URBAN LAND EXPANSION AND INFRASTRUCTURE PROVISION IN AHMEDABAD CITY (NEW RANIP)

[1]HARSH M PATEL, [2]BHUPENDRA M MARVADI, [3]UMANG PATEL

[1]Student, M.E. Infrastructure Engineering, Dept. of Civil Engineering, L.D.R.P. Institute of Technology and Research, Gandhinagar-382015, Gujarat.
[2,3]Assistant Professor,Dept. of Civil Engineering, L.D.R.P. Institute of Technology and Research, Gandhinagar-382015, Gujarat.

h26patel@gmail.com

ABSTRACT *:The rise in economic activities and growth in urban space, rapid expansion of urban areas taking place, which increases demand of natural resources along with land-use changes especially in megacities. Hence, serious problems associated with rapid development such as additional infrastructure and informal settlements arises. Land use planning is understood as a systematic and iterative procedure carried out in order to create an enabling environment for sustainable development of land resources which meets people's needs as well as demands. It assesses the physical, socio-economic, institutional and legal constraints with respect to optimal and sustainable use of land as a natural resources and empowers people to make decisions about how to allocate those resources. This Dissertation work explains Urban Land Expansion of Ahmedabad city is by comparison of Urban Agglomeration and Fringe in manner of utilisation and also analyses infrastructural provision for same.*

Keywords: Land use, Infrastructure Provision, Suburbs, Agglomeration, Sprawl, Fringes

Introduction: Urbanization process emerges out of non-urban areas where the urban centres are created; basic services reach the villages and rural fringes. Here the land and inhabitants get together in urbanization and make urban. It is mainly measured in terms of population growth and transformation of the landscape into the townscape increase day by day, and people come to live in an environment and it is called both physically and socially urban.

- India has more than 17% of world population and 2.4% of the world's geographical area. For India as being the seventh largest country in the world, land management is very important.
- The future growth of any city normally extended to the fringe areas which also called urban agglomeration and urban sprawls left haphazardly developed or undeveloped areas into the city behind. This phenomena is also affected by infrastructure provision strategies for both sprawl and agglomeration areas. The concentric growth pattern of land use of the city and the supporting transport systems raises the problem of the "Ineffective Land Expansion Pattern" for the sustainable development of the city, as it is difficult to integrate public transport system and connect whole the city withtransportation system with time and cost efficiency. The radial development of land use pattern results into the loss of the green landscapes of the city.

Objective: The aim of this dissertation work is to analyse the pattern of the land expansion of city and infrastructural provision for the same and the relation between them. And also analyse the developing agglomeration area in manner of infrastructure.

Study Area: Ahmedabad, the Industrial and financial capital of Gujarat, is the seventh largest metropolitan city in the country in terms of population. It is situated in the Central zone of Gujarat, at an average elevation of 48.77 Metres above sea level, and is located at 22° 58' N 72° 58 E. The Ahmedabad Metropolitan Region borders with Gandhinagar district in the north. The government of India has selected Ahmedabad, a new metropolis, as a category-A city, under Jawaharlal Nehru Urban Renewal Mission as a test example.

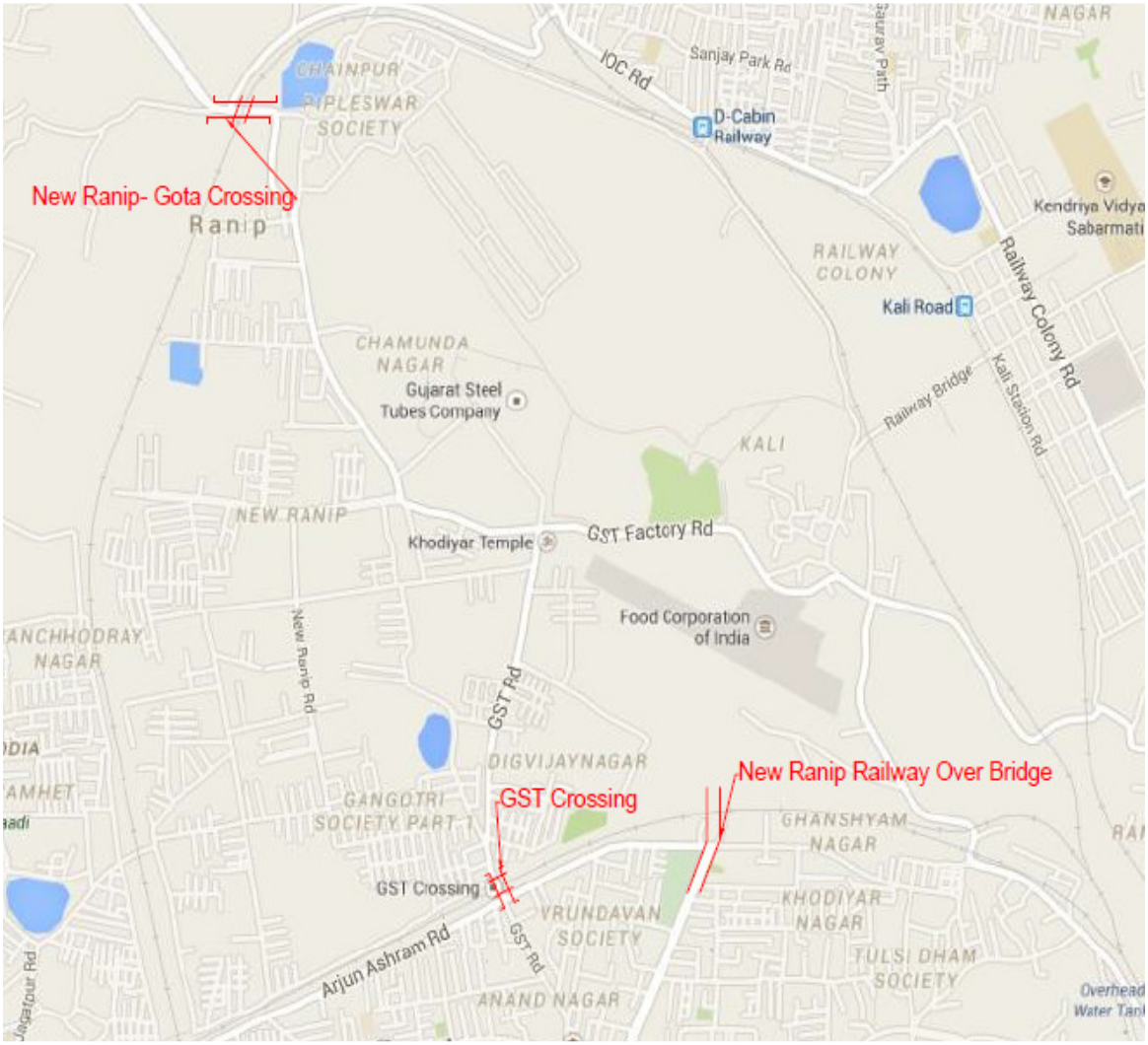

Figure: Strategic location of New Ranip with respect of CBD

➢ The city in the recent past of textile industry which blink it as a favoured destination for most high technology industries and has consequently witnessed a significant in-migration. Recently Ahmedabad city is declared as a world's no.1 Labour Centre for the I. T. Industry. However, rapid in-migration of population from the other parts of the Gujarat itself has posed immense challenges on the city's overall carrying capacity as far as land use and Infrastructural amenities are concerned. Holistically it witnesses a noticeable change in its once existing land use that was much of sectorial to a radial well-established land-use pattern. The growth in recent times inclines North-West ward owing to the availability of open spaces. This study enhances changing land use in the backdrop of urban morphology model (Burgess, 1925) that re-establishes itself with further planning in Ahmedabad.

➢ While this transformation, the haphazard development of the city radial in all directions created immense pressure on the provision of infrastructure. As in the other cities of the world, in Ahmedabad, the increasing trend of urbanisation has continually expanded the area of the city. The rapid growth in city area in the period 1981-1991 was due to the merger of the eastern side of Ahmedabad city with effect from 23rd of February 1986. This has increased a city jurisdiction up to 190.84 square kilometres as per the 2001 Census.

➢ The areas adjoining AMC, falling within AUDA and GUDA limits have shown rapid growth. As stated above the population growth in the peripheral areas is more rapid than the areas within the city limits which is partly due to the saturation of population within the city area and the consequent large-scale housing development in the peripheral areas.

➢ The contrasting spatial patterns observed in the eastern and western areas of AMC have extended into the peripheral areas. The western part is experiencing more rapid growth than the eastern part, in the form of ribbon development along the Sarkhej - Gandhinagar highway is being witnessed during the 1990-2000. These trends are likely to intensify further in the coming decades.

- It is also a noteworthy feature that the spatial expansion of Ahmedabad is largely contiguous and relatively compact.
- It was Burgess who remarked that "an ideal construction of the tendencies of any town or city to expand radially from its central business district". Excluding those area there is normally an area of transition which is being invaded by business and light manufacture. The next area includes the area of workers who desire to live within easy access to their work. Beyond this zone remain the residential zones surrounded by the commuters' zone. Generally, the Ahmedabad Urban Agglomeration exhibits a 25% coverage under core areas, 34% under rural fringes and lying in between are the added semi-urban areas or the urban fringes.
- Several research works done in this area has given recommendations through different policies for the land use pattern through land reservations. But feasibility these recommendations with rapid growth of population needs to be analysed.

Observations:

1) Observations for Fringe-areas:

- As being Municipalities Western Fringe-areas of AUDA Ghuma, Boapal and Shilaj had Water Supply system since 2006-2007.
- As being a suburb of AUDA, road networks are granted to those fringes by AUDA during year of 2008-2009.
- As road networks are developed after drainage and water supply lines provided by municipalities and other concerned departments.
- At the time of commissioning of road network, fringe-areas got BRTS route connectivity to AMC areas.
- From above observations it is concluded that all fringe-areas mentioned above got sustainable development by integrated development plan between various ULBs.
- These areas got more population growth after implementation of all these Infrastructure provision, which emphasise that provision of infrastructure leads to overall growth of the areas.

2) Observations for Agglomeration areas:

- Agglomeration areas like New Ranip, Gota, Jagatpur, Charodi, Tragad (Located at North-West Zone of City) are located even within boundary of AUDA.
- All though agglomerations New Ranip and Gota fully facilitate with Water Supply networks and Drainage networks during year of 2009-10.
- Water Supply networks and Drainage networks in Jagatpur, Charodi and Tragad are under development.
- While considering road networks all the areas mentioned above facilitate during development years 2006-2012.
- As a result of these road networks of some areas deteriorated for development of water Supply and drainage network.
- As BRTS routes are designed on the basis of many considerations, the biggest Loophole in development is to left agglomeration areas unlinked with BRTS.
- Due to unbalanced Infrastructure provision areas are still under growth process and following western fringe areas covered in study.
- Some of the agglomerations are having slums, which becomes hurdle in development process, as it is very difficult task to convince the residents of slums with development plan and rehabilitation process took too long time.

New Ranip:

- New Ranip is the agglomeration located north-west side of the old Ranip Gam area and exactly adjacent to the west side of Sabarmati Railway Colony.
- The area has two Railway lines on its periphery.The area has only two openings toward surrounding areas through railway crossings as per T.P. Scheme, one is GST crossing toward Old Ranip Gam and other is toward north-west Area. New Ranip has been focussed and also been noticed in development since 1990s, but the area took long time in development and land utilisation due to some reasons listed below.
  - Slum development in area as beside location to old Ranip gam
  - Unregulated residence
  - Area is covered on periphery with two Railway lines
  - The area is connected to Old Ranip gam through only G.S.T. Crossing
  - Lake of Water Supply Network
- New Ranip has the best opportunity to develop rapidly and in well planned manner and become preferable location for settlement of population as being closest agglomeration from CBD. In that manner

transportation can become the reason to develop area rapidly. Hence following Transportation Infrastructure of area has been analysed during the work.

- GST crossing (as being the only approach available connecting New Ranip to rest of the city)
- Traffic Volume at GST crossing
- Route Frequency of AMTS

Train Frequency analysis:

➢ The survey data of Train Frequency has been analysed which shows that the average train frequency is almost about 11 min. and total delay at crossing is 98 (32+66) minutes during morning peak hours and 14 min. and 78 (28+50) minutes for evening peak hours respectively.

➢ On time line diagram it shows that 1 min. before the train arrives the crossing gates get closed. Now as per delay data many trains during peak hours has (2 + 5) min. delay period up to clearance of the traffic.

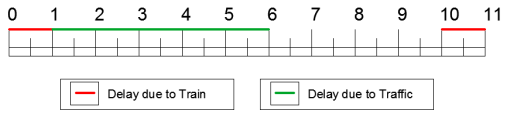

Figure: Time- line Diagram for peak hour delay

➢ Hence the clear time between clearance of congested traffic due to previous train and closing of crossing for next train is about (11 – (2 + 5 -1) + 1) min. = 4 min. As per this calculation average clear time for easy traffic flow is 4 min. to 6 min.

Traffic Volume Count and Passenger Car Unit:

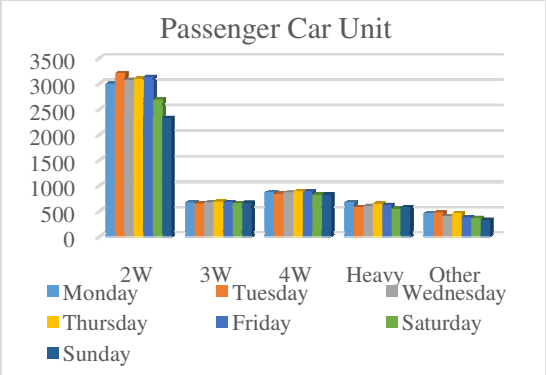

Chart: Graphical Analysis of PCU for Week

➢ The TVC survey and its PCU analysis shows that the population living in the area is using 2 wheeler and 3 wheeler maximum for transportation. During TVC survey it is found that the crossing get very congested during peak hours in both closed and open condition.

➢ After getting result of TVC survey and PCU analysis the question arises is that "why peoples of New Ranip area taking 2-wheeler and 3-wheeler for connectivity to the city although they are facing much congestion?"

➢ To get the answer of this question the work has forwarded toward analysis of connectivity between New Ranip via Old Ranip gam to further city by public transport system.

AMTS Route and Frequency Analysis:

➢ AMTS bus-stops located in New Ranip and Old Ranip areas were visited and Routes and Frequency of buses has been collected (The data collected about bus routes and frequency is cross checked with the official website of AMTS).The survey has been conducted for the skipping frequencies of different routes for morning peak hours of 30 days.

➢ The data collected from survey has been analysed on the bases of highest skipped route time from the all frequency of the same route as below.On the other hand during analysing survey data it is observed that the frequency of AMTS from New Ranip area is almost about 30 min - 45 min for both the routes 74 and 79, which is very less. On the basis of public complains and survey data the problem of less frequency is striking as real and situation gets harder for public when the frequencies get skipped even from designed one.

➢ To overcome this situation, it is favourable to introduce integrated system AMTS-BRTS on the most skipping frequencies of the routes of AMTS from Old Ranip Gam to City areas and increase frequency of AMTS from New Ranip area to Old Ranip Gam.Now to provide AMTS-BRTS integrated system it is required to analyse BRTS routes appropriate to the Routes of AMTS from Old Ranip Gam which can replace AMTS frequency of those routes. To Analyse that BRTS routes passing from Ranip Junction were studied in compare of AMTS routes and summarized as below.

- From analysis it is observed that four routes from all eleven routes of AMTS providing connectivity to Ranip and New Ranip areas have alternative available to extend routes of integrated transit system AMTS-BRTS, which are route no. 13/1, 146/1, 15 and 40/3.

Conclusion:

- New Ranip has only two measures connecting it with rest of the city, GST crossing is one of them. The crossing faces very high traffic flow and high frequency of trains, along with that, the pavement condition and road provision are also inappropriate which leads to the high traffic congestion.
- To reduce the traffic congestion frequencies of AMTS routes connecting New Ranip with rest of the city via Old Ranip gam was analysed and alternative for the skipping frequencies are suggested for improved transportation network.
- From whole study it is concluded that New Ranip, the agglomeration having nearest location from CBD has been left undeveloped during urban expansion due to inappropriate infrastructure provision.
- As the study has covered transportation infrastructure, the improvement measures for the same were suggested by which the area can be served by well transportation facility.

References:

1. http://image.slidesharecdn.com/ahmedabad-121024041835-phpapp02/95/ahmedabad-4-638.jpg?cb=1351070695
2. Indian Infrastructure Report 2009
3. Source: Degraded and Wastelands of India – Status and Spatial Distribution, Indian Council of Agricultural Research, 2010.
4. Government of India (2013). National Land Utilization Policy, Framework for Land Use Planning & Management
5. Sen Priyadarshini (2013). Evaluating the Planning Strategies for Urban Land Use: A Study on Bengaluru City, India: Department of Geography, DumDum Motijheel College, Kolkata, India.
6. Rupali P Zope (2013). The Planning Strategies for Urban Land Use Pattern: A Case Study of Pune City, India: International Journal of Innovative Research in Science, Engineering and Technology, Vol. 2, Issue 7, July 2013.
7. Manju Mohan, Subhan K. Pathan, Kolli Narendrareddy, Anurag Kandya, Sucheta Pandey (2011).Dynamics of Urbanization and Its Impact on Land-Use/Land-Cover: A Case Study of Megacity Delhi: Journal of Environmental Protection, 2011, 2, 1274-1283.
8. R. Laxmana Reddy, B. Apoorva, S. Snigdha, K. Spandana (2013)GIS Applications in Land Use and Land Development of a City:International Journal of Emerging Technology and Advanced Engineering (ISSN 2250-2459, ISO 9001:2008, Volume 3, Issue 5, May 2013)
9. Rajashree Kotharkar, Sarika Bahadure (2012) Mixed Landuse and Sustainable Urban Development: A Case Study of Nagpur: PLEA2012 - 28th Conference, Opportunities, Limits & Needs Towards an environmentally responsible architecture Lima, Perú 7-9 November 2012.
10. Harini Nagendra, H.S. Sudhira, Madhusudan Katti, Maria Tengö, Maria Schewenius Urbanization and its Impacts on Land Use, Biodiversity and Ecosystems in India. Interdisciplina 2, num. 2 (2014)
11. JNNURM City Development Plan, Ahmedabad 2006-2012, Ahmedabad Municipal Corporation and Ahmedabad Urban Development Authority.
12. http://en.wikipedia.org/wiki/Ahmedabad
13. Census of Different Year
14. Reena Lazer, Increasing resources to local government in Ahmedabad, India. Local strategies for Accelerating Sustainability: Case studies of Local Government Success. ICLEI Study, Canada, May 2002.
15. National Land Utilization Policy 2013