



# Gis Integrated Urban Transportation Planning

## KEYWORDS

Urban Transportation, Planning, Remote Sensing and GIS

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**ABSTRACT** *Urban transport planning is very complex and urban mobility solutions need to be multi-dimensional in nature. Good urban transport planning should be more than just engineering and should encompass other important considerations such as land use planning, energy efficiency, emission characteristics, traffic management, human behavior, economics, finance, public policy, governance, health, safety, gender, disability, affordability, ITS, etc. It is important to fully understand the linkages among these different dimensions using GIS. The geospatial technology helps in mapping the entire city which will help in preparing the correct geo-referenced base map showing updated information on plot boundaries and subdivisions. The use of RS and GIS techniques are useful to do the preparation of Master Plan work more expeditiously and accurately. Based on the maps, it will be easy to designate the properties with unique identification number which can be used for various purposes including the GIS applications in transportation*

## 1. INTRODUCTION

Urbanization is an index of transformation from traditional rural economies to modern industrial one. Kingsley Davis has explained urbanization as process (FAO, 1989) of switch from spread out pattern of human settlements to one of concentration in urban centers. Historical evidence suggests that urbanization process is inevitable and universal. Urban areas grow in area and population every day, calling for more resources, better living spaces and improved administration. In 1950, only 28 percent of the world population was urban. Today, more than 45 percent of the world stays in urban areas (Prof. Anjana Vyas and et.al 2004). By 2008, more than half will be living in urban areas, and it is expected by 2030, this figure will cross 60 percent (World Bank, 2005). Urban areas change in its structure and morphology in varied manner, owing to natural growth as well as the socioeconomic aspirations of the cities. With the rise of global networks of capital, the race between cities to compete has coupled with actions to cope with its own growth. In this backdrop, the position of environment becomes an element of criticality, concern and debate (Anji Reddy M, 2005).

## 2. OBJECTIVES

- To prepare a concept plan report and a transport structure plan indicating, broad uses and intensity of land-use keeping the overall Master Plan exercise in view.
- To develop a proper transportation system and traffic management plan and structural road network using GIS.
- To carry out traffic surveys and other reconnaissance surveys to analyse the existing traffic situation and travel characteristics.

## 3. IMPORTANCE OF THE STUDY

- To achieve the above objectives, the following principles of transport planning are given due importance in this study:
- To promote public transport with the objective of encouraging as many private vehicle users as possible to switch to public transport means
- To channel motorized traffic into the main road net-

work in order to bypass residential areas

- To calm and reduce traffic in residential and restricted areas
- To set up park and ride facilities in the periphery of the city accompanied by strict parking rules within the CBD and core areas of the city.

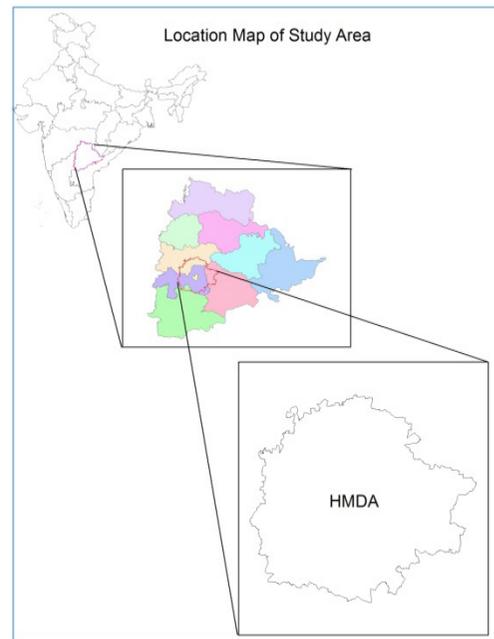


Figure 1: Showing the location map of the study area

## 4. STUDY AREA

Hyderabad City is situated in the river Musi and Krishna basin, which is a tributary of river Krishna, passes through the city and bifurcates it into Northern and Southern Hyderabad. It is situated between 78°22'30" & 78°32'30" east longitude & between 17°18'30" & 17°28'30" north latitude. The ground levels vary from 487 meters to 610 meters above mean sea level (B.Purushothama Reddy 2004).

## 5. METHODOLOGY

The project is executed through the following steps

- Acquisition of satellite data from NRSC, Balanagar, Hyderabad and toposheet from survey of India (SOI), Hyderabad.
- Geocoding and Georeferencing of LISS III and PAN digital data by extracting the Ground Control Points (GCPs) from SOI toposheet
- Digital Image enhancement and application of correction models for making the digital data free from error and distortions in terms of radiometry and geometry of the satellite data.
- Fusion of PAN and LISS III for merged product preparation of a mosaic. This is FCC mode and is used for visual interpretation to extract the land use/land cover information by applying both pre-visual interpretation, ground truthing and post-visual interpretation of this image mosaic.
- Preparation of cartographic output for making the data layer ready for scanning for further GIS analysis.
- Scanning of cartographic output using Ao scanner, digitized data compatible to ARC/INFO GIS software.
- GIS data manipulation and analysis, linking the spatial data file and attribute data file for the creation of topology.
- GIS output in the form of land use/land cover map showing various land use/land cover patterns of MCH jurisdiction.
- Overlay of major road network on the land use/land cover map for the final project as required by MCH administration.

## 6. PROJECT OUTPUT

This report outlines a comprehensive traffic and transportation strategy for the city of Hyderabad for the next 20 years. It has been carried out by considering the earlier proposals, development initiatives planned, land-use considerations, growth management scenarios and also the present day traffic volumes through primary surveys. The various subtasks of this sector are given below.

- Transportation Network  
Regional linkages – Road & Rail  
City road network

- Public Transportation  
Bus Transport  
Rail Transport

Intermediate Public Transport (Para transit)

- Freight Transport
- Review of Earlier Traffic Studies
- Inventory of

Major Transport Corridors with special attention to junctions, flyovers, ROB's, level crossings, over bridges etc

Parking facilities available

Pedestrian facilities available

- Existing Traffic Scenario and assessment of the Existing/Future Travel Patterns through primary traffic surveys

- Proposed short term and long term improvement techniques using GIS  
Within MCH region  
Within HUDA region

## 7. SUMMARY AND CONCLUSION

For the growing population proper planning of the city and its management is crucial in providing better living conditions to the people which is the primary responsibility of the administration. Proper urban planning, decision making and implementation of development proposals through an efficient management call for a generation of comprehensive information system. The urban information system should include some of the areas like urban sprawl, urban land use, zoning, demography, urban environment, **urban transportation**, housing settlement, urban infrastructure like water supply, sewerage, solid waste disposal, power supply, service facilities (Thomas M. Lillesand 2000).

With several new digital information products being made available particularly the High Spatial Resolution Imagery (1m and fine), the need to evaluate the capacity of these new data sources for the urban studies. Hence, it is suggested that the Premises Number and the Unit Number of the premises are the pre-requisites in case of GIS application in Hyderabad for better performance and realistic results.

### Full Orbital link of the city with the Inner and Outer Ring Roads.

- Intra City MRTS- (*Mass Rapid Transit System*), (3 corridors)
- BRTS(Bus Rapid Transport System) on Inner Ring Road, radial roads and Arterial Roads
- BRTS/Dedicated bus routes/Electric Trams on all roads 24 metres and above.
- Major transportation corridors to pass through the core city of Hyderabad.

These corridors would have exclusive lanes for BRTS/Bus System, personalized vehicles, goods vehicles, bus transport/mass transit, greenery, pedestrian paths and subways/skywalks, cycle tracks, overpasses and under passes and parking lots at regular intervals located strategically within or near to the proposed Integrated Facility Centres within the city.

- Defined circulation pattern with proper hierarchy and cross section catering to footpaths, utilities and services.
- Increasing total area under Master Plan roads/circulation from 10.8% existing to 11.49% proposed.
- Making Hyderabad a 'One Hour City'.
- Integrated Transport Plan/System (Multimodal Transportation) by integration of various projects into one common circulation plan. (MRTS, BRTS)
- Identifying major transit for interchange points. Bus/Rail/Road/Metro Rail/Air and developing them as multipurpose integrated facility nodes

An integrated information is thus needed to provide for such an exchange of data that will not only guarantee rapid access to data whenever and wherever required but also prevent detrimental and degradation of the system.

- Geospatial Technology should form the core of the IT strategy of Urban Local Bodies.
- The Urban Local Bodies have valuable and large data in the shape of maps, plans, registers, records etc. The computerization of the records and GIS are the solutions to preserve, update, retrieve and analyze the data and helpful for decision-making and advantageous and dependable in crisis management.
- Remote sensing and GIS help in preparing the correct

geo-referenced base map showing updated information on plot boundaries and subdivisions.

- The preparation of Master Plans is a statutory obligation on ULBs. Due to increase of population and physical growth, the preparation of Master Plan is a gigantic task. The use of RS and GIS techniques are useful to do this work more expeditiously and accurately.
- The map also contains the other features such as roads, streetlights, manholes, dust bins etc which has a lot of utilitarian value in the administration of an ULB.
- Since the maps are digitized the regular updating of the map will be easy whenever a building permission is given or a road is repaired or re-laid.
- Due to the usage of the real-time data it saves not only the time and enhances the accuracy but it also avoids the repetition of the same work and increases the confidence of the public in the administration.
- The availability of data and maps are needed in the formation and maintenance of roads. In number of instances the data collection, storing and retrieval of the data of roads are time taking, cumbersome and incomplete. GIS application solves all these problems. The data including maps shall be regularly updated.
- In the formation of new roads and to study their impact can also be done through GIS application.
- GIS database for manholes, street lighting, potholes, works done, scheduling, etc has to be built and used. GIS application is of a major help in storing and retrieving the data of details, which are underground such as pipelines, drains with their dimensions.
- Web based GIS application in urban administration shall be made mandatory for effective governance and shall be a pre-requisite qualification for making the Urban Local Body (ULB) eligible for any financial assistance from the government.

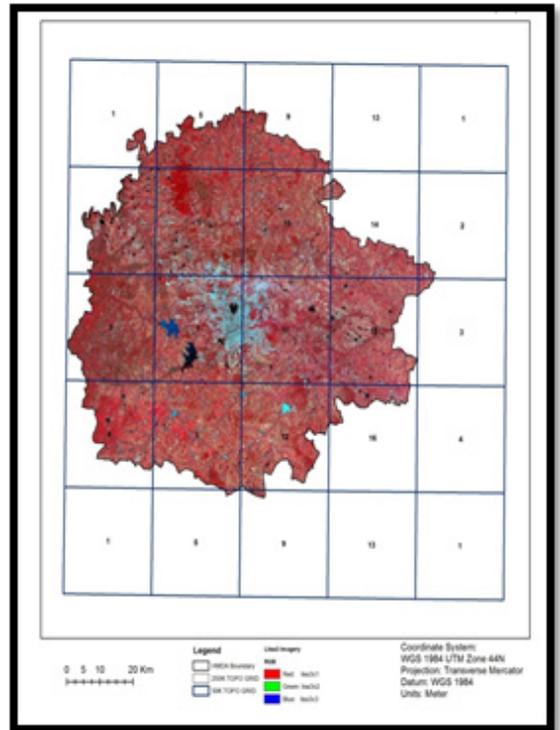
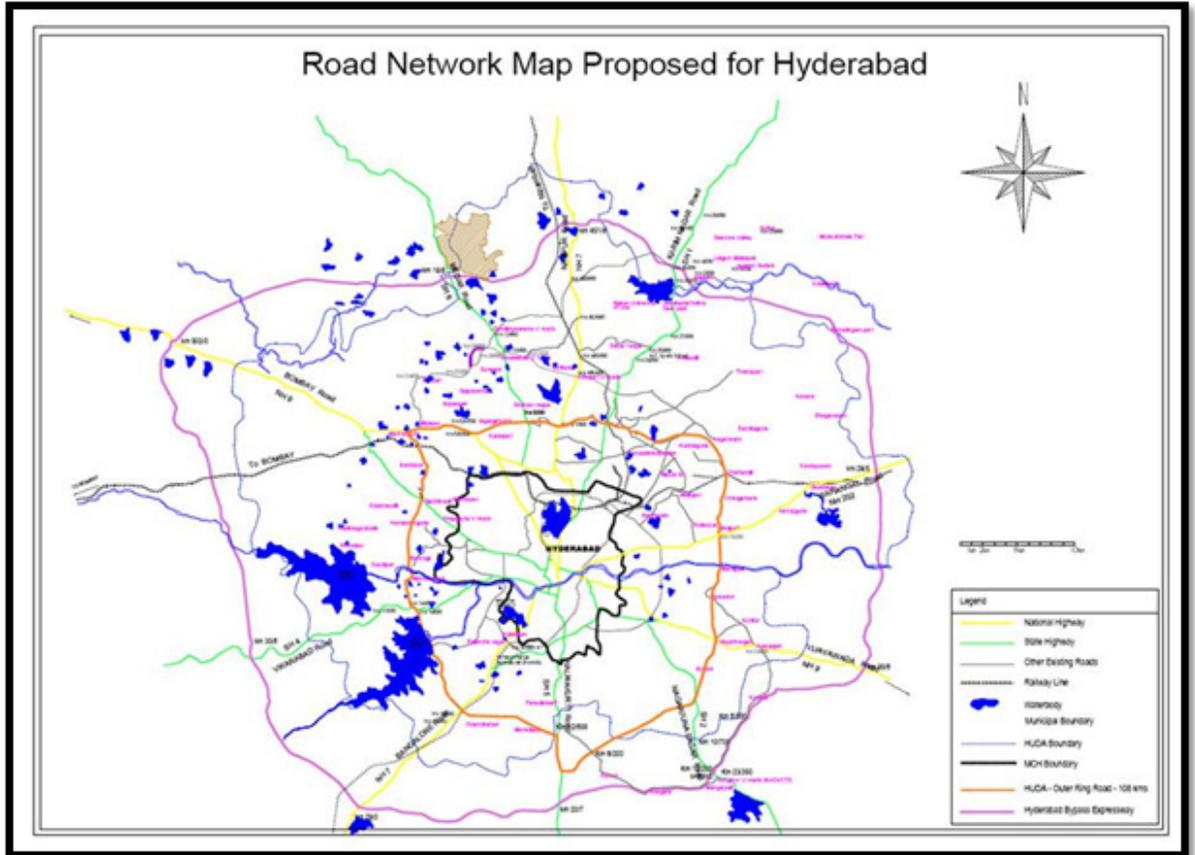


Figure 2: Showing the Top index, Satellite Data and Road Network Map of Study area





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