

Bus Priority Lane on Sarjapur Road, Bengaluru: A Smart Initiative

^[1]Jay H. Shah, ^[2]Nayan Deshmukh

^[1]M. tech Infrastructure Engineering Design, CEPT University, Ahmedabad

^[2]Masters in Urban and Regional Planning, TheMaharaja Sayajirao University of Baroda, Vadodara

Abstract :- Sarjapur road (from Iblur – Sarjapur, 15 kms long) is an emerging commercial and residential real estate destination in the IT sector in Bengaluru (Karnataka) due to its easy accessibility to SEZs and IT parks along the stretch on the Outer Ring Road (ORR). This corridor possesses a character similar to Electronic city, Whitefield and other IT/BT corridors of Bengaluru. Also the presence of Carmelaram railway station acts as one of the important gateways for the inflow of employees working in several IT/BT companies. Development of IT/BT has taken place all along Sarjapur road and new SEZ is expected to be a part of the corridor near Kodathi gate area. The corridor also possesses several Springfield apartment complexes, Wipro campus along with the multitude of schools. The existing corridor is not capable of carrying the large volume of traffic that it carries today and it needs improvement. Although there are BMTC buses with almost a headway of 3 minutes, once the new SEZ comes up and influx of people will increase, even this headway will not be sufficient to carry people. The main objective was to examine the feasibility of bus priority lane on the 15 km long Iblur-Sarjapur corridor, the only link between the Bengaluru city and Sarjapur town located on the Southeast side of Bengaluru. The purpose was to promote the public transport and thus, prepare a corridor development plan emphasizing on safe junction designs and improved pedestrian facilities. Thus after proper considerations a corridor development plan including bus priority lane plan has been made from Iblur till Kodathi gate (as new SEZ is expected to come near Kodathi gate) along with safe junction designs, improved pedestrian facilities and station accessibility plan for Carmelaram Railway Station has also been worked upon.

I. INTRODUCTION OF BENGALURU

Bengaluru, the capital of Karnataka, is India's fifth largest growing metropolis and is known world over as India's Silicon Valley. In the last decade or so, a genial small city, dotted with breathtakingly beautiful gardens; dominated by large defense establishments and government funded labs, transformed quickly into a teeming metropolis with large public sector companies, educational institutions and a global IT hub.

Due to the unprecedented growth of the city, the trip lengths have increased up to 11kms per day presently. These increased trip lengths have led to the increased dependency on private vehicle use. Public Transport (PT) is the backbone of mobility in any city. Even in Bengaluru, 42% of trips are made by PT. However, the mode share of PT is declining with the rapid increase in private vehicle ownership, i.e., 10% per year. As more and more people are moving to the city due to job prospective, the pressure on PT is increasing constantly.

II. INTRODUCTION TO SARJAPUR

Sarjapur road is an emerging commercial and residential real estate destination in the IT sector in Bengaluru due to its easy accessibility to SEZs and IT parks along the stretch on the Outer Ring Road (ORR).

Sarjapur road connects the Sarjapur town to the Outer Ring Road and thus serves as a medium for better connectivity to the core of Bengaluru. The length of this corridor is about 18 km, which begins from Iblur junction and runs until Sarjapur bus stand. Smaller streets that branch out of the central spine acts as connectors to Electronic City, Whitefield and Marathahalli.

The area is considered very important for upcoming investments in terms of a commercial corridor and the fact was triggered after the setup of Wipro campus in past few decades. This corridor possesses a character similar to Electronic city, Whitefield and other IT/BT corridors of Bengaluru as the presence of Carmelaram railway station acts as one of the important gateways for the inflow of employees working in several IT/BT companies.

The corridor also possesses several

Springfield apartment complexes, Wipro campus along with the multitude of schools. Due to the presence of many international schools, it can also turn out to be the educational hub for the city in upcoming years. Motherhood hospital is one of the important features in terms of the medical facilities on this stretch. Apart from these, there are few lakes in the vicinity of Sarjapur road like Iblur Lake, Kaikondranahalli Lake, Saul Kere Lake and Doddakanahalli Lake, which serves the requirement of public spaces on the corridor. Figure 1

III. DATA COLLECTION AND ANALYSIS

Primary Data

Speed and delay

Speed and delay survey was conducted on the project corridor only for the public transport as the focus was to estimate the average journey time and average running time of buses on the corridor.

The following analysis has been carried out of the speed and delay survey:

- Total Journey time
- Total Running time
- Delay time
- Average speed
- Average moving speed
- Max. speed
- Cause of Delays

The survey was done by dividing the corridor into 2 parts i.e., Iblur to Carmelaram and Carmelaram to Sarjapur bus stand depending upon the different land use.

Parameters	Iblur-Carmelaram	Carmelaram-Sarjapur bus stand	Sarjapur bus stand-Carmelaram	Carmelaram-Iblur
Total distance (km)	4.8	10.3	10.3	4.8
Total Journey time (mins)	13.27	17.51	21.53	16.36
Total Running time (mins)	11.34	17.20	21.13	15.41
Delay time (mins)	1.53	0.31	0.40	0.55
Average Speed(km/hr)	21.51	34.54	29.48	17.14
Average Moving Speed (km/hr)	25.04	35.57	30.4	18.13
Max Speed (km/hr)	53.4	75.02	54.54	51.18

Table 1: Speed Delay Survey

Figure 2,

Secondary Data

Public Transportation along the corridor

The existing condition of public transportation on the project corridor defined as per the routes of buses, number of buses, number of trips, and frequency of buses; was provided by Bengaluru Metropolitan Transport Corporation (BMTC) as follows:

- Total number of Bus routes on the Iblur - Sarjapur corridor = 50
- Total number of buses on Iblur - Sarjapur corridor = 114
- Total number of bus trips on Iblur - Sarjapur corridor = 855

Furthermore,

- Through – through bus trips on Iblur-Sarjapur corridor = 324
- Number of buses running from Iblur to Sarjapur bus stand = 54
- Thus, the present headway of buses = 3 minutes

Classified volume counts at junctions

From the counts in the table 2, the Existing Mode Share was calculated to be as follows: Fig3

In the present mode share, it can be observed that, predominant road users are two wheelers followed by four wheelers and others that include LCVs and Trucks. This share is based on the total vehicular counts where occupancy of the vehicles is not taken into consideration. Therefore, the mode share for public transport is quite low.

Moreover, from the volume counts mentioned in the table above, the existing PCU per hour was calculated to be 1614.

The following counts in table 1 on were noted at the junctions as per the survey done by DULT (Directorate of Urban Land and Transport):

Location	Volume	V/C Ratio	LOS
Wipro Intersection [Towards Sarjapur]	1664	0.7	B
Wipro intersection [Towards Iblur]	1754	0.7	B
Iblur Intersection [Towards Sarjapur]	1827	0.8	C
Iblur intersection [Towards silk board]	1981	0.8	C
Carmelaram Intersection [Towards Sarjapur]	1115	0.5	B
Carmelaram intersection [Towards Iblur]	1340	0.6	B
Harlur intersection [Towards Sarjapur]	1965	0.6	B
Harlur intersection [Towards Iblur]	2400	0.6	B

Table 2: Traffic volume count done at different junctions of Iblur-Carmelaram corridor

IV. PROPOSALS

There are five different purposes that are considered to be served through our proposal:

- **Bus Priority**- The most important concern was that the buses should be able to move fast and easily without being hindered by private vehicle. It was difficult to decide how it can be managed if they were to access the bus stops on extreme left of the road and simultaneously, the private vehicles would require to access the private properties along the road.

However, buses were to be given priority but private vehicles were also not to be neglected. Therefore, the bus priority lane, 3.5 meters wide, was not kept on extreme left to minimize the conflict points between buses and the private vehicles accessing the buildings next to the road. Moreover, a service lane of width 3.25 meters was proposed to make it easier for the private vehicles to access the buildings on the road edge. So the bus priority lane is placed between the service lane and the mixed-traffic lane (that shall allow easy flow of traffic). Fig 4

- **Access Management** - The service lane has been proposed to provide direct access to private properties and commercial complexes without hindering the bus priority lane. A physical barrier, 0.2 meter wide placed between service lane and bus priority lane shall stop the private vehicles from moving in bus priority lane while getting merged or diverged from the mixed-traffic lane. Moreover, the entry and exit into the service lane shall be only one at the end of the junctions. At

points where the service lane starts mid-way, a weaving section shall be limited up to 25 meters for entering or exiting the service lane after which the physical barrier shall be present so that the private vehicles are forced to use only the provided entries and cannot enter or exit the service lane in any other way. Fig 5

- **Junction Improvement** - IRC guidelines were referred to decide on the type of signalized junctions but the presence of T-junctions compelled us from providing rotary intersections even where it was required. The next idea was to provide channelizers at left turns that would force vehicles in service lane to take a left turn and thus the service lane cannot be used by straight moving traffic to pass through without accessing the service lane for its actual purpose. Moreover, the bus stops and bus bays are provided after 60 mts from the junction to reduce the conflict points between the left turning vehicles from minor street entering the mixed traffic lane and the buses from bus priority lane entering the bus bay. Fig 6,7,8

- **Pedestrian Facilities** - The proposal was to have table-top crossings at the same level as that of the footpath in order to give priority to pedestrians and force the vehicles to slow down before the ramps. These table-tops shall be restricted by bollards to stop two-wheelers from entering the pedestrian sidewalks. Another important aspect was to have stop lines at junctions before the pedestrian crossing to avoid any possible conflicts during the queuing of vehicles at red light on the traffic signal. Fig 9

- **Station Accessibility Plan** - The proposed ROW would include the space for carriageway as well as footpaths. There would not be an inclusion of median along this stretch and the width of the carriage way shall be 9 meters for the easy flow of vehicles via this stretch. Also, the provision of 2.5 meters wide footpath on either side of the carriageway would encourage the pedestrians to walk. At the entrance of all the private properties, there shall be a ramp for the vehicles to pass through and the footpaths shall remain continuous and at the same level along the whole stretch. Moreover, there will be bollards wherever necessary to avoid the vehicles from riding on the footpaths in any condition. Plantation would be done at an average interval of about 15 meters to improve the pedestrian facilities. At the entrance of railway station, the carriageway is kept 20.5 meters wide in order to ease the turning movement

of the buses.

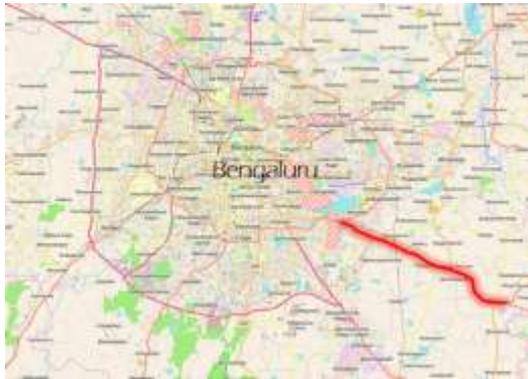


Fig 1: Location of Sarjapur Corridor in Bengaluru

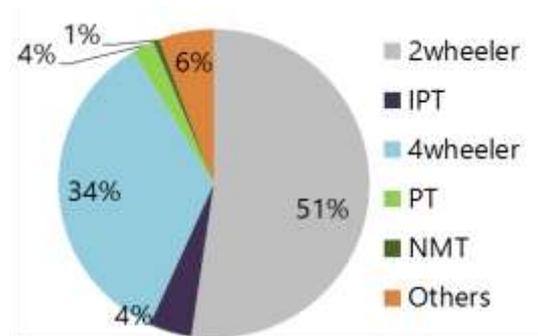


Fig 3: Present mode share of vehicles on Iblur-Carmelaram corridor

Also keeping in mind the demand of parking during the peak hours, parking space of about 1400 sq. meters is provided that can be utilized for the parking of Two wheelers and four wheelers. Fig 10

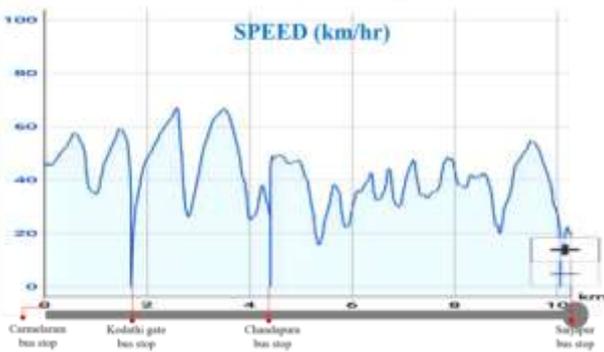


Fig 2: Snapshot of Speed and delay survey carried out in BMTS Bus (1)

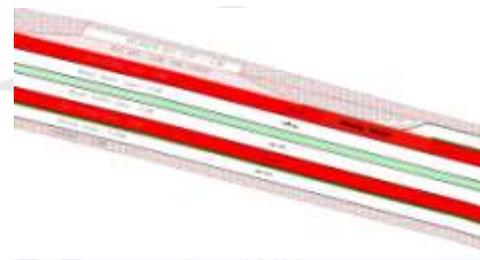


Fig 4: A part of corridor showing Bus priority lane (highlighted in orange color) with other elements.

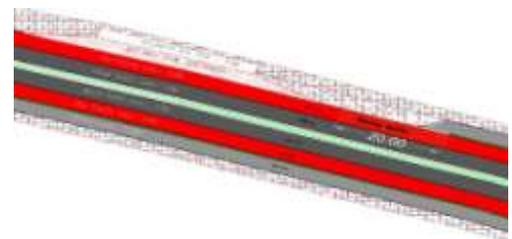


Fig 5: Final Proposed corridor for bus priority lane

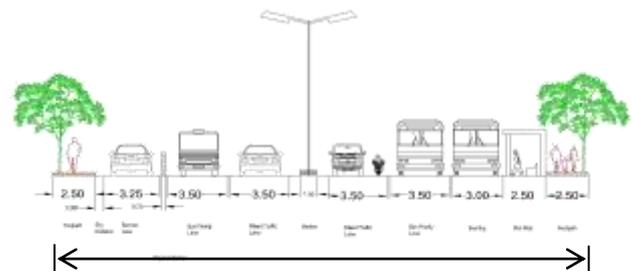


Fig 6: Section of stretch in fig 5.

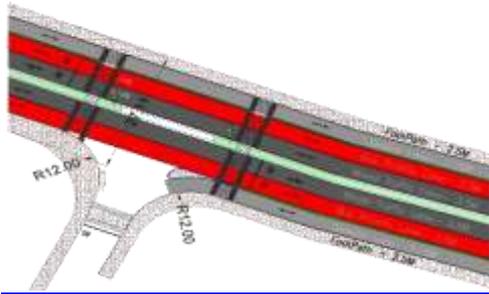


Fig 6: Junction design for Harloor Junction

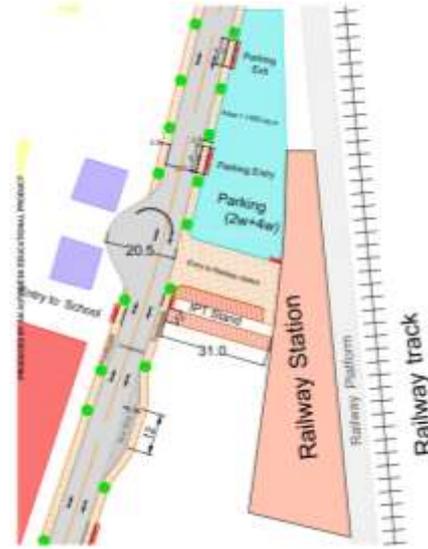


Fig 10: Carmelaram Railway Station Accessibility Plan

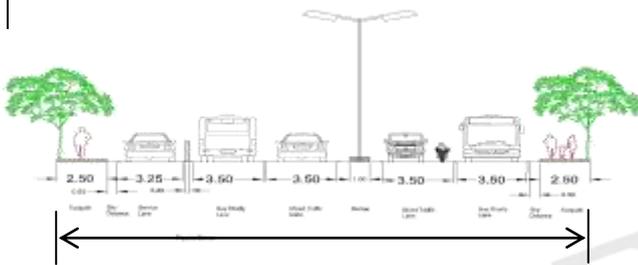


Fig 7: Section across stretch in fig 6

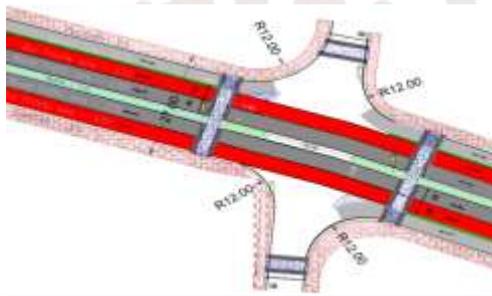


Fig 8: Junction design for Kaikondrahalli Junction

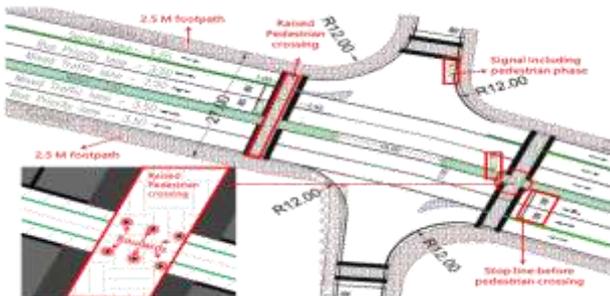


Fig 9: Improved Pedestrian facilities at Kaikondrahalli Junction