VIVA-Tech International Journal for Research and Innovation
ISSN(Online): 2581-7280

Volume 1, Issue 3 (2020)
Article No. 6
PP 1-6

VIVA-TECH IJRI
ANNUAL RESEARCH JOURNAL

VIVA-TECH INTERNATIONAL JOURNAL FOR RESEARCH AND INNOVATION
ANNUAL RESEARCH JOURNAL
ISSN(ONLINE): 2581-7280

GIS aided Urban Planning for preparation of Micro-Level Plan of Channenahalli Village, Bengaluru.

Gireeja M. Sarangdhar[1], Shishir Dadhich[2]
[1](M. Tech Town & Country Planning, Civil Engineering Department, Sandip University Nashik, India)
[2](Assistant Professor, Department of Civil Engineering, Sandip University Nashik, India)

Abstract: *We all know the fact that the surface of earth is spherical and not a plane, and thus in the field of Town Planning we observe errors in an actual plan or map of a region when it comes to its implementation. For smaller areas such as a plot or a small township where the land can be considered to be flat the level of errors observed is less or the accuracy rate is high compared with the larger areas such as a development plan or structural plan or regional plan or even Town Planning Schemes. Remote Sensing & GIS were initially recognized as supporting tools for planning, monitoring, and managing the appropriate utilization of the earth resources. However, due to their multidisciplinary applications and integration with numerous other scientific and technological fields, in the recent years they have become a distinct field of study.*

In this paper we are going to learn about how GIS and remote sensing helps in the preparation of a map with respect to actual ground co- ordinates and various uses of the same in the field of Urban Planning with an actual work done on field under the guidance of experts in Directorate of Urban Land Transport, Urban Development Department, Government of Karnataka.

Keywords *– ArcGIS, Geographic Information System, Geo-referencing, Microlevel Plan, Remote Sensing*

1. INTRODUCTION

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) which was launched by Government of India, four years ago by hon. Prime Minister of India Mr. Narendra Modi on 24th June 2015 which aims to provide every household access to water supply and better sewerage conditions along with increasing the amenity value of cities by developing greenery and promoting non- motorized transport opportunities also made an attempt to implement a reform of formulation of GIS-based Master/Development Plans for 500 AMRUT Cities, which has been approved as a 100% centrally funded sub scheme with budget outlay of Rs. 515.00 crores. Based on the concept of actual geo-referenced maps for developing an area with a new concept against traditional Town Planning Scheme Model for implementation of Development Plan, the Government of Karnataka under the Urban Development Department – Directorate of Urban Land Transport conducted an internship program for 8 weeks from 8th July 2019 at DULT office, (BMTC, TTMC "B" Block, 4th Floor, K.H. Road, Shanthinagar, Bangalore – 560027) and during the internship program, various projects were allotted to various interns in groups and one of those project was "Microlevel Planning" which was allotted to me, Miss. Gireeja Sarangdhar and my two other colleagues namely Mrs. Ruchika Tater from R.V. College of Architecture, Bangalore and Miss. Sushmita Paul from University of Mumbai mentored by Ms. Ann Jacob, Urban Planner.

The main focus of the allotted project was to find alternatives to land development models for faster implementation and also to work on a method or a pilot project which can be utilized as a reference for further development. Even today plans are made by traditionally doing surveys using a total station and various other survey equipment which requires an ample amount of resources and time frames, so as interns we were asked to develop a method for reducing this preliminary time frames and thus we thought of making use of GIS for the preparation of the maps and plans. This paper however would help us understand, how GIS platform can be used for the purpose of Urban Planning.

2. AIM OF STUDY

"The main aim of the study is to make use of Geographic Information System (GIS) for preparation of plans and maps." Under the guidance of Mr. Prashob Raj, GIS expert at DULT Bangalore, with the help of Google

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Earth Pro, ArcGIS and Q-GIS software, the process of formation of map was undertaken which is illustrated further.

3. OBJECTIVE OF STUDY

The main objective is to obtain base map and existing land use map within the internship period of 8 weeks and als o suggest or propose a microlevel plan for the study area.

4. PROBLEM STATEMENT

Bangalore has vast land available for expansion on all the sides and thus the rate of urbanization increases manifold. With faster urbanization, illegal construction practices are observed on major scale and also according to the Section 15- Sub section 2 of the Karnataka Town & Country Planning Act,1961 "If the Planning Authority does not communicate its decision to the applicant within three months from the date of such acknowledgment, such certificate shall be deemed to have been granted to the applicant." And thus haphazard growth continues leading to many problems such as unconnected circulation pattern, lack of supply of basic amenities and ill management of resources. Since Prevention is better than cure, the Government of Karnataka thought of undertaking the project of Microlevel Planning with the help of Student Interns to find a possible solution.

5. METHOD

To plan the future, the base of present is a must, and thus existing conditions were mapped on GIS Software as base map. But before that, to perform the work, a site was to be chosen and thus the village Channenahalli was chosen because the main reason was it lied within the boundary of BDA (Bangalore Development Authority) so all the DCPR would be applicable to that region ensuring ease of work and also being in the jurisdiction of BDA boundary it still had a scope for improvement as it is not yet developed.

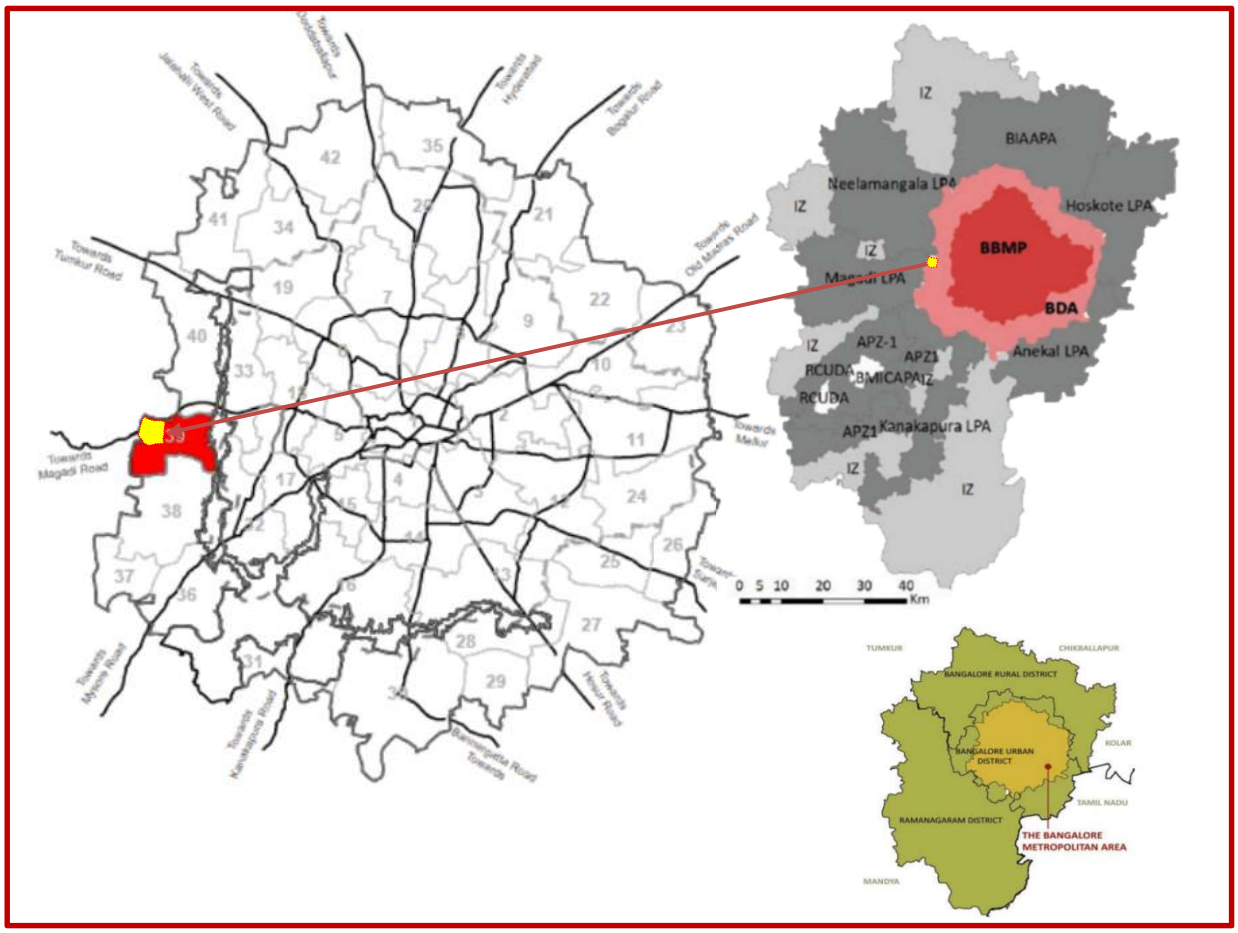

Fig. 1 Location of Channenahalli Village

After selection of site, the boundary of the study area was delineated on Google Earth Pro by overlaying the image onto the software and creating a .kml file using the line tool.

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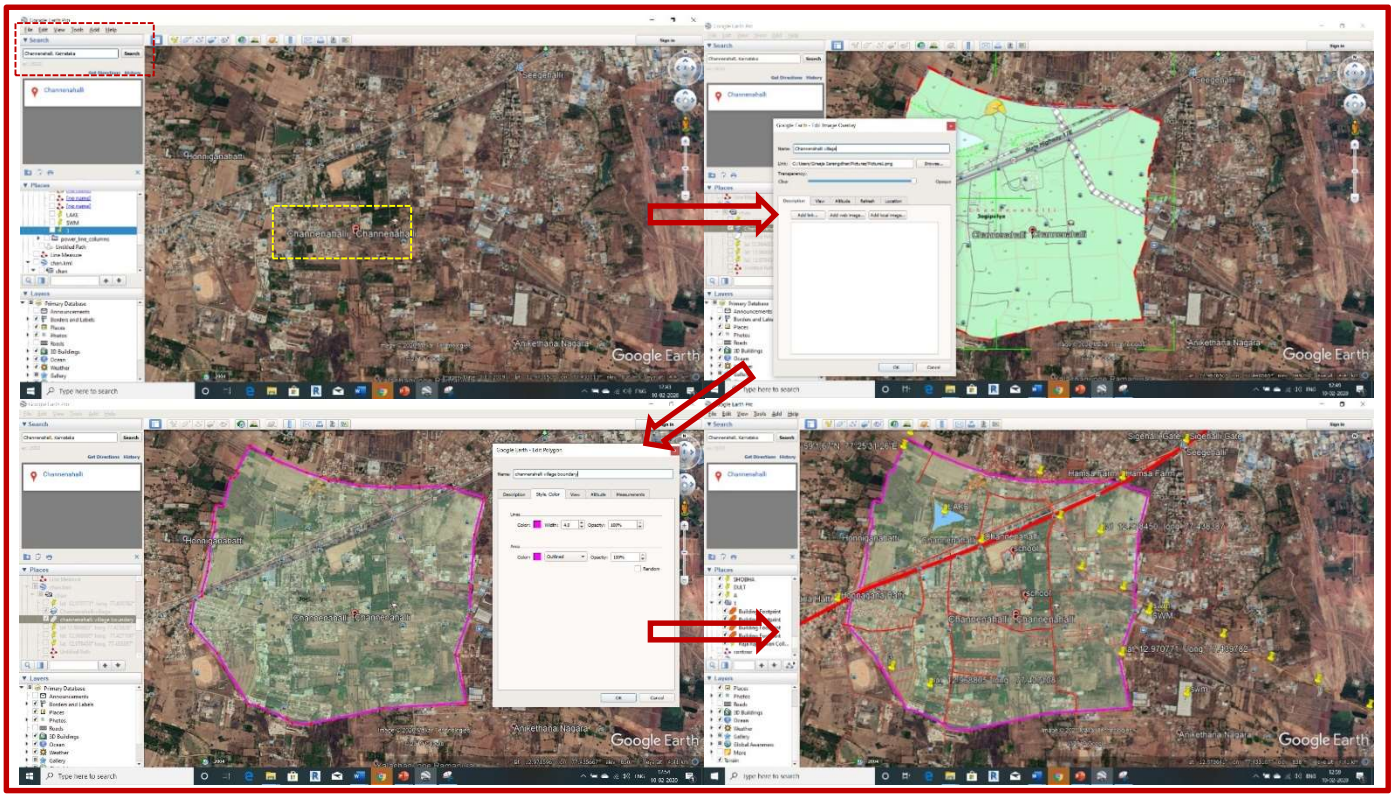

Fig. 2 Working on Google Earth Pro

The first screen in the above image sows how the area is searched by entering the name of the place in the top left bar. The next screen shows the option of image overlaying onto the satellite imagery and how we can set the transparency of the raster to overlay it perfectly, the image of the Proposed Landuse map 2015 of village was overlayed to obtain the boundaries. Later in the Third Screen we can see how with the help of polygon tool the required boundary is delineated. In the last screen data from the Open Street Map or the .osm file is converted into .kml file so as the data of highways and major roads, etc is detailed in the study area and then the entire data was transferred on ArcGIS to obtain a Base map. It was also necessary to understand the ownership and structure of each individual plot within the boundary and for that purpose the village map of Channenahali village was georectified and georeferenced to get the shapefile of the plots within the boundary

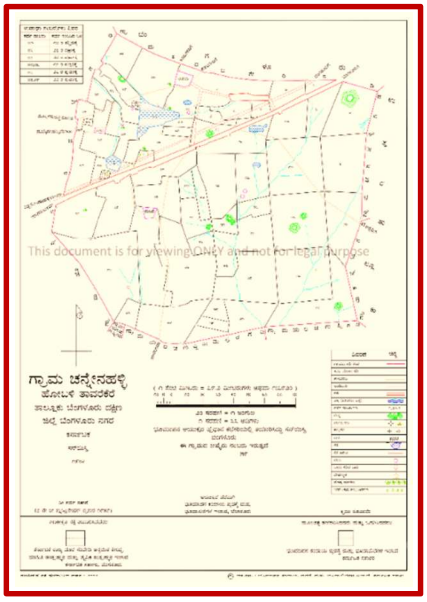

Fig. 3 Channenahalli village map

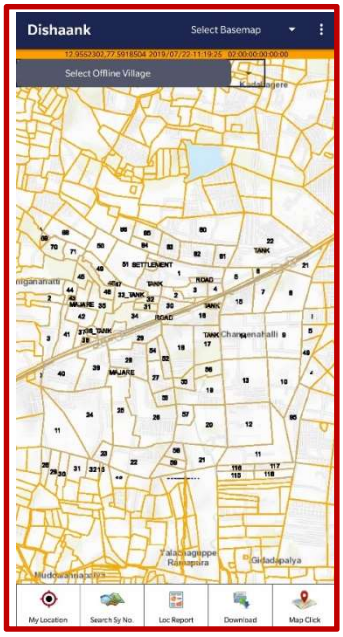

Fig. 4 Screenshot of Dishaank app

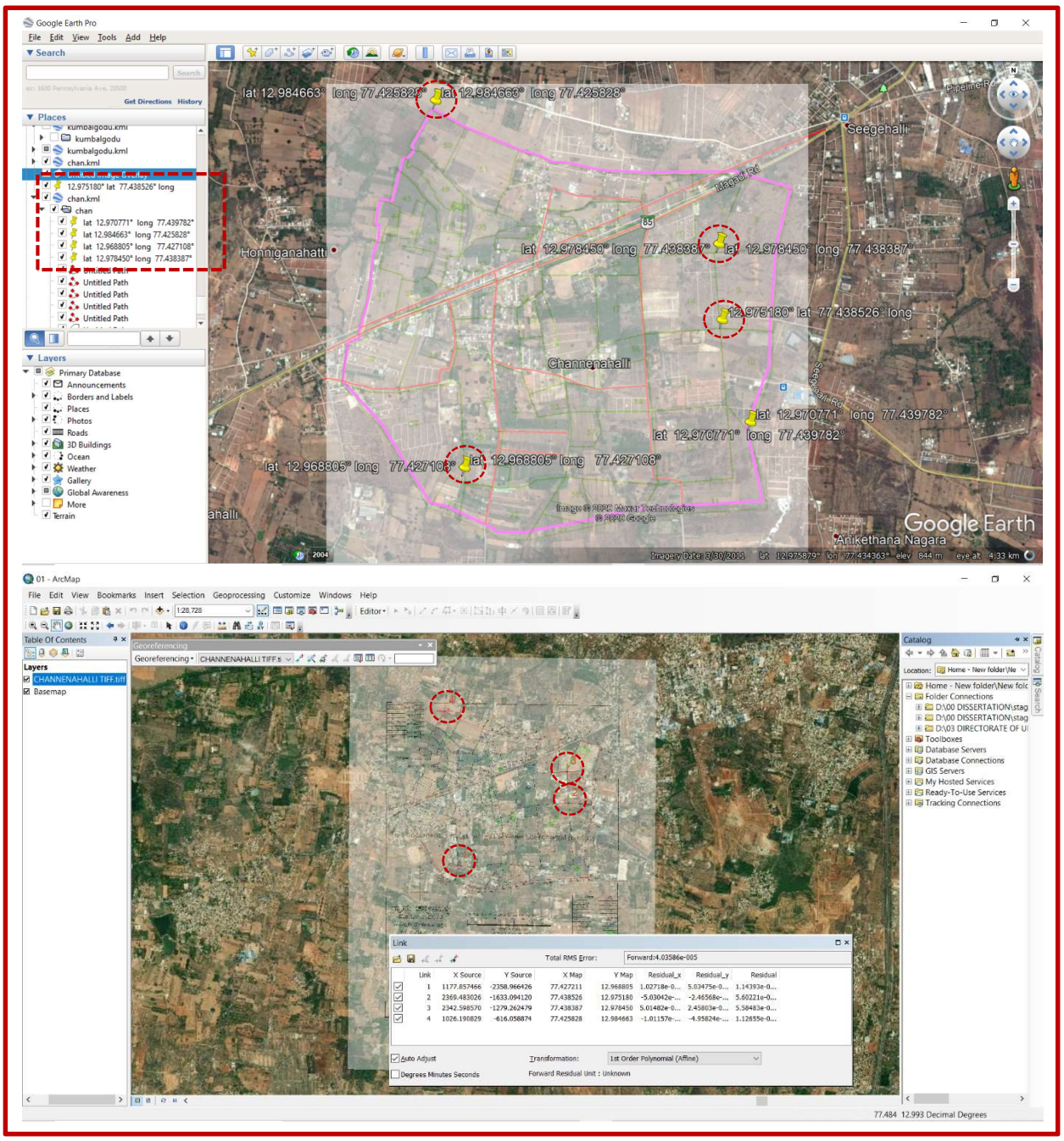

Fig. 5 Georeferencing village map on ArcGIS with the help of Google Earth Pro

After georeferencing the village map, it was digitalized on ArcGIS to obtain the boundary of Original Plots, Existing building footprints, tree cover, etc

6. CONCLUSION

On an average, if we compare the time required by the SPA Special Planning Authority or government of any state to carry out survey and prepare maps it takes more than 9 months and that to publish a preliminary scheme the time frame is 12 months according to act but even this deadline is extended by permissions and also it takes ample manpower to conduct physical surveys and also huge resources to be invested. Even after that we observe errors on that plan because of human mistakes, negligence or any other cause. However remotely sensing the elements through software eventually reduces the timeframe as observed in this work. The data being actually georeferenced, it is accurate to maximum possible extent which will then fasten the pace of implementation. Also it can be concluded that the desired objective of obtaining maps is achieved in stipulated time period of 8 weeks.

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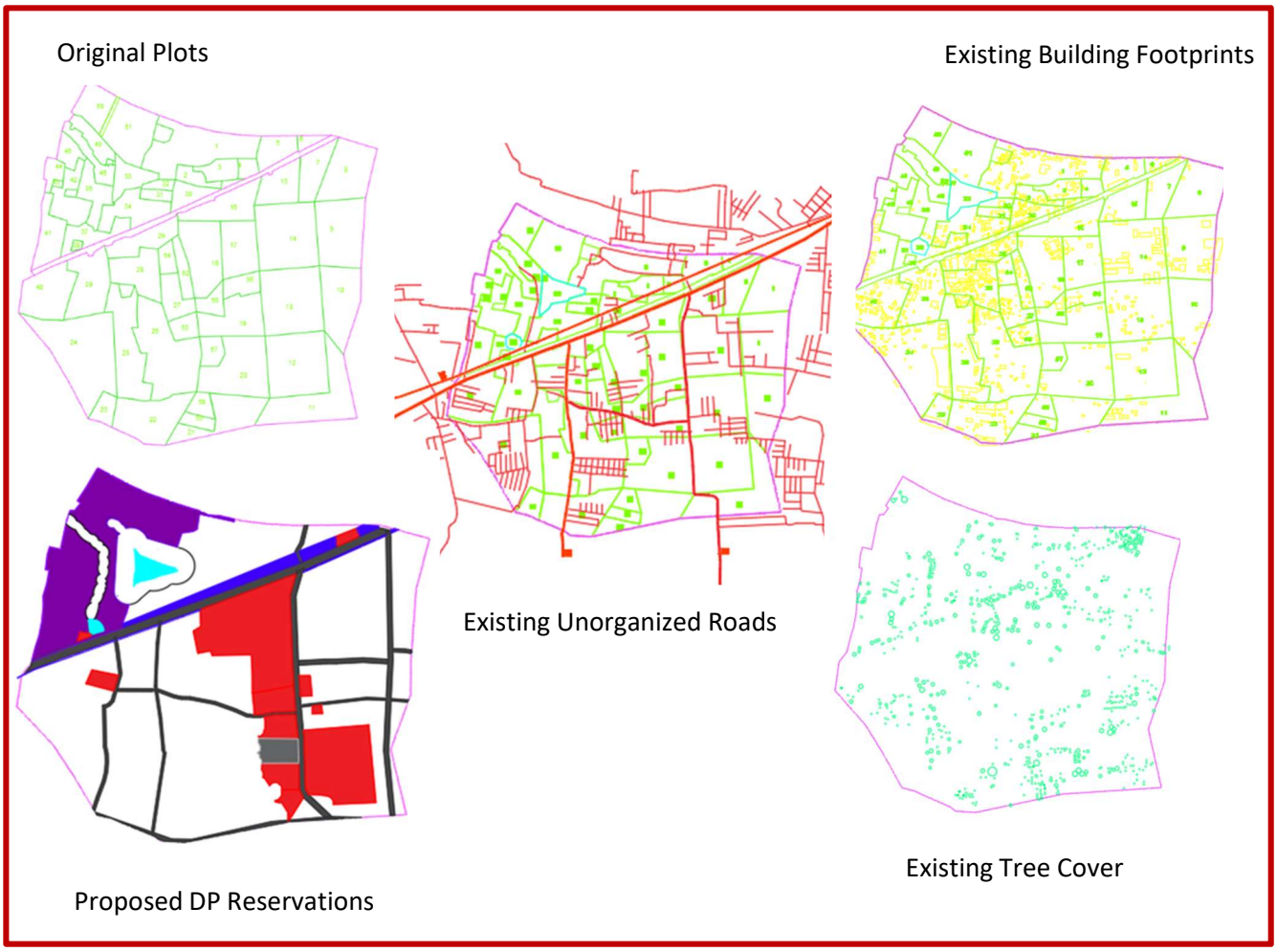

Fig. 6 Various maps created

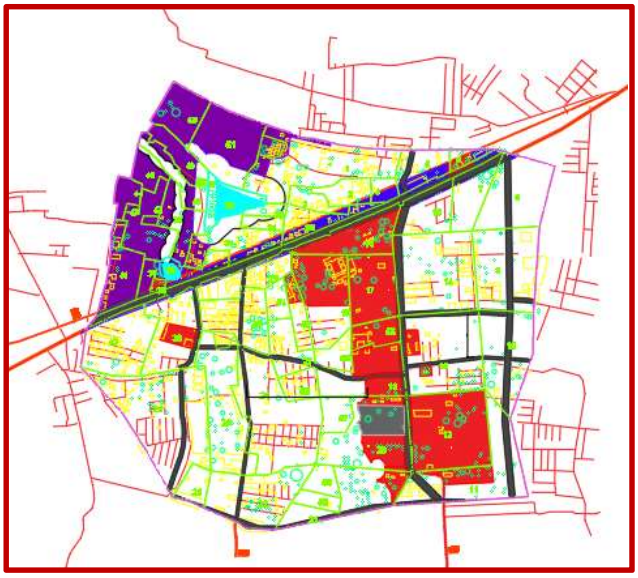

Fig. 7 Compilation of data for future analysis

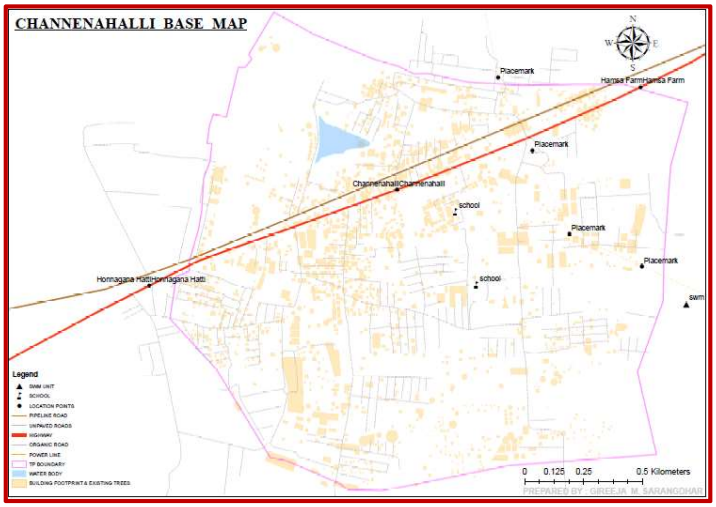

Fig. 8 Base Map of Channenahalli village prepared by author

ACKNOWLEDGEMENTS

I would like to appreciate the efforts taken by my project partners Mrs. Ruchika Tater & Miss. Sushmita Paul during our internship period and helping build the thought process together for better planning of future and fulfilment of the project requirement. This entire study wouldn't get shaped without the guidance of our mentors namely Ms. Ann Jacob and Mr. Prashob Raj. Frequent interactions with other officials and Joint Directors of DULT helped to gain a lot of knowledge from their experience. Also I would like to thank my colleagues Mr. Swaraj Patil, Miss. Sharanya B.S., Miss. Soujanya and Miss. Shrutadevi Rajmane for helping me and my project partners throughout the internship period. Last but not the least I would like to express a sense of gratitude to Mr. Shishir Dadhich, Assistant Professor and PG Co-Ordinator at School of Engineering & Technology, Sandip University Nashik who have always encouraged me in learning new things throughout the academic year.

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