2 Study Area of Bharuchcity

There are major gap between Recommended ROW and existing Major srudy roads are Bharuch-dahej by pass road, collage road and zadeshwar road which are national and state roads. Othere roads like railway
ROW. There are 6 lane carriage way recommended for national road but existing carriage way are only 4 lane for national road. All the National road, Arterial road, Sub arterial Road Recommended separate bus route but there are no separate bus route on existing road network.

Walkways are available only on Bharuch-dahej by pass road. Which not in use. There are no parking policy available in Bharuch city. In city core area vehicles are parked on road. Traffic sinages are available on some roads like Bharuch-dahej by pass road, collge road and netajisubhashchandrabose road. There are no singes available in city core area.

On street parking space is recommended on Sub Arterial and Collector Road. But there are No parking Facilities available in existing road network. Footpath and Not Motorized vehicle track are recommended on National, Arterial, sub-Arterial road. In exiting Road network only on Bharuch – Dahej by pass road Footpath is available

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Road	Road Type	Row	Recommended ROW	Proposed ROW by BAUDA	Carriage Way	Recommended Carriage way
Bharuch – Dahej By pass Road	National Road (Four lane)	25 M	50-80 M	45 M	6 M(2 lane) 5 M (2 lane)	3-3.5 M(6 Lane) 3.5 M for bus lane
College Road	National Road (Four lane)	22 M	50-80 M	-	4.5 M (4 lane)	3-3.5 M(6 Lane) 3.5 M for bus lane
Zadeshwar Road	Sub Arterial Road (double lane)	14 M	30-50 M	24 M	5 M(2 lane)	3-3.5 M(6 Lane) 3.5 M for bus lane
Railway Station Road	Sub Arterial Road (Four lane)	15 M	30-50 M	30 M	6 M(2 lane)	3-3.5 M(6 Lane) 3.5 M for bus lane
Secretariat Road	Sub Arterial Road (Single Lane)	8 M	30-50 M	-	5 M(1 lane)	3-3.5 M(6 Lane) 3.5 M for bus lane
Netaji Shubhashchandrabose Road	Sub Arterial Road (Double Lane)	19 M	30-50 M	-	8 M (2 lane)	3-3.5 M(6 Lane) 3.5 M for bus lane
Soneri market Road	Collector Road (Single Lane)	10 M	12-30 M	24 M	6 M(1 lane)	3-3.5 M (2 lane)

Figure 3Data Analysis of Road

Road	Time	2 - wheeler	3 -wheeler	4 - wheeler	Bus	Truck	Total Vehicle	As per IRC Standard
Bharuch – Dahej By pass Road	Morning	731	386	1052	765	1802	4734	3950
	Afternoon	586	313	986	772	1870	4507	
	Evening	817	426	1118	795.5	1932	5108.5	
College Road	Morning	641	349	1160.5	784	617	3551.5	2850
	Afternoon	462	296.5	891	846	562	3057	
	Evening	682	392	1284	887.5	674.5	3893.5	
Zadeshwar Road	Morning	364.25	387	421	32.5	77.5	1182.25	1000
	Afternoon	318	243	473	20	42.5	1096.5	
	Evening	402	283.5	589	40	27.5	1342	
Railway Station Road	Morning	579	531.5	673	100	360	2143.5	1200
	Afternoon	797	585.5	848	40	20	2290.5	
	Evening	881	607.5	941	120	60	2609.5	
Secretariat Road	Morning	248	356.5	307	50	195	1156.5	1000
	Afternoon	339	383	384	32.5	165	1303.5	
	Evening	376	348.5	366	57.5	222.5	1370.5	
Netaji Shubhashchandrabose Road	Morning	558.25	389	684.5	52	92.5	1776.25	1600
	Afternoon	639.25	417.5	652	42.5	57.5	1808.75	
	Evening	681	397	687	62.5	87.5	1915	
Soneri market Road	Morning	181	274	237	-	-	692	800
	Afternoon	238	275.5	276	-	-	789.5	
	Evening	308	251	241	-	-	800	

Figure 4 Traffic Volume Count

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All the roads have traffic volume s are available more than IRC standard of according to road width. There is maximum traffic volume available on Bharuch-dahej by pass road. Soneri mahal road have less traffic volume compare to other roads and also traffic volume is nearby IRC standard numbers.

ABC circle, Narmada chowkadi and ShrvanChowkadi intersections are located on Bharuch-Dahej by pass Road. There more traffic congestion problem available on this road. Traffic signals are located on these three intersections but they are mostly not in working conditions. Speed delayed time of this intersections are 15-30 min and distance of traffic is 0.8 km to 1.5 km. because pf heavy traffic movement there are more traffic congestions and accident problem available on these three intersections.

Railway station circle, kasak circle, panchbatti circle and chaktinath circle are located in city core area. These intersections are surrounded by commercial area. There are no traffic signals and singes available on these intersections. Also, traffic are not managed by traffic police. Speed delayed time of these intersections are 10-20 minutes and distance of traffic are 0.3 -0.8 km.

Intersection	Type	Conflict Point	Traffic signal	Traffic Stages	Speed Delayed Time	Distance of Traffic
ABC Circle	Unchannelized	24	Yes	Yes	20 – 30 min	0.8 -1.2 km
Narmada Chowkadi	Channelized	9	Yes	Yes	15-30 min	0.8 – 1.5 km
Shravan Chowkadi	Unchannelized	24	Yes	Yes	20 – 30 min	1 – 1.5 km
Railway Station Circle	Rotary	24	No	No	10 - 20 min	0.4 – 0.8 km
Kasak circle	Rotary	24	No	No	10-15 min	0.4 – 0.6 km
Panchbatti Circle	Rotary	24	No	No	10-20 min	0.3 – 0.6 km
Shaktinath Circle	Rotary	24	No	No	10-20 min	0.4 – 0.8 km

Figure 5 Intersection data

V. PROPOSAL

PROPOSAL 1: SEPRATE TRACK FOR HEAVY VEHICLES ON BHARUCH – DAHEJ BY PASS ROAD

There is maximum traffic volume on Bharuch-Dahej by pass road. This Road is on of the entry road for Bharuchcity and also it leads to dahej. Row of the existing road is 25 M which not sufficient for current traffic flow.

Among all the vehicles numbers of Trucks and Buses are more pass through this Road according the survey. Other vehicles traffic flow is also more compare to other roads. So, there are more chances of traffic congestion and accidents on this Road.

According to survey Existing Road cannot sufficient current and future traffic Volume. BAUDA also proposed 45 m ROW for this road. So I proposed 45 M wide road with separate 8 m wide heavy vehicle track, 8 m wide carriage way , 3 m wide service Road, 1.5 m wide walk way. Through this proposal there will be reduction in traffic congestion due to decrease conflicts and also less chance of accidents due to separate lane for heavy vehicles. There is also reduction on speed delayed time. 2- wheeler, 3- wheeler,etc. vehicle have smooth traffic movement without any disturbance.Walk way is also proposed so it is safe for pedestrian movement. There Are 4 intersections are located on this road. So, there is need service road here. Service road also help in control vehicle movement and speed

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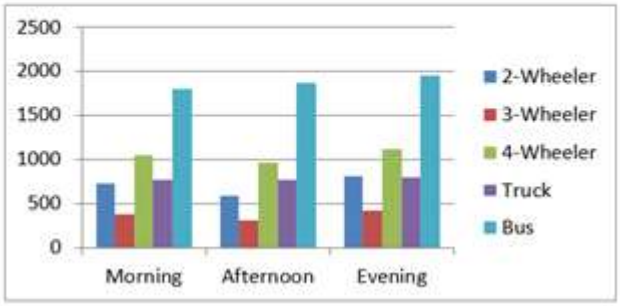
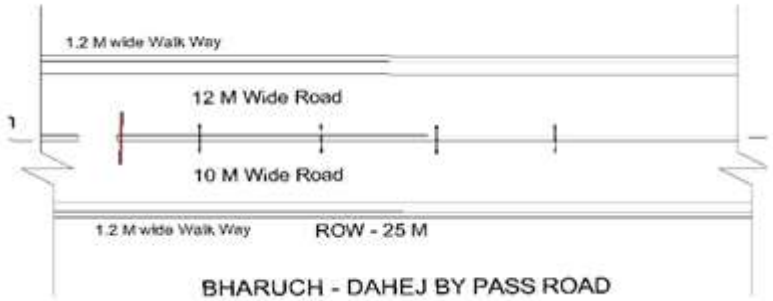
Traffic Volume Count of Bharuch-Dahej by pass Road			
Vehicles	**8 am – 10 am**	**12 pm – 2 pm**	**6 pm – 8 pm**
2 – Wheeler	731	586	817
3 – Wheeler	386	313	426
4 – wheeler	1052	966	1118
Truck	763	772	795.5
Bus	1802	1870	1952
Total	4734	4507	5108.5





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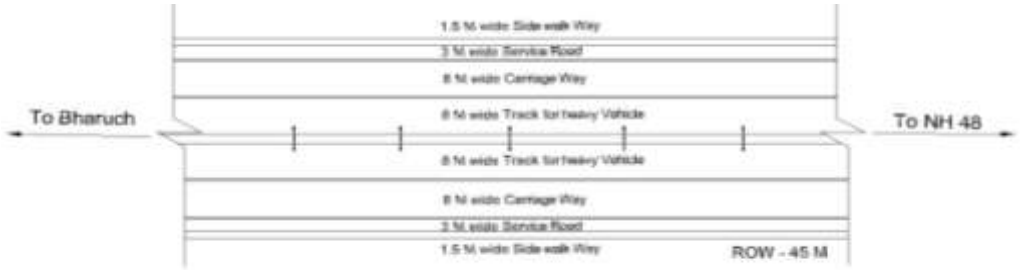
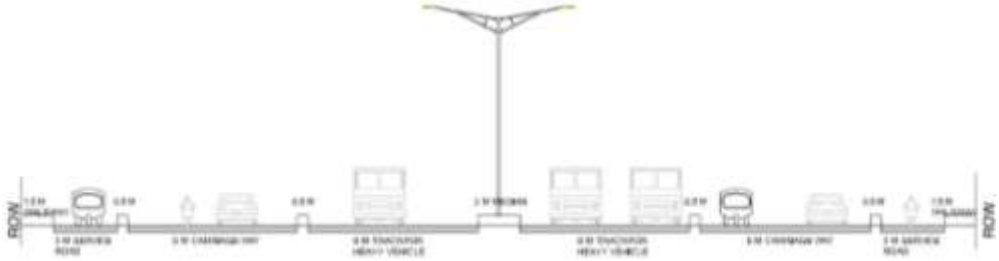


PROPOSED BHARUCH - DAHEJ BY PASS ROAD



PROPOSAL 2: ON-STREET PARKING ON ZADESHWAR ROAD

Mostly Commercial Areas are located on zadeshwar Road near kasak circle. So, vehicles are parked unevenly on Road it creates traffic congestion. Because of Commercial area there is requirement of parking facilities. So Through On street parking, Requirement of parking space and Traffic congestion both issues are solved.

ROW of Zadeshwar Road is 14 m which not sufficient for current and future traffic volume. BUADA proposed 24 m ROW for zadeshwar Road.

Un even parking is major problem on this road.

As per IRC standard 1000 PCU is normal traffic on 14 m road. But according to survey traffic volume are more than 1000 pcu on this road. In evening time there is maximum traffic volume 1342 Pcu. Bus and Truck flow are low on this road. Four-wheeler are mostly pass through this road.

so, I proposed on street planned two-Wheeler parking on 24 m ROW proposed Road. It fulfills the parking Requirements and reduce in traffic congestion.

Traffic Volume Count of Zadeshwar Road			
Vehicles	8 am – 10 am	12 pm – 2 pm	6 pm – 8 pm
2 – Wheeler	364.25	318	402
3 – Wheeler	267	262	283.5
4 – wheeler	421	473	589
Truck	32.5	20	40
Bus	77.5	42.5	27.5
Total	1162.25	1096.5	1342

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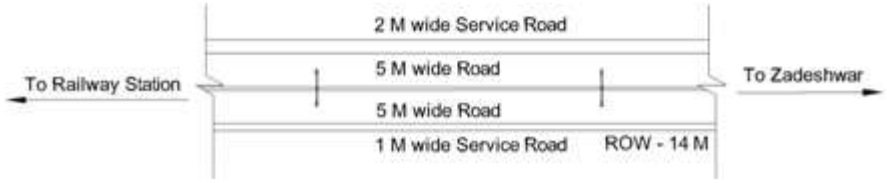
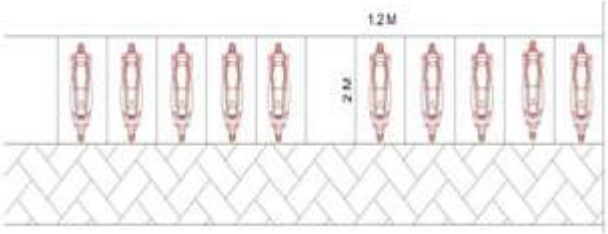
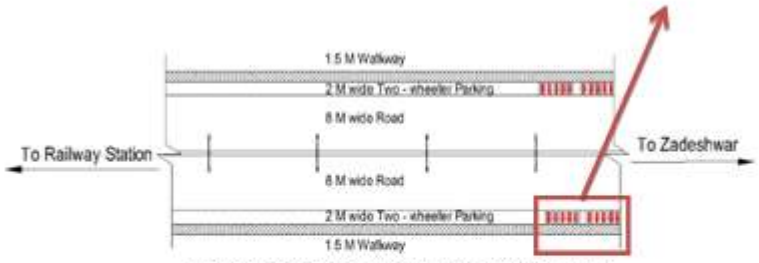
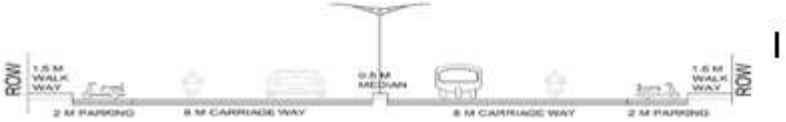


EXISTING ZADESHWAR ROAD





PARKING PROPOSAL ON ZADESHWAR ROAD



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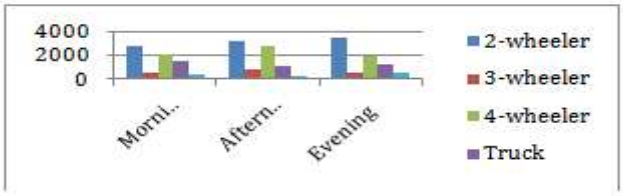
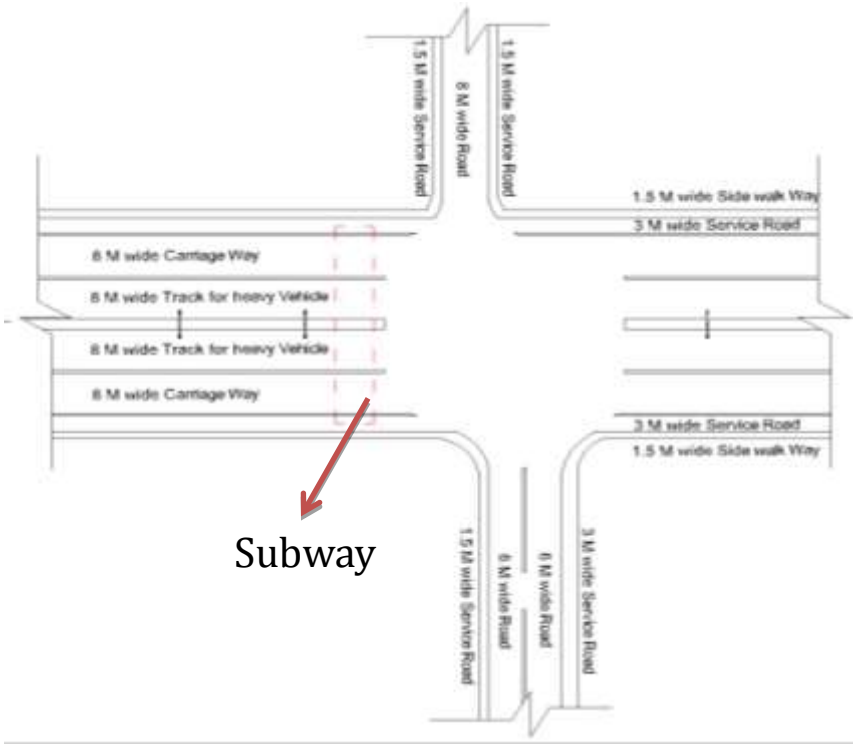
PROPOSAL 3: PROPOSAL OF SUBWAY FOR PEDESTRIANS AND CYCLES AT SHRAVAN CHOKADI

Shravan Chokdi located on Bharuch-Dahej by pass Road So Heavy vehicles pass through this intersection And City is connected by another Road Which link Road. Three schools Shravan Vidhyadham, Swaminarayan goodwill school and Amity School are located near intersection. So Pedistrian, Cycle, School van and rickshaws, etcvehicles movement are continue in day time. Both heavy Vehicles and School Vehicles lead more traffic congestion at this intersection.

Two-wheelers are mostly pass through this intersection which includes bikes and bicycles. Pedestrians are continuously pass through here. Pedestrian include scroll student. So existing situation of intersection is not safe for students. There is need of permanent solution.

So, providing subway is appropriate solution of this issue. It helps in reduction of traffic volume and congestion. It also reduces chances of accidents and make safe for user. Following table is the standard for subway as per IRC.





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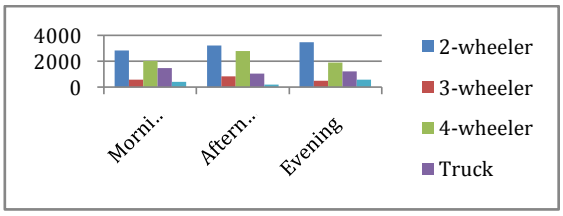
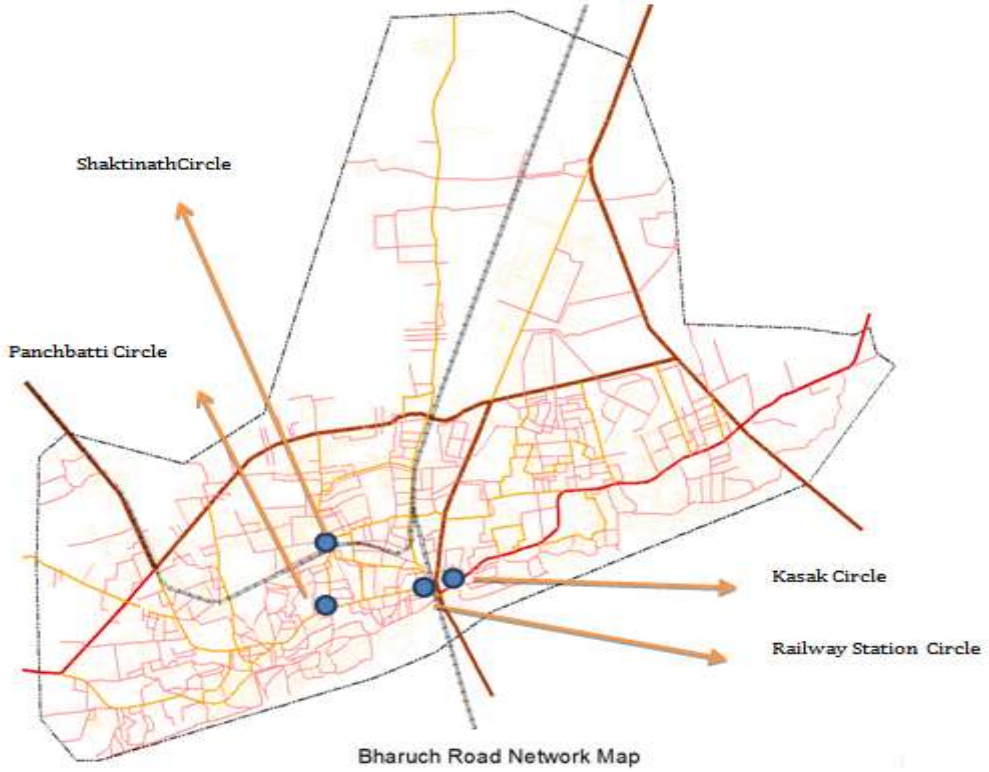


PROPOSAL 4: INSTALL SIGNAL AT KASAK CIRCLE, RAILWAY STATION CIRCLE, PANCHBATTI CIRCLE, SHAKTINATH CIRCLE

Kasak circle, Railway station circle, Panchbatti circle and shaktinath circle are located in city core area. Commercial, public, Education and Healthcare areas are located in core city area.More traffic flow is pass through these intersections. But there is no traffic signal available to manage it. Traffic signal help in manage traffic flow at intersections and reduce chances of traffic congestion and accidents. Traffic signals reduce conflicts of vehicle at intersections.



VI. CONCLUSION

Bharuch is city with old road network with developing Industrial area and increasing population.Road network has been one of the basic facilities in daily life. Bharuch is developing city so industrialization, commercial area, Residential area, Education, etc are improving but road network pattern remains existing. It creates issues like traffic congestions and accidents. ROW of all road is less compared to standard size of ROW according to URDPFI guidelines. National highways are pass with in the city it helps in increase in traffic volume.

Other facilities related transport like Footpath, Non-motorized vehicle track, parking facilities etc. are not available in city. Current road network needs to be improved with this kind of facilities it helps in reduce risk on transport and make safe transport system. At intersection traffic need to be managed by signal so it regulates the traffic. It reduces delayed time of traffic and distance of traffic.

In future Bharuch and Ankleshwargoing to connected by many bridges so city area traffic volume is going to be increase. So, core city area needs to be developed according to future traffic volume.

Traffic management plan is introduced in very rare cities. It helps in fastest growth of city, improve in economy of city, regulate traffic flow and make safe journey. Measures include route restrictions and right of way restrictions which serve to alter the direction and movement of traffic as well as parking which allow for unhindered traffic movement on roads. These are all implemented with the objective of smoothing traffic flow and increasing safety and do so by making better use of the existing infrastructure. More specific forms of traffic management designed to improve the environment, enhance safety or reduce travel demand are considered separately.

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