International Journal of Scientific Engineering and Research (IJSER)
www.ijser.in
ISSN (Online): 2347-3878, Impact Factor (2015): 3.791

Parking Demand Assessment for Light Rail Transit Stations

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Abstract: ***When a new transportation facility is introducing into a city it should be properly planned. Otherwise it may cause bad impacts on the city. Lots of people are coming to the city daily for educational and work purposes. The peoples coming to the city in various private modes find it difficult to park their vehicles because of lack of parking space. So on-street parking is common in the city. This creates lot of problems to the road users. This study will provide a clear idea about parking demand calculation of Light Rail Transit Stations which is going to be implemented in Thiruvananthapuram city.***

Keywords: Transit stations, LRV

1. Introduction

Thiruvananthapuram has attracted a large number of job seekers from within the State and from other States. The importance of Thiruvananthapuram City region has increased substantially over the last few decades not only as an administrative capital but also as an economical active region contributing to the State's economy.

The peak hour peak direction traffic along the busy National Highway corridor of the city is presently about 7000 which is likely to go up to 14,000 in the horizon year 2041. The total number of vehicles having valid registration in the district as on 2010 is 7 lakhs with more than 50% of two-wheelers. Under the circumstances, mass transportation system has to be implemented for our cities at the earliest.

Today the only mode of Public transport system available in the city is bus services, both privately owned and Government owned through Kerala State Road Transport Corporation (KSRTC). The travel demands of the urban population are hardly being met by the existing public transport system. The total bus fleet operating within Thiruvananthapuram district is only about 6000 buses which is totally inadequate to carry even the present level of traffic in the city, with the result, the number of private cars and two wheelers are increasing at an alarming rate. This has resulted in heavy congestion on the roads, low average speed of vehicle and high level of pollution in the city apart from an alarming rate of road accidents.

To scale down the traffic congestion in the city Government of Kerala decided to implement a better Mass Rapid Transit System in the city. Various MRTS systems implemented in the country were analyzed and suggested an elevated Monorail system, which requires only minimal land acquisition. In 2014, the State Government decided to use Light Metro instead of Monorail, in Thiruvananthapuram and Kozhikode, mainly due to cost overruns.

When Light Rail is introduced more riders will use this facility. Out of this high volume of riders there will be riders who will prefer to use their private vehicles which include 2 wheelers and 4 wheelers to commute between their place of residence and the nearest LRTS stop. In this circumstance there is a high necessity to provide parking facility to meet the needs of the riders. This paper deals with the parking demand assessment of Light Rail stations in Thiruvananthapuram city.

2. Light Rail Transit System

Light Rail Transit (LRT) is a rail transit technology capable of providing a broad range of passenger capacities. It is most commonly referred to as "streetcars" or "trolleys". Light rail or Light Rail Transit (LRT) is typically an urban form of public transport using the same rolling stock as a tramway, but operate primarily along exclusive right of way and have vehicles capable of operating as a single train or as multiple units coupled together. With its mix of right of way types and train control technologies, LRT offers the widest range of latitude of any rail system in the design, engineering, and operating practices. The latest generation of LRVs has the advantage of partially or fully low floor design with floor of the vehicles only 300 to 360 mm above the top of the rail. Overhead lines supply electricity to the vast majority of light rail systems. The capacity of Light Rail is about eight times higher than that of a car, if only the length of the vehicle is taken into consideration.

The Light Rail Transit (LRT) system plays an important role in transporting residence from suburban area to urban area. LRT has a number of advantages over the traditional road based transport system. LRT can provide higher carrying capacity, more energy savings, less pollution, better safety and more comfortable transport system. LRT operates on streets, segregated at grade, elevated or in tunnels. The LRT has excellent performance that its capacities are between 20000 and 30000 passengers per hour per direction.

3. Study Area Profile

The Thiruvananthapuram light rail line will start from Technocity (Pallipuram), 400m away from Mangalapuram

junction and terminate at Karamana covering a distance of 22.537 km with 19 stations, along the old NH 47. Slight accommodations were made for the proposed flyovers at Kazhakuttam, Sreekariyam and Ulloor. The total distance of the proposed project stretch is about 41.8 Km. There are 35 stations proposed along the light rail alignment and a depot proposed at Pallipuram near CRPF camp.

The project will be built in 3 phases. Stations would be located at Technocity, Pallippuram, Kaniyapuram, Kazhakuttom, Kazhakuttom Junction, Karyavattom, Gurumandiram, Pangappara, Sreekariyam, Pongumoodu, Ulloor, Kesavadasapuram, Pattom, Plamoodu, Palayam, Secretariat, Thampanoor, Killipalam, and Karamana. The line will be built in three phases.

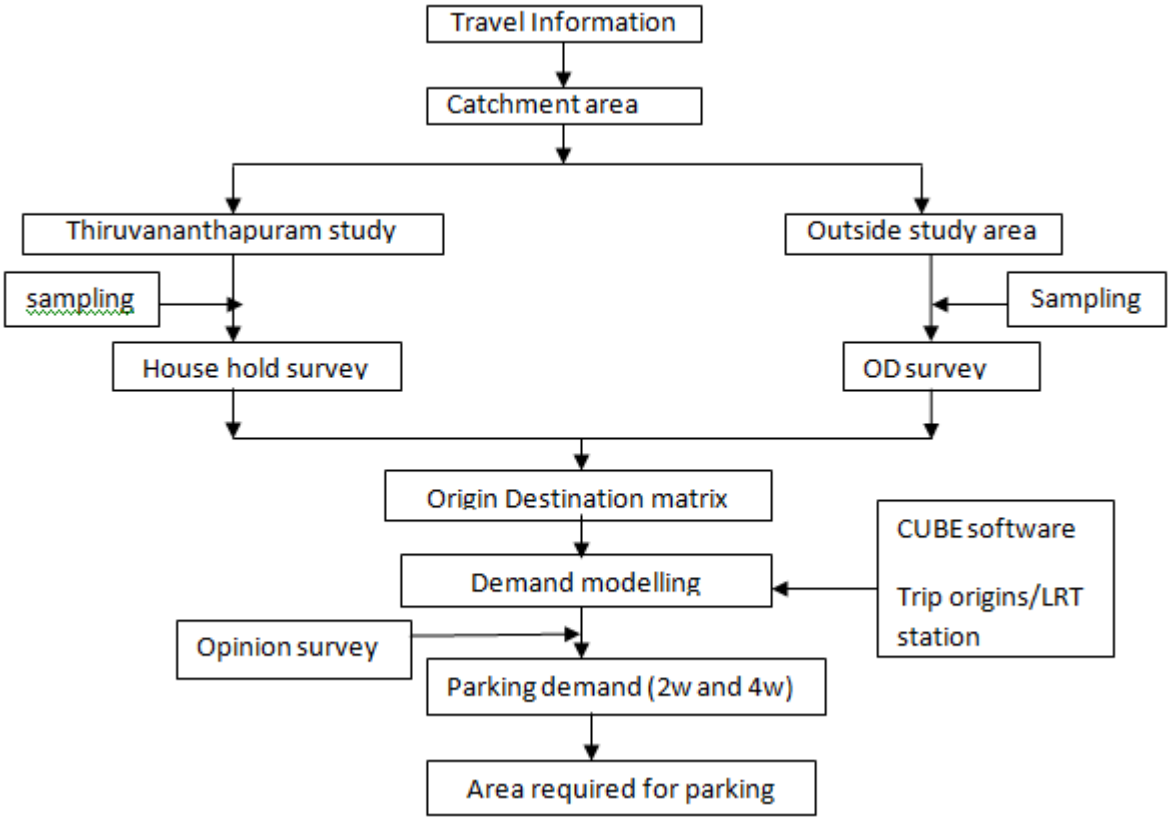
Table 3.1: Route details of Thiruvananthapuram light rail

Route	Terminals		Length (Km)
Route 1	Technocity	Kariavattom	7
Route 2	Kariavattom	Kesavadasapuram	8
Route 3	Kesavadasapuram	Karamana	8
Total	Technocity	Karamana	22.20

4. Methodology

Keeping in mind the general objectives of the study, a detailed methodology for undertaking the study was adopted which consists of a set of tasks as given below:

- Reconnaissance survey of proposed LRT stations
- Data collection from house hold survey and OD survey
- Preparation of OD matrix
- Demand modeling
- Data collection from opinion/stated preference survey
- Analysis of data
- Estimation of parking demand



5. Result

Station Name	2041				
	Estimated parking requirement for 2w	Estimated parking requirement for car	Recommended parking requirement for 2w	Recommended parking requirement for car	parking demand in ECS
Technocity Extn.	1435	639	1435	639	998
Technocity	994	442	994	442	691
Pallipuram	195	87	195	100	149
Thamarakulam	187	83	187	100	147
Kaniyapuram	662	294	662	294	460
Block Office	298	133	298	133	207
Kazhakoottam	1744	776	1744	776	1212
Kariyavattom	462	206	462	206	321
Gurumandiram	176	78	176	100	144
Pangapara	168	75	168	100	142
Sreekariyam	768	342	768	342	534
Pongummodu	274	122	274	270	339
Ulloor	727	323	727	323	505
Kesavadasapuram	623	277	623	277	433
Pattom	530	236	530	270	403
Plamoodu	316	140	316	270	349
PMG/Palayam	636	283	636	283	442
Statue	575	256	575	270	414
Thampanoor	703	313	703	313	489
Killipalam	305	136	305	270	346
Karamana	682	303	682	303	474

6. Conclusion

As a result of various surveys conducted and various analysis methods it was concluded that:

- 93.92 % of the people interviewed were willing to shift to LRT.
- Parking space should be located within 300m from the station in order to shift maximum people to the LRT.
- There should be suitable pedestrian accessibility around the LRT station.
- Proper parking fee should be imposed for two wheelers and four wheelers.
- Out of 21 stations, Kazhakkoottam was found to have the maximum parking demand followed by Technocity extension.

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