Warangal Municipal Corporation (WMC)

Warangal City Development Plan (CDP)

Submitted to:

Warangal Municipal Corporation

Submitted by:

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Warangal City Development Plan

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1. Introduction to City Development Plan (CDP)

1.1 Background

Cities are the engines of productivity and national economic growth. The rapid pace of urbanization in India has not only created opportunities for economic growth and improved quality of life, but also led to pressures on the delivery of urban civic services and increased urbanization of poverty. The escalating demand for basic services in urban centers is resulting in a serious deterioration of service quality across housing, transport, power, water supply, sanitation, healthcare and education. Benign neglect of sprawls by civic authorities has led cities to be vulnerable to natural disasters and disease. In addition, the cities are plagued with a range of issues like fragmented functional domain with conflicting lines of accountability, overlapping roles, limited use of private sector participation, absence of regulatory framework, revenue gaps due to unsustainable tariffs, transfers, non transparent subsidy systems, limited credit worthiness etc. Cities have inadequate devolution of funds and limited powers to borrow. Further there are issues of distributional inequalities in services due to exclusion of poor, lack of transparency, limited civic engagement in governance and development, limited capacity of elected representatives and officials for strategic visioning and urban management. Reforms in governance and service delivery arrangements are required to position them as engines of growth and development. There is a need for comprehensive planning and coordinated effort focusing on fiscal and institutional changes, which underpin existing governance and service delivery arrangements.

Realising the need and urgency to augment the urban infrastructure backed by strengthening of urban governance of cities and to make them vibrant in their social and economical development, Government of India launched Jawaharlal Nehru National Urban Renewal Mission (JnNURM) in 2005. The objective of the Mission was to promote institutional, structural and financial reforms necessary to improve service delivery systems that are sustainable, enhance local economic performance and bring transparency and accountability in the functioning of municipal governments. Sixty Five cities[1] are covered under this Mission, which include cities with million plus population, the state capitals and the cities with cultural and tourism importance. The non mission ULBs are covered under two separate schemes – Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) and Integrated Housing and Slum Development Programme (IHSDP). The funds under these two schemes will be allocated among the states based on their urban population and the state governments may prioritize towns and cities on the basis of their felt need. It is envisaged that the Phase II of JnNURM would cover all the urban local bodies with a population of more than five lakhs.

1.2 Urban Andhra Pradesh

Andhra Pradesh is the eighth most urbanized state in India with an urban population of 2.1 crores, constituting 27.08% of the total population. The Urban Agglomerations of Hyderabad (5.75 million), Visakhapatnam (1.32 million) and Vijayawada (1.06 million) – which together

[1] *Initially Sixty Three Cities were covered in 2005. Two cities viz., Tirupati and Porbandar were added to the list of Mission Cities in 2008-09*

account for more than 35% of the State's urban population - have been identified as the mission cities/UAs that can access additional central assistance under JNNURM. However, in the fourth year of the mission period, the city of Tirupati, was also included in the list of JnNURM cities owing to its importance in religious and cultural tourism.

The second tier of cities in Andhra Pradesh with a population more than 5 lakhs (covered under UIDSSMT/IHSDP till date) are now envisaged to be included in the second phase of JnNURM for additional central assistance. As a pre-requisite to access the additional central assistance under JnNURM, the mission cities are expected to formulate City Development Plans (CDPs) through a consultative process to make them inclusive.

1.3 City Development Plan (CDP) for Warangal

Warangal is the fourth largest municipal corporation of Andhra Pradesh and one of the larger tier 2 cities of India with an estimated population of around eight lakhs (Census 2001: 6.54 lakhs) covering an area of about 100 square kilometers. Located in the south eastern part of the country, the city is a headquarters of Warangal district, with a rich economic base and historical importance.

The City Development Plan focuses on the development of economic and social infrastructure, strategies that deal specifically with issues affecting the urban poor, strengthening of municipal governments and their financial accounting and budgeting systems and procedures, creation of structures for bringing in accountability and transparency, and elimination of legal and other bottlenecks that have stifled the land and housing markets. It provides a basis for cities to undertake urban sector reforms that help direct investment into city based infrastructure. The CDP makes basic policy choices and provides a flexible framework for adapting to real conditions over time. Through the CDP, the city residents share a vision for the future and identify key issues facing the city in the short, medium, and long-term. By providing clear directions for the future, the CDP establishes priorities through a consultative process, and facilitates investment decisions in the context of their desired future outcomes.

A CDP is a ***collective city vision*** and a ***strategic action plan*** including projects, investments, financing and institutional reform for equitable growth of the city to improve the ***quality of life of all citizens*** developed and sustained through ***participation***. A CDP is a medium to long term (twenty years approximately) blue print for overall development of the City covering economic growth, social development, infrastructure requirements, poverty alleviation, land use and environmental sustainability and finances etc. A CDP also aims at promoting good governance and accountability to citizens. It reflects stakeholders' needs and aspirations and hence it has to be developed in a consultative process.

1.4 Defining the CDP Area – Spatial Coverage of Warangal CDP:

Warangal CDP is proposed to cover an area of 471.746 sq.km with population of about 68.8 Lakhs (Census 2001) covering the Warangal Muncipal Coproration (110 Sq.Km) and 42 surrounding villages (361.746 Sq.Km) viz., Allipur, Arepally, Ayodhyapur, Bhattupally, Enumamula, Gopalpur, Gundlasingaram, Kadipikonda, Kothapally(h), Kothapet,

Kummarigudem, Madikonda, Mamunoor, Nakkalapally, Paidipally, Palivelpula, Tekulagudem, Tharalapally, Thimmapur(h), Bheemaram, Komatipally, Chintagattu, Munipally, Devannapet, Hasanparthy, Mucherla, Pegadapally, Vangapahad, Yellapur, Dharmaram, Gorrekunta, Janpaka, Mogilicherla, Potharajpally, Dupakunta, Sthambhampally, Vasanthapur, Rampoor, Unikicherla, Singaram, Bollikunta, Gadepally. The Warangal Municipal Corporation has already mooted a proposal to expand its jurisdiction to cover the surrounding 42 villages to form 'Greater Warangal', which is under the consideration of the State Government. The CDP covers the proposed geographic area of Greater Warangal. The constituents of Greater Warangal are illustrated in the spatial map in figure 1.

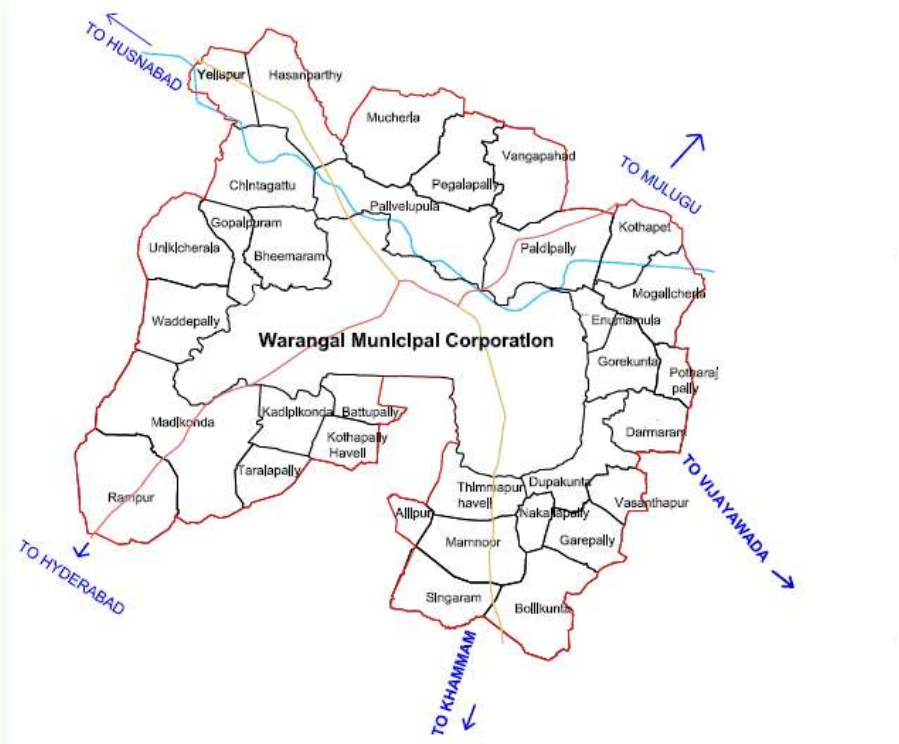


Figure 1: Spatial Map of Greater Warangal

Relationship between Master Plan and CDP: The Comprehensive Development Plan/Master Plans prepared by various cities earlier are largely land-use regulation and monitoring documents and had statutory status. The CDP is envisaged under JNNURM not as a statutory document, but has wider objectives that seek, inter-alia (a) guided growth of the city, (b) citizen's participation, (c) reform in governance leading to a well-managed society, and (d) clear estimates of financial investments and sustainability.

The Master Plans lay down the spatial requirements for the coming years, where a City Development Plan envisaged under JnNURM is a comprehensive document outlying the vision and development strategy for future development of the city, prepared in consultation with wide range of stakeholders by identifying thrust areas to be addressed for achieving the desired objectives and city vision.

Objective: The main objective of Warangal CDP is to have a planned growth of the city in the desired direction and to project Warangal as a 'global city', guided by a shared vision for city's

development. The CDP makes basic policy choices and provides a flexible framework for adapting to real conditions over time. It emphasizes on issues of priority local concerns for livability, and the implied requirements in terms of (1) enhancing Service delivery and productivity, (2) reducing poverty, (3) specific emphasis to gender, (4) improving urban governance, and (5) enhancing financial sustainability.

Scope of CDP: The CDP outlines the strategic policy and investment interventions to achieve the city vision of Warangal including formulation of sectoral plans for the identified sectors. The scope of CDP is to:

- Assess the existing situation with regards to demographic and economic growth, infrastructure services, municipal finances, etc.,
- Identify the gaps in service delivery,
- Outline the issues faced by the city's poor,
- Prepare a vision and sectoral strategic framework outlining the goals, strategies, interventions/projects to achieve the vision, and
- Formulate a city investment plan with appropriate financing strategies and an implementation action plan,
- Focus on the reforms to be carried out at the state and local level in consonance with the vision and strategic plan outlined to sustain the planned interventions.

1.5 Organisational Framework for CDP Preparation:

The process for preparation of the CDP is envisaged to be based on the principles of participation, stakeholder involvement and greater interaction between the various urban institutions. While leveraging the available technical capacity in the urban institutions, it is expected that adequate steps should be taken to augment the same through the use of external consultants or experts as deemed necessary.

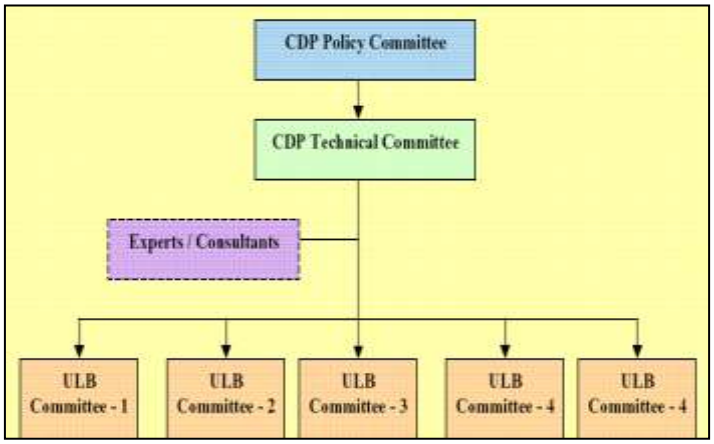


Figure 2: Organisational Framework for CDP Preparation

Given the complex institutional arrangements for planning, implementing and managing urban infrastructure and service delivery, an organizational framework[2] for guiding the CDP preparation process suggested by the Ministry of Urban Development, Government of India in 2007. This framework identifies key urban stakeholders and provides a platform for each of

[2] Revised CDP Toolkit of MoUD, GoI

them to contribute to the planning process. The following diagram depicts the broader organization framework for preparing the CDP.

1.6 CDP Preparation Process

The overall approach and methodology adopted for the preparation of Warangal CDP involved four phases as presented in the figure 3.

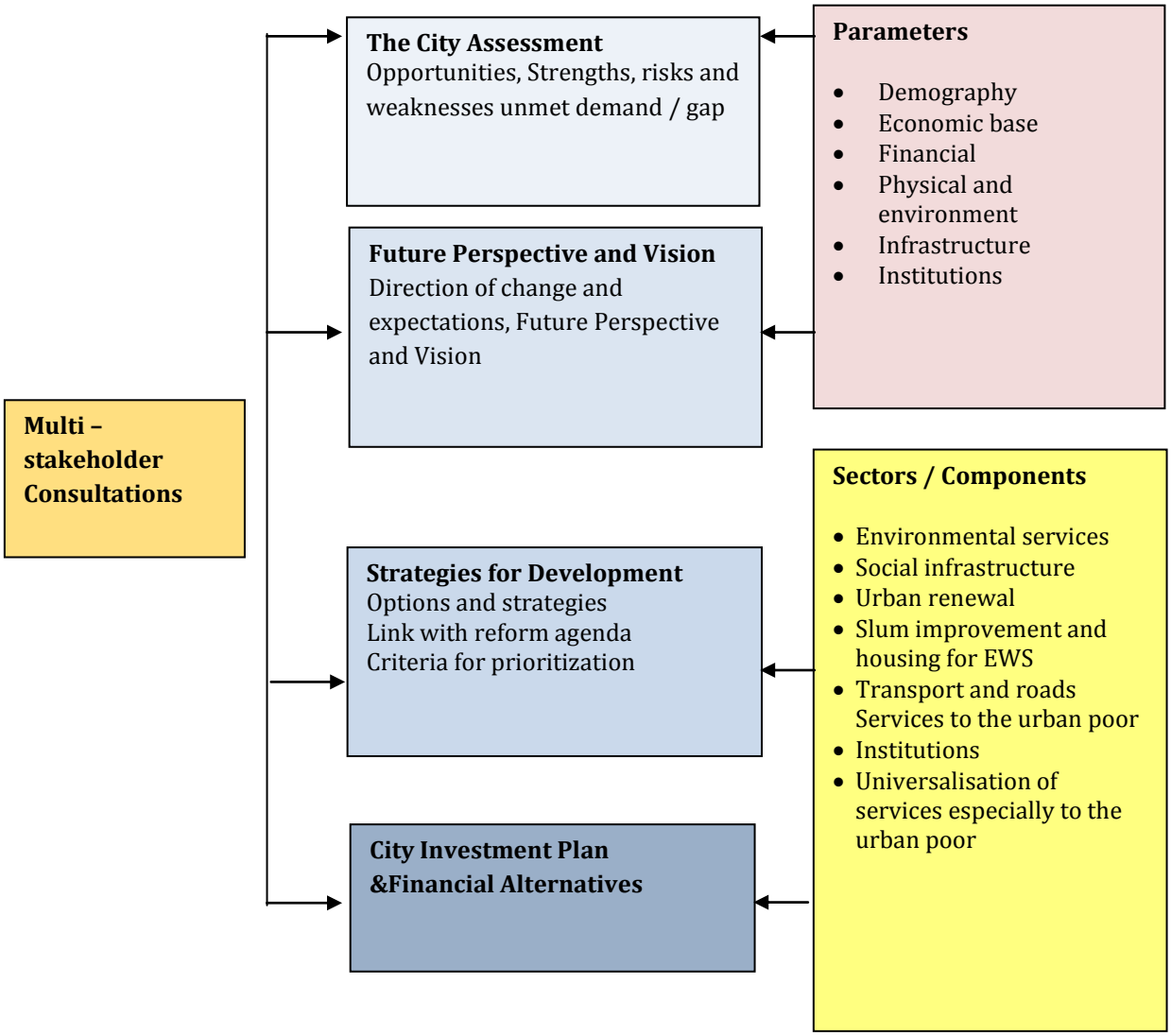


Figure 3: CDP Approach and Methodology

The planning process adopted for the CDP preparation across the four phases is detailed in figure 4.

Figure 4: CDP – Phases of Preparation

Preparatory Phase:

Warangal Municipal Corporation (WMC) initiated the process for the preparation of CDP in 2009 and entrusted it to Administrative Staff College of India (ASCI) with the task of extending technical assistance.

Phase I - Rapid City Assessment:

The current status assessment was undertaken during this phase, laying the foundations for future planning and CDP preparation process. This phase consisted of three steps as given in figure 5.

Figure 5: Steps in Rapid Assessment

(i) Stakeholder Identification and Analysis:

Key stakeholders influencing the development of the city were identified through focus group discussions with the officials of Warangal Municipal Corporation. The importance of each of stakeholder groups in the CDP process and their potential in influencing the process was analyzed as a part of this exercise. The list of identified key stakeholders is given in the annexure #--. These stakeholders were extensively involved in the CDP preparation process.

(ii) Stakeholders' Orientation Workshop on CDP Process:

An initial stakeholder orientation workshop was organized on 2nd March 2010 to obtain the inputs from key stakeholders of the city including the Municipal Council. The objective of the consultation workshop was to brief the stakeholders about the CDP initiative, obtain their inputs for the same and inform the progress of activities. The focus was on the following:

1. Inputs on identification of critical focus areas of city development

2. Discussions on key issues, concerns and challenges of the city
3. Garner suggestions and recommendations with respect to proposed exercise

(iii) Formation of CDP Policy Committee and Technical Committees:

As one of the outcomes of the Stakeholder Orientation Workshop, the CDP Policy Committee (CPC) and CDP Technical Committees (CTCs), discussed earlier as a part of organizational framework for CDP, were constituted on the lines of the Government of India's Toolkit for CDP Preparation. The structure and composition of the CPC and CTCs are presented below.

a) CTC – Infrastructure and Service Delivery
b) CTC – Local Economic Development, Tourism and Heritage
c) CTC – Land Use, Traffic and Transportation
d) CTC - Institutional Strengthening, Urban Finance
e) CTC – Urban Poverty, Slum Upgradation and Housing
f) CTC - Environment, Sustainable Development and Disaster Mitigation

(iv) Rapid City Assessment

The study of the current status of various aspects relating to the city was completed with the stakeholders' participation and involvement through first round of CDP Technical Committee meetings held during April-June 2010. The objective of this step was to obtain comprehensive information and consequently, an in-depth understanding of the existing state of affairs in the city in terms of information necessary for preparation of the city development plan. This helped in identifying the critical sectors of development and focus areas. The process of city assessment is presented in figure 6.

Figure 6: City Assessment and Analysis of Existing Situation

This was followed by an analysis of Strengths, Weaknesses, Opportunities and Threats (SWOT Analysis) as given in figure 7.

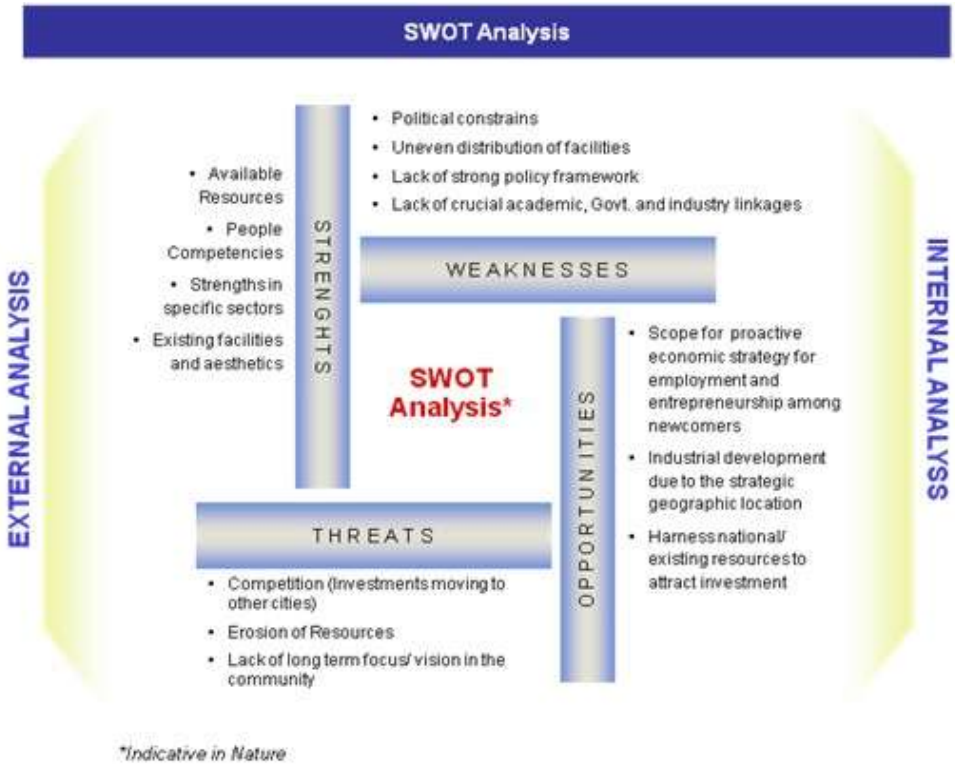


Figure 7: SWOT Analysis Process

Phase 2 Envisioning Phase

In phase 2, the visioning exercise was undertaken with various key stakeholder groups constituted in the previous phase. The objective of this phase was to draw up a City Strategic Vision and Action Plan for the thrust areas.

The CDP Policy Committee constituted at the city level comprising of eminent experts, officials and civil society representatives to identify the challenges and suggest strategies and action plans. CDP Technical Committees/working groups constituted for each of the identified sectors deliberated on the sectoral issues and concerns. The steps in this phase are given in figure 8.

Figure 8: Steps in Envisioning Phase

(i) Theme Development

The vision for Warangal city was evolved around specific themes for development.

Themes
Good Urban Governance
Urban Poverty and Slums (Housing, Services & Livelihoods)
Land use and Local Economic Development
Water Supply & Sewerage
Solid Waste Management/Sanitation
Storm Water Management
Traffic and Transportation
Urban Renewal/ Heritage and Tourism
Social Infrastructure Development
Environment, Disaster Management

ASCI assisted the stakeholders in defining a central or core theme on the basis of defined criteria which can function as the nucleus for economic development of the city, driving the future planning and economic initiatives. The core theme was supported by other themes being built around it, as sub-themes for growth/ development. Theme identification criteria:

1. Potential Economic Impact
2. Multiplier Effect on Other Sectors
3. Uniqueness of Positioning

Thrust Areas for City		
Industry	**Governance**	**Social**
• **Economic Goals** • **Growth Engines *(Focus Industry Sectors)***	• **Stakeholder Accountability and Participation** • **Streamlining Administration** • **Transparency** • **Equitable service delivery**	• **Poverty Reduction and slum improvement** • **Social Infrastructure** • **Gender Perspective**

(ii) Thrust Area Identification

Subsequently, ASCI identified the thrust areas taking into consideration the stakeholders' aspirations and expectations of Warangal city officials. Within each thrust area, the

Development Enablers were keyed out, which would require focused attention for the development.

Identification Criteria

1. Strengths and Opportunities of each city
2. Inputs from Phase 1
3. Discussions with ULB officials
4. Meetings with Different Stakeholder Groups for Obtaining Inputs
5. ASCI's Knowledge and Expertise

(iii) Future State Definition

Based on the key findings current state analysis, Warangal Municipal Corporation has defined the future state of the city in consultation with the stakeholders support, based on:

1. Current Status Analysis and Thrust Area Identification
2. Stakeholders' aspirations and ASCI Expertise
3. Clearly Articulated Vision and Mission Statement
4. Definition of Goals and Targets in Identified Thrust Areas

Based on the above activities and inputs from the previous exercises, a draft vision was formulated to present and share with the key stakeholders for their inputs and approval.

(iv) Visioning Workshop

A visioning workshop was organized with the key stakeholders of Warangal City including the officials from WMC, KUDA, etc., to present and discuss the draft city vision and year wise sectoral strategies for each city. Inputs and feedback from Warangal Municipal Corporation were obtained during these interactive sessions. Subsequently, the City Strategic Vision, Sectoral Vision statements and a broad action plan was finalized.

Subsequent to formulation of the City Strategic Vision, a City Investment Plan was formulated for various key areas of development identified as part of sectoral strategies for achieving the defined vision. The specific programs and projects for realization of the vision and sectoral strategies were identified in the next phase i.e., the strategizing phase.

Phase 3: Strategizing Phase

This phase has involved identification of specific program and projects in each development area and a brief description of them covering an overview of the proposed program/project including the program/ project goal, objectives, broad financial implications and contribution to the vision actualization.

(i) Prioritization of Programs

Based on discussions with key city stakeholders and officials of Warangal Municipal Corporation the programs and projects defined at the end of earlier phase were prioritized into short, medium and long term programs and projects. These are further dovetailed to year wise and sector specific activities/ projects/ programs.

The prioritization is done on basis of co-developed criteria, such as:

1. Compatibility with City Strategic Vision
2. Contribution to Vision Actualization
3. Financial Implications
4. Social and Political Acceptability
5. Technical Implementation Capabilities and Limitations
6. Discussions with Warangal Municipal Corporation

(ii) Implementation Action Plan

This step involved preparation of an implementation plan with clear milestones for the identified projects to ensure timely implementation and sustainable stakeholder participation.

Implementation Accountability Chart

Programs/ Project Identified	Responsible agency/Stakeholder	Estimated Duration
Programs		
Program 1		
Program n		
Project		
Project 1		
Project n		

Phase 4: CDP Approval & Documentation:

This phase involved the sharing of all the reports and outputs with Warangal Municipal Corporation and key stakeholders, for finalizing the same after incorporating their feedback. The outputs are documented for the purpose of wider dissemination.

Integrating gender concerns in CDP process:

A key thrust of the CDP is to bring gender focus in the preparation of CDP. This has been ensured in the following ways:

1. In the stakeholder consultation and FGD, concerns, needs and priorities are identified separately for women and men
2. Wherever possible, gender disaggregated data was collected, analyzed and presented.
3. Strategies and City investment plan are prepared incorporating the gender development.

2. Warangal City - A Profile

2.1 Introduction:

Warangal is the fourth largest city of Andhra Pradesh State with a population of about ten lakhs and located 145 km from Hyderabad, the State Capital. Warangal is located at 18.0° North Latitude and 79.58° East Longitude and has an average elevation of 302 meters (990 feet). The city is the administrative headquarters of Warangal district and is one of the oldest municipalities having been established in 1899. Referred at times as a tri-city, Warangal is a cluster of three towns—Warangal, Hanamkonda and Kazipet, with a common civic administration i.e. Warangal Municipal Corporation (WMC).

The national highway NH 202, connects Warangal to other major cities of the state/country viz., Hyderabad. Warangal is also well connected to major cities of the country by rail network. Kazipet, situated 13 km from Warangal and known as Gateway to North India, is divisional headquarters of South Central Railways and is one of the biggest railway junctions. A deseal-electric locomotive shed is located in Kazipet. Shamshabad Airport of Hyderabad at 170 km distance is the nearest airport to Warangal.

Warangal is one of the major urban centres of the Telangana region addressing the educational, medical, trading and cultural needs of the people not only from the district, but also from neighboring districts. The city has emerged as a regional hub for educational facilities with numerous schools, graduate and post graduate degree colleges, and reputed professional institutions viz., National Institute of Technology (NIT), Kakatiya University (KU), Kakatiya Medical College, and Kakatiya Institute of Technology and Sciences (KITS), etc.

Like many other cities across the country, Warangal City also has witnessed significant growth in recent decades. This rapid pace of growth created opportunities for local economic development and improved quality of life. At the same time, it has also led to pressure on the delivery of civic services and increased poverty. The huge floating population and unplanned linear growth have further contributed to the above pressures. In spite of several reform measures taken in the previous years, the city poses challenges, which need to be addressed.

The city has enormous potential for growth as a tourist and heritage centre as well as a regional centre. This requires enhancing the existing infrastructure - both quantitatively and qualitatively. The investors consider not only the climate and economic potential of cities, but also the quality of services the city offers. In this context, it is imperative that Warangal has good potential to meet world-class standards in governance, infrastructure and service delivery to be at par with the other cities in the state and the country.

The city has embarked upon an ambitious program of preparing a City Development Plan aimed at promoting overall development. However, along with this strategy of economic growth, the city would also need to consider a strategy to alleviate the living conditions of the poor. The number of slums and slum population in the city has been increasing rapidly along with the growing population.

2.2 History of Warangal

The city derived its name from *Orugallu.* It was the capital city of a Hindu Shaivaite Kingdom ruled by Kakatiya Dynasty between 12th to 14th centuries. The city was supposed to have been carved on a single rock, hence the name Orukallu[3] --*one rock* or Ekasila nagaram -- *city on one rock*. Well known rulers of Kakatiya dynasty include Ganapathi Deva, Prathapa Rudra, and Rani Rudramma Devi. After the defeat of Pratapa Rudra, the Musunuri Nayaks united seventy two Nayak chieftains and captured Warangal from Delhi sultanate and ruled for fifty years. Jealousy and mutual rivalry between Nayaks ultimately led to the downfall of Hindus in 1370 AD and success of Bahmanis. Bahmani Sultanate later broke up into several smaller sultanates, of which the Golconda sultanate ruled Warangal. The Mughal emperor Aurangazeb conquered Golconda in 1687, and it remained part of the Mughal empire until the southern provinces of the empire split away to become the state of Hyderabad in 1724 which included the Telangana region and some parts of Maharashtra and Karnataka. Hyderabad was annexed to India in 1948, and became an Indian state. In 1956 Hyderabad was partitioned as part of the States Reorganization Act, and Telangana, the Telugu-speaking region of Hyderabad state which includes Warangal, became part of Andhra Pradesh.

The city has a rich cultural heritage and tourism importance, and attracts thousands of tourists every year. The predominant tourist attractions include Warangal Fort--constructed in 13th century, Thousand Pillar Temple--built by Rudra Deva in 1163 in Chalukyan style, Bhadra Kali Temple--noted for its stone image of Goddess Kali, Siddeshwara temple--built in 3rd century, etc. The Kakatiyas left many monuments including an impressive fort, four massive stone gateways, the Swayambhu temple dedicated to Lord Shiva, etc. The cultural and administrative distinction of the Kakatiyas was mentioned by the famous traveler Marco Polo.

One of the Commissioner's Divisions in former Hyderabad State, and one of the districts in present Andhra Pradesh State were named after the historical Warangal City. The Warangal division in erstwhile Hyderabad state formed the eastern portion of the Nizam's Dominions and extended from the river Penganga in the north to the Krishna in the south. It was one of the biggest districts before 1st October, 1953 when a few taluks were seperated from it and formed into the Khammam district.

Warangal itself is not very ancient but Hanamkonda and legends surrounding it seem to link up the area with the great Vishnukundins and other earlier dynasties of the Buddhist and pre-Buddhist periods of Indian history. The district originally formed a portion of the ancient kingdom of the Andhra kings, who subdued the whole of the Deccan. During the eighth century, it was Orukal, the capital of Yadava Kings of Tuluva Andhras.

A brief journey through various phases of Warangal city's growth is captured in the figure 9.

[3] In Telugu Language, Oru means One and Kal means Stone

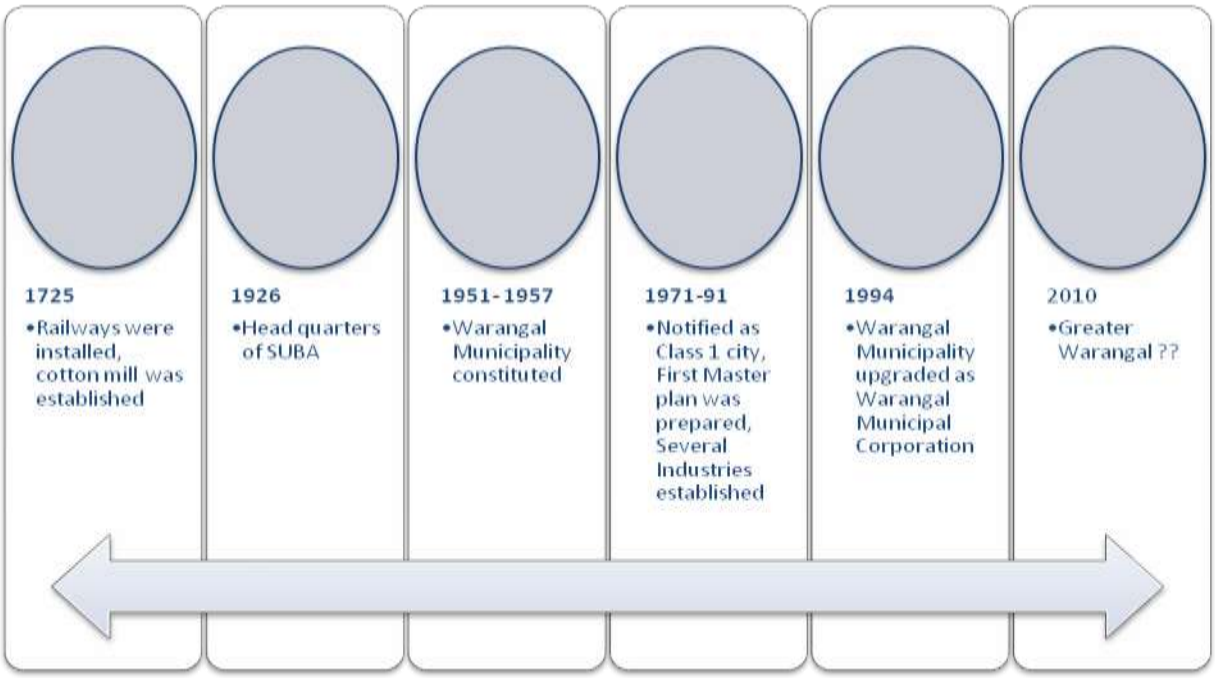


Figure 9: Chronology of Warangal City Growth

2.3 Physical Setting:

The Warangal town is surrounded with isolated hills, hill streams, seasonal rain fed tank and large water bodies & lakes. The district generally tends to be dry without major fluctuations in the temperature. It gets quite warm during the summer months of April, May and June and continues to be warm in rest of the year except during December and January, when the temperature drops slightly. The rainy season sets in the Warangal City with the onset of South-West monsoon in the later part of June month, and ends in the month of September with the closure of the South-west monsoon. The average annual rainfall of the district is 800 mm, with maximum rainfall recorded in the months of July, August and September every year. The major water supply source for irrigation and drinking water to Warangal City is Kakatiya Canal. The other sources of water supply for irrigation in Warangal district include rain fed tanks, wells and hill-streams which require good showers in the season. Granite stone of Warangal district is very famous as construction material. Warangal has both black soils and Red soils, which are rich in Potash and deficient in nitrogen and phosphorus.

2.4 Cultural Setting:

A majority of the city population speak 'Telugu'. Several ancient telugu poets viz., Kavi Potana and Kavi Palkuriki Somanna and also the modern day poets hail from this place. Major Hindu festivals celebrated in the city include Bathukamma festival— a local festival celebrated by women who worship the goddess for nine long days, Dassera, Deepavali, Sankranti are celebrated here. The district hosts the famous bi-annual event, Sammakka-Saralamma Jatara or congregation, which records the participation of over six million people for a full three day period around the small village of Medaram and its adjacent stream/rivulet, Jampanna Vagu--90 km from Warangal city. This fair is believed to be the largest repeating congregation of tribal

communities across the world and commemorates the valiant fight put up by a mother-daughter combination (Samakka and Sarakka) with the reigning Kakatiya king over an unjust law. Also, this is biggest congregation after Kumbha Mela in India.

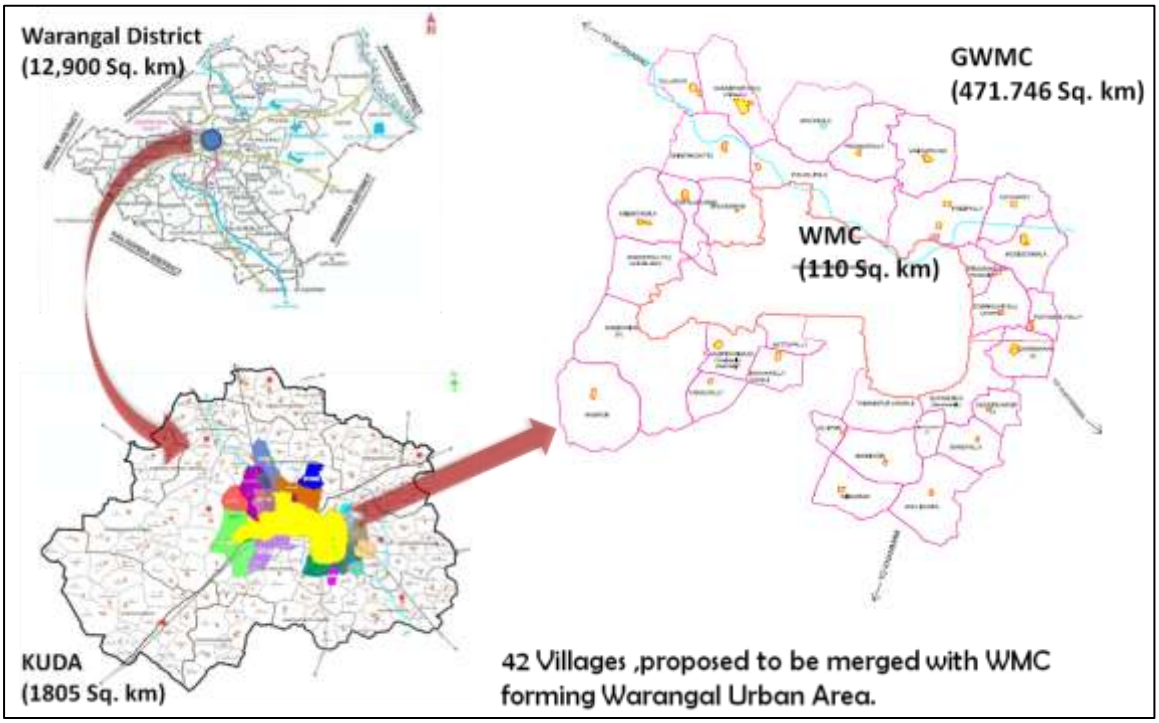


Figure 10: Warangal Urban Area

3. Warangal - Demography

3.1 Demographic Profile

Warangal city, which corresponds to the area of WMC is spread across an area of 110 square kilometers with a total population of 5.30 lakhs (Census 2001). At present it is estimated to be 7.50 lakhs with the city growing at an average annual growth rate of 2.64 percent[4] plus the floating population. The jurisdiction of its civic body i.e., Warangal Municipal Corporation (WMC) limits to above mentioned city area and corresponding population. The city is divided into 53 electoral wards.

3.2 CDP Area - Proposed Greater Warangal:

As discussed in Chapter 1, the CDP area i.e., Greater Warangal is spread across 472 square kilometers and the constituents include, Warangal Municipal Corporation and its surrounding 42 villages (list given in Annexure). The present population of CDP area is, therefore, estimated to be 9.57 lakhs (2010) increased from 6.88 lakhs (2001), as indicated in the table. The surrounding villages spread across 361.75 sq.km, contribute 76.7 percent of 'area' and only 21.6 percent in terms of population. The population of surrounding 42 villages, put together, was 1.57 lakhs as per Census 2001, and has increased to an estimated 2.07 lakhs in 2010 at an annual growth rate of 2.64 percent.

3.3 Population Growth of Warangal

The table 2.4 explains the population growth of Warangal city in the past five decades.

Year	Population	Decadal Growth Rate	Area (Sq.Km)	Density
1971	207520	32.94	44.0	3026
1981	335015	61.44	44.0	7614
1991	461123	37.64	44.0	10631
2001	530636	15.07	68.0/110.0	4824
2010 (Projected)	689000	26.36	110.0	6200
2010 (Incl. 10 % floating pop.)	750000		110.0	6818
2001 (Surrounding Villages)	157978			
2010 (Projected)	207000	26.36	361.7	572
2010 (CDP Area)	957000		471.7	2028

Table 1: Population growth trends of Warangal City

The Warangal Municipal limits have expanded from 44 sq. km to 68 sq. km during 1991-2001, while being upgraded to Municipal Corporation. Discussions with city officials indicate that the operations of Municipal Corporation expanded further to 110 sq. km by including the transitional areas. Despite expansion in the municipal area during the decade 1991-2001 from

[4] The population growth during the decade 1971-81 has not been considered while computing the average annual growth rate of Warangal City in the past four decades. The high growth rate during the decade is attributed to industrialization.

44 sq. km to 68 sq. km, it is observed that the population has recorded a growth rate of only 15.07 percent. Due to continuous in migration of people from rural areas in search of opportunities, it is believed that Warangal Municipal Corporation has recorded an annual growth rate of almost three percent, in the last decade 2001-2010.

Population Density

The population density of Warangal Municipal Corporation at present (2010) is estimated to be 6818 persons/ sq.km, an increase from 4823 persons/ per sq.km (2001 Census). Similarly, the population density of surrounding 42 villages in 2010 is estimated to be 572 persons/sq. km, which increased from 436 persons/ sq. km (2001 Census). Therefore, the average population density of Greater Warangal area is 2028 persons/sq.km, as can be seen in table 2.

	Population 2001	Density (2001)	Population 2010	Density (2010)	Area (Sq.Km)
WMC	530636	4823	750000	6818	110.00
42 Surrounding Villages	157978	436	207000	572	361.75
Greater Warangal	688614	1459	957000	2028	471.75

Table 2: Population,Density & Area

Population Growth Rate

Warangal recorded its highest population growth rate of 61.4 percent during 1971-81. One of the major reasons attributed was that many industries were setup during that decade. The gradual decline in population growth rate during next two decades, 1981-91 (37.6 percent) and 1991-2001 (15.1 percent), further justifies the argument, it was only an exception. The estimated increase in population at an annual growth rate of 2.64 percent during 2001-10, reflects the trend in past three decades and may be attributed to growing migrant population from rural areas in search of opportunities.

Socio Economic Characteristics

Age Structure and Sex Ratio

The Sex Ratio of WMC is 972, as per census 2001, which is less than the state average (978). The average sex ratio in 42 surrounding villages is estimated at 957, as per census 2001. The average sex ratio of CDP area (Greater Warangal) is estimated at 965, less than state average.

WMC					
	0-5	6-16	17-35	35-65	>66
Male	12002	36006	72008	150020	30040
Female	11078	33236	66470	138480	27696

Table 3: Age Structure

Scheduled Caste and Scheduled Tribe

The CDP area (Greater Warangal) has 15.5 percent Scheduled Caste population and 2.4 percent Scheduled Tribe population. WMC recorded a SC population of 11.9 percent and ST population of 2.1 percent as per Census 2001. Similarly, the 42 surrounding villages recorded SC

population of 27.1 percent and ST population of 3.4 percent in 2001. The figures of SC and ST population are presented in the table 4.

	SC			ST		
	Male	Female	Total	Male	Female	Total
WMC	33942	29511	63453	5912	5314	11226
42 villages	21828	21097	42925	2820	2617	5437
Greater Warangal	55770	50608	106378	8732	7931	16663

Table 4: Population of scheduled caste and scheduled tribe

Migration

Composition	Population increase during					
Year	1981-91	% of Total	1991-01	% of Total	2001-10	% of Total
Natural Increase	132742	28.37	62879	11.84		
Migration	-	-	-	-		
Jurisdictional Change	0	0	0			
Total increase						

Table 5: Growth and Migration

Literacy

As per Census 2001, Warangal Municipal Corporation has recorded a literacy rate of 79.8 percent which is comparatively higher than the district (60.5 percent) and state (58.4 percent) figures. Similarly, the average literacy rate of the surrounding 42 villages is estimated at 60.1 percent. The combined average literacy rate for CDP area (Greater Warangal) is 69.9 percent which is still higher compared to district and state averages. The details of the literacy is given in table 6.

	Literates			Literacy Rate		
	Male	Female	Total	Male	Female	Total
WMC	211180	162893	374073	88.97	70.4	79.8
42 villages	50442	32650	83092	76.57	51.5	60.1
Greater Warangal	261622	195543	457165	82.70	60.9	69.9

Table 6: Literacy rate

Population Projections

Population forecasts are essential (1) to understand population growth trends in previous decades, and (2) to suggest the expected population growth in future years. Population projection methodology should consider static parameters like present population, past growth trend and also dynamic parameters like employment, investment opportunities etc. The design population for the provision of infrastructure services should to be estimated, with due consideration to all factors governing the future growth and development of the city. A judgment based on various factors would help in selecting the most suitable method of deriving

the probable trend of the population growth in the area/areas of the project out of the following mathematical methods used for population.

There are various methods for populations projections e.g. arithmetic increase method, geometric increase method, incremental increase method, decreasing growth method and graphical method.

Floating Population:

Warangal being one of the major cities of Telangana Region after Hyderabad, and also being a hub of political, cultural, health and educational institutions, apart from various commercial activities, attracts a significant percentage of floating population from surrounding rural areas of the district as well as region. In the absence of accurate data to measure floating population on a scientific approach, an estimated figure of about ten percent is considered for the base year based on discussions with local expertise and key stakeholders.

Census Year	WMC Population	Actual increase	Growth Rate (%)
1971	207520		32.9
1981	335015	+127495	61.4
1991	461123	+126108	36.7
2001	530636	+69513	15.1
		Arithmetic Mean	Geometric Mean
Average		*+107705*	*26.5*

(a) Arithmetic Increase Method - This method is generally applicable to large and old cities. In this method the average increase of population per decade is calculated from the past records and the present population is added to the average increase. **Pn = [P0 + n.x],** where Pn = Prospective or forecasted population after n decades from the present (i.e. last known census); P0 = Population at present (i.e. last known census); n = No. of decades between now and future; x = Average (Arithmetic mean) of population increase in the known decades.

Population Projections for WMC Area:

Population of Warangal City as per Census 2001 is 530636. Avg. (arithmetic mean) population increase per decade (x = 107705); n = 1, 2, 3;

a) Projected Population for 2011 P1= 530636+(1*107705)+floating pop. = 702000
b) Projected Population for 2021 P2 = 530636+(2*107705)+floating pop. = 820000
c) Projected Population for 2031 P3 =530636+(3*107705)+floating pop. =939000

(b) Geometric Increase Method - This method is mostly applicable for growing towns and cities having vast scope for expansion. In this method percentage increase is assumed to be the rate of growth and average of the percentage increase is used to find out future increment in population. **Pn = Po (1 + r/100) ^n**, where Po = Initial Population i.e. the population at the end of the last known census; Pn = Future population after n years; r = Annual growth rate (%).

Population of Warangal City as per Census 2001 is 530636. Population in 2001 P0 = 530636; Avg. Annual growth r = 2.64 %. Population to be projected for the year 2011 (n= 10), 2021 (n= 20), 2031 (n= 30); Hence Projected Population,

a) For 2011, P1 =530636 x(1+2.64/100) ^10= 757453 = 757000
b) For 2021, P2 = 530636x(1+2.64100)^20 = 982929 = 983000
c) For 2031, P3 = 530636x(1+2.64/100)^30 = 1275524 = 1276000

(c) Incremental Increase Method **–** In this method the increment in arithmetical increase is determined from the past decades and the average of that increment is added to the average increase. **Pn = P0 + n.x + n (n + 1)/2 . Y ;** Where, Pn = Population after n decades from present (i.e. last known census) , X = Average increase of population of known decades and Y = Average of incremental increases of the known decades.

(d) Decreasing Growth Method **-** Average decrease in the percentage increases is worked out and is then subtracted from the latest percentage increase for each successive decade. It is applicable where the rate of growth shows downward trend.

(e) Graphical Method **-** The graph between time and population is plotted from the available data and curve is plotted.

Since Warangal is considered to be a growing city, Geometric Method is being adopted, and for all the purposes of future calculations, the projected population of CDP Area is computed as follows. CDP Area as per Census 2001 = 688614; average annual growth rate r = 2.64

a) Projected Population for 2011 = 963000
b) Projected Population for 2021 = 1276000
c) Projected Population for 2031 = 1655000

In case of projected population for 2011, ten percent floating population has been considered only for core city of Warangal i.e. WMC, as the surrounding villages, with low infrastructure do not seem to attract any floating population. For future projections, with the assumption that the villages will be merged into municipal limits, ten percent floating population for expanded municipal corporation limits has been considered.

Population Characteristics at Sub City Level:

The ward wise population of Warangal Municipal Corporation is given in the table below.

4. City Economy and Land Use

Warangal city economy is predominantly agricultural in nature. The city has a large grain market in Enamamula. This is a rice-growing region and most farmers grow rice for both subsistence and commerce. Cotton has also been a major cash crop since early 1990s; however the cotton sector has been troubled in recent years, and there was a highly publicized spate of suicides by cotton farmers in 1997- 98.

Industry has been neglected in the region. Some industries like Azam Jahi Cloth Mills, which existed during the Nizam's rule, was closed down. Warangal has several small and medium scale industries. A Software Technology Park of India (STPI) was set up recently at NIT Warangal, with the intention of taking the benefits of the Information Technology revolution to the second tier cities. Several companies appear to have shown interest in setting up operations. Warangal makes an excellent location because of its proximity to Hyderabad, the student pool from some of the best institutes in the country, good transportation facilities, infrastructure, lesser traffic problems, etc.

Agriculture and Agro-based Industries

Cotton is the major cash crop and paddy is the major food crop in the region. Chilly cultivation is also wide spread in the area. The region intensely depends on secondary rainfalls and the farmers often have poor harvest due to insufficient or lack of rainfall. Some of the important agricultural activities taken up in the region and their products are listed as under.

Activity Type	Products
Agriculture	Cotton, Rice, Red gram, Bengal gram, Spices, Chilies, Jowar, Maize, Gherkin
Horticulture	Mango, bananas, sweet oranges, custard apple, watermelon, vegetables like tomato, ladies finger, brinjal etc
Floriculture	Rose, jasmine, various aromatic and medicinal plants like citronella, lemon grass

Table 7: Agro based activities

Trade and Commerce

The Enumamula grain market of Warangal city is supposed to be the second biggest market in the entire Asia. Mirchi (Red chilli) and cotton are the main crops. Warangal being the service town for the pilgrims and an educational center, is the key driver in service sector, agriculture and related trade. There is no organized retail cum commercial center in Warangal City. As a result the core city i.e. the old city is very congested with variety of activities leading to chaotic conditions.

Materials and Mining

Granite formation is exposed in the forms of hills, hillocks and small scattered outcrops. The granite rock are being intruded by dolerite dykes, quartz veins etc. They are found in different shades of grey, pink and dark grey. Phorparictic granite is also available. The major minerals found are described below.

Minerals found in Warangal

Hanmakonda	Black Granite, Colour Granite, Granite useful for stone and metal
Hasanparthy	Black Granite, Colour Granite, Granite useful for stone and metal
Geesukonda	Black granite, Coloue Granite
Sangam	Black Granite, Colour Granite, Granite useful for stone and metal colour granite
Dharmasagar	Iron-ore, Black granite, Colour Granite, Granite useful for stone, metal and sand
Wardhananapet	Black granite, sand, Granite useful for stone and metal

Leather Tanneries

There are numerous tanneries and plenty of skins and hides in the city. Leather tanning in Desaipet, and Enumamula is the biggest and most famous. Most of the leather is exported outside the city to the trade housing in Chennai and Kolkata. The existing leather units in the city do not have modern technically advanced state of art processing unit causing environmental problems.

Workforce

The total workers in WMC area are 167886 and that in the CDP area are 235080, as per Census 2001, includes 67194 workers from surrounding 42 villages. The breakup of workforce in WMC and CDP area is given below table 8 and 9.

Type	WMC	42 Villages	CDP Area
Main workers	152742	55945	208687
Marginal Workers	15144	11249	26393
Non workers	362750	81701	444451

Table 8: Workforce (2001)

S.No	Category	City			Slums		
		Number	% of Total Population	% to Sub Category	Number	% to Slum Population	% to Sub Category
1	Total Population	5,30,636			2,29,661		
2	Total Workers	1,67,886	31.64		79,945	34.81	
3	Main Workers	1,52,742	28.78	90.98	71,079	30.95	88.91
	a) Cultivators	1,535		1.00	1,028		1.45
	b) Agriculture Labour	2,816		1.84	2,259		3.18
	c) Household Industry	14,075		9.21	8,560		12.04
	d) Other workers	1,34,316		87.94	59,232		83.33
4	Marginal Workers	15,144	2.85	9.02	8,866	3.86	11.09
	a) Cultivators	146		0.96	57		0.64
	b) Agriculture Labour	2,200		14.53	1,330		15.00
	c) Household Industry	3,251		21.47	2,128		24.00
	d) Other workers	9,547		63.04	5,351		60.35
5	Non-workers	3,62,750	68.36		1,49,716	65.19	

Source: Census of India – Slum Population, 2001

Table 9: Break up of Workforce

Occupational Pattern:

The distribution of the workers across the primary, secondary and tertiary sectors provides an insight on their occupational pattern. In WMC 2.5% of workers are engaged in primary sector and 8.3% workers are engaged in Secondary sector. In surrounding villages, 54.25% workers are engaged in Primary sector, 5.1% workers in Secondary and 40.55% in tertiary sector. In CDP area, the percentages of primary, secondary and tertiary workers are 17.3%, 7.4% and 11.5% respectively. The table 10 gives details of the occupational pattern.

Year	WMC	42 Villages	CDP area
Primary	4,351	36458	40,809
Secondary	14,075	3483	17,558
Tertiary	0	27253	27,253

Table 10: Occupational Pattern

Industries:

Large numbers of factories are concentrated in Hanumakonda followed by Geesugonda. There are many small scale industrial units like rice mills, oil mills, cotton ginning mills, beedi making factory, dairy product, granite slab polishing. It is observed that many cotton mills and rice mills with outdated technologies are running in great loss. There are numerous textile industries in the region, which include handlooms, power looms, wool, garment manufacturing and yarn seizing corporate societies. A Software Technology Park of India (STPI), has been set up recently at NIT Warangal, with the intension of taking the benefits if Information technology revolution to the second tier cities. Several companies have shown interest in setting up operations in STPI.

Name & Type of Industrial Estate	Large	Medium	Small	Area (Acres)
Industrial Estate (APIIC), Kakatiya Auto Nagar , Commercial Complex, Warangal	Nil	Nil	16	9898.7
Industrial Park, Rampur	Nil	Nil	68	129899
Industrial Park, Madikonda	Nil	Nil	62	402017.6
Total	Nil	Nil	146	541815.5

Table 11: Industries in Warangal

Figure 11: Map showing the locations of major economic activities in Warangal

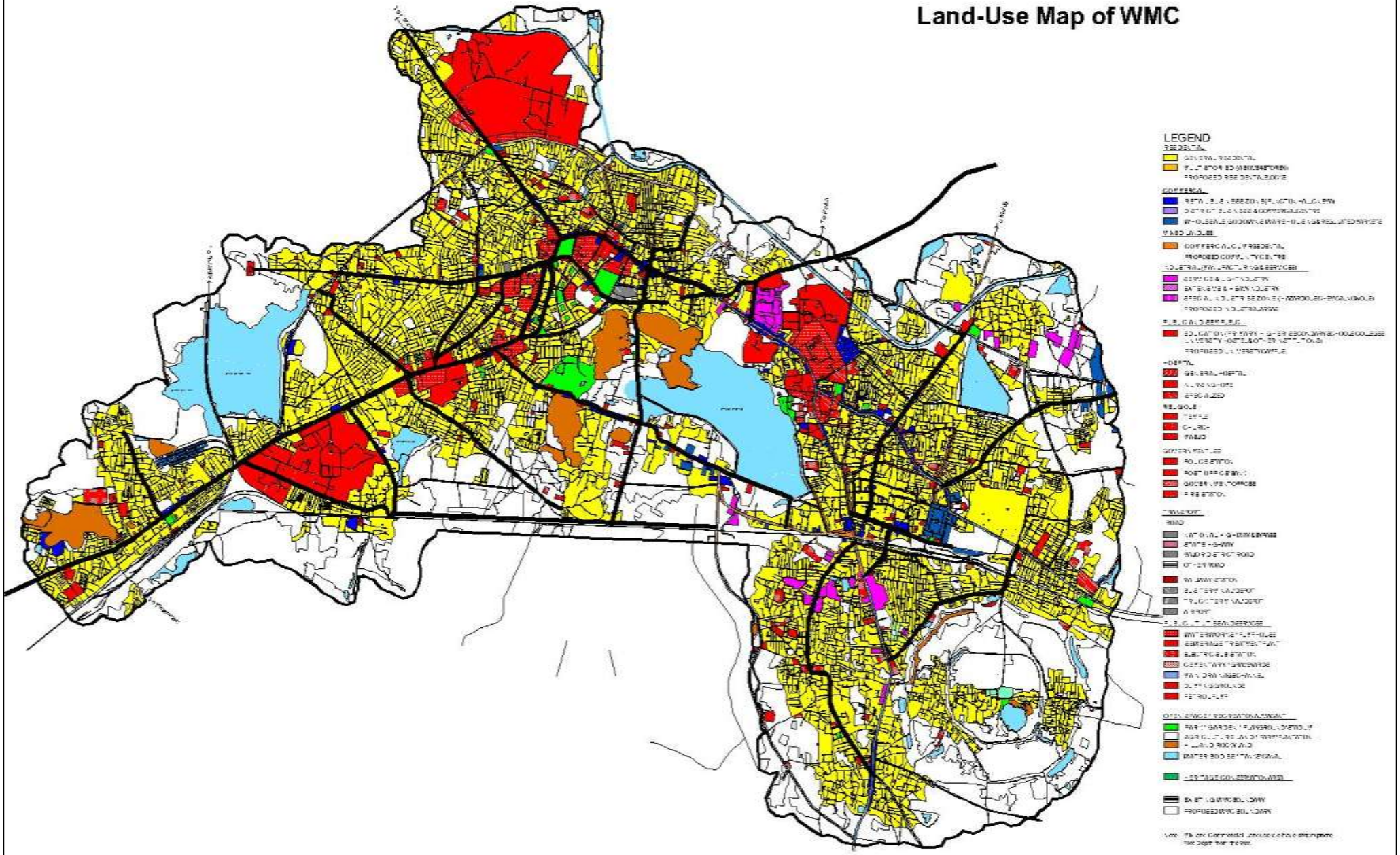
Land Use:

Land use (Sq.kms)	2001	2021
Residential	28.84	28.26
Commercial	1.43	1.73
Mixed –Land use(Commercial & Residential)	0.81	
Industrial	0.02	1.35
Recreational	0.63	6.22
Public & Semipublic	6.51	1.51
Transport & Communications	6.3	11.98
Vacant Land	13.35	6.77
Special area		0.14
Others including Agricultural Land canals, river banks, hills,dense scrub etc.	20.48	10.94
Total	80.33	68.90

Source: KUDA Master Plan

Table: Existing Land use of Warangal

Land-Use Map of WMC

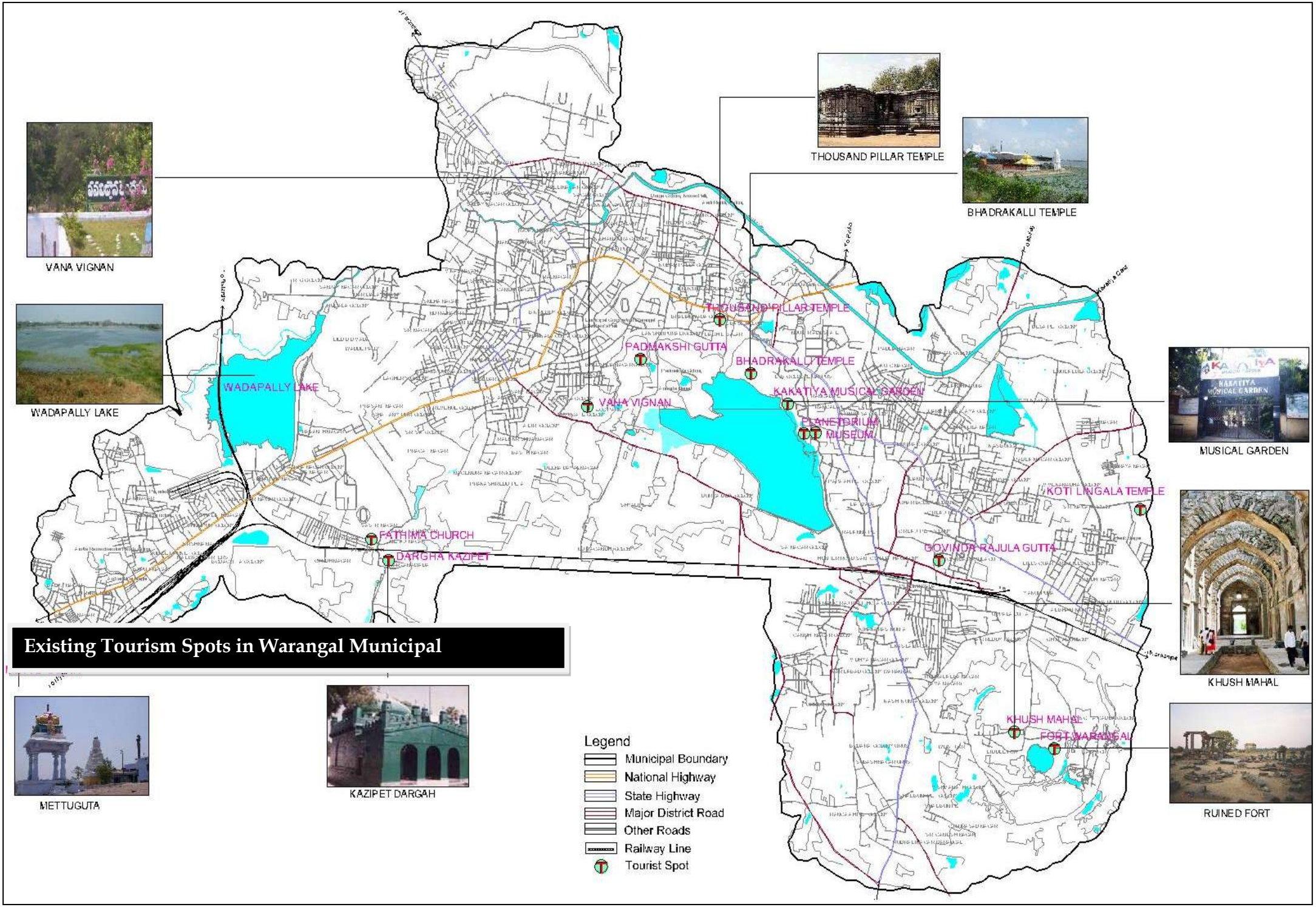


5. Warangal – Tourism and Heritage

The Government of India recognised Warangal as a 'Heritage city', considering its historical importance in the context of Kakatiya dynasty. The city has an excellent tourism potential, and some of the major tourist sites within the city area are given in table 12.

Attractions	Description
Warangal fort	The Kakatiya king, Ganapati Deva and his daughter Rudramma built the fort. Invaders destroyed the fort, only remnants will be seen. It was buits in 1199 A.D.The fort is famous for beautiful carved four 'Kirthi Stambhas" facing the four cardinal points.
Thousand pillar temple	This temple is one of the finest examples of Kakatiya architecture and sculpture. Rudra Deva built it in 1163 AD in the style of Chalukyan temples, star shaped and triple shrined. The 3 shrines are dedicated to Lord Shiva, Vishnu and Surya. The temple is famous for its richly carved pillars, screens and detailed sculpture.
Bhadra kali temple	Situated on a hilltop between Hanamkonda and Warangal, it is noted for its stone image of the Goddess Kali. She is depicted with eight arms and carries a weapon in each hand. The temple is located beside the "Bhadrakali" lake (Cheruvu).
Kush Mahal	It is in the fort proximity,it is the only royal palace in warangal that survives and doesnot come under Kakatiya dinasity.it is built in indo-Saracenic style.
Jain temple	The 2,000-year-old Jain temple of Mahavira is a famous place of worship for Jains in the country. The temple is embellished with beautiful images of Tirthankaras
Kazipet Darga	this place is famous for the tombs of Nizams period.is is lso famous for Urs held in honour of Afzal shah Biabani from 21st to 28 th of safar.(June-july).
Padmakshi temple, Siddeshwara Temple	Which was built in 3rd century, its one of the pachimadwara muka temple (that is the entrance will be from west)
Sri Veeranarayana Temple	This temple was built in the Chalukyan style around 1104.
Mettugutta	Sri Ramalingeshwara swamy temple is situated on the hillock of Mettugutta.It is the ancient temle which attracts large number of piligrams.it is situated at a distance of 2 km from Kazipet railway station.
Vana vigyan Kendra	Located in the hunter rad.is is set up by the forest dept. in 50 acers.
Musical gardens	it is a beautiful laid garden covering an area of 15 acers,adjacent to Bhadrakali tank. The main attraction is a magnificent musical fountain in which a number of colourful lights dancing to the tune of music.
Museum	Adjecent to the musical gardens is the museum with invaluable ancient remains of the Kakatiyas and others.
Planetorium	Between the musium and Musical gardens is the planitorium .
Waddepally tank	This is to be developed with landscaping, fountains, Children's play area, Canteens, a recreational center and internal ring bund is also propsed to be developed to avoide pollution to the summer storage tank in Kazipet.
Sanskriti vihar	it provides visitors the contemporary culture. It has various attractions to serve needs of all kinds of people like venkateshwara temple on the hill top,variety of sculpture work,recreation spots for picnic,lush green foliage,water bodies for boating and handicrafts outlet.
Fatima church	Located on the side of main road at fathima nagar main road.it is a Roman catholic church.

Table 12: Tourism and Heritage attractions in Warangal



Existing Tourism Spots in Warangal Municipal

Tourist attractions around Warangal City

In addition to the forts, temples and gardens located within the city, Warangal boasts of few other tourist sites a little away from the City. Table 13 lists some of the important tourist sites around Warangal City. Despite the fact that the tourists camp themselves in Warangal City, to visit these tourist attractions, no tourism circuits are being explored, for which there appears to be a good potential and opportunity.

Tourist Attraction	Distance from city (km)
Ramappa temple	70
Someswara Laxmininarayana temple	50
Kolanoaka Jain temle (located near palakurthy)	
Komuravelli temple	70
Sri venkateshwara swamy temple	10
Involu temple	22
Quashapur fort	1
Pandavulu gattu	45
Chipuru gutta	15
Chempaka hills	8
Eturunagaram wild life sanctuary	95
Lakanavaram lake	10
Pembatri	60
Ranganathswamy temple	-
Shambhu Ligeshwara temple	-
Ghanpur group of temples	-
Ingurthi	-
Zaffarghar	40
Cheriyala	-
Samakka sarakka temple	30

Table 13: Tourist attractions around the city

Tourism Traffic to Warangal:

The records maintained on the tourist inflows to Warangal district indicate a heavy inflow of domestic tourists at a maximum of 27.13 lakhs recorded in 2008. In the same year, the international tourists also recorded their maximum of only 1243 nos.

Tourist population in Warangal district			
Year	Domestic (GR%)	International (GR%)	Total
2004	1709561	310 (-------)	1709871
2005	2625788 (65.11)	512 (60.55)	2626300
2006	2528312 (-9.62)	810 (63.21)	2529122
2007	1648679 (-65.21)	1081 (74.93)	1649760
2008	2713199 (60.77)	1243 (86.97)	2714442

Table 14: Tourist inflow (Domestic and International) - 2008

It may be observed that the inflow of foreign tourists has slightly increased in the recent years, whereas the inflow of domestic tourists has reduced drastically. The figures available on tourist arrivals at major tourism attractions for the year 2004 are presented in the table 15.

	Indian	Foreign	Total
Warangal Fort	242746	97	242843
Thousand Pillar temple	537280	97	537377
Ramappa Temple	473618	97	473715
Ghanpur Group of temples	49515	0	49515
Sanskrithi Vihar	52344	0	52344
Ethurunagaram Wild Life Sanctuary	45344	0	45344
Phakhal	44184	0	44184
Ramappa Lake	487012	97	487109
Tadvi	60941	0	60941
Vana Vigyan Kendra	74739	0	74739
State Archeological Museum	12031	0	12031

Table 15: Tourist arrivals at major tourist attractions

Almost 5.3 lakh tourists seem to have visited various tourism attractions of Warangal in the year 2004. As there would be repetition of visitors at various tourism attractions, the visitors at a major tourist attraction only are considered. The most frequently visited tourist attractions are observed to be Warangal Fort, Thousand Pillar temple, Ramappa Temple and Ramappa Lake.

Tourism Infrastructure in the City

There are about ten major hotels in the city to cater to the lodging needs of the tourists during their visits. The records maintained at these hotels depict an increasing trend in the number of tourists, are summarized in table 16.

		2000	2001	2002	2003	2004	2005	2006
1	Radhika lodge	8156	3675	4122	7563	12729	18402	19272
2	Vijaya Lodge	17186	5990	6552	201083	24266	33225	31659
3	Maheshwari lodge	8782	4360	6146	40738	45273	55901	57382
4	Hotel ratna	30061	32273	32827	41504	78798	58647	59862
5	Hotel Ashoka	38348	35251	37802	6986	10633	21873	20208
6	Hotel Shankar	8081	5901	6376	5613	11062	22997	22224
7	Sumuka Home	8581	7535	8957	4395	10097	22178	21340
8	Udaya shankar lodge	4090	5535	5286	10334	14300	23532	25371
9	Punnami			11919	17864	17864	32967	35875
10	Surya hotel				14540	14540	31209	34990
	Total	123285	100520	119987	350620	239562	320931	328183

Table 16: Details of trends in tourist accommodation in major hotels of the city

Issues and concerns pertaining to the tourism attractions within Warangal:

Thousand Pillar Temple

- The entrance road of the Thousand Pillar Temple is about 12 feet and is encroached. But according to Archeological Department standards the width of the entrance road should be 100 feet. The temple is surrounded by scattered settlement
- There no entry fee to the Temple, only parking fee collected. But there is no parking lots available. The vehicles are just parked on the roads. The details of the parking fee are two wheelers (Rs. 5/-), Cycles (Re. 1/-), Auto, Car and Van (Rs. 10/-) and Buses (Rs. 20/-)
- There are two hand pumps available in the temple for water. There are seating arrangements but are not used. There are lighting arrangements available.

Handpumps at the Temple premises

Encroachments near the temple

Unused seating arrangment

Lighting arrangement at the temple

Warangal Fort: There is a park developed in Warangal Fort near Gundu Cheruvu. There is entrance fee of Rs.25,but the local people use the park without paying the entrance fee. There are parking lots available. The people from surrounding areas enter the park from the improper fencing of the park. The park consist of a children's play area, garden, food court, 2 tiolets, water taps which are not maintained well. The lake is not conserved properly. As there are no dustbins available in the park the garbage is dumped in the lake or either burnt. The lake is also used by the localities for Ganesh nimergen. The Fort area is under process for excavation.

Lake front

Garbage dumping besides the lake

Dilapidated state of fencing

Poor maintenance of Parks

6. Governance and Institutional Framework

6.1 Urban Local Bodies – Context of Local Government

Governance in the context of rapidly growing cities is gaining unprecedented significance. The concept of good governance with its principles of inclusiveness, transparency, accountability, responsiveness, equity and efficiency is increasingly being considered worldwide as the key to transform the city. Cities are dotted with the presence of multiple institutions providing various services to the citizens. The effectiveness of these institutions is critical to economic growth, poverty reduction and overall quality of life in the city. The institutions governing a city broadly include state government departments, urban local bodies and parastatal agencies. The urban local bodies and parastatal agencies are created through Acts of legislature.

The 74th CAA, 1992, has imparted constitutional status to ULBs and has assigned appropriate functions to them. A constitutional basis is given to the relationship of ULBs with State Government with regard to their functions and powers, timely and regular elections, arrangements for revenue sharing etc. ULBs are given additional powers including preparation of local development plans, programmes for ensuring social justice, and environmental management there by making them more responsive to the local needs. Section 243 (W) of the 74th CAA, 1992, facilitates this. In conformity with the 74th CAA, various state governments have taken initiative to amend their respective Municipal Corporation/ Municipalities Acts and the ULBs have been entrusted with the functions listed in the Twelfth Schedule of the Constitution or section 243 (W) of the 74th CAA, 1992.

6.2 Legal Framework

Warangal Urban Agglomeration comprises Warangal Municipal Corporation and other Outgrowths. Numerous institutions are involved in the governance of Warangal city and the surrounding peri-urban areas. Some of them were established through Acts of legislature and others are part of state government's framework. Warangal Municipal Corporation is governed by the important legislations viz., Hyderabad Municipal Corporation Act, 1955 and The Andhra Pradesh Municipal Corporations Act, 194, which extends to all the fourteen municipal corporations. Similarly, the Andhra Pradesh Village Panchayats Act, 1994 is applicable to all the gram panchayats in the state. The Acts specify the governance framework, the spatial jurisdiction and the functional domain of the urban and rural local bodies.

6.3 Functional Domain

The functional domain of local bodies in the state is derived from respective legislations. The Municipal Acts list the functions under two categories, namely, "obligatory functions" and "discretionary functions". The functional domain was expanded in 1994 as per the 12th Schedule of the 74th CAA. In Andhra Pradesh, the Corporations and Municipalities Acts provide for a majority of the functions listed in the 12th Schedule of the constitution. They include:

- Urban Planning including Town Planning

- Regulation of land use and construction of buildings
- Roads and bridges
- Water supply for domestic, industrial and commercial purposes
- Public health, sanitation, conservancy and solid waste management
- Slum improvement and upgradation
- Provision of urban amenities and facilities such as parks, gardens, play grounds
- Burials and burial ground; cremations, cremation grounds and electric crematoriums
- Cattle ponds; prevention of cruelty to animals
- Vital statistics including registration of births and death
- Public amenities includimg street lighting, parking lots, bus stops and public conveniences
- Regulation of slaughter houses and tanneries

In 2003, the Government, after a review of functions of urban local bodies, transferred five more functions to the urban local bodies through government orders. They are:

- Planning for economic and social development
- Urban forestry, protection of the environment and promotion of ecological aspects
- Urban Poverty Alleviation
- Safeguarding the interest of weaker sections including the handicapped and mentally retarded
- Promotion of Cultural and Aesthetic aspects

The Government decided that the remaining function i.e. Fire Services should remain with the state government and will be transferred after a review later. Now all except fire services are legally transferred. Though the five functions were transferred, they have no statutory basis. There are several issues in the transfer of functions of state agencies to the local bodies. Transfer of functions need follow up legislation, institutional capacity of the local bodies, financial resources, etc., which come in the way of transfer of these functions to the urban local bodies. It is also expected that the transfer of functions will be followed by transfer of officials as well as resources. However, transfer has not happened in the state thereby leaving the transferred functions only on paper.

Performance of 12 Schedule functions in WMC

#	Function	Wholly	Partly	Never
	a) Urban planning			
1	b) Town planning			
	a) Regulation of Land-use			
2	b) Regulation of building activity.			
	a) Planning economic development			
3	b) Planning social development.			
	a) Roads			
4	b) Bridges.			
	Water supply-			
	a) Industrial,			
	b)Commercial			
5	c)Domestic			
	a) Public health,			
	b) Sanitation,			
	c) Conservancy			
6	d) Solid waste management			
7	Fire services			
	a) Urban forestry,			
	b) Protection of environment			
8	c) Promotion of ecological aspects.			
	Safeguarding the interests of			
	a) Weaker sections,			
	b) Physically handicapped			
9	c) Mentally retarded.			
10	Slum improvement and up-gradation.			
11	Urban poverty alleviation.			
	Provision of urban amenities			
	a) Parks,			
	b) Gardens,			
12	c) Playgrounds and others			
	Promotion of			
	a) Education,			
13	b) Aesthetics and others			
	a) Burial grounds,			
	b) Cremations grounds			
14	c) Electric crematoria			
	a) Cattle ponds			
15	b) Prevention of cruelty to animals.			
	a) Vital statistics,			
16	b) Registration of births and deaths.			
	a) Public amenities			
	b) Street lighting,			
	c) Parking lots,			
	d) Bus shelters,			
17	e) Public conveniences and others			
	Regulation of			
	a) Slaughterhouses			
18	b) Tanneries.			

Many agencies are involved in serving the citizens including the poor and the disadvantaged in Warangal Municipal Corporation Limits and its suburbs. Most of these agencies have varying spatial and functional jurisdiction. Functional areas of the agencies also differ significantly.

GOVERNMENT FRAME WORK

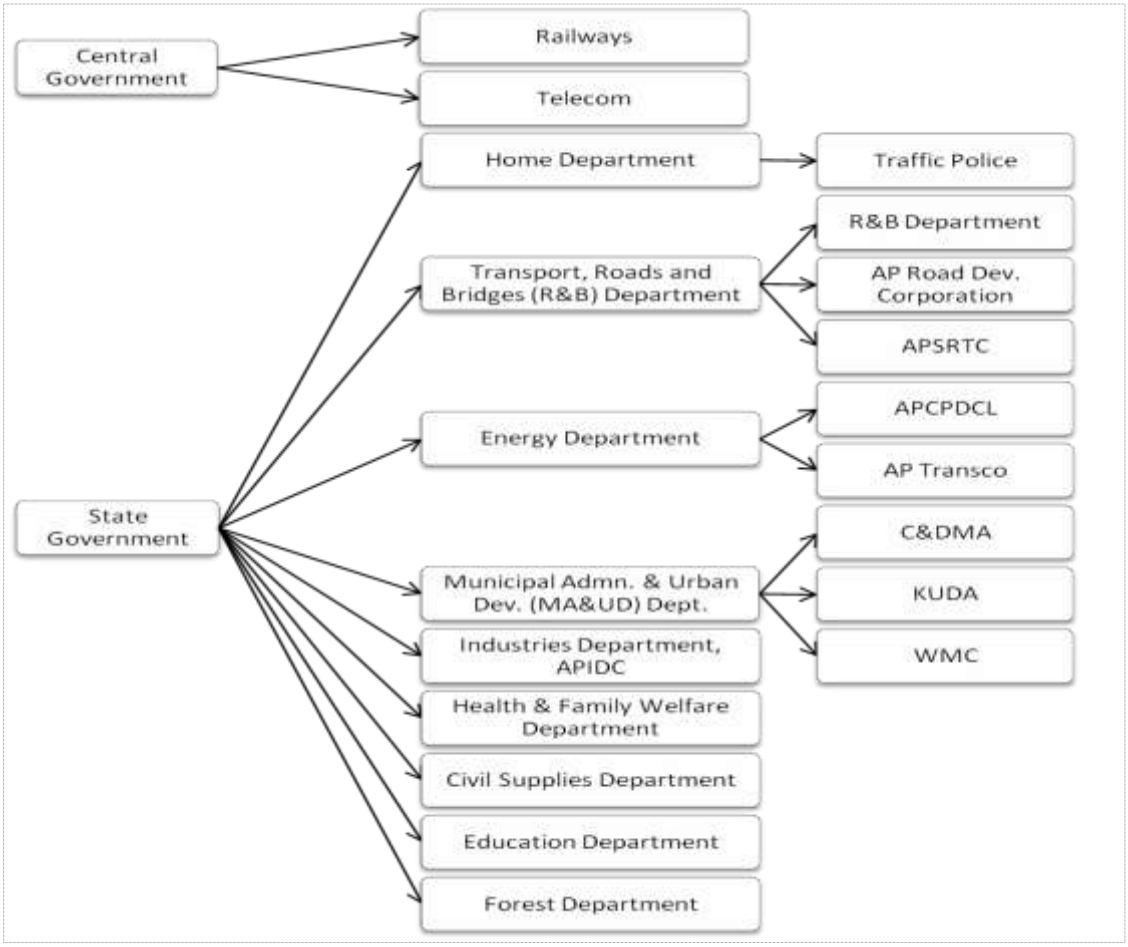


Figure 12: Government Framework

Institutions	Accountability to ULB	Area Coverage	Key services
WMC	Direct	WMC	Major Civic Services including roads, street lighting, SWM, slum improvement
KUDA	Indirect	KUDA	Town Planning, Construction of selected flyovers and parks
AP HB	Not	State	Housing
APS RTC	Not	State	Public Transport
AP R&B Dept.	Not	State	Road Infrastructure
A.P PCB	Not	State	Not involved in service delivery. Responsible for Law & Order, pollution control
A.PIDC	Not	State	
South Central Railways	Not	South India	Rail Transport
A.P Tourism	Not	State	Tourist service delivery, development of tourism, Heritage conservation
A.P CPDCL	Not	KUDA	Electricity
AP Transco	Not	State	Electricity
Postal & Telegraph Dept	Not	State	Postal and Telegraph,
City Police	Not	WMC	Safety & Security, Responsible for Law & Order
APUF & IDC ltd.	Not	State	Finance for Urban infrastructure
A.P Fire and Emergency	Not	State	Not involved in service delivery. Responsible for Law & Order, fire services

Table 17: Institutions and their reponsibilities

6.4 Institutional Framework

Warangal Municipal Corporation (WMC)

The Warangal Municipal Corporation is divided into 53 election wards, each ward electing a Corporator. The Mayor is elected by the elected Corporators. At present there is no council, and Special Officer is appointed.

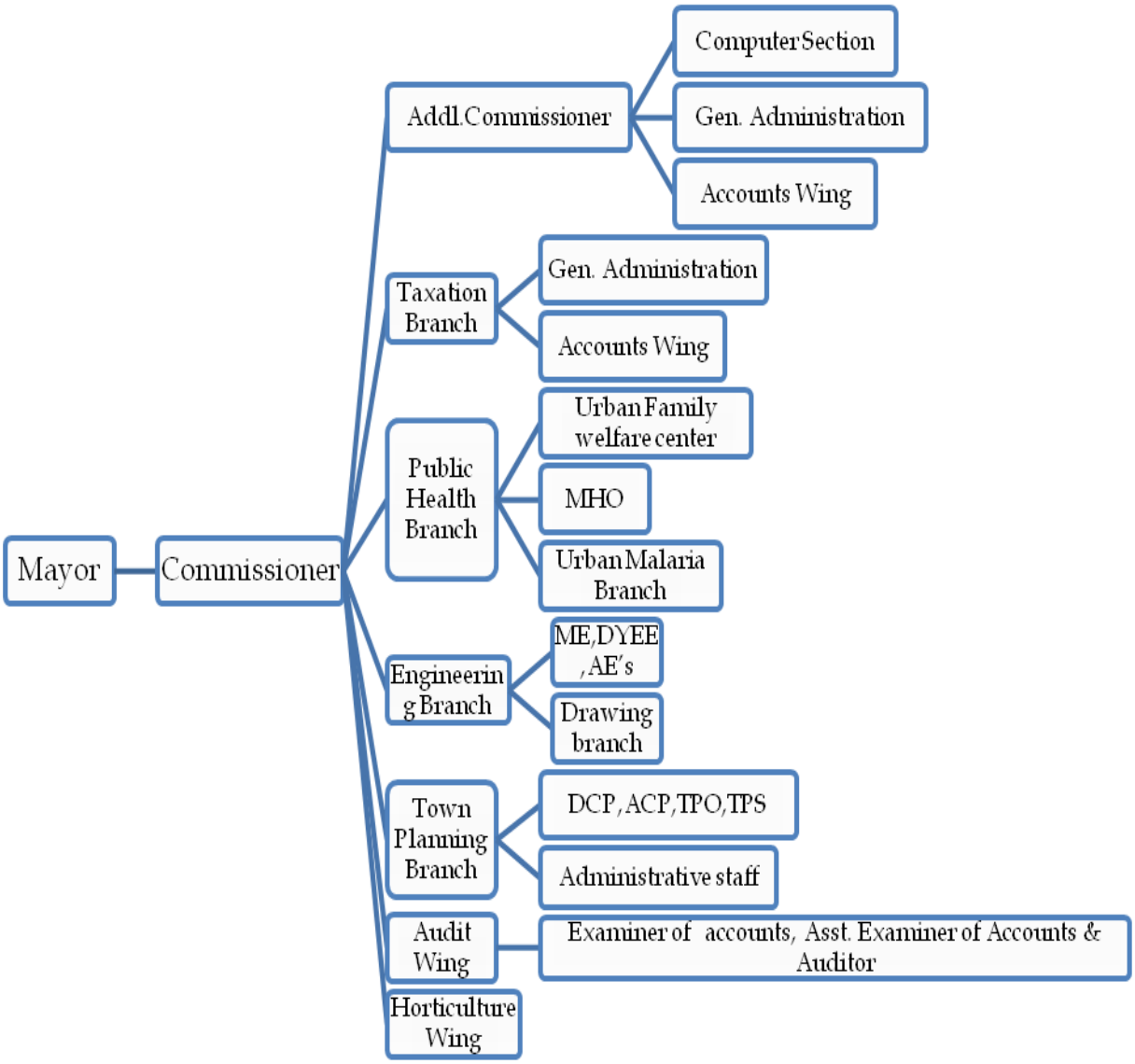


Figure 13: Organogram of WMC

Kakatiya Urban Development Authority (KUDA)

The Government constituted the Kakatiya Urban Development Authority in the year 1982 covering 171 villages including 27 villages of Karimnagar district and Warangal Municipal Corporation area comprising of 1805.0 sq km jurisdiction. The objectives of KUDA include,

1) Preparation of Master Plan and ensuring development as envisaged in the same.
2) Co-ordination of development activities with various agencies and providing infrastructure facilities.
3) Formulation of projects in sectors and their implementation.
4) To regulate and control the development through statutory plans and other measure

Functions of KUDA:

To prepare the Master Plan, Zonal Development Plans (ZDP) for the entire KUDA Metropolitan Region.

1) To undertake land acquisition and development.
2) To achieve planned development by undertaking satellite townships and sites and services.
3) To undertake housing projects for various income groups under the Public Housing Groups with the financial assistance of HUDCO.
4) Road widening schemes / new road development projects.
5) Development of commercial complexes, shopping / office complexes.
6) Providing infrastructure in the township areas, colonies and layouts undertaken by KUDA.
7) Allotment of houses and plots to various income groups.
8) Development of recreational facilities.
9) Urban forestry.

6.5 Roles and Responsibilities of various Service Delivery Agencies:

A number of schemes are being implemented by the agencies listed in the table 18. Each agency is implementing at least three to four schemes and the total number of schemes is found to be anywhere between 30 to 40. A majority of the programmes are regular developmental schemes of the central or state governments with annual budgetary allocations. The service delivery agencies are implementing schemes that a have a gestation period of three to five years. Majority of the programmes also attempt to provide direct benefits to the public.

Service	Service Delivery	Policy Making	Regulation
Traffic & Transport, (Road, Railways)	APSRTC, Indian Railways & Traffic Police,	APSRTC, Indian Railways & Traffic Police	APSRTC, Indian Railways & Traffic Police
Road Infrastructure	WMC, KUDA, APSRTC, Road & Building Dept., PWD, RTA, Private Sectors	WMC, KUDA, APSRTC, Road & Building Dept.,	WMC, KUDA , APSRTC, Road & Building Dept.,
Environment/ Forestry	Andhra Pradesh Pollution Control Board (APPCB)		
Water Supply	WMC	WMC	WMC
Drainage	WMC	WMC	WMC
Sewerage	WMC	WMC	WMC
Sanitation	WMC	WMC	WMC
Solid Waste	WMC	WMC	WMC
Solid waste Management	WMC	WMC	WMC
Communication & Telecom	Telegraphs Department, Private Agencies	Telegraphs Department, Private Agencies	Telegraphs Department, Private Agencies
Urban poverty	WMC	WMC	WMC
Industrial development	AP Industrial Development Corporation	AP Industrial Development Corporation	AP Industrial Development Corporation
Law & Order	Warangal City Police	Warangal City Police	Warangal City Police
Power Supply	WMC, AP Transco, APCPDCL	WMC, AP Transco, APCPDCL	WMC, AP Transco, APCPDCL
Housing	KUDA, Warangal District Collectors Office, APHB	KUDA, Warangal District Collectorate, APHB	KUDA, Warangal District Collectorate, APHB
Tourism	AP State Tourism Corporation Ltd.	AP State Tourism Corporation Ltd.	AP State Tourism Corporation Ltd.
Recreation Facility	AP Tourism, WMC, KUDA		
Urban Planning Development & Control	WMC, KUDA	KUDA, State Government	State Government

Table 18: Roles and Responsibilities of various Service Delivery Agencies

7. Municipal Services – Water Supply

Introduction, Existing situation, Service Level Indicators:, Key issues and Concerns:

Indicators	Units	WMC	42 Villages	Greater Warangal
Service area	Sq.Km	110	361.8	471.8
Population Served (2001)	Number	530636	157978	688614
Population Served (2010)	Number	750000	207000	957000
Households Served (2001)	Number	112224	34849	147073
Households Served (2010)	Number	150000	41000	191000
Water Production Volume	MLD	72.3	-	72.3
No. of HSCs	Number	58578	2048	60636
No. of PSPs	Number	1786	880	2666

Table 19: Existing Situation – Water Supply

7.1 Major Sources of Water Supply

The major source of drinking water for Warangal is Kakatiya Main Canal (originating from Manair Dam, 70 km away) which runs along the northern part of the city. The water drawn from this Canal caters to the water supply requirements of the city without interruption for almost eight to nine months in a year. On an average, around 72.28 MLD of water is drawn every day from Kakatiya Canal for distribution across the jurisdiction of Warangal Municipal Corporation after necessary treatment. During the canal closure period, the raw water is drawn from three summer storage tanks namely Dharmasagar SS Tank, Wadepally SS Tank and Bhadrakali SS Tank. These tanks are fed by pumping water from Kakatiya Main Canal. In case of surrounding 42 villages the major source of water supply is ground water extracted through bore wells and open wells. The water pumped from bore wells is stored in the Overhead Service Reservoirs (OHSR).

Summer Storage Tank	Capacity (mcft)	Water available (mcft)	Losses and dead storage (mcft)	Present water drawn (mcft)
Dharmasagar	795	361	124.4	290.2
Waddepally	795	53		
Bhadrakali	795	10.5	7.3	3.1
Total	2385	424.5	131.6	293.3

Table 20: Storage Facilities – Summer Storage Tanks

7.2 Treatment & Storage facilities:

During non summer months (eight to nine month period), the raw water is drawn directly from Kakatiya Main Canal, and treated at three treatment plants (filtration plants) located at Desaipet (37.2 MLD), Wadepally (15.99 MLD) and Kakatiya University Campus (19.09 MLD), within the city limits of Warangal. The raw water is also pumped regularly into the SS tanks for storage

and subsequent use during canal closure period. The water is drawn from Kakatiya Canal through gravity at two locations, (1) Kakatiya University Campus processed at treatment plants in KUC and Wadepally and (2) Auto Nagar, processed at Desaipet treatment plant.

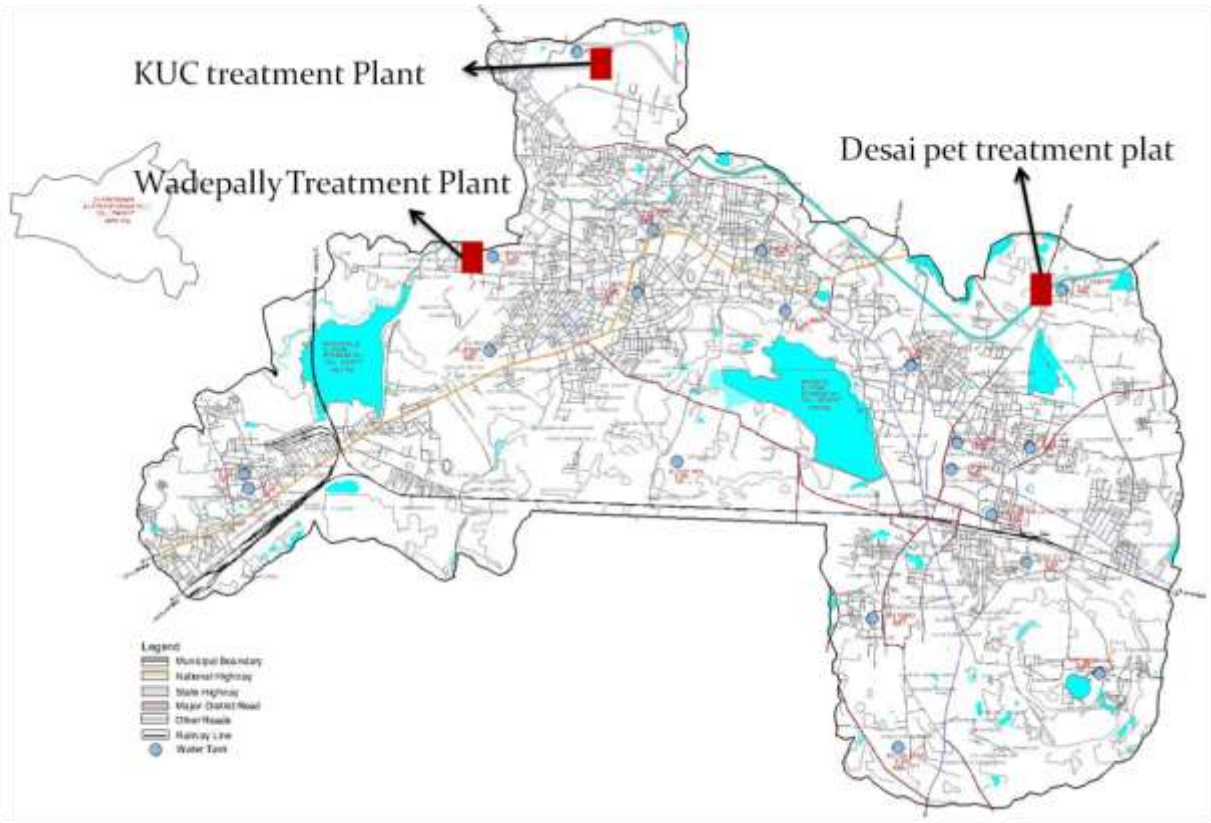


Figure 14: Map showing the locations of Filtration Plants and Service Reservoirs

During the canal closure period (3-4 summer months), these three treatment plants (filtration plants) draw water from the SS tanks, depending on wherever water is available. Unlike other two SS tanks, the Dharmasagar Lake being located at a higher elevation is capable of supplying water by gravity to the treatment plants at Wadepally, KUC and Desaipet. Presently in the absence of necessary and adequate O&M arrangements, the replenishment of SS tanks is largely dependent on rains.

Location of WTP	Distance from City "Km"	Installed Capacity MLD
Waddepally	Within the city	15.99
Kakatiya University Campus (KUC)	Within the city	19.09
Desaipet	Within the city	37.20
Total		72.28

Table 21: Location and installed capacities of Filtration Plants

Water Treatment Process at Filtration Plants in Warangal:

Stilling Chambers (Water is collected)

Venturi Flume (Chemicals are added)

Flash mixture (Chemicals are mixed thoroughly)

Clarifluculator (Sedimentation)

Filters (Filteration)

Through Inspection chambers to Sumps and Reservoirs

The treated water from Desaipet Plant and KUC Plant are pumped into two high-level 'Master Balancing Reservoirs' located within the premises of treatment plants. The master balancing reservoirs supply the water to the low-level elevated service reservoirs (ELSRs), which are 19 in number, spread across the city in their respective zones. The total storage capacity of treated water is estimated to be 25.2 MLD through the above facilities. See Table 22.

Sl.No	Location	Capacity(KL)
1	Vishnupuri, Kazipet	125+900
2	Shyampet	300
3	Subedari, Hanmakonda	1600
4	Nakkalagutta, Hanmakonda	2278
5	NGO's colony, Waddepally	1200
6	Public garden, Hanmakonda	1650
7	Machili Bazar, Hanmakonda	900
8	KUC, Hanmakonda	1620
9	Gudibandal, Hanmakonda	1600
10	Auto Nagar road, Mattewada Warangal	1600
11	Desaipet, Warangal	1800
12	Kashibugga, Warangal	1500
13	Charbouli, Warangal	1800
14	Charbouli II , Warangal	1364
15	Puppalagutta, Warangal	500
16	Ursu,Kareemabad, Warangal	900
17	Fort Warangal, Warangal	900
18	Rangasaipet, Warangal	1318
19	Govindarajulagutta, Warangal	1364
Total		25219

Table 22: Service Reservoirs in WMC and their Storage Capacities

Water Treatment and Storage facilities in surrounding villages:

An Non Government Organisation (NGO) M/s Bala Vikasa Social Society operating from Warangal, is implementing community owned drinking water supply projects in some of the 42 surrounding villages. The initiatives taken up by the NGO include, construction of overhead service reservoirs, laying of distribution pipelines from reservoirs to individual houses (through gravity), setting up of water purification plants (eg. Vangapahad village, Hasanparthy Mandal) and drilling of bore wells in the streets for targeted beneficiaries etc. Primary sample surveys revealed that a large number of population residing in surrounding villages is dependent on bottled water supplied by private agencies.

Balavikas Treatment Plant

Balavikas - De flouridation

About eleven of the surrounding 42 villages have water treatment facilities located within their villages and the details are given in table 23. The ground water drawn from bore wells is treated and stored in 71 over head service reservoirs.

Mandal	Villages	Treatment capacity (KL)
Hanmakonda	Gopalpuram	150
	Paidepally	NA
	Gundla singaram	50
	Kothapally(h)	0.5
	Kummarigudem	60
	Madikonda	2.5
	Mamunoor	NA
	Tekulagudem	1.2
	Tharalapally	0.8
Hasanparthy	Vangapahad	2.0
	Yellapur	1.0
Wardhannapet	Singaram	1.0
Sangam	Gadepally	2.0
	Total	27.1

Table 23: Water Treatment facilities in surrounding villages

7.3 Distribution Network:

In WMC limits, the total length of the water distribution system is 2336 Km comprising of AC, CI, HDPE, PSC and PVC pipes, and there are 1786 public stand posts (PSPs). Barring a few villages, majority of the surrounding villages do not have water supply distribution lines laid from the overhead service reservoirs to individual houses. The total length of distribution lines in the surrounding villages is only about 270.7 km, and there are 880 PSPs.

Infrastructure	WMC	42 Villages	Greater Warangal
Length of Distribution Network (Km)	2336	270.7	2606.7
Power Bores (no.)	228	165	423
Hand bores (no.)	1782	673	2455
Storage Reservoirs (no.)	19	71	90
Public Stand Posts (no.)	1786	880	2666
Water tankers (no.)	40	Nil	40

Table 24: Water Supply Infrastructure in WMC

7.4 Service Level Performance – Water Supply

	Unit	Benchmark	WMC	Villages	Gr. Warangal
Household Coverage	%		43.9	5.0	55.6
Per capita supply	lpcd		96		
Hours of supply	hrs/day		1/3	0.5/1	-
Non-revenue water	%				
Metered Connections	%		0.44	0	0.34
O&M Cost Recovery	%				
Coll. Efficiency of W charges	%				

7.4.1 Water Supply Coverage:

The Handbook on Service Level Benchmarking (SLB) circulated by the Ministry of Urban Development (MoUD), Government of India has defined the Water Supply Coverage as the ratio of the total number of households (HHs) connected with individual water supply connection to the total number of households in the city. *Water Supply Coverage (= (total number of HHs with individual connection/total HHs in city)*100)*

Water Connections	HHs Served	Total HHs	Coverage (%)
Individual HSCs	58381	150000	
Bulk/Apartment connections	7420	150000	
Domestic Connections (HSCs/ Bulk)	65801	150000	43.9
Public Stand Posts (PSPs)	84199	150000	56.1

Table 25: Water Supply Coverage in WMC

As per Census 2001, the total number of HHs residing within the jurisdiction of Warangal Municipal Corporation (68 sq.km) is estimated at **124856**, with a population of **530636**. Considering the population growth over the last ten years, the present population of Warangal

Municipal Corporation is estimated to be **750000** with **150000** households. As on March 2010, the total number of individual house service connections as per the records of WMC is **58381** nos catering to equal number of households. *See table 25*. In addition to the house service connections, there are **371** bulk/commercial connections catering to 7420 households residing in apartments, commercial establishments etc. The *water supply coverage*[5] in WMC is only **43.9 percent**. Exclusion of water supply through PSPs in the calculation of water supply coverage figures is therefore largely debated by several stakeholders during consultations, and there is a broad consensus among stakeholders to include supply through both HSCs and PSPs. The figures indicate relatively poor water supply coverage in Warangal, mainly due to the excessive dependence on PSPs in the absence of distribution network and high access cost in slum areas and a fairly large number of illegal connections.

The problem is likely to further magnify with proposed expansion of Municipal Corporation to include surrounding 42 villages forming Greater Warangal. The total number of households residing in surrounding villages as on 2010 is estimated at around **41000,** of whom the households connected with house service connections is only **2058** . The coverage of water supply coverage in surrounding villages is only **5.0 percent.** One of the major reasons for poor coverage in the surrounding villages is the non existence of distribution network in majority of the areas. The table 26 explains the impact on 'water supply coverage' as a result of expansion of corporation limits and emphasizes the need for effective planning for future water supply requirement of expanded Municipal Corporation.

	WMC	42 Villages	Greater Warangal
HH with individual water connections	65801	2058	60636
Total HHs	150000	41000	191000
Water Supply Coverage (%)	43.9	5.0	31.7

Table 26: Water Supply Coverage

Most of the CDP Area (Greater Warangal) is covered by piped water supply at least through PSPs, except for a few slum areas and some locations of surrounding 42 villages, where the supply is through water tankers.

Frequency and Duration of Supply:

The frequency of the potable piped water supply is ½ hour to 1 hour once in 2-3 days in WMC and ½ hour /day in surrounding 42 villages. On an average, WMC supplies water to the citizens for about 10-15 days a month, where as the water supply, though in less quantities and for much lesser duration, is supplied daily in surrounding villages.

7.4.2 Per capita availability and supply of water:

The SLB Handbook defines the per-capita availability of water, measured as 'litres per capita per day (lpcd)', as the ratio of total volume of water put in the distribution system after treatment to the total population served. *Percaptia supply (lpcd) = (total vol. of water put in distribution network in litres/total population served).*

[5] As defined in SLB Handbook of Government of India

Accurate figures on daily water supply production and water supply consumption are not maintained by Warangal Municipal Corporation due to the absence of bulk flow meters at treatment plants and domestic metering at the consumer end. Therefore the figures of Per capita availability or supply both at the production end and at consumer ends are computed based on estimations of water production and consumption.

Water Production is estimated based on the installed capacities of all three treatment plants in WMC, which is about **72.28** MLD. The total population served by WMC, in 2010, is estimated to be **750000**. The per-capita supply at production end is hence estimated to be **96 lpcd**. The CPHEEO norms as well as the National Benchmark for this indicator suggest an average per capita supply of 135 lpcd for the cities with population similar to that of Warangal, which indicates a shortfall of 39 lpcd in WMC area.

The figures of shortfall would further increase if the per-capita water supply figures at the consumer end are considered. While 72.3 MLD of water is produced by WMC, it is estimated that only 56.3 MLD of water actually reaches the consumers either through HSCs (45.4 MLD) or PSPs/tankers (10.9 MLD). The leakages amount to almost 16 MLD, in the form of physical losses, commercial losses in the form of unauthorized/illegal connections etc. The details are explained in the section 7.4.5 on Non Revenue Water.

The surrounding villages are largely dependent on bore wells and open wells. For the computation of per capita supply, only the production volume of only treated ground water is considered. Based on the estimates collected from District Panchayat Office, the treated water produced through ground water sources for domestic supply is approximately equal to 5 MLD. The total population served by this treated water is 207000. The per capita supply is about 24 lpcd. Table 27 indicates the percapita supply of water (at the production end) for WMC and surrounding villages.

	Water Produced (MLD)	Population Served (no.)	Per capita supply (lpcd)
WMC	72.28	750000	96
42 villages	5.00	207000	24
Greater Warangal	77.28	957000	81

Table 27: Per-capita Supply of Water

7.4.3 Extent of metering of water supply connections

The domestic water supply connections of Warangal Municipal Corporation are not metered and only the commercial connections (505 nos.) are metered. The extent of metering in WMC, i.e. ratio of metered connections to total connections, is equal to **0.45 percent** only. (Extent of metering =505*100/58578).

Since there are no metered connections in the surrounding villages as well, the value of the indicator will further reduce to **0.34 percent** for the CDP area/Greater Warangal. The table 28 represents the present situation of extent of metered water connections.

	Total Connections	Metered Connections	% metered
WMC	58578	505	0.45
Surrounding 42 villages	2058	0	0
Greater Warangal	60636	505	0.34

Table 28: Metering Status of Water Supply Connections

7.4.4 Non Revenue Water (NRW):

The estimated NRW of Warangal Municipal Corporation is about 39 percent while the national benchmark for the same is only 20 percent. Of the total 74.8 MLD water produced by WMC it is estimated that only 45 MLD is billed to the consumers. The Non Revenue Water of about 30 MLD includes, free water supply to urban poor through PSPs and Tankers (10.9 MLD), commercial losses such as un authorized/illegal connections, free supplies to the privileged sections of society, leakages in distribution network, physical losses such as transmission and distribution losses (un accounted for water) etc. Measurement of NRW through a scientific approach calls for accurate measurement systems in place, metering practices at production and intermediate distribution points, consumer metering, periodic water audit, leak detection studies, etc.

7.4.5. Complaint Redressal :

On an average, only about 120 water supply related complaints are received every month at Warangal Municipal Corporation. The written complaints are accepted by the grievance cell located at WMC, and the Call centre facility supports the registration of complaints made through telephone. The complaints can also be registered online by the citizens through web based applications from the municipal corporation website (address: http://59.93.61.90/).

Under the current mechanism, all the complaints will be documented and reported on a daily basis to Assistant Engineer of Water supply, who holds the primarily responsibility for the redressal of complaints. Based on the variety of complaints, on an average it takes about three to four days to attend each complaint and rectify the problem (if any). After the problem is fixed or resolved, signature is obtained from the respective household to acknowledge the same and in case of complaints registered by citizens through call centers; a message is given to the citizen on redressal of complaint. However, it is observed that proper records are not maintained on the number of complaints reddressed. In surrounding 42 villages the water supply related complaints are addressed by village panchayat. There is no mechanism at village panchayat to formally register a complaint.

7.4.6 Adequacy of Treatment and Disinfection and Quality of Water Supplied:

In WMC the number of samples taken at every treatment plant in a month is 18 nos. WHO standards are given in table below. The pH value ranges from 6.6 to 8.7 and meets the quality criteria of drinking water. The conductivity varies from 90 to 2350 µmhos/cm and meets the criteria limits for drinking water as well as irrigation purpose. Concentration of Nitrates is observed within the Standard limit. In surrounding 42 villages there is no data available on the quality of water.

Population served	Minimum number of samples per month
Up to 5000	At least 4
5000-90 000	1 per 1000 persons
90 000+	90 + (1 per 10 000 persons)

Table 29: WHO standards for water quality

7.4.7 Cost recovery in water supply services:

The total operational expenditure for water supply related works in Warangal Municipal Corporation is estimated to be Rs. 7.23 crores for the financial year 2009-10. This includes staff costs, electricity charges, chemical costs, repairs and other maintenance costs. See Table 30. The total operational revenue through water supply taxes and non taxes for financial year 2009-10 is Rs. 13.25 crores, with cost recovery of 183 percent.

Cost Recovery in Water Supply Services	**%**	**183.3**
Financial Information - Operating Expenses		
Regular Staff and administration	Rs. Lakhs	183.0
Outsourced/Contract Staff Costs	Rs. Lakhs	30.0
Electricity Charges/Fuel Costs	Rs. Lakhs	300.0
Chemical Costs	Rs. Lakhs	160.0
Repairs/Maintenance Costs	Rs. Lakhs	40.0
Bulk (Raw/Treated) Water Charges	Rs. Lakhs	
Other Costs	Rs. Lakhs	10.0
Total Operating Expenditure	Rs. Lakhs	723.0
Financial Information - Operating Revenues		
Arrears at the beginning of previous year (2009-10)	Rs. Lakhs	527.0
Revenue demand from user charges	Rs. Lakhs	
Revenue demand from tax/cess - Water Service only	Rs. Lakhs	1250.0
Revenue demand from other revenues (eg. connection costs/Donations etc)	Rs. Lakhs	75.0
Total Revenue Demand for previous year	Rs. Lakhs	1324.9

Table 30: Cost Recovery of Water Supply Services

The total operational expenditure for water supply in the year 2007-08 is estimated to be Rs. 10.39 crores against the operating revenue of Rs. 6.95 crore. The total cost recovery of water supply services is **66.8** percent.

In addition to component of water tax collected as a part of property tax, operating revenue for Water Supply service in Warangal is realized through user charges based on a fixed water supply tariff. While a domestic consumer without a metered connection is charged with a fixed tariff per month (flat rate) @ Rs. 100/- , the non domestic consumers with metered water supply connections are levied a user charge on the basis of water consumption. The tariff for non domestic consumers (apartments, commercial) is fixed at Rs. 15/- per KL.

Tariff structure	Tariff
Domestic (Flat rate)	Rs. 100/- per month
Apartments	Rs. 15/- per KL
Commercial	Rs. 15/- per KL
Railways	Rs. 15/- per 10 KL

Table 31: Water Tariffs

The connection cost for securing a domestic connection is @Rs.7000/-, where as the connection cost for Commercial and Industrial connections is based on diameter of pipeline. The water supply connection cost for apartment is based on the number households in the apartment in addition to a mandatory Security Deposit. For all the connection type the road cutting cost is also added with the connection cost. The details of connection costs are given in the table 32.

In surrounding 42 villages the total operating revenue is estimated to be about 60 lakhs, which is calculated by multiplying tariff and number of HH with water supply connection. There are no metered connections in surrounding 42 villages. The water supply connection cost varies from Rs.1000 to 3000 and the tariff is fixed in each village which varies from Rs 20 to Rs 50 per month.

Connection type	In Rupees	
Domestic	6000-7000	
Commercial	1/2 dia	14000
	1/2 inch to 3/4 inch	26500
	3/4 dia	17500
	1 dia to 1 1/4 dia	52500
Industrial	10,000 liters	52500
	10,001 - 25000 liters	94500
	25,001-50,000	120500
	50,000 – 100000	183750
Apartments	1-12 HH	1 lakh + Rs 5000 Security deposit
	12-16 HH	1.5 lakh + Rs 8000 Security deposit
	16 and above	2 lakhs + Rs 10,000 Security deposit
Road cutting cost		
Mud road		200/meter
Metal		300/meter
B.T		400/meter
C.C		600/meter

Table 32: Water Supply Connection Costs

7.4.8 Collection Efficiency of water supply related charges

In WMC water bills for commercial connections are collected by the meter readers directly, where as bills from the house service connections are paid by the owners directly at E-seva centers for every 6 months regularly. A sample receipt of payment against the water bill obtained from e-seva services is illustrated in the figure 15. The total demand generated for

water supply related user charges for the year 2009-10 is Rs. 13.25 crores against which the collection is only Rs. 3.78 crores, with collection efficiency of only 23.9 percent.


WARANGAL MUNICIPAL CORPORATION
(DUPLICATE)
06/03/2010
BILL NO. : 547448 CASH RECEIPT DATE :
H.NO. : 16-1-542/2
NAME : V.RAJU
LOCALITY : SRR THOTA
Period : Upto Mar-2010
MPAN NO.: 0916011196
CON. NO.: 40630

Particulars	ARREARS DEMAND	ARREARS COLLECTION	CURRENT DEMAND	CURRENT COLLECTION	TOTAL
Property Tax			444	444	444
Water Charges			600	600	600
Fines		27		27	27
Total :					1071

Received rupees in words (One Thousand Seventy One Only)
as detailed above.
with Thanks
Sig. of Clerk
Deputy Commissioner
WARANGAL MUNICIPAL CORPORATION
COMMISSIONER
WARANGAL MUNICIPAL CORPORATION
Uma Maheshwar & Co. WGL 98494 04655

The collection efficiency of water supply related charges is defined, as per SLB handbook, as the ratio of total collection in the current year against the current year total demand.

Figure 15: Water Supply Monthly Bill

7.5 Water Supply Demand Assessment

For planning purposes, the future water demand has been computed to cater to the requirements of population residing in the CDP area i.e., Greater Warangal.

Projected Year	Projected Population Greater Warangal	Water Demand (MLD)	Deficit
2001	688614	112	39
2011	963000	156	84
2021	1276000	207	134
2031	1655000	268	196
2041	2148000	348	276

Table 33: Water Supply Demand

Ongoing Projects under UIDSSMT:

Warangal Water Supply Improvement Scheme:

Government of India has approved a Water Supply Improvement Scheme in Warangal Municipal Corporation under UIDSSMT for an amount of Rs. 178.66 crores. The Central Share is Rs. 131.56

crores, GoAP share is 16.44 crores; WMC share is 30.66 crores. The major components of the proposed project are listed below:

1) Constn. of RCC Intake well in Dharmasagar tank including Coffer dam, RCC foot bridge
2) Laying of MS raw water conduit (2100mm dia) across Dharmasagar reservoir earthen bund to convey 248 MLD of raw water.
3) Laying of MS pipe lines, 2100mm/1400mm dia, & BWSC pipeline, 100mm /700mm dia
4) Providing suitable crossing arrangements for raw water gravity main across Kazipet to Balharsha Railway line near Waddepally village
5) Construction of RCC Intake well, 10.50m dia, in Waddepally tank including Coffer dam, RCC Foot Bridge with all allied electro-mechanical works.
6) Additional off take arrangements on Kakatiya Canal at KUC and Desaipet
7) Construction of suitable capacity filtration plants at (i) Waddepally to deliver 39 MLD, (ii) at KUC to deliver 18.18 MLD, and (iii) at Desaipet to deliver 18.18 MLD
8) Construction of clear water sumps at three filtration plant locations i.e. at Wadepally and at KUC (2000kl each), at Desaipet (2500kl) and at two local pumping stations i.e. at Balaji Nagar and at Shambunipet (500kl each).
9) Construction of Pump houses one each at three filtration plant campuses Wadepally, KUC and Desaipet and at two local pumping stations Balajinagar and Shambunipet.
10) Clear water pumpsets at the pump houses
11) Construction of Master Balancing Reservoir at three filters' sites
12) Laying of HDPE Feeder mains (supply, laying, jointing & testing)
13) Providing suitable crossing arrangements for the feeder main to cross the railway track, Siddhartha nagar near Kazipet town railway station.
14) Construction of ELSRs (15 nos.) at the following locations. Table.
15) Laying of HDPE water pipe lines for distribution network (supply, laying, jointing & testing)

7.6 Key issues and challenges – Water Supply

- Source Augmentation: The existing drawl from the surface water source, Kakatiya Main Canal, is inadequate to meet the present requirements of Warangal population and augmentation is essential to meet the future demand also. There is a huge demand supply gap, which is likely to widen drastically in future.
- Storage facility: The existing Bhadrakali and Wadepalli summer storage tanks are getting dried up in peak summer months leading to excessive dependency on ground water through borewells.

- Treatment Capacity: The existing treatment facilities are inadequate to meet the present water demand (156 MLD) for Greater Warangal area and the future demand (268 MLD) of the city for year 2031.
- Distribution System: The existing distribution system is inadequate to meet the needs of the Greater Warangal population, especially the surrounding villages. The distribution system needs to be expanded to the surrounding villages in addition to replacement and rehabilitation of old pipelines in some parts of WMC.
- System Losses (Transmission and Distribution): Losses and Unaccounted for Water in WMC is estimated at 39 percent, which includes leakages and illegal (domestic and non domestic) connections. There are an exorbitant number of illegal connections, which remain untraced in the absence of concentrated efforts contributing to system losses. In addition, there are high amounts of physical loses due to old transmission and distribution network. Absence of metering to both domestic and public tap connections is resulting in unreliable estimates of Water Consumption.
- Service Levels:
    - Limited network coverage
    - Poor frequency of water supply
    - Poor O&M cost recovery due to lack of commercial approach
    - Need to rationalize tariff structure
    - Unregulated abstractions of ground water leading to falling of ground water levels mainly in surrounding 42 villages
    - Lack of efficient energy conservation measures
    - Lack of effective communication strategy
    - Inaccurate or absence of customer meters

8. Sewerage and Sanitation

8.1. Sewerage System

Warangal Municipal Corporation does not have an underground drainage/sewerage system and the individual household toilets are either connected to septic tanks or soak pits. The waste water from household kitchens, effluent water from toilets and septic tanks is let into the road side open drains, finding its way towards natural nallahs running across the city. Disposal of waste water into open drains is one of the major concerns of current city management. The unsafe disposal of sullage results in manifold problems viz., waste water stagnation, bad odour along roads, unsanitary conditions and mosquito breeding etc. This is detrimental to the health of citizens, who suffer from several water borne diseases.

Efforts were made in the past to overcome the situation in a planned manner by getting a Comprehensive Sewerage Master Plan prepared as a part of DFID funded Andhra Pradesh Urban Services for the Poor (APUSP) project. A new sewerage system with sewer network, conveyance and sewage treatment plants were proposed as a part of the said project. However, it is observed that the project has not been taken up as yet.

	Units	WMC	42 villages	Greater Warangal
Service area	Sq.Km	110	361.746	471.746
Population (2001)	Number	530636	157978	688614
Population (2010)	Number	750000	207000	957000
Households (2001)	Number	112224	34849	147073
Households (2010)	Number	150000	41000	191000
Coverage of Open drains	%	37.1	46.2	37.9
No. of treatment plants	Number	Nil	Nil	Nil
Treatment & Disposal	%	Nil	Nil	Nil
Recycling / Reuse	%	Nil	Nil	Nil
O&M recovery	%	NA	NA	NA

Table 34: Sewerage and Sanitation facilities

The quantum of Waste Water generated by the households of WMC on a daily basis is estimated to be around 57.3 MLD, as per Census 2001 figures, which is collected by the open drains and is disposed into the existing natural nallahs without any kind of treatment. The surrounding 42 villages also do not have underground drainage network adding further to the overall problem.

The length of open drain network collecting the waste water from households of WMC is estimated to be **2482 km** of which **1002 km** is length of pucca open drains and **1480 km** is that of kutcha drains. With the total road length of the city at 2700 km, the coverage of open drain network is estimated at **37 percent,** which is the ratio of pucca drain length to city road length. Similar open drains also exist in surrounding villages, except for a few villages like Pedagapally and Potharajupally, where the open drains also are unavailable. The length of open drains (incl. both Pucca and kutcha) in surrounding villages is **123 Km** and road length is **266 Km.** As the length of pucca drains could not be ascertained, it may be understood that the coverage of open drains in surrounding villages is much less than the computed **46.2 percent.** In case of CDP area (Greater Warangal), the length of open drain network is < 1125 km against the total road length of 2966 km with an overall coverage of drain network at less than 38 percent.

Type	WMC	42 Villages	Greater Warangal
Length of Pucca drains(Km)	1002	123	1125
Length of Kutcha Drains (Km)	1480	-	-
Total Length of Road Network (Km)	2700	266	2966

Table 35: Coverage of Open drain network in Warangal

There is no waste water treatment facility in city. The waste water collected by open drains is directly disposed into three natural nallahs without any kind of treatment and the outfalls of these nallahs are connected to water bodies as indicated in table 36. There was water recycle plant located at Desaipet water treatment plant which used to recycle the water from Koti Cheruvu. But due to the extension of the water treatment plant the recycle plant was removed.

	Originates from	Flows through	Finally let out into
Nallah 1 (6.15 km) RL: 280-256	Wadepally tank	Sanjay Nagar Colony, Laskar Singaram, Naim Nagar, Kishanpura, Idgah Colony, Pedagapally village, Yellamma Cheruvu, Reddypuram and Bhairanpally village	Vellamma Cheruvu
Nallah 2 (8.3 km) RL: 265-250	Fort area	Perkawada, Old beet road, Ramannapeta, Papaiah pet Coloy, Pothanagar, Rangampet near Mulugu road, Kakatiya Colony, Raipur, Gantupally village and Bhairanpally village	Nagaram Cheruvu
Nallah 3 (5.3 km) RL: 270-255	Chikkavaddapally tank	Kasibugga, Ekashila Nagar, Bank Colony and Auto Nagar	Koti Cheruvu

Table 36: Natural Drains inWarangal

- *The length of Nallah – 1 inside the city is 6.15 km and RL at starting point is 280m & end point is 256 m.*
- *The length of the Nallah – 2 inside the city is 8.3 Km anf the RL at starting point is 265m & End point is 250 m.*
- *The length of the nallah -3 inside the city is 5.3 ant thr RL at the starting point is 270 &end point is 255m.*

map

8.2. Sanitation

Sanitation system forms the integral part of the physical infrastructure, therefore proper and healthy sanitation system is a basic requirement of today. The total number of registered properties in Warangal is 80722. However, considering the population of 750000 as on year 2010, it is estimated that Warangal has more than one lakh number of properties. As per the ILCS report, the total number of individual toilets within the jurisdiction of Warangal Municipal Corporation is 47745.

8.2.1. Coverage of Toilets:

It is estimated that the coverage of individual toilets in Warangal Municipal Corporation is only about 30 percent, and the remaining 70 percent are completely dependent on community facilities. In case of surrounding villages, the coverage of individual toilets is about 50 percent. Of the total 41000 households, it is estimated that 20843 have individual toilets and 11929 connected to septic tanks.

	WMC	42 villages	Greater Warangal
Total Households	150000	41000	191000
HHs with access to individual toilets	47745	20843	68588
HHs dependant on community toilets	?	?	?
HHs without any access to toilets	?	?	?
Coverage of Toilets	30	50.0	?
No. of Public Toilets	12	Nil	12

Table 37: Toilet facilities

In WMC, there 12 public conveniences constructed and being maintained by the Sulabh International and other community development societies are grossly inadequate and serve very less population including floating population, leading to high prevalence of open defecation. Ex-scavengers of the ULB are mostly appointed by these agencies for maintenance. The locations of these public conveniences are given in the table 38. A user charge of Rs. 2/- for toilets, Rs. 3/- for latrines and Rs. 5/- for bath facilities is being levied at these public conviniences.

S. No	Location of Public Conveniences
1	Ambedkar statue, (Near Petrol pump
2	Public Gardens
3	Beside Collectorate
4	Beside APSRTC Bus stand, Kazipet
5	Adhalath
6	Kumarpally Vegetable market
7	Hanmakonda Bus stand,Sridevi talkies road
8	Vijaya talkies road
9	Mulugu road
10	Kothawada,Junction Warangal
11	Head post office,Warangal
12	Warangal Bus stand

Table 38: Location of Public Conviniences

Extent of Open Defecation (%)

The total number of individual toilets in Warangal Municipal Corporation area is 47745, which means that about **30 percent** of the population has access to individual toilets and the remaining **70 percent** population (five lakh people) is either dependant on community/shared toilets or resorting to open defecation. The populations who do not have access to either the individual or community sanitation are supposed to be defecating in the open. It is therefore important to estimate the population dependant on community facilities, by estimating the maximum usability of the community toilets. As per norms, each toilet seat can cater to a maximum of 50 people each day. Therefore if the total number of toilet seats of the functioning community toilets are taken, estimating the population dependent on community toilets would be easier. Five lakh people to be catered by community toilets need about 10 thousand toilet seats, or 1000 community toilet blocks of 10 seats each.

Redressal of Customer Complaints – Sewerage and Sanitation

The complaints with regard to drainage and sanitation on a daily basis are escalated to Medical and Health Officer, who instructs the concerned sanitary inspector of the ward, primarily responsible for the redressal of complaints. It takes about 3 to 4 days to attend each complaint and rectify, however the existing systems needs to be strengthened to capture the redressal status of the complaints on a periodic basis.

Key issues and challenges

- Absence of Sewerage Network
- Poor coverage of open drain network, especially in surrounding/peripheral areas.
- No waste water treatment facilities leading to improper disposal
- No recycling and reuse of waste water
- High prevalence of open defecation
- Poor maintenance of community toilets

9. Solid Waste Management

Municipal Solid Waste refers to solid waste from houses, streets, and public places, shops, offices, and hospitals. Management of these types of waste is most often the responsibility of municipal or other governmental authorities. Although solid waste from industrial processes is generally not considered municipal waste, it nevertheless needs to be taken into account when dealing with solid waste because it often ends up in MSW stream. Solid waste management is one of the obligatory functions of Municipal Corporations in Andhra Pradesh. The Municipal Solid Waste (Management and Handling) Rules, 2000 lay down the steps to be taken by all the municipal authorities to ensure management of solid waste according to best practice. As per the rules, they must provide the infrastructure and services with regard to collection, storage, segregation, transport, treatment and disposal of MSW. The existing situation of solid waste management in WMC is given in the table 39.

	Unit	WMC	42 villages	Greater Warangal
Service area	Sq. km	110	361.7	471.7
Population served (2001)	Number	530636	157978	688614
Population Served (2010)	Number	750000	207000	957000
Households served (2001)	Number	112224	3484	147073
Households served (2010)	Number	150000	41000	191000
Waste Generated	Tons/day	360	43.8	403.8
Waste Collected	Tons/day	320	0	320
Collection efficiency	%	91.4	0	81.2
Door to Door Coverage	%	59.7	7.7	48.4
Extent of Segregation	%	0	0	0
No. of land filling sites	Number	0	0	0
Solid Waste Recycled/recovered	%	0	0	0
Scientific disposal	%	0	0	0
Cost Recovery	%	0	0	0

Table 39: Solid Waste Management facilities

Waste Generation:

The waste generated in WMC is estimated to be 360 tons per day (See table 40), which includes the waste from households, street sweeping, hotels and restaurants, markets, commercial establishments and horticulture debris. Typically the domestic waste generation in Indian cities ranges between 0.3-0.6 kg and for Warangal it works out to 480 grams per capita per day. In surrounding 42 villages the total estimated waste generated is 43.8 tons/day, calculated based on the empirical formula for per capita waste generation i.e., waste generated = population * 0.21 kg. per capita per day. Therefore Greater Warangal generates a waste of 403.8 MT every day at 400 grams per capita per day.

Based on the data available from some of the similar Indian cities, the density of waste in Warangal is assumed to be 0.3 Kg/cu.m. In terms of the composition of waste, it is assumed that

40 percent of the waste generated is bio-degradable and the remaining 60 percent is non-biodegradable.

Waste Generation –WMC		
Waste Generated by Households	180	TPD
Waste Generated by Street Sweeping	170	TPD
Waste Generated by Hotels and Restaurants	1	TPD
Waste Generated by Markets (Vegetable Markets, Mandis etc)	0.9	TPD
Waste Generated by Commercial Establishments (eg. Institutions, etc)	5	TPD
Waste Generated by other sources (eg. debris, horticulture waste etc)	3	TPD
Total Waste Generated in WMC	360	TPD

Table 40: Daily Waste Generation in WMC

Primary Collection:

Primary collection is the most essential component of SWM service and in Warangal it comprises door to door collection, street sweeping, collection from bins and open dumping, drain silt etc. While the objective of primary collection of municipal solid waste is to prevent littering and to facilitate compliance with MSW 2000 rules, organized collection of MSW at household level is being undertaken through door-to-door, house-to-house or community bin service, at regular pre-informed schedules.

Street Sweeping:

The WMC carries out street sweeping on a daily basis. WMC is divided into 20 sanitary circles, for administrative purposes, there are 16 sanitary inspectors and 33 sanitary maistries/safai karmacharis, who are primarily responsible for regular monitoring of sanitation in their respective circles. The Sanitary Inspectors report to Municipal Health Officer, who heads the SWM service in WMC. In addition, 465 workers are deployed by WMC to undertake street sweeping activities and door to door garbage collection.

Door to Door Coverage:

The total number of households residing within municipal limits of WMC is estimated to be 150000 (2010) and the number of establishments as per municipal records is 11546. Of these, 96000 households and 485 commercial establishments are estimated to be covered by Door to Door Collection every alternate day. The household level coverage of SWM service is only 59.7 percent in WMC. In case of surrounding 42 villages, it is estimated that only 3484 households out of the total 41000 households have door step collection, which is about 7.7 percent. Therefore, the coverage of Door to Door collection in the CDP area (Greater Warangal) is only 48.4 percent.

Collection Vehicles and Transportation of waste:

The garbage from household is collected through tricycles/handcarts and then transferred to community bins/dumper bins. The garbage from community bins/dumper bins across all the

wards is collected through tractors/dumper placers and dumped at the dumping yard. Currently, the garbage is being dumped at two designated sites, one at reddipuram and other at Ammavaripet. The Corporation has one JCB, 16 dumper placers, 26 tractor trailers, 277 tricycles and 3 tippers. The table 41 gives the details of the vehicle capacities and the number of trips made by these collection vehicles each day.

Type of vehicles	No. of vehicles	Capacity	No. of trips
Dumper Placers	16	3 MT	3
Tricycles	277	50 kg	
Tippers	3	5 MT	3
Tractor trailers	26	3 MT	3
Mini Tippers	4	1 MT	3

Table 41: Collection Vehicles used for Transportation of waste in WMC

A common practice observed in Warangal is that both the household and commercial waste are often dumped in nearby open spaces, which is later collected by tricycles. Even in surrounding 42 villages, the waste is collected through vehicles such as bullock carts, hand driven carts, tractors etc. The hand driven carts are mostly used to collect the waste dumped in open places and gather them at one place. The bullock carts are used to collect the waste from open spaces and dumper bins (about 221 in surrounding 42 villages) and dispose the waste outside the village which is done once in 15-30 days. The tractors (private) are only used in rainy seasons or when the waste is over bundled.

Efficiency of Collection of Municipal Solid Waste:

Of the total waste of 360 MT generated each day, about 320 MT (91 percent) is being collected and transported to disposal facilities with the help of various solid waste collection vehicles mentioned above. The collection efficiency of solid waste in surrounding villages is understood to be very less as there is no formal mechanism for daily waste collection.

waste being lifted from open spaces s in villages

handcarts used for primary collection

waste dumped in nearby open areas in villages

A reconnaissance survey undertaken across 10 surrounding villages reveals that waste is commonly dumped at open places and burnt, which is an unacceptable SWM practice prevalent in the surrounding villages of Warangal city.

Segregation of waste:

Waste segregation practice is not being followed in WMC. The municipal solid waste, which is collected on a daily basis by WMC workers, is being dumped at Shahimpet disposal site and also

in the low lying areas, and similar is the case with surrounding 42 villages. The waste is neither segregated at source nor at the disposal sites.

Scientific Disposal:

The waste collected at household level and from community bins is transported and dumped at Shahimpet disposal site, of area 23 acres and three kilometers from city limits. There is no scientific land fill site constructed and the waste is not disposed in scientific manner. As discussed earlier, the manner of waste disposal in surrounding villages is by burning the waste at open places beyond the village at distance of 1-2 km, as illustrated in the picture below.

Recovery of Solid Waste:

practice of burning the collected waste is very common in peri urban areas

waste dumped in the road margins

Hospital Waste Disposal:

The Auto Clavable waste is stabilized (1.2Kg/Sq.cm) and is sold to the private party, authorized by Andhra Pradesh Pollution Control Board, once in a year. The incinerable waste is burnt in two chambers with 50 degree celcius and 100 degree celcius respectively. The left out waste from Autoclavable and Inceinerable waste is disposed scientifically at Sy.No.240, Ammavaripeta Thimmapur , Kothapalli, Warangal.

Hospital Waste

Name of the Authorised person	G. Chandra Mohan (9849009040)
Name of the CBMWTF	Kakatiya Mediclean Services
Location of the CBMWTF	Sy. No. 240, Ammavaripeta, Thimmapur, Kothapalli, Warangal.
Area covered *	Warangal city, Hanamkonda, Kazipet, Mahabubabad, Jangaon, Narsampet, Parkal, Gudur, Wardhanapet, Bhupalpally
No. of HCEs covered*	185
No.of Beds Covered*	3850

Total Quantity of BMW collected Incinerable waste Auto clavable Waste	 ~350 kgs/ per day ~65 kgs/per day
Cost of treatment charged	Rs. 3.50/- per day/bed
Treatment facilities installed Capacity of Incinerator Capacity of Shredder Capacity of Autoclave Capacity of ETP	 100 kgs/hr 50 kgs/hr 412 ltrs 5 klitrs

Table 42: Hospital Waste Management

Complaint Redressal

There is a grievance cell (Written Complaints), Call center and online facilities available for customers to register their complaint. All the complaints are documented and are reported daily to Medical and Health Officer, who orders the respective ward sanitary inspectors who are responsible to attend the complaints and solve the problem. It takes about 3 to 4 days to attend each complaint and rectify it. After the problem is set right signature is taken from the respective HH and people who registered complaints through call centers are given a message. There is no proper maintenance of the number of complaints readdressed in Warangal Municipal Corporation.

Cost Recovery of SWM Services:

The total annual operation and maintenance expenditure for SWM services at WMC is estimated to be Rs. 14.68/- crores. This includes, the staff costs, fuel cost for vehicles, repairs and maintenance costs, contract labour cost, chemical costs etc. There is no mechanism of cost recovery through user charges.

Demand Assessment:

Understanding the Current Demand (2010):

- Population of Greater Warangal (2010) = 957000 (750000+207000)
- Number of Households = 191000 (150000+41000)
- Percapita Waste Generation-weighted avg. of 450g(WMC) and 210g(villages)= 400 g
- Waste Generated per Day (2010) = 957000*400 = 382.8 MT
    - (includes domestic, commercial waste and street sweeping)
- Average household size (assumption) = 6.0
- Average waste generation from each household = 6.0*0.4 = 2.4 kg
- Average density of municipal solid waste (assumption) = 300 g/cu.m. = 0.3kg/cu.m.
- Average Volume of waste generation from each household = 2.4/0.3 = 8.0litres
- Number of plastic bins required at each household = 2 nos.
- Volume of each household plastic bin = 5 litres
- Average Volume of a Tricycle/handcart = 250 litres
- Quantity of waste collected by a tricycle = 250 * 0.3 kg/cu.m. = 75 kg
- Number of households that can be covered by each tricycle = 75/2.4 = 32 nos.

- Assuming each tricycle/handcart covers 100 households per day (scheduled six hours of work time) by making three trips @33 houses in each trip to the nearest transfer station; we need about 1900 tricycles of capacity 250 litres for entire Greater Warangal as on date. The number of vehicles may further be reduced with the increase in vehicle capacity.

Norms for Sanitation Workers:

The Manual on Solid Waste Management by Ministry of Urban Development and Poverty Alleviation 2000, recommends the following norms, which are compared against the existing staff strength in WMC.

		Staff/ population	Normative Strength	Existing Strength	Gap
	Municipal Health Officer	1:500000	1	1	0
	Sanitary Officer	1: 100000			
	Sanitary Inspector	1: 50000	15	16	
	Sanitary Sub-inspector	1:25000		-	
	Sanitary Supervisor	1:12500	60	33	
	Sanitary worker (part time for DTDC)	1:1000	750	465	
	Sanitary worker (street sweeping)	1 :600m			

Requirements for the next five years:

With an annual population growth rate of 2.64 percent, the waste generation is also expected to increase in the next five years at the same rate. Same is the case with infrastructure requirements.

Greater Warangal	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Estimated Waste Generation (MT)	382	392	403	413	424	435
Number of Households	191000	196042	201218	206530	211982	217579
Number of sanitary workers	1910	1960	2012	2065	2120	2176
Number of tricycles	1910	1960	2012	2065	2120	2176
No. of secondary storage points	96	98	101	103	106	109
No. of transfer stations	4	4	4	4	5	5

Working Norms for Street Sweepers:

CPHEEO estimates that a sweeper can cover 30000sft of open space per day. Sweeping norms in running meters of road are as follows:

- High density area – 300-350 meters
- Medium density area – 500-600 meters
- Low density area – 650-750 meters

Considering the variations in core city and the peri-urban areas of Warangal, an average figure of 600 metres is used to estimate the requirement for Warangal and compare with the current staff. With a total pucca road length of about 1800 km, Greater Warangal needs about 3000 street sweepers.

Secondary Storage:

A waste collector with handcart/tricycle is not expected to walk more than 250 metres and therefore waste containers for secondary storage should be available within a radius of 250m. In high density areas, one container should be placed for every 5000-10000 residents depending upon the size of the container ranging from 3 cu.m. to 7 cu.m. Greater Warangal requires either 95 vehicle containers of 7 cubic meter capacity or about 190 smaller containers of 3 cubic meter capacity.

Transfer Stations:

As it would be uneconomical to transport smaller quantities of waste to landfill sites located at longer distances, it is appropriate to transfer the waste from small vehicles/containers into larger containers trucks so that waste can be transported more effectively over long distances. With an assumption that a large container vehicle with a capacity to carry 15 MT can make five trips from transfer station to disposal site each day, 4-5 transfer stations would be required for Greater Warangal

Transportation of Waste:

If a mechanized system of lifting the containers is used, one driver and one sanitation worker per vehicle per shift should be enough to operate the waste transportation system. one worker should be able to connect the containers to the vehicles and to facilitate the unloading of the vehicle at transfer station or disposal site. Norms prescribe that a tractor may make six to eight trips to the disposal site in one shift if the distance is less than 5km, but it may make fewer trips if the distance if the city is congested.

Treatment of Organic Waste:

Household waste contains about 40-50 percent organic waste. With an estimated 40 percent (150 MT) biodegradable waste in Greater Warangal, MSW 2000 rules mandate improved management and treatment of this fraction of waste before final disposal.

- Composting is defined as a controlled process involving microbial decomposition of organic matter under aerobic conditions. Biodegradable waste is converted to a soil like substance (compost), which is a valuable soil amendment and fertilizer. Composting schemes vary in terms of scope, technology and management.
- Anaerobic digestion is a process that produces bio-gas from decomposed waste. The biogas can be used to power electricity generators or to produce heat. The anaerobic digestion process reduces the volume of organic matter form the waste stream, therefore reducing the amount of waste that needs to be put in a landfill or incinerated.

Future Demand (2031) – Landfill Requirements:

- Population of Greater Warangal (2031) = 1655000
- Number of Households = 331000
- Estimated Waste Generation (2031) = 662 TPD
- Current Waste Generation (2010) = 382 TPD
- Total Waste Generation in 20 years = ½*(382+662)*365*20 = 3810600 tonnes
- Total Waste Volume (assume density 0.5 tonnes/cu.m.)Vt = 7621200

- Volume of daily cover (10% of above), Vc = 0.1*7621200
    - 15cm soil cover on top and sides for lift height of 1.5 metres
- Total Volume required for liner and cover systems (assume 1.5m liner system, including lechate collection layer, and 1.0m thick cover system, assume height of land fill = 20m), Vl = k Vt = 0.125*7621200 = 952650
- Volume likely to become available due to settlement/biodegradation of waste and other factors Vo = m Vt = 0.1 *7621200 = 762120
- Estimate of Landfill Volume = Vwi
  = Vt+Vc+Vl-Vo = 7621200+762120+952650-762120 = 8573850 cu.m.
- Area of Landfill required: (assume height of landfill = 15m)
    - Area required for infrastructure facilities = 8573850/15 = 571590 sq.m
    - = 57.2 hectares
- Dimensions: Preferred ratio of length & breadth is 2:1
- Area = $2L^2$ = 571590; L = (Square root of 571590)/2 = 378 m (breadth); length = 756m
- Add 25% extra for side slopes, total land required = 1.25*57.2 = 71.5 hectares.

Key issues and challenges

The following deficiencies in SWM system are observed in Warangal:

- Primary collection: Grossly inadequate with low levels of household coverage.
- Partial or negligible segregation of recyclable waste at source
- In appropriate systems of secondary storage of waste
- Irregular transport of waste in open vehicles
- No treatment of waste
- Inappropriate disposal of waste at open dumping grounds

- Optimal distribution of functions and responsibilities
- Involving local governments in system planning and development and encouraging private sector participation in waste management
- Institutional strengthening and human resources development
- Effective public participation in segregation of recyclable waste and storage of waste at source.
- Effectiveness of awareness building or direct community involvement
- User Charges
- Waste Minimization, Recycling
- Integrated Waste Treatment

10. Storm Water Drainage:

Records indicate that Warangal has received heavy rainfall (>70 mm in a single day) for about 30 times in the past 20 years. The maximum rainfall recorded in a single day at Warangal is 185.6mm on 13th August 1986, and the maximum hourly rainfall recorded at Warangal is 93mm on 20th August 1983. The average annual rainfall of Warangal based on the hourly rainfall data records of IMD station at Ramagundam for the past 20 years is estimated at 760mm. Surface drainage forms an important aspect in the context of Warangal Town. The improper design or blockage to the natural drainage pattern can result in severe water logging and unhygienic conditions in the town. The map below shows the identified major water logging areas within WMC area.

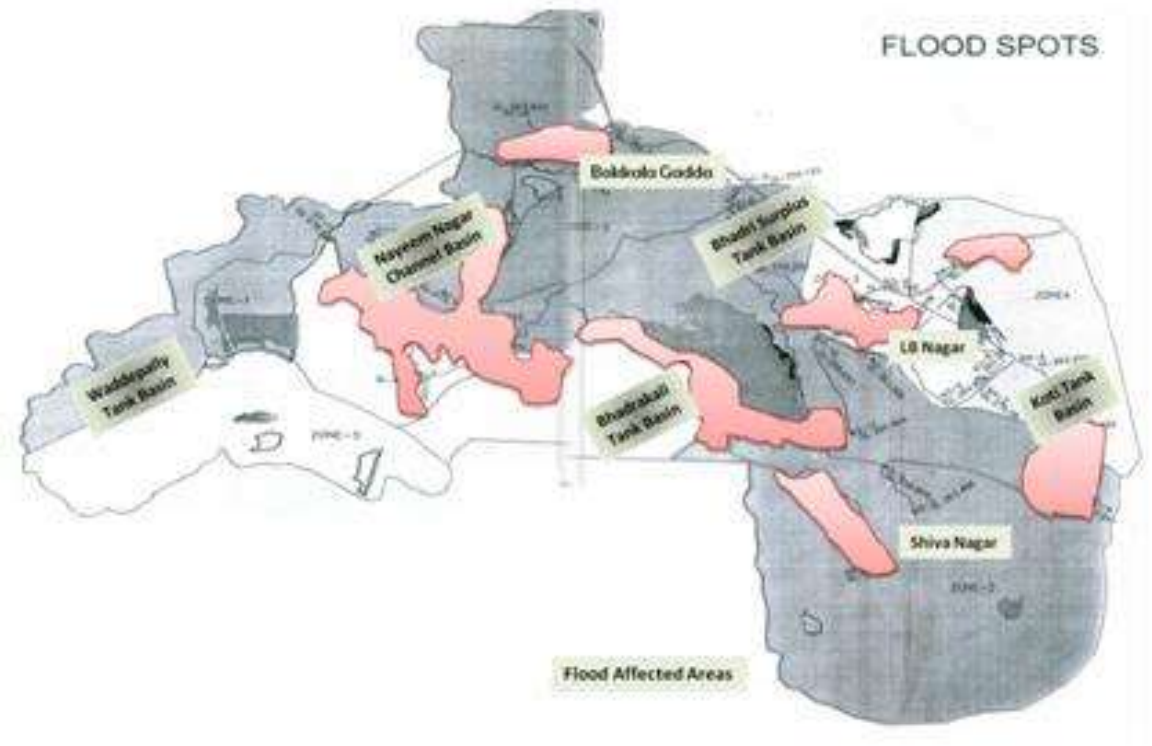


Figure 16: Map showing the locations of flooding areas

The open drains in WMC along with existing 15 Km Strom water drains carry the rain water and helps in avoiding the water logging. the total coverage of Strom water drainage in WMC is worked out to be 92.49%.In surrounding 42 villages the total length of open drains is 123.38 Km, thus the coverage of storm water drainage is 46.45%.Considering the proposed GWMC the coverage of storm water drainage is calculated as 88.37%.The table 43 gives the details of drains available for Strom water.

	WMC	42 Villages	Greater Warangal
Total Length of open drains (Km)	2482	123.4	2605.4
Length of exclusive Strom water drains	15	nil	15
Total Length of Road Network	2,699	265.6	2965.1

Table 43: Existing Drainage Network

Key issues and challenges

- Low Coverage
- Low Capacity
- Lack of integrated drainage plan
- Encroachments
- Resulting in flooding and inundation

11. Traffic and Transportation

Transport infrastructure is one of the most important infrastructure facilities in any city and plays a critical role in the growth and development of the city and its surrounding hinterland. Besides providing regional connectivity for movement of people and goods/ commodities to and from the city, the transport infrastructure also guides the spatial growth of the city by connecting the peripheral areas to the city centre which is generally the economic hub. The need to take an integrated long term view of transport needs of Warangal Municipal Corporation and to plan road development, public transport services and rail transport as a part of the urban planning process is being well recognized as essential for the efficient functioning of the urban system.

The traffic and transportation schemes are presently implemented by various departments and agencies. While long-term planning and coordination is carried out by KUDA, individual schemes are executed by South Central Railway, Roads and Buildings (R&B) Department of Government of Andhra Pradesh, and Warangal Municipal Corporation (WMC). While the urban rail network development is carried out by the South Central Railways, the major arterial & sub-arterial road corridors and other roads are developed and maintained by R&B Department, KUDA and the Warangal Municipal Corporation respectively. The inner city roads within the municipal area are improved and maintained by the Warangal Municipal Corporation and the R&B Dept., maintains selected stretches of road network especially those that favor inter-city movement, with significant traffic volume. As regards traffic management and enforcement, the same is looked after by the Warangal Traffic Police.

Linkages:

Warangal being the district headquarters is well connected by rail and road network with other major cities in the state. Constructed towards the end of 19th century, Kazipet is an important railway junction between Hyderabad and Vijayawada, at which railway line from Hyderabad join Chennai-Delhi section of the South Central Railway (BG). Through this railway station, Warangal is connected to important cities like Hyderabad, New Delhi, Kolkata, Vijayawada and Chennai. The National Highway NH 202 passes through Warangal from west to north eastern side (from Hyderabad to Mulug) almost cutting the city into two halves. Besides this, there are state highways and major district roads linking Warangal to other cities in the region. The state highways link Warangal city with its neighboring districts of Karimnagar in North, Khammam in South and Narsampet in East. A 30 metre wide bye-pass road takes off from NH-202 (Hyderabad Road) and meets the Karimnagar State Highway.

Like many other emerging cities in India, Warangal city is also witnessing an unprecedented urbanization, since past few decades, leading to a profound impact on the overall traffic and transportation system. With an objective of analyzing the existing growth pattern and traffic scenario and to assess the prospective traffic and transportation requirements for next 25-30 years, a Comprehensive Traffic Study for Warangal town was commissioned under Andhra Pradesh Urban Service for the Poor (APUSP) project and the study report has been submitted to

Warangal Municipal Corporation in December 2007 by the consultants M/s. CRAPHTS Consultants (India) Private Ltd.

Existing Road Network:

The length of road network of Warangal town is estimated to be about 2700 km. The break-up of the road length by type of the road is presented in the table 44:

Type of the Road ((Km)	WMC	42 villages	CDP Area
B.T.Road	480.0	49.5	529.5
C.C Road	475.0	144.3	619.3
WBM Road	568.5	69.8	638.3
Kutcha	1,176.0	—na-	1176.0
Total	2,699.5	262.6	2962.1
Municipal Roads	2,699.5	NA	NA
State Roads	45.0	NA	NA
National Highways	11.4	NA	NA
Other MDRs, Village Roads	54.7	NA	NA
Total	112.4	NA	NA
Foot-over Bridges	1	0	1
Bridges & Flyovers	3	0	3
Subways	0	0	0

Table 44: Existing Road Network

The roads in old city area are narrow, winding and unplanned in nature, where as the fringe areas exhibit a radial road pattern. Majority of the arterial roads in the city have an average Right of Way (RoW) of 30 meters. These arterial roads emanating from the city provide physical connectivity between the city and its surrounding areas. The road network of Warangal is playing an important role to determine the land use structure of the city and its integration with its peri-urban areas. The major roads of the city are given in the table 45.

Hyderabad – Hanamkonda Road (NH 202)	Jaya Prakash Narayana Road
Bye-Pass Road (Inner Ring Road)	Narsampet Road
Hunter Road	Under Bridge Road
Karimnagar Road	Khammam Road
University City Road	Desaipet Road
Mulugu Road	Mogilicherla Road
Mahatma Gandhi Road	Warangal Station Road
Swami Vivekananda Road	

Table 45: Major Roads

Review of Comprehensive Traffic Study of Warangal:

As a part of the above mentioned study, several field level primary surveys were conducted viz., road inventory survey, speed delay survey, classified traffic volume count survey etc., to assess the physical characteristics of roads, identify bottlenecks, traffic characteristics, etc.

Characteristics of Road Network:

The road inventory survey conducted along a primary road network of length 86.4 km, indicated that about 72 percent of road length had RoW between 21 - 30 metre, 53 percent of road length has a carriage way width of only seven metres, 62 percent of the road length does not have a central median, resulting in frequent traffic conflicts, accidents, delays in travel time, etc. The other details of road inventory survey are presented in table 46.

Classification by category	Range	Road length (km)	% to total
Right of Way (RoW)	10m-20m	24.05	28 %
	21m-30m	62.35	72 %
Distribution carriageway	7m	45.65	53 %
	11m	10.40	12 %
	14m	30.35	35 %
Median availability	Not Available	53.55	62 %
	Available	32.45	38%
	1 m width	18.40	22%
	2 m width	14.05	16 %
Surface type	Bituminous	80.50	93 %
	Concrete	5.90	7 %
Abutting land use	Residential	50.90	59 %
	Commercial	11.40	13 %
	Open	23.60	28 %

Table 46: Road Inventory Survey

Except Gadepally village (population 1691) in Sangam mandal, the remaining 41 out of the surrounding 42 villages have significant portion of internal paved roads.

Characteristics of Traffic Flow:

Traffic volume count surveys conducted at five outer cordons (24 hrs), ten mid block locations (8 hrs) and seven screen line locations (16 hrs) indicate the following:

Outer Cordons: Of the traffic moving in and out of the study area, a maximum of 33 percent share is observed at Hyderabad Road. This is followed by Karimnagar Road (21 percent), Khammam Road (20 percent), Mulugu Road (19 percent) and Narsampet Road (17 percent).
Share of Passenger traffic (>85 percent) is observed to be higher than share of Goods traffic in all the five cordon locations. Majority of the traffic (both passenger and goods) is due to fast vehicles in these locations.

Mid Block Locations: Of the ten mid block locations selected for survey, maximum traffic was recorded at Thousand Pillar Temple, followed by Vaartha Office, Arts & Science College respectively. Maximum share of traffic is due to light fast vehicles in all these locations. A maximum of 21 percent of slow vehicle traffic is recorded at Khammam road, followed by Bapuji nagar (19 percent).

Screen Line Locations: Of the seven screen line locations, maximum traffic has been recorded at Alankar Bridge junction, followed by Under Bridge junction, Fatima Nagar ROB. Beat Bazaar exhibited the highest share of slow vehicle traffic at 28 percent followed by Under Bridge (21 percent) and Kumarpalli Bridge (19 percent).

OD Survey:

Major Traffic Junctions and Intersections:

Three junctions viz., Ambedkar Junction, Hanamkonda Chowrasta and Pochamma Maidan Junction exhibit maximum peak hour traffic flow in the morning and evening. Major junctions in WMC are given in table 47.

Kazipet Junction	Hanamkonda Govt Hospital	Warangal Chowrasta
Fathimanagar Junction	Junior College Junction	Warangal Head Post Office Jn.
Subedari Junction	Hanamkonda Chowrasta Jn.	Naidu Petrol Pump Junction
Collector Residency Junction	Alanka Theatre Junction	Warangal Railway Stn. Jn.
Adalath Junction	Mulugu Road Junction	Shivanagar Jn. (after under bridge)
Nakkalagutta Junction	MGM Hospital Junction	Shivanagar Jn. (before underbridge)
Hanamkonda Bus Stand Jn.	Pochamma Maidanam Jn.	Raithigudda Junction
Ambedkar Junction	Kasibugga Junction	Inthizar Police Junction
Petrol Pump Junction	Venkataramana Theatre Jn.	
Kakatiya University Junction	Christian Colony	

Table 47: Major Road Junctions

Pedestrian Traffic:

Transportation Services

Intra City Public Transport

The city is not served by an organized public transport system which has led to operation of intermediate public transport (private vehicles) from different parts of Warangal city. These include especially the hired auto-rickshaws (shared seating with seven member capacity), providing service to the citizens in meeting the day to day mobility needs. APSRTC is operating city bus services in some of the major bus routes. Moreover, there is a larger dependence on personalized vehicles for mobility with two wheelers accounting for a significant share. Of the

35517 registered motor vehicles with RTO office during 2005-06, 71 percent were two wheelers and seven percent were auto rickshaws.

An intermediate public transport operator survey was carried out (with 100 samples), to assess the Para Transit system in Warangal, as a part of comprehensive traffic study. The survey indicated that each of such auto rickshaws carried an average of 60 passengers per day. While the average monthly income of the auto rickshaw operator ranged between Rs. 4500/- to Rs. 10000/-, the average monthly expenditure for the same ranged between Rs. 600/- to Rs. 5000/-.

City to City Transport:

Rail transport: There are two major railway stations (Kazipet and Warangal) within the municipal corporation limits. Kazipet rail terminal caters to a significant proportion of passenger traffic. It is estimated that about 57500 passengers move in and out of Kazipet terminal and about 82000 passengers move in and out of Warangal Terminal.

A study of hourly variations of passenger flow at both the terminals indicates a variation between lowest 500 to highest 11400 passengers in a single hour. Kazipet terminal recorded a flow of about 11400 passengers during the peak hours between 1800-1900 hrs and Warangal terminal recorded a flow of about 9000 passengers during the same hour. In both the terminals, the outflow is recorded to be higher than inflow especially during peak hours.

Road transport: Regular bus services connect Warangal with Hyderabad, Vijayawada, Visakhapatnam, Tirupati and Kurnool in Andhra Pradesh. There are six bus terminals, 33 bus stops, three bus stations (Hanamkonda, Warangal-1 and Warangal-2). The APSRTC bus terminal caters to a significant proportion of intercity bus passenger traffic.

APSRTC terminal operates around 39 buses every day and the occupancy rate of bus transport is estimated to have touched 40000 in the recent months (2010). In addition 31 sub urban buses are also operated. Terminal survey carried out for 24 hour duration at APSRTC terminal (as a part of comprehensive traffic study), indicated that almost 1,832 buses move in and out of this terminal carrying about 32000 passengers daily.

A study of hourly variations of passenger flow and buses at APSRTC bus terminal indicates a variation in passenger flow of 34 during 0300-0400 hrs (2 buses) to 3036 during 1900-2000hrs (143 buses). Similar to rail transport, the passenger outflow is higher than the passenger inflow during the peak hours from Warangal to other cities.

Goods Transport:

Maximum truck volume is reported on Beat Bazar road (531 trucks in 16 hrs period between 0600 hrs to 2200 hrs), followed by Hunter Road-2 (468 trucks in 16 hrs). Maximum accumulation of trucks per a single hour varies at each of the three truck terminal locations, with 75 trucks on Beat Bazar road (0700-0800 hrs), 61 trucks Hunter Road-2 (0900-1000 hrs), and 36 trucks on Venkatarama road (0700-0800 hrs). Some of the major issues and concerns related to rail/bus terminals include:

- The present location of APSRTC Complex in central part of city is adding up to already prevailing congestion. This may further contribute to problems in future.
- Inadequate facilities within the terminal complex such as bus bays and shelter, circulation area, passenger amenities and facilities, boarding and alighting platforms, passenger information system, etc.
- The existing rail/bus terminals need up gradation in order to provide comfortable and reliable system of transportation for inter-city passengers.
- Lack of appropriate segregation strategies to facilitate easy movement of people and vehicles within terminal area and traffic management strategies on its bounding network.
- Presence of informal sector and commercial activities around the existing terminals aggravate the problem of smooth flow of traffic. Immediate action should be taken to remove all encroachments and bottlenecks on the entry and exit of terminal sites.
- A single centralised regional bus terminus not contributing towards enhancement of prevailing traffic situation in the city. Key stakeholder groups prefer relocation of existing bus terminals in the core areas to peripheral areas to improve the situation.

Parking

Parking is an important component of urban transport system. Parking surveys were carried out as a part of comprehensive traffic study at both off-street and on-street locations to assess the parking characteristics viz., parking demand, usage pattern of dedicated parking facilities, parking accumulation on road stretches, parking duration, composition of parked vehicles etc. Uncontrolled roadside parking is an omnipresent problem in the city. Parking situation has been assessed in terms of maximum parking accumulation at each location so as to get idea about the existing parking demand.

Location	Cars	2- wheelers	3-wheelers
Battala Bazar	67	143	556
Beat Bazar	18	325	108
Hanmakonda chowrasta	87	555	67
J.P.N road	43	496	56
VN road	34	431	108
Warangal Chowrasta	6	449	26
Warandal R/s\S road	11	542	41
Total	266	2941	962

Table 48: Parking Survey Details

House Hold Survey

Street Lights

The total number of street lights in WMC covering the length of 807.33 Km of road length is 26642, which means the coverage of street lights is 29.9 percent. In surrounding 42 villages the number of street lights are 8054 covering the road length of 244.06 Km, thus the percentage of

coverage of street lights is 92.63 percent. 39.48 percent of Greater Warangal area is uncovered with street lights. The details are given in table 49.

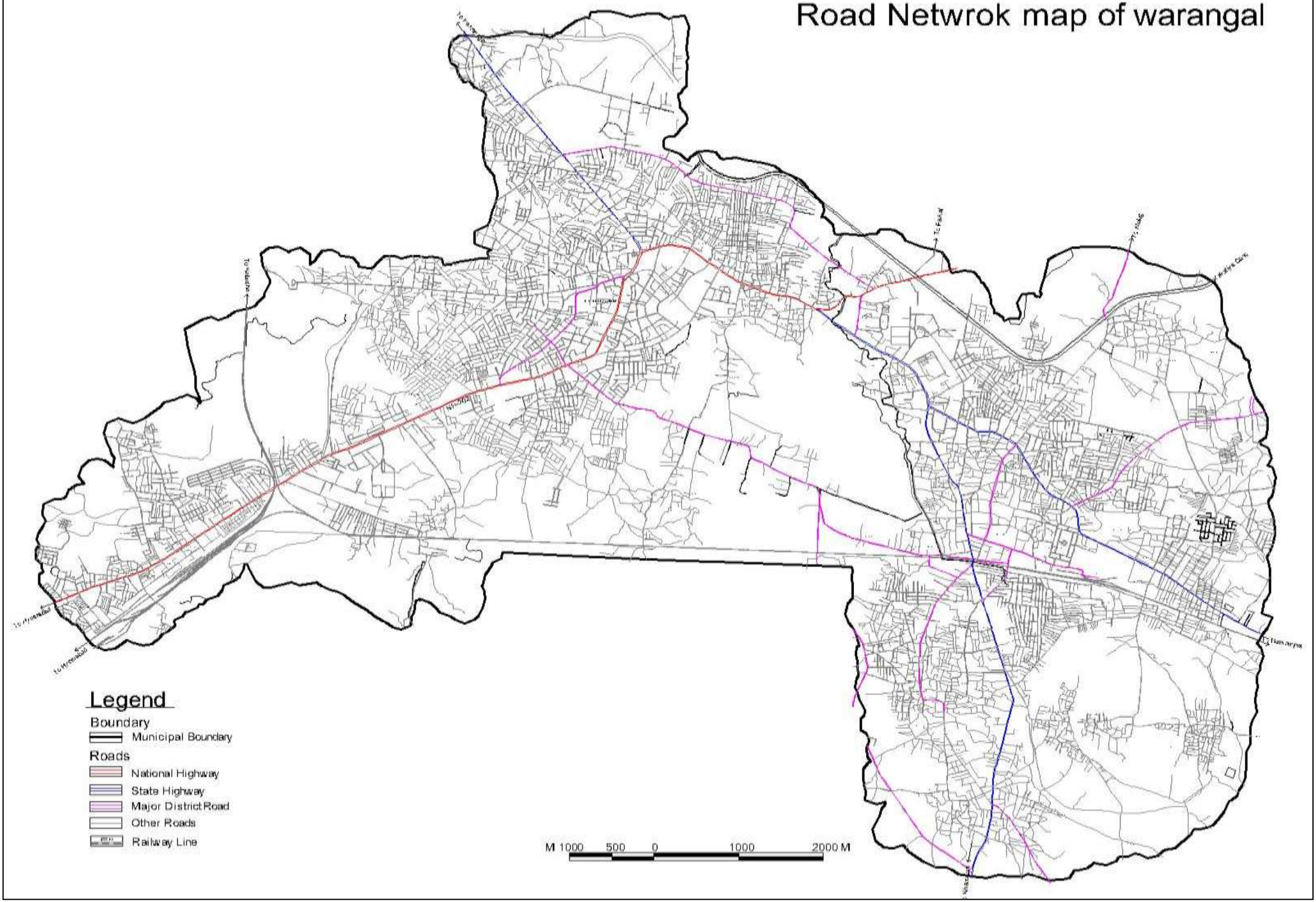
	WMC	Surrounding Villages	Greater Warangal
Roads Length (in Km)	2,699.50	263.48	1737.33
No. of Streetlights existing	26642.00	8054.00	34696.00
Road coverage (in Km)	807.33	244.06	1051.39
Area Uncovered by Street lights (%)			39.48

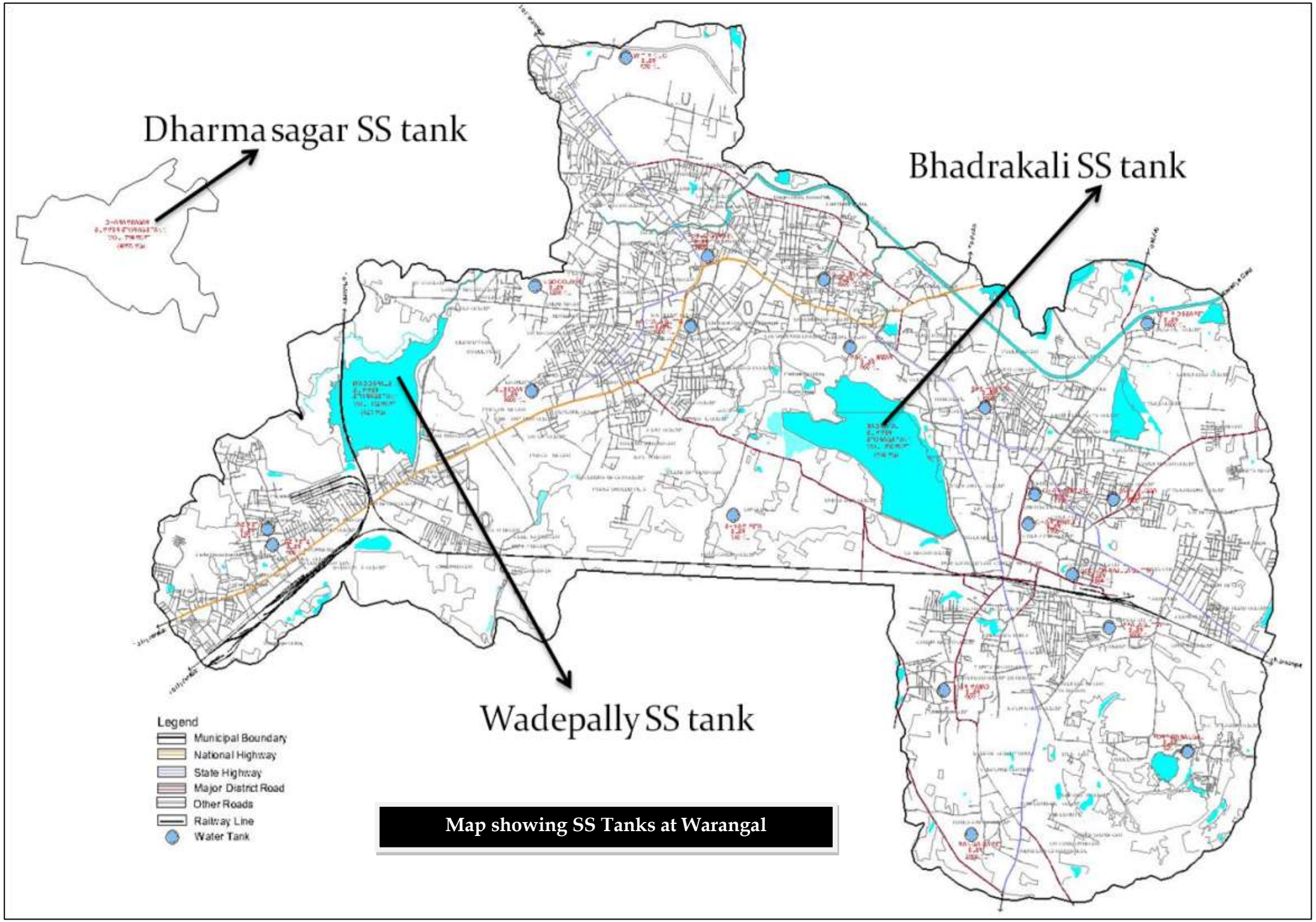
Table 49: Street Lighting in Warangal

Key Issues and Challenges

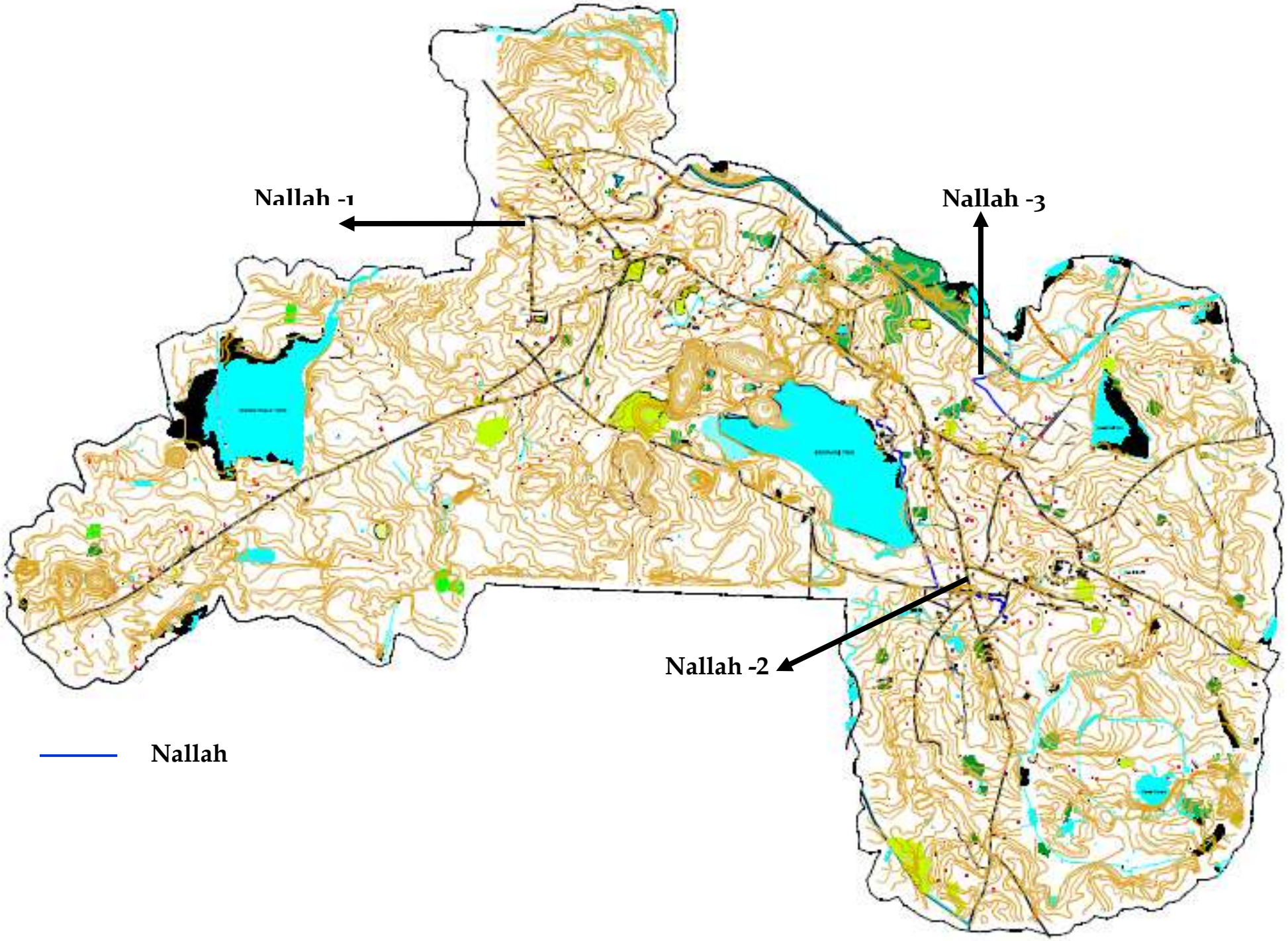
- Road network particularly in old areas suffers from capacity constraints. There is a heavy congestion in the old city areas with narrow streets, pedestrian – vehicular conflict and lack of road safety measures, and these narrow roads do not cater to the existing traffic volume.
- Heavy traffic congestion at Hanamkonda Chowrasta – need for alternative roads
- Kazipet – Hanamkonda – Warangal, an important East-west corridor for the city, appears to be suffering from serious design flaws with sharp horizontal curves
- There is no hierarchy of road network visible in WMC. The major arterial road (NH and SH) within the city is 30m wide followed by major district roads of different widths.
- Intersections devoid of proper channelizers, slip roads for left turning traffic, poor turning radii.
- On-street parking due to absence of any allotted parking space
- Uncontrolled growth of auto-rickshaws along with mixed traffic with multi modes of transport.
- Presence of commercial and informal activities around the terminals aggravates the problem of smooth flow of traffic.
- Road Safety issues not adequately addressed
- Lack of truck terminal leading to trucks parked all along the hunter road, as several godowns are loacaded around the area, where hundreds of lorries get unloaded every day
- Poor connectivity to the southern part of the city beyond railway track. There is a need for Rail Over Bridges.
- Poor connectivity to the surrounding villages.
- Outer ring road (bypass) is approved, but there are financial constraints for the implementation (the financial implication is @ Rs. 5 crore per kilometer stretch amounting to a total of Rs. 85-100 cr)
- Poor passenger amenities.

Road Netwrok map of warangal





Map showing SS Tanks at Warangal


Nallah -1
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Nallah

12. Urban Environment

Air Pollution:

Air Quality is regularly measured at (1) Venkateshwara filling station, Mulugu road, Warangal, (2) Balasamudra, Hanmkonda, (3) E-seva center Nakkala kunta Hanmakonda, and (4) M/s Noven Life service, IDA,Rampur, Warangal. The average SpM is observed to be within the approved standard limit which is 200 g/Cu.m for residential and 500 g/cu.m for industrial area. Ambient Sulphur dioxide concentration is comparatively lower than standard limit as per Environment protection rule. The annual average Nitride concentration are very high than the standard limit. It is observed to be 100%.

Water Pollution:

Water is the basic requirement for any domestic or industrial area. The major sources of water are either from Surface or fro ground water. The pH value ranges from 6.6 to 8.7 and meets the quality criteria of drinking water.The conductivity varies from 90 to 2350 µmhos/cm and meets the criteria limits for drinking water as w ell as irrigation purpose. Concentration of Nitrates is observed within the Standard limit.

Noise Pollution:

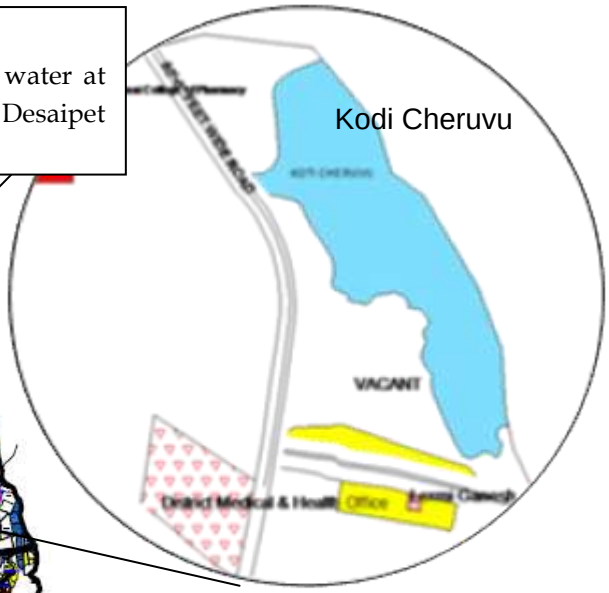
Noise is simply defined as the unwanted sound. Noise is a sound which is composed of many frequency components of volumes, distributed over the audible frequency range.In general weighted decibel(dBA) scale has been designed to weight the various components of noise according to the response of the human ear.In oder to monitor the noise level a base line noise identified throughout the city by APPPCB.

Major Concerns:

(a) Leather tanning: There are numerous tanneries and plenty of skins and hides in the city. Leather tanning in Desaipet, Enumamula is the biggest and most famous. Most of the leather is exported outside the city to the trade housing in Chennai and Kolata.the existing leather units in the city do not have modern technically advanced state of art processing unit causing environmental problems

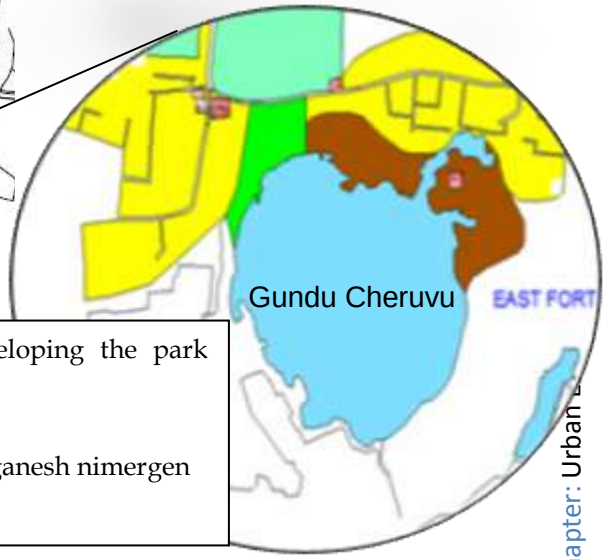
(b) Water bodies: There are large numbers of water bodies in WMC and also in surrounding 42 villages which need to be conserved viz., Gundu cheruvu, Cinna Waddepally Cheruvu, Kodi Cheruvu are few of the identified water bodies. The three water bodies are marked on the spatial map given below.

- The waste water from treatment plant is disposed.
- There use t o be a treatment plant to recycle the water at Desaipet ,but was removed due to the extension of Desaipet treatment plant.



- The lake is polluted.
- Surrounded by slum.
- Not conserved.
- Used for Ganesh Nimergen.

- The lake is conserved by developing the park aroug it.
- But is polluted by the visitors.
- The local people are using it for ganesh nimergen



13. Urban Poor and Slums

A majority of the urban poor in Warangal lead their life as labourers and they can be categorized as daily wage labour, under employed labour, seasonal labour, etc. The poor stay in slums, notified and non-notified, squatter settlements and other places which lack infrastructure facilities such as roads, drainage, housing, electricity, basic education and health, etc. With the implementation of programmes like Swarna Jayanthi Sahari Rozgar Yojana (SJSRY), the community based organisations like neighborhood groups and neighborhood committees have taken roots and they have been participating in the poverty alleviation and other development programmes effectively. This proved to be a backbone for programme implementation and effectiveness.

Slums in WMC

There are 145 slums in WMC, which include 91 notified and 54 non-notified slums, with total slum population of 2.26 lakhs. Spread of slums across the city is contributing to unhygienic environment in terms of cleanliness, water stagnation, presence of vectors, etc., which increases vulnerability towards deceases. Living conditions of the poor have consistently deteriorated due to several factors like inadequate environmental infrastructure and basic services. The details of slums are given in table 51.

Status	Number	Slum Households	Slum Population
Notified	91	33278	148669
Non-notified	54	17591	77076
Total	145	50986	226293

Table 50: Slums and Slum Population

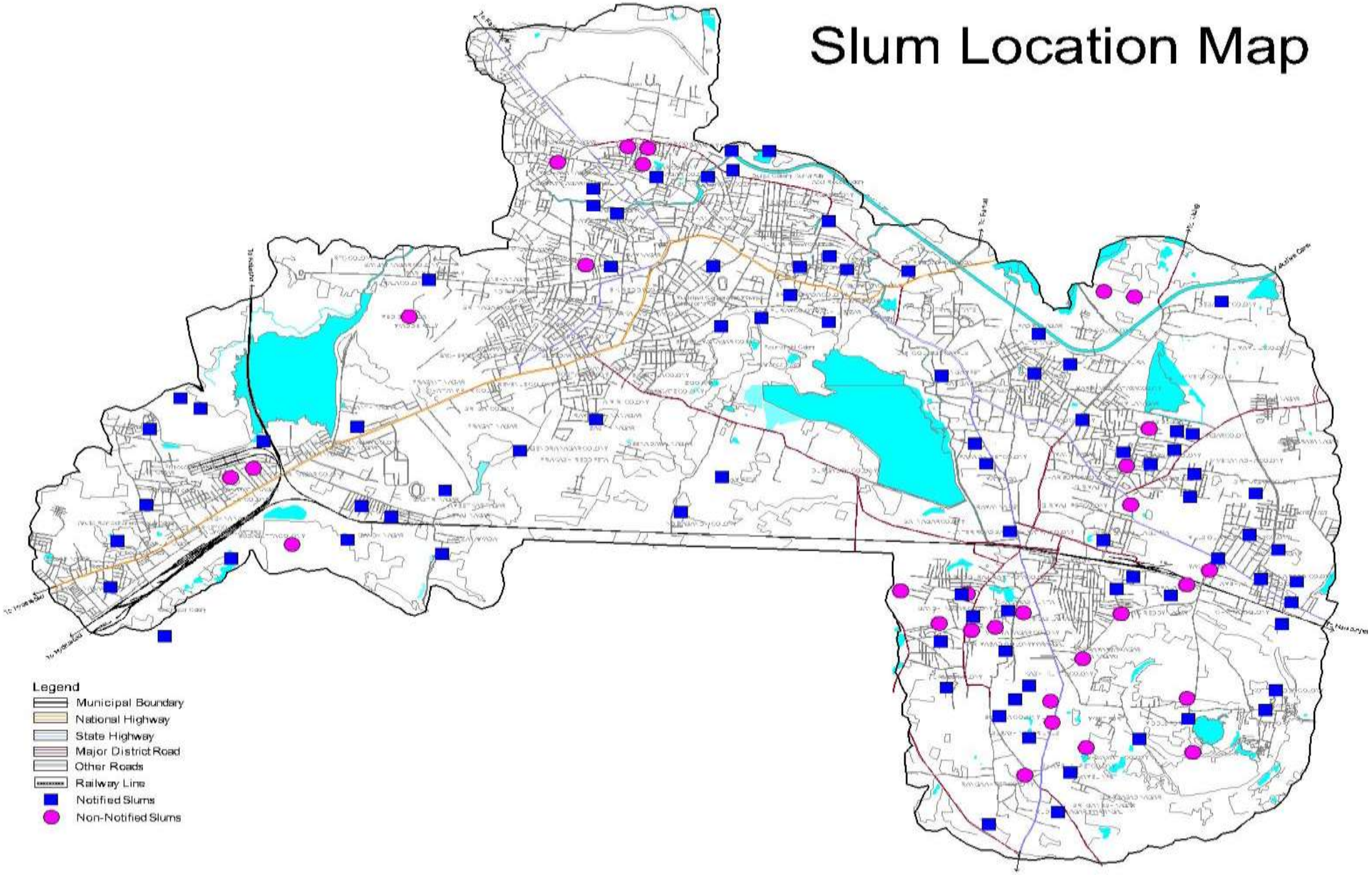
Slum and Below Poverty Line population

According to Census 2001, slum population in Warangal is 226293 (48,534 households), constituting 42.69% of the total population of the city. This is much higher than the percentage of poor in the state and the country, which stand at 32.2 % and 23.1% respectively. The data on slums in the 42 villages is not available. Discussions with the officials and elected representatives of these villages indicate that the absence of basic infrastructure like water, sewage and other facilities and housing, all villages can be considered as slums requiring enormous investments

	WMC	
Item	BPL	Slum
Population	121872	226293
% to the total city population	22.96	42.69
Households	29116	50986
% to the total Households	23.29	40.78

Table 51: Below Poverty Line Population

Slum Location Map



Socio-Economic Characteristics

Warangal is one of the rapidly developing cities of Andhra Pradesh. Migration to city has been increasing due to non-availability of agricultural operations in rural areas, due to prevalence of droughty conditions etc. Large numbers of people have been migrating into the city looking for employment opportunities and livelihoods. These migrants are not only from villages of Warangal district but also from the neighboring districts in the region.

Literacy

As per census 2001, the literacy rate of slum population in Warangal is 73.54%. There are variations between male and female literacy rates. Male literacy rate is 84.9% where as the female literacy rate is only 62.02% - a very wide differential. When compared to the literacy rates of the city, it presents depressing picture. For example, the overall literacy rate of the population in the city is 79.82%. Comparison between the male and female literacy rates in the city and the slum populations is given in table 53.. A redeeming feature, however, is that the literacy levels in the city as well as slums are marginally better when compared to the state. From the discussions with the officials it is evident that despite increase in the literacy levels over the decades, the dropout rate in schools in the vicinity of slums is increasing. Most of these dropouts are being drawn into the labor market.

Category	City %	Slums %
All	79.82	73.54
Male	88.97	84.90
Female	70.43	62.02

Table 52: Slum Literacy – Census 2001

Work Participation Rate

A majority of the population in the city belongs to the category of non-workers constituting more than 68%. Total workers constitute only 31.64% of the population. Of the workers, a majority of 90.98% are main workers and 9.02% is marginal workers. Among the main workers cultivators, agriculture labour and household industry constitute a minority of 12.06% and a majority (87.94%) belongs to the category of other workers. Similarly, in the slums also the situation is not much different.

About 34.81% are workers. Among the total slum population main workers, marginal workers and non-workers constitute 30.95%, 3.86% and 65.19% respectively. Of the workers, a majority of 88.91% are main workers a small minority of 11.09% are marginal workers. Among the main workers, cultivators, agriculture labour, household industry and other workers constitute 1.45%, 3.18%, 12.04% and 83.33% respectively (See Table 54). Similar pattern exists in case of marginal workers also. There is a need for appropriate strategies to provide skill upgradation/development opportunities to enhance the capacity and improve the ability of the poor and the marginalized to earn better livelihoods

S.	Category	City	Slums

No		Number	% of Total Population	% to Sub Category	Number	% to Total Slum Population	% to Sub Category
1	Total Population	5,30,636			2,29,661		
2	Total Workers	1,67,886	31.64		79,945	34.81	
3	Main Workers	1,52,742	28.78	90.98	71,079	30.95	88.91
	a) Cultivators	1,535		1.00	1,028		1.45
	b) Agriculture Labour	2,816		1.84	2,259		3.18
	c) Household Industry	14,075		9.21	8,560		12.04
	d) Other workers	1,34,316		87.94	59,232		83.33
4	Marginal Workers	15,144	2.85	9.02	8,866	3.86	11.09
	a) Cultivators	146		0.96	57		0.64
	b) Agriculture Labour	2,200		14.53	1,330		15.00
	c) Household Industry	3,251		21.47	2,128		24.00
	d) Other workers	9,547		63.04	5,351		60.35
5	Non-workers	3,62,750	68.36		1,49,716	65.19	

Table 53: Classification of Workers in City and Slums – Census 2001

Housing :

One finds mixed housing in Warangal – from pucca, semi-pucca to kutcha mud houses and small shacks made of thatched and plastic sheet. Most houses are single storied, with one or two room houses. As per Slum Survey (2003) out of total households in the slums 33% have pukka houses, 18% asbestos houses and 9% live in thatched and kutcha houses.

Water Supply:

(As per primary survey and Interviews)

- Tankers are available at Slums once in two days.
- Charges of Rs 2 from each HH is collected for tankers Supply.

Solid waste :

(As per primary sample survey and and Interviews)

Solid waste is dumped at open Spaces and nearby lakes.

Toilets

The coverage of toilets in WMC is 80.57. In surrounding 42 villages the coverage of toilets is observed to be nil according to the sample survey. Sample size =10 villages,3 HH each).

WMC		42 Villages		Greater Warangal	
Coverage Households	% Of coverage	Coverage Households	% Of coverage	Coverage Households	% Of coverage
41056	80.57			41056	Na

Table 54: Access to Sanitation

Social Infrastructure

	No. of Slum with access to
Services	WMC
Community halls	20
Street Children Rehabilitation Centres	1
Night Shelters	65
Women SHGs	4734
PWD SHGs	25
SLFs	158
Youth Associations	28
Mahila Samithis	151

Table 55: Access to Social Infrastructure

Pensions-widow, old age and disabled

In the Warangal Municipal Corporation, the total sanctioned pensions are 36378 in which 1674 pensions are sanctioned under INDIRAMMA scheme and 6661 pensions are sanctioned under other schemes. 1020 old age pensions have been distributed under INDIRAMMA scheme and 4834 are sanctioned under other schemes, it covers all the divisions in Warangal Municipal Corporation. An amount of Rs 200/- to Rs 400/- is disbursed per head per month.

Category	2008-09
Widow Pension	12901
Old-Age Pension	17877
Disabled Pensions	4073
Weavers Pensions	1527
Total	36378

Table 56: Pensions – 2008-09

Key issues and challenges

- Lack of data: There is a lack of dependable data and wide difference in various sources of data on aspects of poverty including number of slums, slum population, access to services like water, sanitation, livelihood, etc.
- Land tenure: This continues to be a daunting issue in addressing the problems of the poor. People living in non-notified slums are most vulnerable, as they are not officially recognized. They are most vulnerable with no regular incomes, access to basic services, absence of tenure rights, etc.
- Deterioration of infrastructure created by investments under various slum improvement programs earlier has deteriorated over time due to inadequate maintenance in the post-project phase resulting in poor quality of service availability.
- Non- availability of affordable housing and inadequate service levels in some slum pockets has led to deteriorating environmental problems.
- Few households have constructed toilets and open defecation is common and use of public toilets is limited.
- Garbage disposal is another major issue for the urban poor, as the current mechanisms are not adequate. One of the common grievances across all the slums is the absence of identified location within a slum for garbage disposal.

Absence of adequate health infrastructure, inadequate social security or safety nets add to the problems of the poor.

14. Social Infrastructure

Education Facilities

There are 320 primary, 357 secondary and seven higher education schools in Warangal Municipal Corporation, which include government, private and aided schools. In the surrounding 42 villages there are 108 primary, 29 secondary and 14 higher secondary schools. The higher secondary schools are available at an average distance of 7.5 km. There are 132 Anganwadi centers in surrounding 42 villages. The table 58 gives the details of educational facilities in WMC and surrounding 42 villages.

	WMC				Surrounding 42 villages			
	Govt.	Private	Aided	Total	Govt.	Private	Aided	Total
Primary School	91	195	34	320	-	-	-	108
Secondary School	45	266	46	357	-	-	-	29
Higher Education	4	3	-	7	-	-	-	14
Vocational Training	12	-	3	15	-	-	-	-

Table 57: Education Facilities in Greater Warangal

Warangal is the fourth-largest city in Andhra Pradesh and is known for important educational institutions like Kakatiya Medical College and National Institute of Technology, Warangal. The table 59 gives the details of educational institutions in Warangal.

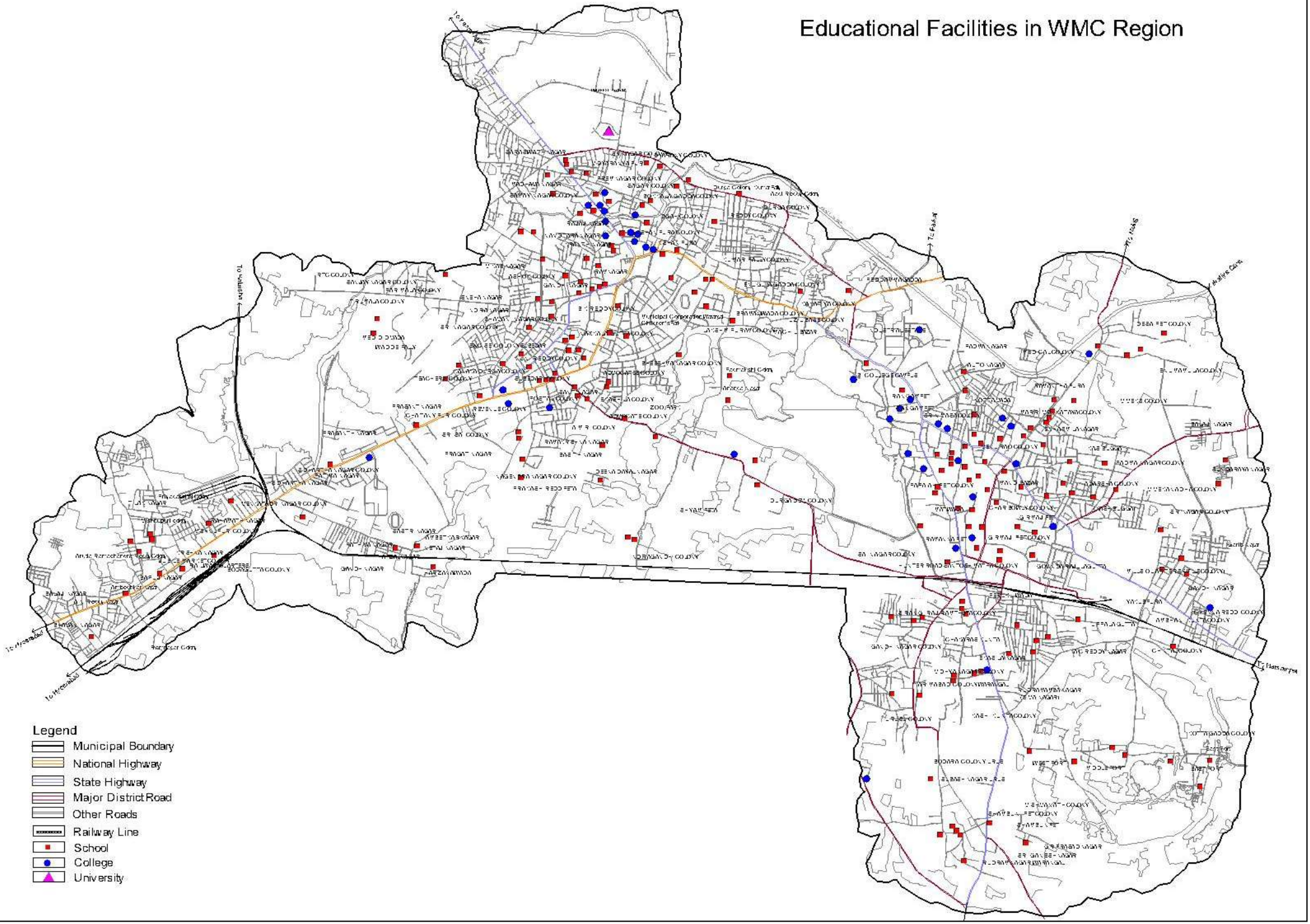
Education Facilities	Number
University	1
Engineering College	6
Medical College	2
Pharmacy College	5
Polytechnic College	3
Private Degree College	6
Government Degree College	6
Junior Colleges	11
ITI	3

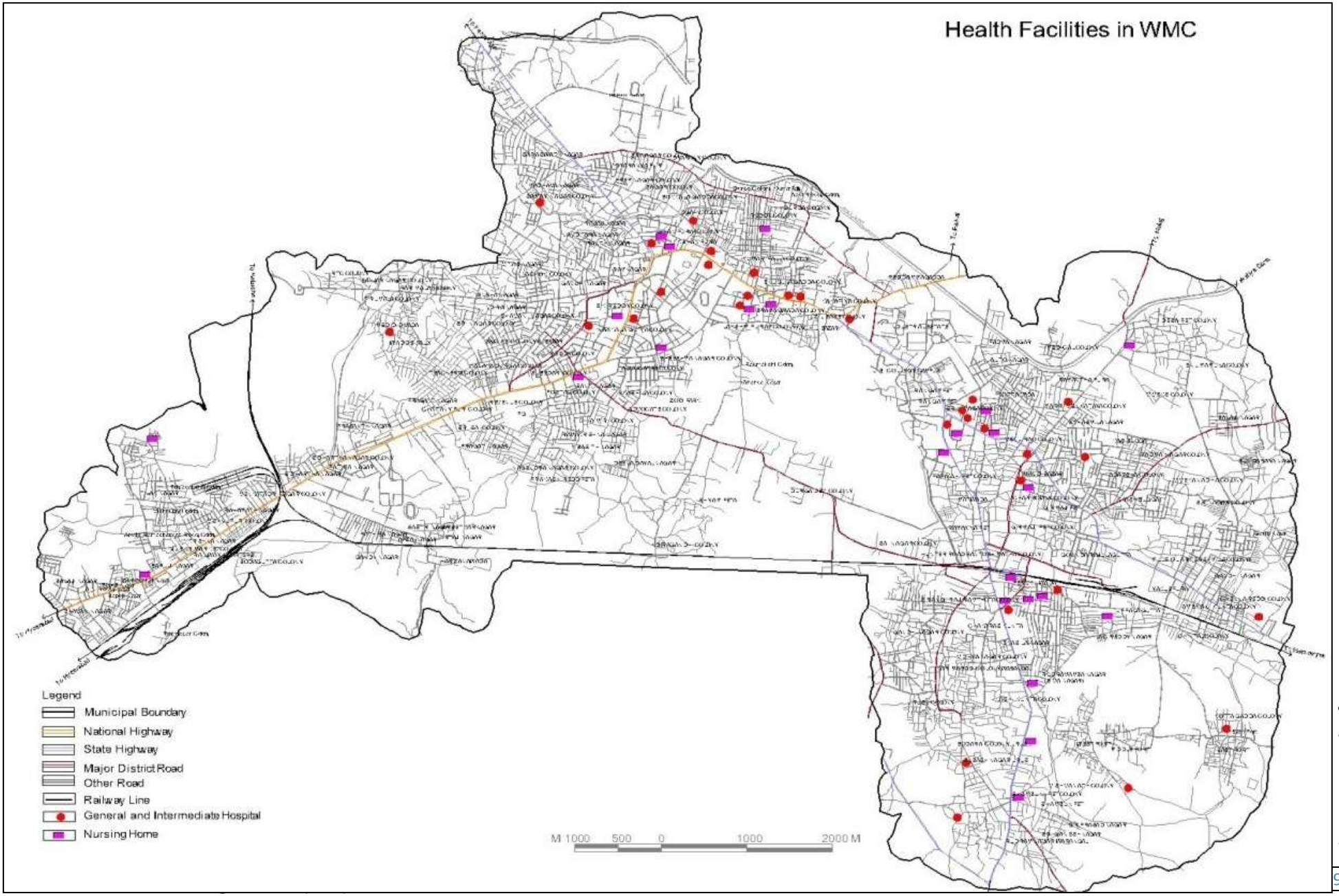
Table 58: Educational Institutions in Warangal

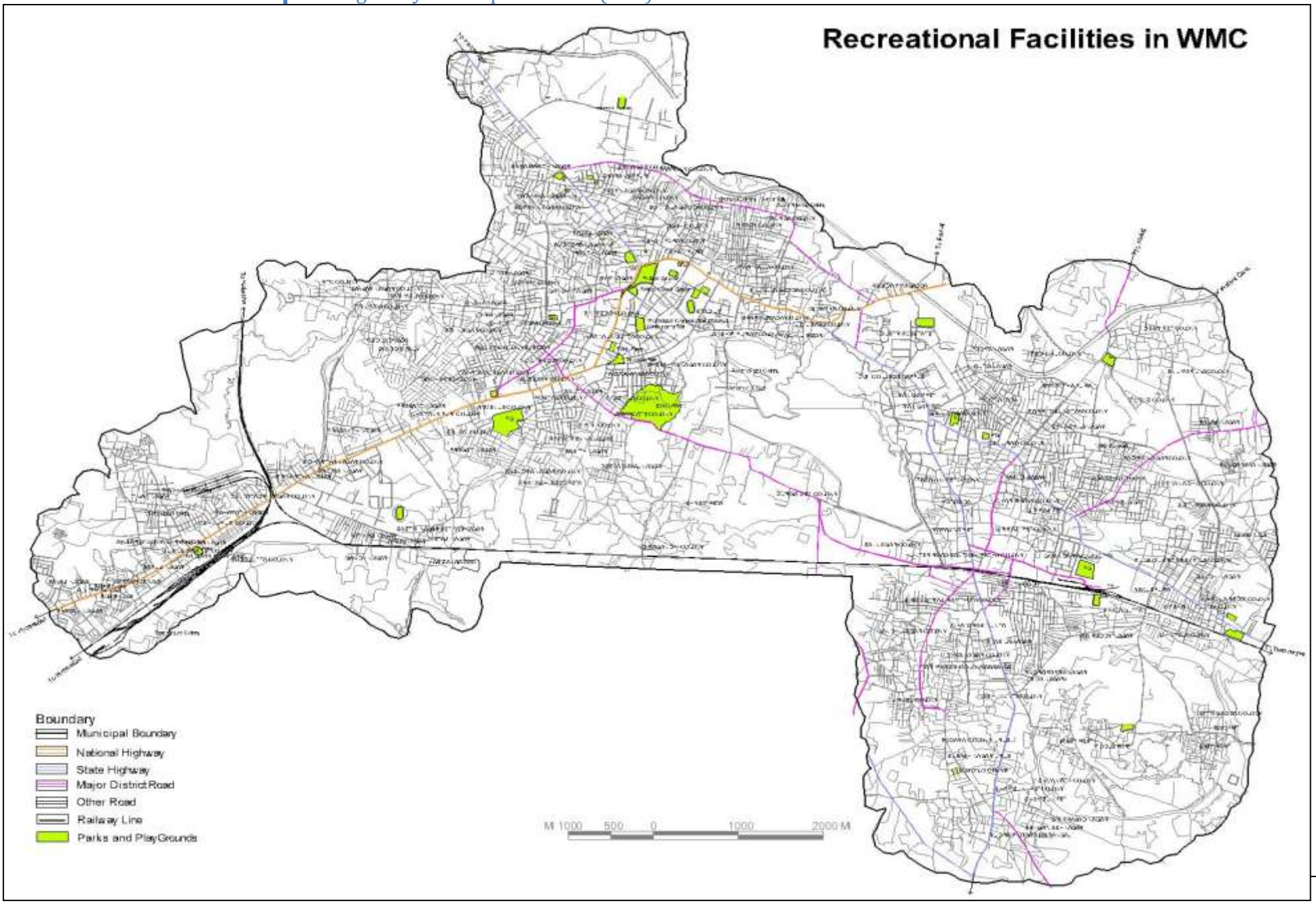
Health Facilities

There are 129 health centres in Warangal Municipal Corporation with total capacity of 2900 beds. The primary health centers which include the major hospitals like MGM hospital etc are 29 in number. In surrounding 42 villages there are 54 primary health centers and 30 secondary health centers. The tertiary health centers are within a average distance of 6.5 Km in for surrounding 42 villages.

Educational Facilities in WMC Region




Health Facilities in WMC
Legend
Municipal Boundary
National Highway
State Highway
Major District Road
Other Road
Railway Line
General and Intermediate Hospital
Nursing Home
M 1000 500 0 1000 2000 M


Recreational Facilities in WMC
Boundary
Municipal Boundary
National Highway
State Highway
Major District Road
Other Road
Railway Line
Parks and PlayGrounds
M 1000 500 0 1000 2000 M

15. Municipal Finance:

Current Scenario:

At present, the municipal accounts in Warangal Municipal Corporation are prepared on cash based single entry system. Under this system, the revenue realizations and expenditures are recorded on the basis of actual realizations and expenditures. In simple terms, receipts and payments are recorded after they are actually received or paid in cash.

The assessment of the municipal finances of WMC is based on the annual accounts for the financial years 2004-05 to 2008-09. All receipts and payments are classified into various heads of account and the closing balance at the year-end is arrived. The classification of transactions in municipal accounts has a closer reference to the functions, programs and activities of the municipality. The classification of each item of receipt and payment has to be made according to the head of the account to which it relates. A summary of the actual income and expenditures of WMC municipal fund is presented in the Annexure, which presents the actual figures, sectoral contribution and growth rates of key items of income and expenditure.

Warangal Municipal Corporation collected a Property Tax of Rs. 1893.89 lakhs against the total current demand of Rs. 2664.22 lakhs for the year 2009-10. The arrear collection was Rs. 415.28 lakhs against the arrear demand of Rs. 623.22 lakhs for the financial year 2009-10. WMC collected an Advertisement Tax of Rs. 37222/- against the current demand of Rs.____ for the year 2009-10. The arrear collection was Rs. 40122/- against the arrear demand of Rs.___ for the financial year 2009-10.

Assessment of Finances of WMC:

The finances of WMC have been reviewed for five years from 2005-06 to 2009-10. In the Annual Accounts of WMC, the receipts and payments, both revenue and capital, are detailed out under various heads viz., general account, lighting account, water and drainage account, town planning fund account and deposits and advances accounts, etc. The items of both receipts and expenditure may broadly be classified under revenue and capital accounts as per their sources and uses.

Revenue Account

The revenue account comprises revenue income/receipts and revenue expenditure. Revenue receipts are recurring in nature and comprises own/internal sources of the urban local body i.e. taxes and non taxes and external sources - in the form of shared taxes/transfers and revenue grants from the state and central governments. Revenue expenditure also has recurring nature and comprises expenditure incurred on salaries and allowances, pensions, routine operation and maintenance cost, and debt servicing etc.

Capital Account

The capital account comprises capital income/receipts and capital expenditure. The capital income of WMC comprises grants, and contributions. Corporation has not availed any loans in the recent past. In 2007-08, the total capital receipts of WMC were Rs. 272.75 lakhs, where in

the capital expenditure of Rs. 779.29 lakhs was made towards the roads improvement, water works, public health, street lighting etc.

Head	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
Opening Balance	195.08	1017.69	554.38	265.56	96.27	465.75
Revenue Account						
Income	4295.57	3760.48	4543.54	5137.94	5340.8	5465.86
Expenditure	2686.44	3846.34	3838.24	4800.68		
Capital Account						
Income	202.69	710.63	148.52	272.75		
Expenditure	989.22	1386.54	1142.64	779.29		
Overall Surplus / Deficit	822.60	-761.77	-288.82	-169.28		
Closing Balance	1017.69	554.38	265.56	96.28	465.75	

Table 59:

Revenue Receipts

Own sources of Revenue Receipts include all the taxes imposed by urban local body viz., property tax, vacant land tax, etc and non- taxes such as water charges, rents from municipal properties, etc. Share of own sources to the total revenue income is 43.77 percent for the year 2009-10.

Property Tax

Property tax is the main source of revenue income to Warangal Municipal Corporation. It contributes to about 29.1 percent of the total income of the Corporation and about 79.17 percent of its own revenues. Annual Rental Value (ARV) method if followed for the collection of property tax. In this method, the Property tax is levied on all buildings and lands at a percentage of their Annual Rental Value. The components of Property Tax are:

1. tax for general purpose
2. water tax
3. drainage tax
4. lighting tax, and
5. conservancy tax.

For the year 2009-10, the share of property tax revenue to the total revenue income is 34.65 percent. The overall collection performance stands at about 71.09 percent of the total demand (2009-10) as on 31 March 2010, indicating tremendous scope for further improvement of collection efficiency. While the collection efficiency of the current demand was 72.45 percent, the collection efficiency of the arrear demand was only 66.63 percent.

Non-taxes

Income from Non-tax sources include fees and user charges levied as per the Municipal Act for the services provided by the Warangal Municipal Corporation. These include water and sewerage charges, income from building license fees, Market Fees, D & O Trades and

Encroachment and other fees. Share of non-tax revenues to the revenue income of Warangal Municipal Corporation is 14.43 percent for the year 2009-10.

Revenue Expenditure

Revenue expenditure of Warangal Municipal Corporation has been analyzed based on expenditure heads which are broadly classified under the following departments/sections of Warangal Municipal Corporation – Salaries of different departments including pensions, Operations and Maintenance of the Water supply, Public Health, Public Works, Electricity Charges for water supply and street lighting. Revenue expenditure is further classified into establishment, operations and maintenance and debt servicing. The Revenue and Capital expenditure is given n the table 60.

Establishment Expenditure

The establishment expenditure includes salaries and allowances paid to municipal employees and contract workers, routine office maintenance costs, etc. The expenditure on establishment accounted for about 30.66 percent of revenue income and 37.1 percent of revenue expenditure in 2009-10.

O&M Expenditure

Operation and Maintenance expenditure is spent for the purpose of the routine engineering maintenance of the water supply and drainage networks, sanitation, solid waste management and roads. The O&M expenditure accounted for 51.7 percent of the total revenue expenditure and 42.8 percent of the total revenue income in 2009-10.

		2005-06	**2006-07**	**2007-08**	**2008=09**	**2009-10**
	Opening Balance	1017.68	554.38	285.56	96.27	465.75
1	Taxes	1446.26	1512.37	1827.58	2043.21	2144.33
2	Non Taxes	637.93	649.38	694.73	784.70	788.65
3	Assigned Revenues	2035.53	2257.21	2615.61	2512.89	2532.88
4	Non Plan Grants	649.84	143.09	272.75	0	0
5	Plan Grants	687.98	1891.62	961.82	1572.38	1062.70
	Grand Total Receipts	**6475.22**	**7008.05**	**6638.05**	**7009.45**	**6994.31**
	Establishment	1009.41	1374.51	1600.06	1620.86	1675.78
	Maintenance of Service	2108.80	2261.66	2010.47	2143.04	2338.96
	Capital Works	2287.33	2524.83	2395.56	2173.01	2372,01
	Others	515.30	581.49	535.69	606.79	505.52
	Grand Total Exp.	**5920.84**	**6742.49**	**6541.78**	**6543.70**	**6892.27**

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The receipts and expenditure of WMC are being maintained under following major heads:

		Ordinary Receipts	Capital Receipts	Ordinary Expenditure	Capital Expenditure
A	**General Account**	• **General Taxation** Property Tax Advt. Tax Entertainment Tax Vacant Land Tax Warrant Distraint fees Fines, Forfeitures Stamp Duty Copying fee Miscellaneous Recpts • **Management** Law – cost s recovered Transfer from grants • **Communications** Sale of forms Time barred Cheques Mutation fees FC grants Drainage Tax Waqf Board grants FDR withdrawls • **Public Health** B&D registration fee D&O Trade fee • **Remunerative enterprises** Market fees Slaughter house fee Shop rents Guest house rent Auctions • **Investments realised**	• **Management** Loans Per capita grants Contributions • **Communications** Non Plan grants SFC grants MLA LAD MP LAD	• **Central Mgmt** General Estb – Salaries Pay Commission Computers, personnel Honararia – Mayor Stationery, Printing Office furniture Postage, Telephone Miscellaneous Exp. Elections General Body exp. Training – officials FDRs Study tours Law charges Contract Labor charge Vehicle hire charges Funeral charges • **Communications** • Road maintenance • Drain maintenance • Asset maintenance • **Public Health** PH staff salaries Pensions Contingencies Vehicle hire charges Chemicals costs Fairs, Festivals Medical Camps Private sanitation • **Remunerative Enterprises** • **Investments made**	• Drains Capital • Roads Capital • Buildings • Parks & PGs • Community Halls • Fairs, Festivals • Beautification • Repairs/ maintenance • Cost of Land • Central Lighting
B	Lighting Account	• Subsidiary A/c	• Subsidiary A/c	• Street Lights	
C	Water Supply & Drainage Account	• Water Charges • Tap Donations • RWH fees • Boring fees • W. Tanker charges	Nil	• Pay & allowances • Pension Contri. • Hire charges • Private tankers • Chemicals • Vehicle repairs • Borewell charges • Filter bed repairs • SS tank maintenance • WS pipelines • RWH	• WS expenditure • Road cutting charges • Junction improvements • Desilting borewels •
D	Town Planning Fund Account	• Encroachment fee • Planning fee • Club rent • Betterment charges • Sports cess • Site rents • Open spaces fee	• Layout Charges • Cost of Land • Development Charges	• Pay & allowances • Pension Contri • Planetorium maint. • Survey charges • Legal charges • Contingencies	• Subsidiary A/c
E	Deposits and Advance	• Deposits • Advances	NIL	• Deposits • Advances	NIL
	Endowments A/c	•		•	
	Conservancy Fund	•		•	

Table 60:

Revenue Receipts/Income of the last five years (in actual):

#	Head	2003-04	2004-05	2005-06	2006-07	2007-08
I	Taxes					
	a) Property Tax	615.32	685.25	551.43	579	608
	b) Scavenging Tax	45.25	75.29	65.29	87.98	92
	c) Water Supply & Drainage Tax	335.49	411.39	340.32	355.32	373
	e) Lighting Tax	343.25	450.35	385.35	395.32	415
	Total Property Tax	1339.31	1622.28	1342.39	1417.62	1488
	f) Advertisement Tax	22.27	30.34	66.05	8.35	55
	g) Cable Tax	0	0	0	0	0
	h) Animal & Vehicle Tax	0	0	0	0	0
	Total Taxes (a) to (h) :	1361.58	1652.62	1408.44	1425.97	1543
II	Non Taxes					
	a) Tap rate Charges	542.28	590.3	637.93	646.36	678
	b) Excess Water Charges	0	0	0	0	0
	c) Drainage Cess	0	0	0	0	0
	d) Water Supply Contribution (Capital- on)	85.37	75.37	106.75	97.35	100
	e) Market Fees	0	2.25	6.35	11.58	12
	f) Quarters Rent	1.12	0.52	1.1	2.5	3
	g) Slaughter House Fees	4.19	4.01	4.2	2.76	3
	h) Shop Rooms Rents	16.75	24.89	3.97	3.57	4
	I) Encroachment License Fees	3.68	22.06	23.84	1.91	2.5
	j) D & O Trade License Fees	23.12	11.77	55.47	47.68	50
	k) Betterment Contribution	110.03	112.02	102.13	203.87	214
	l) Building License Fees	96.81	83.98	80.03	85.03	89
	m) Layout Fees	0	0	0	0	0
	n) Miscellaneous Receipts	187.94	337.75	367.45	375.25	385
	Total (a) to (n)	1071.29	1264.92	1389.22	1477.86	1540.5
	III Assigned Revenues					
1	a) Entertainment Tax	238.83	185.73	125.03	116	122
2	b) Surcharge on Stamp Duty	557.59	563.86	416.79	522.73	548
3	c) Profession tax compensation	114	114	114	114	114
4	d) Offset loss of Property Tax	8.8	8.8	8.8	8.8	8.8
5	e) Motor Vehicle Compensation	6.1	6.1	6.1	6.1	6.1
6	f) Others	0	0	0	0	0
	Total (a) to (f)	925.32	878.49	670.72	767.63	798.9
IV	Grants					
1	Per Capita Grant	38	38	38	38	38
3	Pay & D.A. Grant	0	0	0	0	0
4	Secondary Education Grant	0	0	0	0	0
5	Elementary Education Grant	0	0	0	0	0
6	S.J.S.R.Y. Grant	58.87	0	0	72.3	75
7	E.I. Scheme Grants	0	0	0	0	0
8	Flood Grants	0	20	0	15	20
9	MP Lads	30.43	59.27	13.57	10.21	50
10	ASC	76	20	50	10	50
11	Crucial Balance	13.05		5.6	0	0
12	11th Finance	60	0	12.5	0	0
13	12th Finance	0	0	0	359	400
14	Rajiv Nagara Bata	0	0	0	40	0
	Total Grants	276.39	142.87	114.07	544.51	633
	Grand Total	**3612.21**	**3938.9**	**3582.4**	**4215.9**	**4515.4**

Source: WMC

Municipal Revenue Expenditure (Rs. in Lakhs)

Year	Establishment (wages and salaries)	Operation and Maintenance	Interest payment	Others	Total
2003-04	1034.50	1445.18	NA	NA	2479.18
2004-05	1072.81	1079.99	NA	NA	2152.8
2005-06	1134.89 (1009.41)	1805.23 (2108.80)	NA	NA (515.3)	2940.12 (3633.5)
2006-07	1192.00 (1374.51)	1803.96 (2261.66)	NA	NA (581.49)	2995.96 (4217.6)
2007-08	1251.90 (1600.06)	1851.00 (2010.47)	NA	NA (535.69)	3102.9 (4146.6)
2008-09	1620.86	2143.04	NA	606.79	4370.7
2009-10	1675.78	2338.96	NA	505.52	4520.3

Source: WMC

Section wise Expenditure for O&M (Rs. In Lakhs)

Items	2003-04	2004-05	2005-06	2006-07	2007-08
a) Roads	22.74	85.73	75.54	79.24	81.00
b) Secondary Schools	0	0	0	0	0
c) Elementary Schools	0	0	0	0	0
d) Dispensaries	0	0	0	0	0
e) Public Health	245.28	289.11	373.82	400.82	421.00
f) Parks	9.37	4.44	50.26	80.95	45.00
g) Street Lighting	177.56	113.17	146.33	165.25	173.00
h) Water Supply	333.72	395.31	416.34	437.15	459.00
I) Departmental Buildings	42.01	16.93	420.77	62.35	65.00
j) Drains	13.17	13.69	43.83	52.35	55.00
k) Latrines & Urinals	375.99	135.84	164.00	75.00	79.00
l) Stationery, Printing, Contingencies & Other Miscellaneous	225.34	25.77	114.34	450.85	473.00
Total Taxes (a) to (i) :	1445.18	1079.99	1805.23	1803.96	1851.00

Key Financial Indicators:

Items	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
Operating Ratio	1.91	0.97	1.26	1.55		
Capital Utilization Ratio	0.21	0.45	0.09	0.17		
Share of Establishment Cost	0.54	0.82	0.71	0.68		
% Revenue Spent on Establishment	49.8	38.6	39.8	40.3		
Debt Servicing % of Income	NA	NA	NA	NA		

Governance Reforms:

Reforms and Change are critical elements in development process, and they become more significant in urban development process in the context of growing cities and consequent pressure on infrastructure services, growth of poverty, etc. These challenges of growing cities are further compounded by institutional constraints like inadequate capacities, fragmented structures, functional overlaps and dated processes and procedures. Governance reforms have become imperative for efficient delivery of services, provision and maintenance of infrastructure and to provide efficient and responsive governance to the people.

Recognizing the significance of reforms to provide efficient and effective governance, various state governments including Andhra Pradesh, Tamil Nadu, etc., have initiated several urban sector reforms during the last decade. Similarly the urban local bodies particularly the municipal corporations have also initiated some city specific reforms to improve governance. Prior to the launch of JnNURM in 2005, most of these reforms have been individual initiatives, often project based, at respective city and state level without a common framework for integration at national level.

JnNURM synthesized these reform initiatives of the past and designed a comprehensive urban reform agenda which forms a part of the tripartite Memorandum of Agreement (MoA) between Ministry of Urban Development, Government of India, the state government and the urban local body. The states and cities have committed to a specific timeline for implementing these reforms within the Mission period, failing which the Mission cities would find it difficult to access the additional central assistance from Government of India under the Mission.

Reform Commitments under JnNURM and UIDSSMT:

Government of Andhra Pradesh and the mission cities covered under JnNURM and UIDSSMT have given their commitment to implement the envisaged Reform Agenda in order to receive funding support under the Mission for urban investments. Following are the state level reforms to be implemented by Government of Andhra Pradesh before 2012.

- Implementation of 74th Constitutional Amendment Act.
- Repeal of ULCRA.
- Reform of Rent Control Laws balancing the interests of landlords and tenants.
- Rationalisation of Stamp Duty to bring it down to no more than 5 per cent.
- Enactment of the Public Disclosure Law.
- Enactment of the Community Participation Law to institutionalize citizen's participation
- Assigning or associating elected ULBs with "city planning function".

Identified as one of the mission cities under UIDSSMT, Warangal Municipal Corporation has signed an MoA with the State Level Nodal Agency in January 2007 and has committed to implement the reform agenda as per the guidelines of UIDSSMT. Following is the list of six ULB level mandatory reforms to be implemented by Warangal Municipal Corporation by 2012.

- Adoption of modern accrual-based double entry system of accounting
- Introduction of a system of e-governance using IT applications, such GIS and MIS
- Property Tax Reforms

- Levy of reasonable user charges with the objective of recovery of full recovery of cost of O&M or recurring costs.
- Internal earmarking of funds in the budgets for basic services to the urban poor.
- Provision of basic services to the urban poor including security of tenure at affordable prices, improved housing, water supply and sanitation.

City Level Reforms - WMC:

The Warangal municipal corporation has been implementing various reforms initiated by state government aimed at improvement in service delivery and strengthening of municipal performance in the city. Some of these reforms are discussed below.

a. *Computerization of Municipal records:* The Corporation initiated the process of computerization of municipal records, aimed at improving the service delivery efficiency of the ULB. WMC could provide facilities for online payment of taxes, which not only increased the tax payer satisfaction levels but also contributed to the increase of municipal revenues.

b. *Rationalization of fee structure for mutation and valuation certificates:*

c. *Birth and Death Certificates – Spot Issue:* Certificates can be directly obtained from Hospitals. In case of birth or death, the certificate can be obtained within five days period. The processes have been streamlined to reduce the time effort and resources. Since 2000, the birth certificates are issued even on Sundays. In the current process, soon after the application is received, the database is updated in the computer and a printout of computerized certificate is given. These computerized certificates are signed by the MHO and forwarded to the municipal counters for delivery to the applicant within a stipulated timeframe.

d. *Updating of Accounts and Audit:* The preparation of accounts and their audit is under process by the Accounting Professional employed by WMC. The internal audit is helping the Municipal Corporation to check the misuse of funds

e. *Expenditure Control:* Several measures were introduced towards reduction of establishment expenditure and to reduce/eliminate wasteful expenditure.

f. E-Seva counters set up at five locations within the city at (1) behind WMC head office, (2) Charboli, (3) Shivanagar, (4) Nakalagutta (Hanmakonda), and (5) Kazipet, and to increase the collection efficiency. Some of the major transactions handled by e-seva counters are, water bill, electricity bill, quarterly tax, yearly tax, RTA- life tax, driving license, and telephone bills (postpaid)

g. *Computerization and modernization of office systems:* The computerization has been undertaken at the office of the municipal corporation with the amount of Rs. 50.00 lakhs, sanctioned under APUSP. This facilitated a transparent and efficient service delivery as well as online updating.

h. *Capacity Building:* In tune with the state government's policy, all the officials and elected representatives are being periodically trained and oriented on management as well technical aspects of municipal functioning. This is helping the municipality to improve efficiency as well as public image. Up gradation of skills, development of team work, better office management, harmonious relations between political and executive functionaries are some of the benefits of capacity building efforts.

i. *Strengthening of Town planning with GIS:* The Municipal Corporation has initiated the process for the database creation for the entire city on all aspects of civic management using GIS technology. This is expected to facilitate rationalization of house numbering, preparation of the Master Plan, etc. Knowledge gaps among the staff are a serious limitation for full utilization of GIS. To overcome this training is being imparted to the staff on GIS applications to make full use of the technology. This initiative is ongoing and undertaken by APUSP.

j. *Weekly Review Meetings with Staff:* Review meetings are being conducted with the municipal officials every week, and line departments every week to review the progress, identify the gaps and issues, and to plan alternative courses of action to overcome the problems. This is proving to be an important tool to improve municipal efficiency.

k. *"Face to Face" Interaction with Citizens:* To directly understand the grievances of the community and to solve them immediately without any loss of time a "face to face" interaction with citizens is being under taken in WMC. This has been a popular initiative in Warangal and citizen grievances were being resolved much to their satisfaction.

l. *Call Center:* A call center has been established in 2006, which provides a dedicated phone line facility (a unique number 103) to which citizens can call up and register complaints/grievances over telephone. The complaints can be registered either online or through a telephone. It is envisaged that the complaints are resolved within specified timeframe, and due acknowledgement of complaint redressal taken from concerned complainant. The water supply complaints are escalated to Additional Engineer and those related to Solid Waste, Sanitation or Drainage is escalated to Municipal Health Officer.

m. E-Governance

Streamlining and decentralising tax collection system to facilitate easy access to the citizens

- Agreement with e-seva of the state government for payment of bills in 10 centers
- Agreement with….Bank to accept tax payment
- Establishment of online tax collection centres by corporation at 15 centres in important places including slums
- Establishment of two mobile tax collection centres
- Internet centers owners authorized to collect municipal taxes by executing bank guarantee to the corporation

A **citizen charter** is established in the WMC with the following mandate:

	Timeframe to attend complaints	**Time Frame**
1	**Sanitation**	
	Lifting of garbage	24 hours
	no sweeping	24 hours
	removal of drain choking	48 hours
2	**Emergency Operations**	
3	**Birth and Death Certificates**	
	Issues of Birth & Death Certificates & Non availability certificate	5 days
	Inclusion/Correction of Name in Birth Certificate	3 days
	Issue of Birth & Death Certificates in case of non institutions	1 week
4	**Trade Licence**	**2 weeks**
5	**Roads**	
	Filling up Pot Holes	7 days
	Removal of Obstruction on roads	3 days
	Road Cutting Permission	7 days
6	**Rain Water Harvesting**	
	Blockage/Choking of drains	1 day
	Replacing of catch pit covers	3 days
	Removal of water stagnation	1 day
7	**Town Planning**	
	Grant of Individual Building Permission	15 days
	Grant of group housing scheme	30 days
	Grant of Multistoried Building	30 days
	Plot sub division approvals	30 days
8	**Sanction of Tap Connections**	**15 days**
9	**Mutation of Property**	**7 days**
10	**Issue of Ownership, No-Due Certificates, extract of assessment**	**5 days**
11	**Assessment of Property Tax**	**15 days**

Key Issues and Concerns in Governance

Multiple agencies operate within a city and are involved in the delivery of services to citizens. Despite having overlapping roles and responsibilities towards the provision of infrastructure and service delivery, some of these agencies have their own priorities, procedures, lines of accountability, financing patterns, which often may not be in conformity with those of the ULB. Lack of inter departmental coordination in such situation becomes a serious roadblock for effective municipal governance.

In addition to WMC, the city of Warangal has decent presence of regional and district offices of various state government departments and parastatal authorities i.e., KUDA, APSRTC, AP Transco, R & B Dept., AP Tourism Corporation, APPCB, etc. Thus, there are many managers connected with service delivery and infrastructure provision. In addition to general coordination between urban and rural local authorities, between urban local authorities and managers, there are several inter-departmental and inter-institutional coordination issues which arise in day to day administration. Some concerns emerging due to existence of multiple service delivery agencies are highlighted below:

Coordination between ULB and Development Authority: KUDA is preparing master plan for Warangal Municipal Corporation area. The plan provides for common infrastructure systems and amenities, which transcend municipal boundaries. Plan implementation appears to be a bigger challenge as real problems emerge only then. There appear to be coordination concerns between WMC and KUDA in aspects related to provision of inter-municipal, inter-district and inter-state roads, common amenities like wholesale markets, truck terminals, bus stations, garbage dumping yards, landfill sites etc.

Poor coordination and conflict between the local elected body and government appointed executives of ULB, is not favoring the smooth planning and functioning of Corporation.

Need for formal Coordination Mechanism: Inter agency coordination is a concern and needs to be addressed on a priority basis by various service delivery agencies operating within the city. The service delivery often suffers when more than one agency is involved and there is no mechanism in place to ensure coordination among these agencies. What citizen looks for is 'quality of service' and would be least concerned about whose responsibility it is to deliver the service.

The institutional strategies required include:

1. Establishing clear lines of accountability of all service delivery agencies, and
2. Constituting autonomous service delivery agencies in different sectors like water and sanitation, transport, roads, solid waste management etc.
3. Performance based memorandum of understanding between the corporation and various service delivery agencies focussing on targets and outcomes.
4. Establishing a Reform Monitoring Unit as a oversight body to monitor the reforms underway and being proposed;
5. Strengthening local government capacities by outsourcing the project management and M&E functions;
6. Establishing appraisal institutions and processes;
7. Strengthening decentralisation – 74th CAA
8. Evolving inclusive governance mechanisms
9. Evolving partnerships for service delivery
10. Establishing coordination mechanisms to overcome spatial and functional fragmentation

Warangal CDP - Part 2

SWOT Analysis

Stakeholder Consultations and Feedback:

City Level Orientation Workshop on 2-3-2010 - Stakeholder Priorities identified

1	Solid Waste Management: • No official Dumping yards and no Solid Waste treatment Practices are happening • Proposed new dumping yard for SWM may be developed on a priority in the land already earmarked for the same. • Development of dumping sites for city localities in the allocated 32 acres of land
2	Sanitation, Sewage and Drainage: • Improper disposal of sewage and sullage into the open drains is a major concern. The outlets of individual toilets seem to be directly connected to open drains leading to several public health issues. Need for good septage management • Urban poor and open defecation in slums in WMC • Need for improvement of drainage system
3	Water Supply: • Poor Water Supply Coverage esp. individual connections and low water availability • Citizens perceive the coverage of water supply to be only 10-15 percent of WMC • Urgent need to regularize illegal water supply connections – domestic and commercial • Metering of under assessed commercial water connections on a priority • Water supply 178 crores project-Internal connection of water supply quality of supply and quality of pipelines, usage, pressure of water, maintenance, Water quality checking, water reservoirs, conservation of existing water bodies. • Existing water supply source might be insufficient for future needs. Need to identify the additional water supply sources, especially to cater to needs of surrounding villages. • Preservation of existing water bodies in surrounding villages on a priority basis, through necessary regulations. • Water supply connections in slums are major issue • Input of water content and output of water content, operational waste to be looked • Filter Beds and water sources and Rain water harvesting • Water Supply and Sanitation issues at Ram Nagar and Bodgutta areas • Water supply Badrakali, Waddepalli tanks got dried in summer all population who are dependent on that are using bore wells • Need for focused efforts on Quality of water supply & distribution system in WMC • Water supply- Improvement of water quality and efficient supply, recycling of water
4	Roads and Transport: • Electricity Department and roads and Municipal Corporation should be co-ordinate properly • Link roads to be developed with respective to the main road which is existing in the city • Tourism could be one of the major strength of the city. Need for concentrated and coordinated efforts by transport and heritage departments to capitalize and exploit the tourism potential of Warangal • Linkages of road to Educational Institutions and other services • Parking places in the city should be proposed • Traffic and Transportation-Public Transport, Widening of roads, cycle & pedestrian paths, signal systems efficiency improvement, Aiming at 30% of trips to be walk trips, parking locations allotment in WMC area. & Outer ring road to WMC • Footpaths / signage of speed breakers manholes and hawkers are major problems under transport • Only one road exists between Kajipet & Warangal. Alternative roads to state highway Link roads needs to be develop. • Coordination between NHAI & R&B, WMC, Electricity department • Coordination between RTA, APSRTC, Traffic Police, WMC, APPCDL, Kuda
5	Urban Planning: • Identification of Existing Market places. Markets and decentralization of markets to spread the entire city area with respective to spatial planning • Warangal to be developed as a heritage city because of its high tourism potential • Identification of slum areas, top priority to the slum improvement
6	Municipal Governance: • Need for improvements in complaint redressal system to make it more efficient • Need to include the municipal financial data of 2008-08 and 2009-10 • Educating and increasing awareness level to the city citizens • Need to formulate and implement sector wise projects • Need for concentrated efforts on Revenue Mobilization
7	Urban Environment: • Air quality and noise and water quality data. • Ground water levels and quality of ground water • Buffer Zones and environment/ green zones should be developed in and around city

CDP Technical Group (CTG) Meetings:

As a part of CDP process and as an outcome of City Level Stakeholder Orientation Workshop held on March 2nd 2010, Technical Groups/Committees (CTGs) were constituted and used as important tools for providing a platform for initiating a dialogue and discussion leading to key sectoral issues, concerns, priorities, and strategies. The CDP Policy Committee was also constituted along with the above to drive the entire process of CDP preparation.

It was envisaged that the CTGs constituted for a group of key prioritized sectors would hold deliberations with a predefined terms of reference drafted for the purpose. Till the draft strategic action plans as well as specific investment proposals for their respective areas are prepared and finalized, the CTGs will meet regularly. The details of the meetings held and the stakeholders, officials and non officials, who participated in these meetings are given in Annexure. The outputs of these discussions in the form of concerns, suggestions and recommendations have been captured while formulating the draft strategic action plan for the city along with city investment plan. After the final approval of CDP Policy committee, the same would be shared in a city level stakeholder consultation.

The list of six CTGs constituted is given below:

#	CDP Technical Groups/Committees (CTGs) - Thematic areas
1.	Infrastructure and Service Delivery (Water Supply, Sewerage & Storm Water Drains)
2.	Land Use, Traffic and Transportation
3.	Environment, Sustainable Development and Disaster Management
4.	Social & Livelihoods, Poverty and Slum Upgradation, Local Economic Development
5.	Heritage Conservation, Culture and Tourism Development
6.	Municipal Institutional Strengthening (Governance, Municipal Finance)

The generic terms of reference for the CTGs are as follows:

- To review the background studies, concept papers and other relevant documents and assess the current status
- To review the ongoing policies, programmes and initiatives and the roles and responsibilities of respective institutions
- To identify key challenges, concerns and priorities for the identified working group area
- To formulate the specific strategies leading to strategic action plan
- To formulate specific investment requirements leading to city assistance programme

Approach : Each CTG comprising 5-6 members was envisaged to meet around three to four times to identify the key issues, concerns and priorities and to formulate strategic action plan and specific investment programmes for the identified sectoral area. One of the CTG members was identified as the Convener of the Group to coordinate the dialogue and discussions and prepare a small working group report.

City Vision

Drawing from the city assessment and the critical issues as outlined in previous chapters, this Chapter seeks to identify some of the key strengths and weaknesses which characterize the city of Warangal, as well as some of the significant opportunities and possible threats which the city faces. This analysis is in consonance with the SWOT Analysis framework and helps establish the foundation on which the City Vision has been structured.

In order to ensure that this Vision is owned and shared by local stakeholders in Warangal, it has been finalized in discussions with and taking inputs from all key stakeholders in Warangal. This City Vision is further reinforced by developing a unique vision for each of the sectors covered by the CDP. Finally, development strategies for each of the sectors have been set out in this chapter. These development strategies set the overall direction of reform for each sector and will be implemented through the various projects identified in the following chapter.

SWOT Analysis of the City

Several rounds of discussions and consultations were held with key stakeholders in Warangal, including the Mayor (Warangal Municipal Corporation), Corporators and other Officials of the Municipal Corporation, the Municipal Commissioner (Warangal Municipal Corporation), the District Collector (Warangal) and prominent citizens from the city, with a view to understanding some of the inherent strengths and weaknesses of the city. The following table captures the key strengths and weaknesses which emerged from these consultations and also outlines some of the opportunities and threats which Warangal faces. The objective of this exercise is to build on the strengths, which act as drivers of growth, and address the weaknesses through establishing a long term vision for growth and development, and establishing clear development strategies, so as to take advantage of opportunities in diverse economic sectors, social development and inward investment and also to mitigate potential risks and threats which the city is likely to face in the future.

City SWOT:

Strengths	Weaknesses
• Place of Historical and Cultural Significance • Serving as regional hub for various activities • Presence of numerous academic institutions/ availability of technical expertise • Good regional road connectivity • Excellent potential for tourism and heritage • Availability of local skills • Good regional connectivity	• Significant infrastructure deficiencies – Water Supply (non availability of raw water and adequate distribution network facilities), Sewerage and Drainage, Solid Waste Management • Poor tourism infrastructure • Poor civic governance capacities (both finance and HR)
Opportunities	**Threats**
• Potential for heritage tourism • New Improved JnNURM	• Environmental degradation of natural resources (diminishing number of water bodies)

Analysis of Strengths:

The city of Warangal has rich tourism and heritage importance and attracts thousands of tourists every year. This historical significance of the city which dates back to early dynasties of Buddhist Periods of Indian history, the Andhra Kings and the Hindu Shaivate kingdom ruled by Kakatiya Dynasty. This preponderance of mythology reinforced by strong religious traditions manifests itself in a number of regional festivals (Bathukamma festival, Sammakka-Saralamma Jatara, etc) and temples. Warangal has always been a magnet not just for regional and national tourists but also for international tourists who flock to the city throughout the year to discover ancient heritage of the region. The town is therefore in a unique position to leverage these well entrenched attributes in order to showcase itself as a front-runner among tourist destinations in the State.

The city also possesses an ambient climate and a pleasant natural setting. The inimitable combination of the historic places, the temples and the nearby water bodies makes it an ideal spot for tourists. The city is also well connected by rail and road to Hyderabad and other cities in the state. In addition, the city already possesses decent quality hotels, providing an ideal environment for sustaining and boosting tourism in the city. Warangal has a tradition of local skills in……, the latter, in particular, has significant economic potential if leveraged efficiently with prospective markets beyond the borders of the country.

Analysis of Weaknesses

The city faces a number of infrastructure deficiencies, primarily in the areas of water supply, sewerage and drainage, and solid waste management. Not only does this impact the quality of life of residents, but it also poses a significant threat to the fragile environmental and ecological balance in the city. Although the city an excellent tourism potential, it appears to be largely untapped due to inadequate tourism infrastructure, in terms of …….. Finally, the overall quality of civic governance has been hampered by a lack of financial resources as well as technical capacity of the local government agencies responsible for managing the city. This will need to be significantly augmented if the city is to make rapid strides on the path to reform.

Analysis of Opportunities

Today, global forces are creating unprecedented opportunities for growth. Many growth opportunities have also emerged from India's ongoing economic reforms. Andhra Pradesh is in a good position to capture these opportunities—and has already made some breakthroughs in doing so. Going forward, the State can capitalise on its many strengths to create strong and rapid growth. To achieve the targeted level of development (Vision 2020), Andhra Pradesh will need a three-fold approach: (1) building capabilities, i.e., developing human resources, improving the quality of life in the State, and attracting investment in its economy; (2) focusing on high-potential sectors as its engines of growth; and (3) transforming governance, i.e., channelling the Government's efforts into enabling and facilitating economic growth.

In this current milieu, Warangal stands to gain significant ground if it is able to project itself as a well developed tourist destination with a range of diverse tourist attractions ranging from eco-tourism to religious, cultural and heritage tourism, with amenities to appeal to a cross segment of prospective tourists, from international to domestic to local. The city stands to gain significantly from the opportunity presented by the New Improved JNNURM. This programme, in addition to providing grant funding for permissible components, enables the city to develop a well planned reform agenda and establish institutional mechanisms for sustaining growth and development in the city.

Analysis of Threats

Warangal has been witness to continuing environmental degradation of natural resources with a visible effect especially on the water bodies in recent times. In addition, the pressures of playing host to a large number of tourists and visitors in normal course and also during the regional festivals have also added to the challenge of preserving the local environment.

Warangal City Vision

City Vision is one of the cornerstones of the City Development Plan. This vision encapsulates the core values of the city and also outlines in a succinct, yet unambiguous manner, the direction in which the city desires to progress. The vision, which is formulated, shared and owned by all the key stakeholders in the city, also lays the foundation for identifying strategies for development along the various themes and sectors which make up the development plan of the city.

"Warangal City aspires to be the centre of heritage and cultural tourism, an inclusive and futuristic city providing high quality services with universal access including the poor. It will be slum free, citizen friendly, well governed and environmental friendly city"

OR

To transform Warangal into a vibrant regional economic hub, through urban renewal and infrastructure development

Sectoral Strategies

The Sector Plans are prepared to provide a realistic and time-bound plan for prioritised ULB-level projects to be implemented in 5 to 10 years time frame. These shelf of projects are prepared through a technically sound, participatory and transparent process. Depending upon the scope and urgency in the local context, the Warangal Municipal Corporation would finance some of the projects through its own sources, government grants, borrowings or public-private partnerships and would initiate a set of improvement initiatives in operations and maintenance of municipal assets.

Water Supply:

Demand Assessment:

Adequacy assessment of water supply, in the earlier section indicates - inadequate service levels for citizens including the tourists; inadequate coverage in the newly developing areas and surrounding 42 villages; and inability to ensure supply on continual basis. This present scenario is likely to deteriorate further given the future growth of the City. Total water demand and net surplus or deficit for the ULB is estimated for Base year (2010) and for the future (2026) on a standard water consumption rate of 155 lpcd, and is tabulated below.

Water Demand – Greater Warangal

Year	Estimated Population (In Lakhs)	Water Demand (MLD) @162 lpcd	Availability (MLD)	Surplus/Deficit (MLD)
2011	963000	156	72	84
2016	1121000	182	-	109
2021	1276000	207	-	134
2026	1453000	235	-	163
2031	1655000	268	-	196
2036	1886000	306	-	233
2041	2148000	348	-	276

Considering the current deficits and the future requirements for water supply, a set of strategies and projects are suggested in the subsequent sections.

Sector Vision and Strategy:

Water Supply Vision: *"To assure adequate and equitable daily water supply at reasonable hours within two years, and aspire to provide continuous (24X7) Water Supply to its citizens"*

- To achieve equitable spatial growth through planned provision of supply in newly developing areas
- To improve service quality: to provide 24X7 water supply or to provide atleast four hours of water supply daily at 135 lpcd
- To increase the coverage of water supply
- To recover all operational and maintenance charges through rationalized Water Tariff

Goals and Service Outcomes:

The goals and service outcomes based on the proposed strategy for the horizon period is presented in the table.

	Current Status	2016	2021	2026	2031	2036

Network Coverage to HHs (%)	32	60%	100%	100%	100%	100%
Per capita Supply (lpcd)	81	135	135	135	135	135
Hours of Supply	0	4	24	24	24	24
Quality of Water	0	80	100	100	100	100
Non Revenue Water	39	25	20	20	20	20
Consumer Metering	0	40	80	100	100	100
Cost Recovery (%)	100	100	100	100	100	100

Considering the current deficits and the future requirements for water supply, the strategies and action plans are suggested. For the provision of water supply in Greater Warangal, the WMC should facilitate creation of capital assets to meet the future requirements.

Water Supply - Strategic Action Plan:

Strategies and action plans for the water supply sector have been developed, covering policy level planning, reforms, institutional strengthening, source augmentation and service delivery aspects. Some of the initiatives are listed below:

Comprehensive Water Supply Plan:

The comprehensive water supply plan for Warangal focuses on the source augmentation, yield increase, adequate storage, and adequate distribution network reach and treatment facilities for future requirements.

Source Augmentation:
The Water Supply Improvement Scheme for Warangal being implemented by Public Health Engineering Department of Government of Andhra Pradesh under UIDSSMT provides for the construction of intake wells at Dharmasagar tank and laying of raw water gravity mains from Dharmasagar reservoir to treatment plants with a carrying capacity equal to the ultimate water demand of 248 MLD considered for 2036.

In view of proposed expansion of city boundaries with the inclusion of surrounding 42 villages, further augmentation of the existing source and identification of new source to meet future water demand seems pertinent.

What are the alternatives available ??

Enhancing Storage Capacity:
Additional storage reservoirs need to be created for the next 10 years to meet the future water requirement in Greater Warangal especially surrounding villages. Fifteen additional elevated service reservoirs (ELSRs) have already been proposed as a part of the ongoing Water Supply Improvement Scheme for Warangal being implemented by PHED.

Augment the water storage capacity for more equitable supply of water; augment capacities for dedicated storage for areas of tourist and cultural significance

Distribution Network:

Provision of additional water supply distribution network in the uncovered areas: The current network covers 80 percent of the road network and an additional 80 km of distribution network has already been proposed under the Water Supply Improvement Scheme being implemented by PHED. A further additional 200 km of distribution network is required to cover the present un-served population of both WMC and surrounding villages and also to meet the future water demand for the projected population of Greater Warangal as on 2031.

Treatment Facilities:
Enhancement of Water Treatment facilities by additional 76 MLD has been proposed at the three existing filtration plants of Wadepally (39 MLD), KUC (18.18) and Desaipet (18.18) as a part of the ongoing Water Supply Improvement Scheme being implemented by PHED. Provision needs to be made for additional water treatment plant of 50 MLD capacity to meet the ultimate water demand for 2031.

Water Supply System Rehabilitation Plan:

The water supply system rehabilitation plan for Warangal focuses on the need for partial or complete overhauling of existing water distribution pipeline and/or need for replacing old, defunct and inadequate piping system by proper distribution network.

Mapping & GIS:
To address the issue of system rehabilitation, mapping and establishing a GIS system is pertinent to detail out system location, characteristics, age and condition. This would enable identifying dilapidated sections of the network and those that require replacement. Spatial representation of the identified uncovered areas of water supply distribution network supports in assessing the day to day water supply demand for tanker supply in these areas.

Rehabilitation of Distribution Network:
Replacement of water supply distribution network for a length of 85 km in the core area of Warangal Municipal Corporation has already been proposed as a part of the ongoing Water Supply Improvement Scheme being implemented by PHED. Based on the outcome of Leak Detection studies, further provision for the rehabilitation of distribution system shall be explored.

Water Supply Asset Management Plan:

To address the condition assessment and the performance of the water supply assets, it is recommended that an asset management plan be prepared for Warangal city. Mapping & GIS initiative proposed earlier can be linked with this.

Water Supply Operation and Maintenance Plan:

The plan explores the potential options of involving the private sector for O&M (e.g. management contract). Phasing out Public Stand Posts (PSPs) and converting them into individual or group connections shall be explored.

Rationalisation of Water Tariff:
Future capital investments on system upgradation being imminent, the tariff structure shall be revised from time to time to enable cost recovery and to service the additional debt from capital investments.

Water Management Plan:

The plan includes comprehensive strategy for water management through leak detection, conducting energy audit study for checking of unaccounted for water and strategy for use of recycled water for non potable use, based on a pilot study.

Unaccounted for Water:
Warangal Municipal Corporation shall undertake leak detection studies to ascertain the volume of unaccounted for water. This to an extent, if corrected properly, would help the Corporation realize more water which can be ploughed into the system. Necessary improvements shall be proposed for the existing water distribution system by controlling leakages, and installing bulk domestic water meters, to control Unaccounted for Water (UFW). Leak detection study shall lead to carrying out rehabilitation of the water supply system.

Hydraulic Modeling:
Scientific method of designing water distribution network using hydraulic models shall be taken up, for establishing hydraulically independent District Metering Areas (DMAs) and increase customer connections.

Water Supply Metering: Phase wise metering starting with the high income areas

Water Conservation Measures:

Rejuvenate water bodies and make Rainwater Harvesting scheme (RWH) mandatory for every new development. Strict enforcement shall be made for Rain Water Harvesting.

Regularising the illegal connections:

Provision of incentives to legalize unauthorized connections

Institutional Strengthening and Capacity Building:

Human Resource Development Plan for the ULB highlights the staffing requirements and training needs for medium, long term. In addition to the recruitment of trained engineering personnel for management of water works, it is more important to ensure that these personnel are kept technically updated. It is necessary that periodic training is imparted to the operational staff of the WMC.

It is important to develop key performance indicators to monitor and improve the sustainable performance of the water supply system. It is essential to have a time frame to achieve the above mentioned plans. The time frame for water sector planning is given below.

	2011	2012	2013	2014	2015	2016
Water Supply Rehabilitation Plan						
Comprehensive Water Supply Plan						
Asset Management Plan						
Water Management Plan						
Mapping and GIS						
Piloting 24X7 water supply						
Source Augmentation						
Network Coverage for HHs						
Performance Benchmarking / Monitoring						

Project Identification for Improvement of Service

Proposed projects and sub-components to be undertaken for improvement of water supply to the city, as elaborated below.

	Project	Description of Project Sub components	Parameters
	Augmentation of distribution system		
	Laying of network surrounding villages and newly developing areas	Construction of distribution network to supply water from water treatment plant in the city to the peripheral villages. This will bring the villages under the municipal water distribution network irrespective to their location at high altitudes.	200 kms
	Laying of network in city area		60 kms
	Installation and Testing of New Consumer Meter	Installation of additional meters will include more consumers to enter into a legal water supply network system. This will enable significant reduction in NRW and increase in financial accountability. Further, inclusion of a meter system will also force end users to minimize water consumption and avoid wastage of water.	Approx.50,000 New Consumer Meters
	Replacement of pumping machinery	Proposed Locations – xxxx The pumping machineries in these areas have completed their operation life. Present condition of these pumps is worse with significantly reduced efficiencies and high O&M costs. The replacement of these pumps will enhance water supply service delivery in these areas	5 Nos. Pumping Machinery
	Rehabilitation of Old Distribution Network in City	Old, chronically leaking, irreparable pipes, especially in the old areas, where pipelines have exceeded their operation life will be replaced. This project will allow sufficient improvement in water supply levels and bring significant reduction in NRW.	Approx. 60 to 70 Kms
	Developing and implementing a Communication Strategy		
	Water Supply System Rehabilitation Plan	Mapping and GIS; Rehabilitation of distribution network	
	Water	Leak Detection Study and Rehabilitation of	

	Conservation and Management Measures	Assets as required. Energy Audit Study for all Pumps. Implementation of Water Harvesting for All new Constructions and for Major Public Buildings (existing and proposed)	

Project Screening and Prioritization

In the several stages of the consultation meetings, the list of projects identified - during the process of developing the CDP, field visits, discussions with stakeholders, and demand assessment; have been evaluated in relation to the service levels, growth trends and future needs of the City. Based on the listed projects and in consultation with the elected representatives, the municipal corporation has set-up CDP Policy Committee at City Level consisting representatives of all major stakeholder. The committee has gone through an elaborate process to finalize the projects and implementation priorities for their city, based on rationale, demand and sustenance; with assistance from the consultant. The project screening was based on priorities such as, ready availability of detailed project reports, project capital cost vis-à-vis benefit to the city, and the projects resolve to address the present drawback of the system and to achieve sustainable service levels in the future.

Cost Estimate for Prioritized Projects

The projected sector demand was compared with the supply from the existing source and the ongoing projects, to verify the adequacy and need to augment the capacity of certain components. Based on the above, proposed project components and cost estimates are tabulated below. Detailed list of project sub-components is attached in **Annexure.** Cost of proposed augmentation and improvement works for water supply for Greater Warangal is estimated at **Rs. 120 Crore**.

Proposed Project and Cost Estimates Water Supply

Project Components	Cost (Rs. In Crore)
System Augmentation Works	
Augmentation of Storage Capacity, Installation of Bulk Meters	50.00
Augmentation of Distribution System in WMC	25.00
Augmentation of Distribution System in surrounding villages	10.00
Installation of Consumer Meters	10.00
Sub Total - System Augmentation	95.00
Rehabilitation and Strengthening Works	
Replacement of Pumping Machinery	1.00
Replacement of Distribution Network	9.00
Sub Total - System Rehabilitation	10.00
Institutional Strengthening and Capacity Building	
Design and implementation of Performance Monitoring System	2.00
Design and implementation of Communication Strategy	2.00
Upgradation and Strengthening of Assets	1.00
Water Conservation and Management	10.00
Sub Total – Institutional Strengthening	15.00
Total Investment Proposed	**120.00**

Institutional Mechanism for Implementation

These projects will be implemented by the PHED, with assistance and support from the Government of Andhra Pradesh.

Sewerage and Sanitation:

Over and above current deficiencies discussed earlier, future growth of the city demands enhanced sewage treatment capacities. The total demand for treatment capacity is estimated for base year (2010) and for the future (2036) on basis of 80 percent discharge with standard water consumption rate of 162 lpcd, and is tabulated below.

Sewerage Demand:

Year	Estimated Population	Sewerage Generation (MLD)	Treatment Capacity Required	Deficit
2010	957000	125	125	125
2016	1121000	145	145	145
2021	1276000	165	165	165
2026	1453000	188	188	188
2031	1655000	214	214	214
2036	1886000	244	244	244

Sector Vision:

"To attain environment *friendly citywide coverage of sewerage and sanitation system"*

- To achieve universal coverage in the City and improve service levels
- To develop environmentally safe Collection, Treatment and Disposal system
- Provision of safe and hygienic Sanitation Facilities to major Tourist/Pilgrim locations, Slum Areas and other city-wide locations
- Prevent flow of sewage and sullage into natural drains and water bodies

Strategies:

The recommended approach is to increase the service levels in terms of coverage, to achieve gross population coverage of 100 percent, for resident and floating population, through protected sewerage and sanitation system with treatment and disposal facilities. Assuming that the Collection system is extended to approximately 75 percent of the city road length (2700 km), it is estimated that approximately 80 to 85 percent of the population will be covered under safe sewer system.

Strategies to address current issues and future requirements are elaborated below.

- Scientific designing of sewer zones using hydraulic models;
- It is imperative to treat generated sewage up to a safe standard, before disposal, to protect water resources and improve hygienic conditions. Hence, it is recommended to build STPs, on priority basis.
- To achieve maximum network reach, and population coverage in the Zones, citizens need to be encouraged for seeking the household level connection. It is recommended to adopted schemes like subsidizing connections charges in pre-commissioning stages, etc.
- Expand coverage to slum areas; provide low-cost sanitation facilities where required;
- To rationalize charges up to sustainable levels, so that it does not become burden on the consumer, and to propose a graded tariff system for the City.

- Rehabilitation and cleaning of the water bodies for improvement of water quality and over-all ambience of the City, and to contain sewage disposal into water bodies
- The required treatment capacity in Year 2036 is estimated at 244 MLD indicating a deficit of total 244 MLD. Long term projects for augmenting treatment capacity should be pursued beyond 2016 to meet the deficit in 2036. This may require suitable financial assistance from government/ financial institutions.

Other Strategic recommendations include:

i. Operation and Management Plan - Adoption of an Operation and Management Plan and Schedule for PHED, including options of using the private sector for O&M (e.g management contract).
ii. Asset Management Plan - To regularly assess the condition of assets and their performance, it is recommended that an asset management plan for Sewerage assets be prepared and adopted
iii. Tariff Revision Schedule The tariff schedule may be reviewed to lower initial costs, and link charges to extent of usage
iv. Performance Monitoring - To monitor certain key indicators to assess the performance of the system and to ensure sustainability of operations.
v. Institutional Strengthening and Capacity Building - To recruit trained engineering personnel for management of treatment work/pumping stations and to keep them technically updated, through periodic training.

While preparing the sewerage and sanitation plan, incorporating the assessment and sectoral vision, it is essential to set some goals for the sector, to be achieved within a time horizon. Some examples are given in the table below.

	Current Status	2016	2021	2026	2031	2036
Sewer network coverage to HHs	0	30	60	80	100	100
Treatment & disposal arrangement against collection	0	30	60	80	100	100
Recycling and reuse	0	10	20	30	40	50
Cost recovery (% of O&M)	0	20	40	80	100	100
Safe sanitation facilities	NA					

Project Identification for Improvement of Service

A project report for 'Comprehensive Sewerage and Sanitation' was prepared by the consultant M/s Consulting Engineering Services (India) Pvt. Ltd in close consultation with WMC, PHED, APUSP and other key stakeholders in 2006. A new sewerage system was proposed which consists of sewerage network, conveyance and sewage treatment plants etc. for the ultimate design year of 2036. Based on the topography of the city, the WMC area was divided into six zones. Under decentralized system, five STPs were proposed across these six zones.

It may be noted that the above proposal was prepared considering the ultimate population of 12.99 lakhs for the design year 2036 based on suggestions of PHED during 2007. This present CDP has estimated the ultimate population of 18.86 lakhs for the year 2036 and the same has been used for calculating the future requirements of sewerage and sanitation.

The proposed projects and sub-components to be undertaken for improvement of Sewerage and Sanitation System to the city, is elaborated below.

	Project	Description	Parameters
A	**New Sewer Network**		
	Laying of Sewer Network in WMC	• The Project includes construction of Sewer Network in WMC area. • Works include Supply, Laying, Testing and Commissioning of Sewer Network and Trunk Mains, along with construction of Manholes and appurtenances along with restoration of Roads.	Sewer Network – 800 km – Phase I 500 km – Phase II
	Expansion of Sewer Network in Surrounding Villages	• The Project includes construction of new Sewer Network in surrounding 42 villages (Greater Warangal). • Works include Supply, Laying, Testing and Commissioning of Sewer Network and Trunk Mains, along with construction of Manholes and appurtenances along with restoration of Roads.	Additional Sewer Network – 500 km – Phase III
	Installation of Service Connections	• Provision of Service Connections to include under municipal sewerage collection system network. This will reduce contamination and disposal of sewage through open drains and into Water Bodies	75000 connections – Phase I (@ Rs. 3000/- per residential connection (Rs. 10,000 for commercial connection)
	Installation of Service Connections	• Provision of Service Connections to include under municipal sewerage collection system network. This will reduce contamination and disposal of sewage through open drains and into Water Bodies	75000 connections – Phase II
B	**Construction of Sewerage Treatment Plant**		
	Construction of STPs across 6 zones, near Sakarasikunta (Zone-1), Pothana Junior College (Zones-2,4), Vidyaranya Colony (Zone-3), Bandham Cheruvu (Zone-5), Somidikunta (Zone-6)	Construction of decentralized sewage treatment plants (STPs) as proposed under APUSP studies. Works include Construction of five STPs— • 25 MLD capacity dedicated for Zone-1: Fort Warangal Catchments, • 65 MLD capacity for Zone 2& 4: Warangal and Subedari Catchments, • 25 MLD capacity dedicated for Zone-3: Naimnagar Catchments, • 15 MLD capacity dedicated for Zone-5: NIT catchments, • 15 MLD capacity dedicated for Zone-6: Vishnupuri Catchments.	5 Nos Total Capacity - 145 MLD for design period upto 2016
C	**Public Toilet Blocks**		
	Provision of Public/Community Toilet Blocks at important locations and slum areas	Areas proposed – Near Venkatarama Theatre, Ashoka Hotel 'X' Road, University 'X' Road, Muccharla Nagaram 'X' Road, Mulugu 'X' Road, Amrutha Theatre, Gemini Theatre 'X' Road and other slum localities around the City. The Project will help improve sanitary conditions for floating population and resident slum population.	Public/Community Toilet Blocks - 20 Nos
	Providing and constructing of individual toilets (ILCS units) in slums	Out of 38000 slum households, ILCS units have been constructed for about 15000 households in the previous decade. To achieve the complete coverage, it may be required to construct at least another 10,000 individual toilets (ILCS units) in addition to the provision of community toilets.	10000 ILCS units

D	Institutional Strengthening and Capacity Building		
	Developing O&M Systems	Control System for proper O&M situation of existing and proposed community/public toilets	
	Developing a Communication Strategy	Awareness Programs with the support of local NGOs and media for creation of awareness to public and slum dwellers on sewerage and sanitation system	
	Equipments and Machinery	Procurement and operation of equipments required for operation and maintenance of the sewage collection system.	

Project Screening and Prioritization

In the several stages of the Consultation Meetings, the list of projects identified - during the process of developing the CDP, Field Visits, Discussions with stakeholders, and Demand assessment; have been evaluated in relation to the service levels, ongoing works, growth trends and future needs of the Town. Based on the listed projects and in consultation with the local elected representatives, the Municipal Corporation has set-up a CDP Policy Committee at City Level consisting representatives of all major stakeholder. The committee has gone through an elaborate process to finalize the Projects to be executed along with the implementation priorities for their City based on Rationale, Demand and sustenance; with assistance from the Consultant.

Those projects are taken on priority such as, ready availability of Detailed Project Reports, Project Capital Cost vis-à-vis benefit to the City, and the Projects resolve to address the present drawback of the System and to achieve sustainable service levels in the future.

Depending on the funds availability, the works can be taken up as per following priorities:

Zone	Priority	Remarks
2&4	1	Thickly populated areas covered with both residential and commercial
1	2	Old fort are and thickly populated
3	3	Thickly populated area
5	4	Fast developing area
6	5	Fast developing area

Cost Estimate for Prioritized Projects

The Projected Sector demand were compared with the existing service level and the Ongoing Projects, to verify the adequacy and need to augment the capacity of certain components. Based on the above, Proposed Project components and Cost Estimates are tabulated below. Detailed list of Project Sub-Components is attached in **Annexure A.** Cost of Proposed Augmentation and Improvement works for Sewerage System Works for Warangal is estimated at **Rs. 419 Crore**.

Project Component	Cost (Rs. In Crores)
Laying of Sewer Network in WMC – 800 km	200.00
Expansion of Sewer Network to surrounding villages – 500 km	100.00
Installation of Consumer Connections – 75000	30.00
Construction of Sewage Treatment Plants (145MLD) - excl. land cost	60.00
Construction of Public/Community Toilet Blocks (20 Nos.) – 200 seats	4.00
Construction of ILCS units	5.00
Procurement of O&M Equipment and Machinery/ Capacity Building	10.00

O&M cost for first five years (@ average of Rs. 2.0 Crore per annum)	10.00
Total Investment Proposed	**419.00**

Institutional Mechanism for Implementation

These project will be implemented by the PHED, Government of Andhra Pradesh.

Storm Water Drainage:

Introduction

Adequacy assessment of drainage system, in the earlier section indicates - inadequate service levels for residents; inadequate coverage along the roads and in the newly developing areas; and inability to maintain the drains on continual basis.

Sector Vision

"To improve the city environment and avoid flooding by augmenting the drainage network"

Development Objectives

The development objectives are as listed below

i. To reduce health hazards and improve ambient environment quality.
ii. To reduce occurrences of stagnation or overflow of waste water, by improving its carrying capacity.
iii. To improve water collection and storage in natural water bodies, and ground water re-charging, through proper drain networking

Strategies

The recommended approach is to increase the storm water drains coverage network and rehabilitate existing drains. This will also serve the purpose of improving the sustainability of water bodies in the City and avoiding flooding. Strategies that address the key issues are elaborated below.

1. It is recommended to formulate a capital investment plan focusing on improvement works and construction of tertiary drains (roadside drains)
2. Upgradation, cleaning (desilting and removal of solid waste) and widening of existing secondary drains and construction of additional drains in newly developing areas and especially low lying areas to avoid flooding during rainy season.
3. Improvement and rehabilitation of primary drains (drains not upgraded or partially upgraded), through widening, deepening, construction of side-walls, cross-drainage works and diversion works at critical locations. It is targeted to train, restructure and line the remaining Drains.

Other recommendations include adoption of an O&M Schedule for works varying from drain cleaning to desilting.

Project Identification for Improvement of Service

A project report for Comprehensive Storm Water Drainage for Warangal was prepared by M/s Consulting Engineering Services (India) Pvt. Ltd under Andhra Pradesh Urban Services for the Poor (APUSP) project of GoAP in 2006.

The salient features of the SWD scheme are presented below:

- Majority of the waste water flow from city open drains discharges into three major natural nallahs, which run across the city from south to north direction. The waste water collected by these natural nallahs flows into nearby water bodies.
- The critical gaps in the city drainage system were identified and accordingly rehabilitation proposals are made to improve the condition.
- The flood affected areas are identified and necessary mitigation proposals are made.
- The proposals made for converting the kutcha drains into pucca drains and also converting major nallahs into pucca drains.

Type of Drain	Existing (Km)	Proposed (Km)	Total (Km)
Primary Drain (>600mm)	10	35	45
Secondary Drain (0.3 – 0.6m)	100	200	300
Tertiary Drain (< 0.3m)	425	672	1095
Total	535	902	1440

Proposed Projects and Sub-components to be undertaken for improvement of Storm Water Drainage works in the City, as elaborated below.

Identified Projects Storm Water Drainage

	Project	Description	Parameters
A	Drainage Networking		
	Construction of new drains	The proposed works include Re-aligning, training and construction of new Drains, to improve the living environment. • New primary drains are proposed at Bhavani nagar, Naim nagar, Pochammakunta, Kasikunta, Sakaraskunta, Kothawada, & Desaipet areas. • Secondary drains along the major roads (200 Km) • Tertiary drain network (700 Km)	900 Km
		Conversion of all kutcha drains (approx. 1000km) to pucca CC drains	1000 Km
		Promote Water harvesting and re-charge, as mandatory for Public Buildings, through regulatory and legal measures.	
B	Improvement Works		
	Rehabilitation of network	• Construction of stone masonary wall and PCC bed to three existing natural nallahs and converting them to Pucca Drains • Nallah-1: Pucca cross section proposed from Waddepalli tank outlet to KC Canal crossing • Nallah -2: Pucca cross section proposed from Machili Bazar to KC Canal crossing	10 Km
		• Desilting/cleaning of all tertiary and secondary drains, Removal of encroachments in some areas of natural drainage	
	Rehabiliation measures	• Provision of outlet sluice for Bandam Cheruvu,	

	in encroached areas of local water bodies to mitigate flood problem	with an outlet drains to let out storm water quickly. • Construction of open Channel CC drain for Sakarajkunta to drain out the flood water to Nallah-2 • Reconstruction of the outlet weir at Desaipet slum to reduce water spread area.	

Project Screening and Prioritization

In the several stages of the Consultation Meetings, the list of projects identified - during the process of developing the CDP, Field Visits, Discussions with stakeholders, and Demand assessment; have been evaluated in relation to the service levels, growth trends and future needs of the Town. Based on the listed projects and in consultation with the local elected representatives, the Municipal Corporation has set-up an empowered committee at City Level consisting representatives of all major stakeholder. The committee has gone through an elaborate process to finalize the Projects to be executed along with the implementation priorities for their City based on Rationale, Demand and sustenance; with assistance from the Consultant. Those projects are taken on priority such as, ready availability of Detailed Project Reports, Project Capital Cost vis-à-vis benefit to the City, and the Projects resolve to address the present drawback of the System and to achieve sustainable service levels in the future.

Cost Estimate for Prioritized Projects

As understood based on the above discussion, the Sector demand focuses on the need to augment the capacity of certain components, rehabilitation works and Awareness building among the mass. Based on the above, Proposed Project components and Cost Estimates are tabulated below. Detailed list of Project Sub-Components is attached in **Annexure A.** Cost of Proposed Augmentation and Improvement works for Storm Water Drainage Works for Warangal is estimated at **Rs. 225.00 Crore**.

Proposed Project and Cost Estimates Storm Water Drainage

Project Components	Cost (Rs. In Crores)
System Augmentation Works (Construction of New Drain Network)	
Construction of Primary Drains & Nallahs	110.00
Construction of Secondary Drains	25.00
Construction of Tertiary Drains	75.00
Rehabilitation and Strengthening works	
Improvements to Existing Drains, Desilting and Cleaning	10.00
Equipment and Machinery for O&M	5.00
Total Investment Proposed	225.00

Institutional Mechanism for Implementation

It is recommended that an all works pertaining to Maintenance of Assets shall be managed by the Municipal Corporation.

Solid Waste Management:

Demand Assessment

The total waste generation for the ULB is estimated for base year (2010) and future upto 2026 on a waste generation rate of approximately 250 gms/capita/day (based on CPEEHO norms). The waste generation rate can be expected to grow higher than 250 gms/capita/day as the city population increases and there are enhanced levels of consumption.

Solid Waste Demand – Warangal Municipal Corporation

Sector Vision and Strategies

Sector Vision

Solid Waste Management Vision – WMC: "After one year, we want to see the city clean with no garbage lying on the streets" OR

A litter free, clean city that collects and disposes its solid waste in an environmentally safe manner

A comprehensive solid waste management plan for Greater Warangal covering policy level reforms, capacity building of ULB staff, effective collection and safe disposal mechanism is very essential.

	Unit	2011	2016	2021	2026	2031	2036
Door to Door Collection	%	48	90	100	100	100	100
Segregation at Source	%	0	90	100	100	100	100
Mechanised Waste Handling	%	50	60	80	100	100	100
Scientific Waste Disposal	%	0					
Cost Recovery of O&M	%	0					
Private Sector Participation	%	0					

Development Objective

The existing solid waste management system in Warangal outlining the key issues and concerns were discussed in the earlier chapter. An improved solid waste management for Greater Warangal is envisaged with the following development objectives:

- To develop a sustainable MSW management system covering 100 percent population, the entire city, in an environmentally sound manner by 2013.
    a. Strengthen the current primary collection system with community involvement;
    b. Develop a 100 percent door-to-door collection system;
    c. Devise a Waste Segregation system at the household level;
- To improve Waste Collection and Transportation system, by improving accessibility to collection points and means to avoid accumulation of solid waste.
    a. Ensure daily collection and safe disposal of biodegradable waste;
    b. Streamline the street sweeping activities;
    c. Develop environmentally safe final disposal facility through land fill
- To reduce environment pollution and health hazards, through modernization and scientific disposal of waste.
- To improve management through active public participation, Public awareness campaigns and healthy sanitary habits.
    a. Promote public private partnership and NGO support

b. Educate the public and create awareness on various issues of solid waste management

- To carve an efficient course for resource/cost recovery, in MSW management, through recycling of waste, re-use of waste and user charges for MSW.
  a. Explore cost recovery options wherever feasible.
  b. Support the informal recycling activities
  c. Strengthen the institutional capacity

Door to Door Collection:

The door to door collection shall be extended to the other uncovered areas, and PH workers shall undertake waste collection on a daily basis in the morning hours. Each PH worker shall be provided with a tricycle/hand cart depending on the area and collected waste shall be deposited in container bins. Litter bins shall be provided along main roads to avoid littering. To achieve 100 % door to door collection, it is essential to procure the required number of tricycles/hand carts, based on net demand and replacements required after vehicle operational life of 5 years for existing vehicles.

Source Segregation of Waste:

A Twin-bin system of solid waste storage at source shall be encouraged. Under this system, WMC shall arrange/provide two separate plastic bins (8-10 litre capacity) of different colors to each city household, directing them to temporarily store the biodegradable and non biodegradable waste in the designated bins before being collected by authorized waste collector. The containerized tricycle/hand cart used by PH workers for household waste collection shall have necessary provision to collect and store biodegradable and non biodegradable waste separately.

Street Sweeping:

High density areas comprising residential, commercial and market places shall be swept on a daily basis; medium density areas shall be swept on alternative days; and fringe areas shall be swept once in a week. Classification of major road stretches across the high density, medium density and low density areas for the above purpose in terms of running road length is very essential to plan for and bring improvements in street sweeping.

Each sweeper engaged in street sweeping may be given individual containerized hand cart of an average capacity of 250 litres. WMC shall procure additional tricycles/hand carts as per the demand.

To maintain state of the art cleanliness, the city corporation may explore the usage of mechanical road sweepers, now commonly visible in some of the major Indian cities. Warangal has some wide and important road stretches such as Kazipet-Hanamkonda-Warangal, hunter road etc, for the routine maintenance of which, these mechanical road sweepers shall be procured.

To ensure free flow of waste water and public safety, the open surface drains of the city, which are often clogged due to unauthorized dumping of garbage by citizens and PH workers, need to be regularly cleaned at a specified periodicity.

Warangal Corporation shall undertake direct collection of waste from large and medium sized hotels/restaurants, cinema halls/function halls and construction sites. Separate tipping trucks with adequate staff shall be provided for the purpose and the collection shall be carried out on a fixed daily schedule; waste shall be directly transferred to the disposal sites.

Secondary Collection & Transportation of Waste:

For effective secondary collection, additional numbers of vehicles shall be procured by WMC and mounted with hydraulic equipment on their LMV/MMV chassis to carry the projected waste generation (435 MT by 2016) in Greater Warangal. Additional numbers of tractor trailers, dumper placers and tipper trucks shall be procured by WMC to strengthen the transportation between secondary storage points, transfer stations and final disposal sites.

To enable effective monitoring of the SWM vehicle movements, GPS equipment shall be procured by WMC and installed in the designated vehicles carrying waste to the disposal site.

Transfer Stations:

With the landfill site located at a distance of about 3-4 km from the city, it is not advisable to carry all the waste through small vehicles and containers to the disposal site. With a view of optimum utilization of small vehicles and reducing the cost of transportation, it is necessary to set up 4-5 transfer stations for bulk transfer of waste from different parts of the city to the disposal site. These transfer stations shall be located within the city, preferably at the sites which are already serving a similar purpose.

Processing and Disposal:

The characteristics and quantity of solid waste generated in the town primarily influence the disposal options. A review of the solid waste generated from sample households indicate that 40 percent of the waste generated in Warangal has organic nature. In terms of quantity around 382 MT of waste is generated every day and is expected to go up to 662 MT by 2031. Considering these aspects, it is recommended to develop a landfill site and composting facility for safe disposal of solid waste of Greater Warangal. The disposal strategies for Warangal will be to :

(a) Compost the organic fraction of the waste
(b) Sanitary landfilling of inorganic fraction of waste, including rejects from compost, and
(c) Educating the community on 3R strategy (Reduce, Reuse and Recycle).

Technology options for Composting:

Aerobic composting, vermin composting and anaerobic digestion are the three available options of biological degradation of organic components of solid waste. Of the three options, aerobic composting is simplest to develop and operate. Manual windrow composting is the most ideal and economical option for waste disposal, as this option would not require major mechanization and the plant could be manually operated.

Landfill Requirements:

Area requirements for the land fill sites are worked out based on waste generation trends and sustainable waste management practices. With the percapita waste generation rate of 400

grams/captia, the city generates around 382 MT of waste. Following similar trends, Warangal generates around 662 MT of waste by 2031. For the design year of 2031, Warangal shall be requiring an area of __acres to develop sanitary land fill and composting facilities.

Public Awareness:

Public awareness campaign shall be undertaken to educate the citizens on linkages of SWM practices and public health, source segregation of waste, etc. Such awareness to public contributes to enhanced waste recovery ratio and also reduces the burden on landfill facility by minimizing the quantity of incoming waste after necessary segregation. Further, it also contributes to the mitigation of street littering. Awareness creation through short films, neighborhood level meetings shall be initiated; short documentary films on citizen awareness for SWM shall be screened in television through local cable TV networks.

Community Participation:

Door to door waste collection shall be undertaken with direct monitoring of Resident Welfare Associations (RWAs). To this effect formation of RWAs shall be encouraged and a stakeholder based monitoring system initiated, where RWAs will have a mandate to check the quality of service delivery and they would also certify door-to-door collection, street sweeping and container lifting services under their jurisdiction. City level monitoring mechanism shall also be developed with partnerships between WMC and locally prominent NGOs.

Institutional Strengthening and Capacity Building:

Recruitment of trained environmental engineers and management professional for effective solid waste management is an important aspect confronting the WMC, and as well of more importance is to keep them technically updated. Periodic training shall be imparted to the operational staff of the ULB.

Strategies and Time frame for implementation:

		2011	2012	2013	2014	2015	2016
1	Door to Door Collection						
2	Introduction of Twin Bin System						
3	Source Segregation						
4	Mechanization of Waste Transportation						
5	Fleet Management System						
6	Development of Scientific Land fill						
7	Development of Compost facility						
8	IEC Activities						

Project Identification for Improvement of Service

Proposed Projects and Sub-components to be undertaken for improvement of MSW management in the City, as elaborated below.

Identified Projects Solid Waste Management

	Project	Description of Sub Components	Project Parameters
A	Collection and Transportation		

	Procurement and Testing of Collection Equipments	Collection Equipments Wheel Barrows, Dumper Placer Containers (0.45 cu.m), Garbage Storage Containers (0.60 cu.m)	
	Procurement and Testing of Transportation Equipments and Vehicles	Transportation Machinery, Dumper Placer Machines, Garbage Collector Machines.	
B	Disposal of Waste		
	Construction of Sanitary Landfill	Construction of scientifically designed Sanitary Landfill Site (design Year 2026)	
	Procurement and Installation of Incinerator	Installation of Incinerator for and Introduction of bio-medical waste management facility with support from Indian Medical Association	
	Waste Testing Facility	Establishing Laboratory for Testing of Waste, segregate chemically active wastes.	
C	Institutional Strengthening and Capacity Building		
	Educating the Community and Public Awareness Campaigns	Educate Community on principle of Reduce, Re-use, Recycle and Recover, for effective MSW management. Campaigns for improving Sanitary habits, littering habits and active participation of Public at Citywide MSW management	

Project Screening and Prioritization

In the several stages of the Consultation Meetings, the list of sector projects identified - during the process of developing the CDP, Field Visits, Discussions with stakeholders, and Demand assessment; have been evaluated in relation to the City's primary need, availability of funds for similar works, growth trends and future needs of the Town.

Cost Estimate for Prioritized Projects, proposed

As understood based on the above discussion, the Sector demand focuses on the need to augment the capacity of certain components, rehabilitation works and Awareness building among the mass. Based on the above, Proposed Project components and Cost Estimates are tabulated below. Detailed list of Project Sub-Components is attached in **Annexure A.** Cost estimates for improvements in Solid Waste Management for Warangal is estimated at **Rs. 86.00 Crore**.

Proposed Project and Cost Estimates Solid Waste Management

Project Components	Cost (Rs. In Crores)
Procurement and testing of Collection Equipments	2.00
Procurement and testing of Transportation Equipment and Vehicles	3.00
Construction of Sanitary Landfill facility	75.00
Procurement and installation of incenerators	0.50
Waste Testing Equipment	0.50
Educating the Community and Community Awareness Campaigns	5.00

Total Investment Proposed	86.00

Institutional Mechanism for Implementation

It is recommended that an all works pertaining to Maintenance of Assets shall be managed by the Municipal Corporation.

Traffic and Transportation:

System Adequacy

Adequacy assessment of roads and transport, based on earlier section indicates Inadequacy of surfaced roads and properly designed road junctions, Absence of road hierarchy, Pollution and congestion due to rapid increase in vehicles over the last few years, encroachments and informal activities along roadside, Inadequate parking facilities and Lack of a public transport system. This present scenario is likely to deteriorate further given the future growth of the City.

Considering the current deficits of the system and broad future objective, set of strategies and projects are suggested in the subsequent sections.

Sector Vision:

"To develop a transport system commensurate with the growth and spatial structure of the City and to provide improved access, safety and efficient mobility across the city"

Development Objectives

- To improve accessibility to all parts of the city
- To reduce travel time
- To facilitate safe and smooth traffic flows
- To facilitate safe pedestrian movement

Strategies:

The recommended approach is to increase the network, to achieve an average cover to cater to 100 percent of the population. Given the high density of population within the municipal area, and constraints for development, it is proposed to emphasize on clearing of traffic bottleneck, strengthening and widening measures and lying of incomplete network, to improve the surface quality of roads and addressing the issues of congestion. Citing the City's regional significance and the tourism potential, it is recommended to improve transport facilities, like parking areas, truck terminal, bus stand, etc.

- With an objective to improve flow of traffic it is recommended to develop strategies to streamline the existing and future traffic in the City. The City is densely populated and is an important tourist destination, although the city's road system has many ill-designed road intersections which lack in characteristics such as road geometric features, channelling islands, parking lanes for turning vehicles, acceleration and deceleration lanes etc. To encourage congestion free mobility, it is recommended to improve junctions characteristics through improvement of geometrics, provision of grade separated subways, junction landscaping and lane dividers at major junctions. It is also

recommended to introduce bus-based public transport system based on detailed feasibility and rider-ship study, for easy movement of daily pedestrian traffic and reduce two-wheeler traffic.

- Removal of traffic bottlenecks - It is recommended augment the capacity of major transport corridors, through provision of ROBs and Flyovers along major road junctions and road-rail junctions, to help reduce travel delays and congestions. It is also recommended to provide grade separated facility for Pedestrians at major junctions, to improve safety and reduce accidents

- Traffic Management Measures -As a part of renewal strategy for dense areas, it is recommended to manage traffic through measures like one-way system and one-side parking system. For this purpose it is recommended to provide traffic police control points at required locations in the city, based on a detailed study for traffic management. Given the high numbers of two wheelers and three wheelers composition, in the overall traffic, it is recommended to signalize major cross-roads, to create accident free roads and junctions. For traffic safety and convenience, appropriate signs, markings, lighting, guideposts are required to be provided on curves, intersections, public utility places, etc. Proposals for road furniture should be made considering the importance of the road, safety and aesthetic. The design of the road furniture and quality proposed should be of international standards.

- Improvement of Parking Facilities and Pedestrian facilities - At present there are few organized parking places in the City. In the absence of inadequate parking lots, haphazard parking of tourist and local vehicles causes traffic congestion. In addition to this, loading / un-loading of goods by traders causes traffic congestion and parking problems. It is thus, recommended to leverage area s in the Inner city and outside, through appropriate strategy of acquisition or rehabilitation, to provide for Parking Areas. It is recommended to located these areas, in proximity to commercial area, places of tourist significance and places of religious significance.

- De-congestion of Inner Areas and Diversion of regional traffic - Citing the regional significance and tourist significance, the town is expected to receive commercial through traffic and destined traffic. Hence, it is recommended to streamline commercial activities, by shifting of major commercial activities outside congested areas. This will eventually result in reduction of pollution and traffic congestion in the congested areas of the City. Apart from this, it is recommended to augment capacity and connectivity of By-pass road. As a long term strategy, it is proposed to widen and strengthen, existing network along the ULB periphery to be developed as a ring road.

- Improve connectivity to developing areas and improve road network - Improvement of network, through provision of surfaced roads - The road widening projects can provide success to a certain extent in increasing the area under roads, but are limited to certain commercial corridors and critical link roads only. Road network strengthening is recommended through capacity augmentation of new network, primarily in newly developing areas and to address the issue of incomplete linkages. Road Planning is recommended in newly developing areas to ensure that quantity of network, parking and traffic infrastructure provision matches the future demand. New formation works are to be proposed for 2 lane carriage way, as per NHAI standards.

Comprehensive Mobility Plan:

	Current Status	2013	2016	2021	2026	2031
Percentage reduction in	-	20%	25%	30%	30%	35%

travel time						
Riding comfort	25%	50%	75%	100%	100%	100%
Transport safety (to reduce accidents)	-	70%	80%	100%	100%	100%

Project Identification for Improvement of Service

Proposed projects and sub-components to be undertaken for improvement of Road and Transportation for Warangal, is elaborated below.

	Project	Description of Sub components	Project Parameters
	Construction of New Roads	Provision of new roads, two lane carriageway, with provision of one side parking; provision of proper direction boards, signage, lane marking, pedestrian crossings and street furniture. • Arterial Roads (50-60m) – 46 km • Sub arterial roads (30-50m) – 18 km • Collector roads (20-30m) – 38 km • Local roads (10-20m) – 18 km	Proposed road length approx. 120 km
	Upgradation of municipal roads	To reduce congestion on roads, improve roadside parking and improve pedestrian facilities, it is recommended to upgrade unsurfaced roads to black top roads. Proposed works: upgradation of WBM roads (640 km) and kutcha roads to BT roads (1120 km)	Proposed road length for Improvement 1800 km
	Strengthening and Widening of major Sub Arterial Roads	Upgradation of Hyderabad Road, Khammam Road, Karimnagar Road, Narsampet Road, Mulugu Road, etc., with ROW of 125 feet.	
	Strengthening and Widening of City Roads	Hyderabad-Hanamkonda-Warangal Road which acts as cardinal road needs serious strengthening in terms of grade separators, pedestrian segregation etc.	
	Improvement of Road Infrastructure & related other facilities	Proposed works include provision of street lights, signage, mini bus shelters (64 nos.), footpaths and road crossings	
	Junction Improvement Works	It is proposed to improve major junctions in the city, through provision of landscaping of traffic circles, road geometric features, road markings, channelling islands, parking lanes for turning vehicles, acceleration and deceleration lanes etc. Some of the critical intersections/junctions that need improvements include: • Hanamkonda Chowrasta • Kazipet Intersection • Warangal Railway Station • Warangal Head Post Office • EsukaGadda Intersection • Fathimanagar Junction	
		Construction of Grade separated pedestrian crossing facilities along different approach arms in the form of a FOB or an underpass for • Kazipet intersection (one arm) • Hanamkonda Chowrasta (two arms)	
	Construction of	Proposed works include construction of new bus terminal, for	

	New Bus Terminal	roadway buses; with provision for covered bus bays, information kiosks, tourist facilitation centre, rest rooms, public conveniences, and direction boards.	
	Construction of ROBs and RUBs	To overcome traffic bottleneck and reduce travel time, it is proposed to provide atleast three ROBs at various locations in the city; Capital investment for the works is proposed to be shared by railways department (approximately 40 % of total investment)	3 ROBs
	Flyover	To overcome traffic bottleneck and reduce travel time, it is proposed to provide flyovers at two locations in the city. Proposed locations (i) xxxxxx, and (ii) xxxxxxx.	4 flyovers
	Construction of Multi-storeyed parking complexes	It is proposed to provide parking facility at five different locations near Hanamkonda Chowrasta, Enugulagadda, JPN Road, SVN Road.	
	Bus based Pubic Transport System /BRTS	It is also recommended to introduce bus-based public transport system based on detailed feasibility and rider-ship study, for easy movement of daily pedestrian traffic and reduce two-wheeler traffic. This will help improve connectivity within city and reduce traffic congestion in the City. Two possible corridors, which may become viable, based on minimum transport demand of 4000 peak hour public transport demand (phptd) beyond 2031 as per BRT guidelines for operation are the inner ring road and the outer ring road.	
	Construction of Truck Terminal facilities	To avoid freight parking along Grain Market Road, Beat Bazaar and Hunter Road, Two Truck Terminals are proposed at	
	Construction of Bypass Road	Construction of proposed Outer Ring Road/new bypass road (200 feet wide) emanating from Hyderabad Road and traversing along the northern side upto Khamman Road	

Project Screening and Prioritization

In the several stages of the consultation meetings, the list of projects identified - during the process of developing the CDP, field visits, discussions with stakeholders, and demand assessment; have been evaluated in relation to the service levels, growth trends and future needs of the City. Based on the listed projects and in consultation with local elected representatives, the municipality has set-up an empowered committee at City Level consisting representatives of all major stakeholder. The committee has gone through an elaborate process to finalize the projects and implementation priorities for their city, based on rationale, demand and sustenance; with assistance from the consultant.

The project screening was based on priorities such as, ready availability of detailed project reports, project capital cost vis-à-vis benefit to the city, and the projects resolve to address the present drawback of the system and to achieve sustainable service levels in the future.

Cost Estimate for Prioritized Projects

Cost of proposed augmentation and improvement works for Traffic and Transport for Warangal is estimated at **Rs. 950 Crore**.

Proposed Project and Cost Estimates Traffic and Transport

Project Component	Cost
Construction of New Roads	300.00

Construction of Outer Ring Road/Bypass Road	400.00
Upgradation of municipal roads (to BT roads)	150.00
Strengthening and widening of Arterial/Sub Arterial Roads	
Strengthening and widening of city roads	
Improvement of Road facilities	10.00
Junction Improvement Works	10.00
Construction of Flyovers	10.00
Construction of New Bus Terminal	20.00
Construction of ROB/RUBs	10.00
Construction of multistoried parking facility	10.00
Construction of Truck Terminal	30.00
Total Investment Proposed	**950.00**

Institutional Mechanism for Implementation

These projects will be implemented by the WMC/KUDA/PWD/APSRTC, with assistance and support from the Government of Andhra Pradesh, to pool in technical expertise.

Heritage and Tourism

Demand Assessment

Tourism in Andhra Pradesh: The vision 2020 identified the "Tourism Sector" as one of the Growth Engines for the Economic Development of the State. Vision 2020 of Andhra Pradesh Government also envisages that the State will be a leading tourism destination offering a wide variety of experience to its visitors. Warangal has been identified as a Tourism Region along with Hyderabad and Pakhal Lake. Warangal is also one of the five special Tourism Destinations in the state along with Hyderabad, Visakhapatnam, Tirupati-Tirumala and Nagarjuna Konda.
An assessment of Tourism Facilities in the earlier section indicates the following – inadequate service levels for tourists; lack of tourism promotion initiative; and lack of awareness towards heritage conservation.

The growth in domestic tourist inflows in Warangal District, for 2005 and 2008 indicates an increase from approximately 26 lakh tourists and 27 lakh tourists, respectively, which has declined in the years 2006 and 2007 and is a cause of concern. Also, the growth in visit of international tourists has not been very significant in the recent years, and needs to be addressed through appropriate strategies. Almost 5.3 lakh tourists seem to have visited various tourism attractions of Warangal in 2004.

Sector Vision:

"To make Warangal an international tourist destination by leveraging historical, natural, cultural, heritage in addition to present religious attractions"

Development Objectives

The Sector Objectives are as listed below

- To conserve and restore heritage monuments in Warangal.
- To increase the number of tourists (domestic & foreign) visiting Warangal in a sustainable manner;
- To prolong the average stay of tourists

Strategies:

- Heritage conservation strategy should incorporate a comprehensive inventory that can be used to make informed decisions about the management of heritage sites, depending on the condition of asset and its significance in history. This is to be supplemented by a work program to protect and rehabilitate heritage features as well as improve opportunities and provide incentives for the local community to be involved.

- As a part of tourism development, to increase the flow of tourists to the city, it is recommended to improve connectivity of Warangal to other major cities. Although, the city is well connected at the state level, there is a need to augment connectivity improvement at national level. As a part of strategy, it is recommended to explore options for improving air connectivity of the City, to improve international connectivity to encourage tourism, in Warangal. Provide facilities for parking and other tourist amenities

- Marketing and Promotion of festivals and similar events - it is suggested that an agency created by the State Government, with support from the local body and Private Sector, should draw up plans for marketing and promotion of the City. Some of the facilitation measures can include promotion and marketing of the events at national and international level, through involvement of State Government, Tourism Development Corporation and Private Agencies. This also calls for representation at national and international level for similar events. Other measure to attract more tourists, include media promotion, voluntary exhibition in prominent cities to promote event and handicrafts and organizing new events.

- With an objective to prolong the stay of tourists in the City and increase economic benefits to the city, it is recommended to promote budget hotels and resorts. It is proposed to weed Warangal, in major tourist circuits of the State, in a way so as to promote overnight stay. Apart from this, it is recommended to promote single/multiple day package tours, with the City as base location. It is recommended to promote establishment of heritage properties and budget hotels, and associated facilities, with support from ITDC, and private developers.

- Improve safety for tourists - The State government s Tourism Policy for promotion of Tourism as an economy generator for the State, highlights the role of State Government and Local Body as a regulator in the Industry. Integral part of the Policy are the recommendations on ensuring safety and security to the Tourists, improvement of law and order, Tourist Police, Code of Conduct, Complaint handling, for ensuring safe and hassle free stay for the Tourist. It is recommended to adopt and implement the same at Local Level to strengthen the City's image as Tourist friendly destination.

- Promote avenues of growth with rural tourism and adventure tourism - To devise different promotional options for domestic and international tourists to bring them to Warangal and prolong their stay. There is a good scope of eco-tourism in the region with wild life sanctuaries and bird watching. Emphasis to be given to make these destinations popular.

    - For domestic tourists the focus would be more as a Leisure/Sightseeing destination with a focus on - religion/culture tourism and wildlife/nature.

    - For international tourists the positioning would be more on - Heritage tourism, Cultural tourism and Arts & Crafts, Ecotourism/Adventure tourism on surrounding hills and sand dunes

- Circuit could be development from Hyderabad to Warangal, which could be a day trip. En route facilities to be provided throughout the National Highway. A circuit to be developed for the tourist destinations in the around the KUDA Development Area. Circuits have been shown in the map which can provided historical, pilgrim and options of eco-tourism.
    - Circuit 1 (Religious and Eco –Tourism) Warangal City- Pandavula Gutta-Ghanapuram- Ramappa –Warangal City.
    - Circuit 2 (Eco-City) Warangal: Warangal City-Eturunagaram-Pakhal Wild life – Warangal City
    - Circuit 3 (Religious and Historical Tourism): Warangal City- Anantharam – Inavolu-Zaffargah-lakhavaram Lake –Warangal City
    - Circuit 4 (Religious, Cultural and Historical Tourism): Warangal City –Ghanapur –Quilaspur Fort –Pembarti- Kolanpaka-Champak Hills- komuravelli-Cherial-Warangal City.
- Promote new locations - As a part of promotion strategy, it is recommended to develop and leverage new venue for revenue generation, from tourism, through establishment of Arts and Crafts village, Development of Location as picnic spot etc.
- Community (individuals, owners, corporate s and institutions) involvement, through measures like fiscal incentives, grants for development and sponsorship schemes, and community awareness should be an integral and important component of the strategy. Isolated efforts have recently been initiated by the local bodies in Mumbai, Hyderabad, Ahmedabad and by the State of Kerala, although suitable fiscal-incentives are needed to boost conservation movement in all states of the country. Monitoring is also an important component, to evaluate the effectiveness of the strategy, and to provide updates to the strategies as needed.

Major initiatives / Projects

With rich ancient history, monuments, forts, temples, pristine natural and artificial water bodies, Warangal still lacks the status of a 'defined tourist centre' in the state of Andhra Pradesh. Moreover, the tourist infrastructures facilities are also limited. Several government initiated tourism related projects are listed below, including infrastructure improvements and new or renovated tourist attractions. The following listed projects are small in scale and hence might not have a considered impact on the tourism of the region. There is a need to identify major tourist sports and make large-scale improvements in the existing situation, to make tourism as a major driver of economy.

Proposed projects and sub-components to be undertaken for improvement of Tourism in Warangal Region are as elaborated below.

A	Improvement/ Development Works		
	Renovation of		
B	Heritage Conservation & Development		
	Conservation and		

	Restoration of Monuments		
C	Provision of Tourist Infrastructure and facilities at	Provision of city-wide tourist facilities Beautification and promotion of new venues	
	Thousand Pillars Temple	• Illumination can be provided to the temple with sound &Light show as one of the attraction • Garden and lawns around the temple needs to be improved by landscaping and planting flower plants • Toilets need to be constructed for public convenience • The approach of the temple needs to be improved and an attractive board needs to be put up for easy identification • The road in front of the temple needs to be widened to give a full view of the temple from the main road • There is a need to provide parking place	Rs. 300 Lakhs
	Warangal Fort	• Water fall on Gundu Cheruvu Hillock • Preparation of Model Cultural Complex • Development of Handicrafts Centre (Hastakala Nilayam)	Rs 25 Lakhs
	Bhadrakali Temple	• Small shopping complex needs to be constructed outside the temple where shops can be leased out for various purposes namely, • Pooja material and pradadam, tourist literature, religious books, photos and cafeteria • Toilets are to be constructed for Public convenience • A parking place is to be earmarked and leased out	Rs 20 Lakhs
	Vanavignana Kendra	• Renovating the entrance gate to give a facelift to entrance point • Recreation hall cum meeting hall	Rs 8 Lakhs
	Mettugutta	• Strengthening of approach Road • Providing of Madapa • Sitting arrangement for the visiting Tourists • Providing of Open Auditorium	Rs 30 Lakhs
	Ramappa Temple	• A toilet block will facilitate the visiting Tourists • Arrangement of Parking Place at Temple & lake • Arrangement of Drinking Water Facility • Beautification of Bund areas from Cottages to Tourist Rest House	Rs 20 Lakhs
	Pakhal Lake and Abhayaranayam	• Small cafeteria is to be provided and least out to local people • Public toilets are to be provided • Drinking water facilities is to be provided	Rs 5 Lakhs
	Lakhnavaram	• A Black topped road from main road to lake needs to be arranged for about 10 kms to make it more accessible for the interested tourists • Providing shelters and sitting places	Rs 80 Lakhs
	Someswara Laxminiarayana Temple, Palakurhty	• Construction of Ghat Road up to Temple	Rs 50 Lakhs
	Padmakshi Temple	• The tank bund needs to be strengthened and road can be laid around the tank by widening the bund • Raising of Bund • Providing fencing around the tank • Steps into the tank and strengthening the tank • Providing plantation and electricity • Providing drinking water facility	Rs 15 Lakhs
	Komuravelli	• Construction of Public toilets	Rs 8

	Jathra	• Construction of Small Canteen and shopping Complex	Lakhs
	Eturingaram Wild Life Sanctuary	• A wild life recreation and sightseeing zone can be created to see the animals in the forests thought watch towers • Construction of some sitting and creating leisure place	Rs 30 Lakhs
	Chempal Hills	• Construction of 6 huts • Constriction of public toilets • Providing of Children Play equipments • Cafeteria	Rs 8 Lakhs
	Anantharam	• Cottages with toilets facilities including with two VIP Rooms • Beautification of natural Tank Bund • Boating Facilities • Development of Lawns • Providing Children Play Equipments	Rs 50 Lakhs
	Waddepally Tank Bund	• Development of Landscaping, Lawns, fountains, Lighting, Compound wall, Drinking water facilities, public toilets, open auditorium • Formation of internal ring bund to be free from pollution with revetments and drains	Rs 200 Lakhs
	Qualishapur Fort	• Laying of Approach road • Basic Amenities like toilet and Drainking Water facilities • Development of Landscaping & Recreation facilitation	Rs 20 Lakhs
	Pandavula Gutta	• Drainking water facility to be extended to the top of the hill by arranging a pipeline with motor for the visiting tourists • A small Cafeteria is to be constructed and leased out for local People	Rs 3 Lakhs
	Musical Garden	• Construction of indoor games park for children • Construcution of "Vishram " Cottage & development of tank view landscaping	Rs 60 Lakhs
	Inavolu temple	• The mandapam and Keethi Toranas need to be renovated • Construction of Public Toilets • Small Canteen	Rs 16 Lakhs
	Chilpur Gutta	• Face-lift of the way to temple is to be improved • Open mandapam • Providing of drinking Water facilities	Rs 17 Lakhs
		•	
D	Other major projects for Tourism Promotion		
	Construction of Guest Houses		
	Construction of heritage hotels		

Project Screening and Prioritization

The project screening was based on priorities such as, project capital cost vis-à-vis benefit to the city, the projects capacity to address the present drawback of the system and to achieve sustainable service levels in the future.

- Short term project which can improve city level facilities and accelerate tourist inflows
- Projects capitalising on the uniqueness of the city e.g. the built and natural heritage.

Project Summary and Cost Estimate for Prioritized Projects

Cost of proposed augmentation and improvement works for Tourism and Heritage for Warangal is estimated at **Rs. 45 Crore**.

Project Components	Cost (Rs. In crores)
Improvement and Development Works	15.00
Heritage Conservation	15.00
Provision of Tourism Infrastructure and facilities	15.00
Total Investment	45.00

Institutional mechanism for Implementation

The Projects are to be implemented by ASI, INTACH, KUDA and WMC, with assistance and support from the Department of Tourism. Following the capital works; it is recommended that the assets be maintained by the local body, through user charges. It is recommended to have a local heritage committee, comprising of representatives of state and local government and civil society (temple committees) etc.

Housing and Basic Services to Urban Poor

Vision

Drawing from the current situation and issues which brings out the gap in access to basic services by urban poor in Warangal, there is a need for concerted efforts to bridge the gap. Discussions with different stakeholders and consultations with urban poor, allows formulating two development objectives. First, is to provide basic services to all slums through an integrated slum development project and improve the social and physical infrastructure. The specific components of the first goal is to improve road connectivity, internal roads, improved access to drinking water, toilets, bins for garbage disposal, solid waste management, and covered and cemented drains. Second, development goal is improve the living condition and quality of life of urban poor. These two development objectives emerge from the overall vision for the city and sector vision for the urban poor:

A City that provides basic urban services of adequate standard and quality to all particularly to all urban poor and a City without Slums

Strategies:

- The strategy for addressing the concerns of urban poor therefore has to focus on providing basic services in the existing slums. The short-term strategy is to focus on improving basic services in slums where the services are not adequate and where with minimal investments services can be improved. The long term strategy has to focus on providing non-existent services and at a parallel level draw plans for rehabilitation of some of the existing slums through planned development of colonies along with other developments in the city. Our approach indicates provision of household for urban poor;

- In order to increase access to basic services in the existing slums, a detailed scientific survey of the slums is required. The survey would map individual household s access to basic services against their social and economic profile. Similar studies have already been undertaken in our state and also in West Bengal for integrated slum development planning. The detailed study will also help in prioritization of projects and interventions based on the scores each existing slums would receive.

- To the extent feasible community involvement may be secured in maintaining the facilities particularly community toilets, solid waste management etc.

Identified Projects – Housing and BSUP:

	Project	Cost (Rs. In Crores)
1	Provision of Infrastructure Services	15.00
2	Provision of Social Amenities	5.00
3	Provision of Housing (10000 benefeciaries)	90.00
	Total Investment	**110.00**

Urban Growth Management

Housing Demand Estimation.

The housing profile of Warangal city reflects a shortage in the housing supply. The housing demand at the rate of 5.0 persons in a household is estimated at 191400 units, for 2010 while the present stock is only 103000 units of which xxxx houses are in a dilapidated state. Hence it can be stated that there are xxxxx livable *pucca* houses in Warangal for a population of 957000 persons. Therefore the clear gap emerging from this is of xxxxxx units - for year 2010. The demand estimates have been projected upto year 2026, based on projection of household size. It is assumed that household size of the town will reduce from a high of 5.00, currently, to 4.50, uptill year 2026, attributed to improvement in economic and social conditions of the population.

Proposed New Urban Developments as per KUDA Master Plan:

As per the Master Plan for KUDA, the land available for development within the existing WMC is 2676 Ha encompassing existing land uses. A total additional population of over five lakhs by horizon year 2026 will be absorbed in the available land within WMC along with few commercial centres. Due to constraint within the WMC, few commercial centres are proposed to be provided in extended WMC. To decongest the existing commercial areas located in the core Warangal and Hanamkonda Chowrasta, six commercial centres are proposed outside the core city. Organised industrial areas are proposed to be developed beyond the existing WMC limits. In addition, a New University Campus is proposed to meet the demand of higher education of not only the additional population but also the population of the region. Land has been identified for the creation of a NEW TOWN, which will accommodate additional population and be self dependent.

Sector Vision:

"To promote a spatial structure of the city that supports economic activities and growth by integrating land use and transport development and conserving natural assets and built heritage"

Development Objectives

The Sector Objectives are as listed below

- Optimal allocation of land based on changing needs of the city;
- Conserve environmentally fragile areas hills and lakes;
- To match the housing demand;
- Inner city renewal through improvement of infrastructure and services

Strategies

- Review and Updation of the Master Plan - It is recommended to periodically review and update the Master Plan to capture the urban dynamic, growth and sprawl areas, at every 10 years interval. As a part of the update, it is recommended to promote economic and commercial activity, and infrastructure in newly developing areas, as a means to attract development and to achieve equitable population distribution.
- Leverage Town Planning Schemes, as tool for equitable allocation of land use - It is also recommended to use Zonal Plans or Town Planning Schemes, as tool for planned development, and sustainable allocation of land use. It is recommended to promote micro-level planning; to improve quality of life through planned provision of services like roads, water supply and sewerage.
- Special Development Control guidelines for Inner City Area and other areas of natural and heritage significance
- Public Participation and Consultation at Neighbourhood level - Period Campaign for Community awareness and Participation through programs, shows and activities recommended, like movie display, street plays, meeting and exhibitions. It is recommended to involve the all stakeholder and organize community meeting during process of preparation of Renewal Plan for the Inner City, to create social benefits, avoid disputes and non-confirming land use.
- Promotion of ambient environment through afforestation, conservation and improvement measures for lake, hills and other environmentally sensitive areas; Set-up / designate a dedicated authority for these functions.
- Leverage recreational value of natural assets - Improvement in environmental quality, through measures mentioned above, and aesthetic quality, through measures like development of promenade, regular cleaning, treatment of water; it is recommended to leverage the recreational value of the Lake. It is recommended to promote the lake as a city level recreational space, with promotion of appropriate land use and activities surround the lake
- Creation of New Housing Stock - Apart from Andhra Pradesh Housing Board/ KUDA, the agencies traditionally involved for planning various schemes and providing houses/plots for development, it is recommended to involve private developers to meet the housing demand through leveraging land at subsidized rates. It is recommended to identify and plan for provision of stock, so as to achieve equitable urban growth.
- Improve connectivity, and encourage development of commercials in newly developing areas - To support creation of new housing stock, it is recommended to provide proper linkages and off-site infrastructure to developed schemes, and creation of Land Bank. It is also recommended to promote economic and commercial activities, to attract development in the newly development schemes
- Inner City Area Development strategy and Plan
- Improvement of quality of life, especially in inner city areas, through measures like Transfer of Development Rights and special development guidelines.

Major initiatives / Projects

Proposed projects and sub-components to be undertaken for improvement of urban structure and core city areas in Warangal are as elaborated below.

	Project	Description of Sub components	Project Parameters
A	Renewal and Redevelopment of Inner City areas		
	Improvement, widening and strengthening of roads		
	Upgradation of other city roads		
	Construction of Foot Over Bridges		
	Pedestrianisation and Signage		
	Disaster Management and Beautification		
B	Environment Improvement		
	Conservation of environment		
	Improvement of green areas		

Project Screening and Prioritization

The project screening was based on priorities such as, project capital cost vis-à-vis benefit to the city, the projects capacity to address the present drawback of the system and to achieve sustainable service levels in the future.

- Short term project which can improve the quality of life in Inner city area
- Projects under disaster mitigation and management.
- Projects ability to address the needs of growing numbers of tourists.

Cost of proposed augmentation and improvement works for inner city renewal for Warangal is estimated at **Rs. xx Crore**.

Project Components	Cost (Rs. In crores)
Renewal and Redevelopment	
Improvement of Environment	
Total Investment Proposed	

Institutional mechanism for Implementation

The Projects are to be implemented by PWD/KUDA and Warangal Municipal Corporation, with assistance and support for the State Government. Post Capital works; it is recommended that the assets shall be maintained by the ULB, through user charges wherever applicable.

Institutional Strengthening

Sector Vision

To convert Warangal Municipal Corporation into a modern professional institution that leverages Information technology, provides civic services in a transparent, accountable and citizen friendly manner, and provides its employees a conducive working environment.

Development Objectives

Development objectives to attain the above Sector vision are

- Achievement of full computerization in key municipal functions such as property tax collection, license fees, municipal certificate and sanctions and ensuring all Municipal Administrative Staff are fully computer literate with regard to the usage of computers with regard to the various Municipal functions, leading to improvement in efficiency and overall productivity of the Municipal Staff.
- Clear cut demarcation of roles and responsibilities within WMC, leading to the proper and effective functioning of WMC
- Decentralization of all key municipal functions, leading to better provision of services to the citizens and better administration.
- Implementation of Modern Methods of accounting, budgeting, auditing and Financial Management.
- Develop interactive channels of communication with citizens, so as to incorporate citizen feedback and demands in all policy and Administrative decisions. The development of same will lead to an improvement in citizen interaction and service delivery, enabling ULBs to act as a vibrant unit of self government.
- Complete implementation of requirements under 74th CAA in a phased manner, so as to make the local bodies, as vibrant units of self government.

Development Strategies

Leverage Developments in Information Technology - Urban agencies and line departments will need to adopt Information Technology to improve service delivery, decision making, and urban management, to create a transparent and accountable basis of governance. In particular, the e-Governance initiatives under the National Mission Mode Programme for e-Governance in Municipalities (a Government of India programme) covering the implementation of GIS, IT based Accounting and Management Information Systems should be leveraged and dovetailed with other state level interventions.

Allocate all WMC Responsibilities with WMC Departments - WMC should clearly identify its existing responsibilities, both obligatory and discretionary in nature, under the Andhra Pradesh Municipal Corporations Act, 1994. These responsibilities should be clearly mapped to various departments to ensure that clearly responsibilities are clearly aligned to all departments and roles for departmental staff can be allocated in an unambiguous manner. Responsibility for all support functions such as accounting and procurement should also be similarly allocated.

Undertake Continuous Capacity Building Initiatives for all Staff - Human resources are the key to efficient service delivery in any organization. The urban local bodies will need to put a greater emphasis on developing core skills of their staff in order to ensure that these skills are relevant to the ever changing operational environment. Development of the human resources

should cover all urban agencies and departments and focus on all areas with regard to policy formulation, organizational development and training and knowledge management.

Move Towards Zonal Structure of WMC Management - Decentralization of municipal functions, in line with the spirit of the 74th CAA, with a citizen centric approach, particularly in service delivery, citizen interface and planning will greatly enhance the operational capabilities of WMC. WMC should move towards a zonal structure with the necessary delegation of powers and authority to municipal managerial staff with the decentralized structure.

Providing a Conducive Working Environment for Municipal Staff - The municipal facilities should be upgraded to support the process of decentralization. Zonal offices as well as the central municipal office should be well maintained in order to ensure that municipal staff has a pleasant working environment. It will also create a citizen-friendly environment both locally and centrally.

Developing a forum for citizen participation - WMC leadership should develop a mechanism for ensuring the involvement and active participation of citizens in the planning and budgeting process. Ward Committees should be activated and should act as medium for such interactions.

Active Involvement of WMC in all Urban Projects/Initiatives - The 74th CAA envisages the urban local body as a unit of local self governance. To that end, ULBs should be actively involved in planning and implementation of all urban projects and initiatives. This can be best achieved through the development of a mechanism for coordination and cooperation with the state government/ parastatal agencies and citizens forums (e.g. tripartite contracts).

Projects Identified for Institutional Strengthening

Training of Employees - Continuous training and skill building of the Municipal Staff shall be required during the mission period and thereafter to built capacity in financial, technical, interpersonal skills and overall administration.

Implementation of Geographical System - GIS could prove an important tool for planning, socio-economic and environment development and Urban Management Centralized Information Database. The Implementation of GIS would lead to Better revenue Demand and Collection, Better Regulatory Mechanisms and Better Planning and Operation.

Implementation of E-governance System for Municipal Administration - Implementation of E-governance in ULB shall lead to improved service delivery mechanisms of the local Bodies, leading to better, timely and satisfactorily services. The E-Governance System would lead to Common database and minimum duplication, Data integrity - single point data capture, Single point data access for management, Fast updation of data and Facilitates enhancement of system

Modernization of the WMC office Infrastructure - Modern office infrastructure with proper furniture storage space and basic hygienic and sanitation facilities shall lead to high employee morale and increased employee productivity and efficiency.

Improving Citizen Participation - Lack of Governance at local level and Citizen Awareness, does not lead to the full utilization and benefits of the Infrastructure Facilities. An active citizen participation and awareness programme would lead to

- Better informed citizens of their responsibilities and role in civic management
- Higher acceptance of the Levy of User Charges is likely to be higher
- Conservation of critical natural resources such as water and green cover

Cost Estimate for Prioritized Projects

Based on the above, Proposed Project components and Cost Estimates are tabulated below. Cost of Proposed activities under Institutional Strengthening for Warangal Municipal Corporation is estimated at **Rs. 10.0 Crore**.

	Project	Cost (Rs. In Crores)
1	Organisation Reforms, Training of ULB Staff	2.00
2	Implementation of GIS	3.00
3	Implementation of e-Governance system	2.00
4	Modernization of Office	2.00
5	Public Awareness Campaigns to improve Citizen Participation	1.00
	Total Investment Proposed	**10.00**

Financial Operating Plan:

Introduction:

This Chapter deals with the Financial Operating Plan (FOP) for WMC. This FOP comprises of a forecast of the various items of income and expenditure of WMC, based on certain assumptions, on Business-as-usual basis, and after incorporating the impact of various reform initiatives to be taken up at the ULB level.

The FOP has been prepared for a period of ten years (from F.Y 2010-11 to F.Y 2019-20), on the basis of the analysis of the relevant financial data for the last five years (from F.Y 2005-06 to F.Y 2009-10).

The FOP has been prepared for two scenarios:

1) ***Business as Usual:*** Under this scenario, the FOP has been prepared assuming growth in various items of revenue and expenditure based on the trends of the past 4 years. Where an unambiguous CAGR can be identified for a specific item of revenue or expenditure, this rate has been used for forecasting. However, in those cases where a clear CAGR cannot be identified, the forecast has been prepared based on specific assumptions.

2) ***FOP with the proposed Financial Initiatives:*** Under this scenario, the impact of various initiatives has been factored into the forecast. These initiatives are primarily focused on revenue augmentation and are described in detail later in the chapter.

Warangal Municipal Corporation:

Financial Operating Plan Business as Usual Scenario

The Business as Usual Scenario projects the financial statements on the basis of trends for the last four years. The various underlying assumptions for preparation of these projections are:

- The various items of income and expenditure have been projected on the basis of CAGR (Compounded Annual Growth Rate), computed on the basis of actual figures for the F.Y 2004-05, F.Y 2006-07 , F.Y 2007-08 and F.Y 2008-09
- Wherever the growth is inconsistent, the items of income and expenditure have been assumed to grow at a nominal rate of ___% annually.

The following table summarises the Projected Revenue Income, Revenue Expenditure and Revenue Surplus/ (Deficit) for the next ten years.

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Revenue Receipts									
Tax Revenue									
Assigned Revenues									
Rental Income (Mpl. Properties)									
Fees & User Charges									
Sale and Hire Charges									
Revenue Grants, Contributions and									

Subsidies									
Income from investments									
Interest earned									
Other Income									
Revenue Exp.									
Establishment Expenses									
Administrative Expenses									
Operation and Maintenance									
Interest Charges									
Program Expenses									
Revenue Grants, Contributions and Subsidies									
Misc. Expenses									
Surplus/Deficit									

Capital Investment Plan

Introduction

The Capital Investment Plan for the city of Warangal identifies various development works, projects and initiatives that need to be taken up for achieving the development objectives for the city, as identified in earlier chapter, keeping in line with the City Vision and Sector Vision as put forward in the same chapter.

The projects have been identified based on discussion and suggestion by various stakeholders, during the two Stakeholder Workshops and various focused group meetings, and also on the basis of demand assessment to fulfill current service delivery gaps and meet future demand of the City.

The Capital Investment Plan also provides a summary of total investments required for the city, investments required from proposed NI-JNNURM, the impact of proposed investments on institutional finances and suggest alternate financing strategies.

Projects Proposed as part of the City Development Plan

The following section sets out the projects identified for each sector and aligns these projects with the sector vision, development objectives and development strategies.

Urban Growth Management

Vision: ***To promote a spatial structure of the city that supports economic activities and growth by integrating land use and transport development and conserving natural assets and built heritage***		
Development Objectives	**Development Strategies**	**Projects**
Optimal allocation of land based on changing needs of the city	• Periodic review and updation of the Master Plan. Promotion of commercial use in newly developing areas, for	

	equitable development • Leverage Town Planning Schemes, as tool for equitable allocation of land use. • Specific Development Control guidelines for Inner City Area • Public Participation and Consultation at Neighbourhood level, during Plan preparation, to create social benefits and avoid non-confirming land use.	
Conserve environmentally fragile areas hills and lakes	• Recommended measures include afforestation, removal of encroachments, de-silting, and control of sewage outfalls into existing water bodies • Leverage recreational value of these areas. • Re-modelling of Institutional framework to create independent authority for lakes.	
To match the housing demand	• Creation of new housing stock, through active participation of Private Sector. • Improve connectivity, and encourage development of commercials in newly developing areas	*Proposed Project for EWS Housing, summarised under Basic Urban Services for Poor Section)*

Capital Investment

Table below summarizes the Capital Investments required for development of the City over the next 6 years, Investment proposed under NI-JnNURM, proposed capital contribution under NI-JNNURM, and contributions by different levels of government for the same. The table indicates funding sought under the two Sub-Missions i.e. Sub-Mission I – Urban Infrastructure and Governance and Sub-Mission II - Basic Services to the Urban Poor.

S.No	Sector	Total Capital Investment	Sectoral Distribution
1	Water Supply	120.00	
2	Sewerage & Sanitation	419.00	
3	Solid Waste Management	86.00	
4	Storm Water Drainage	225.00	
5	Traffic and Transportation	950.00	
6	Tourism and Heritage	50.00	
7	Housing and BSUP	110.00	
8	Urban Growth Management	100.00	
9	Institutional Strengthening	10.00	
	Total Investment	**2070.00**	

Table xxx indicates that a financial outlay of approximately Rs. _____ crore in required for infrastructure development works for Warangal City in the foreseeable future, of which approximately Rs. _____ crore is proposed under NI-JNNURM program. Partial funding is sought under NI-JNNURM since some of the projects are not permissible under the mission guidelines or projects funding is available from alternative sources.

As in case of solid waste management, financial outlay estimated for the city is available as tied grant from the state government under the Twelfth Finance Commission as per the prevailing institutional arrangements, and hence is not sought under JNNURM funding. Apart from this, some projects under Traffic and Transportation have not been considered, given its potential to attract private investment or alternative funding, as and when necessary.

Financial outlay of approximately Rs. _____ crore is sought as assistance from central government and remaining 20%, approximately Rs. _____ crore, shall be contributed by the State Government/ Parastatals and Urban Local Bodies. After appraisal and sanctioning of mentioned projects through procedures set under the project financial and technical assessment, GoI is expected to devolve Rs _____ crore as its share, to the GoAP. This shall be transferred to the Nodal agency for execution of works. GoAP will further devolve Rs _____ crore, as its share, and the proceeds of the GoI assistance to the State Level Nodal agency, which shall in turn disburse the funds to Warangal Municipal Corporation in a mix of soft loan and grant /grant-cum-loan on individual project basis.

Prioritisation of the Sectors/Projects

The projects have been prioritised (given in the Annexure), based on the below criterion.

- Number of beneficiaries
- Priority for the sector / criticality of the project
- Conformity with other proposed projects
- Current levels of commitment of the ULB/Parastatal Agencies to the project (i.e. has the preparation of the DPR been initiated by the ULB)
- Sustainable in terms of operational cost and capacity of ULB/ Parastatal Agency to maintain
- Time required for project completion / commissioning
- Land availability and approvals required
- Rehabilitation / leveraging of existing assets and capacities

Annual capital investment required for different sectors is presented in the following table, below.

Investment Sustenance Plan

The financing pattern as prescribed in the guidelines for JNNURM, suggests a financing share of 80%, 10% and 10% of total project cost by Central Government, State Government, and ULBs/Parastatal Agency respectively.

The following table compares the combined available surplus with the WMC and the required contribution of WMC towards the JNNURM funds. The available surplus has been computed after deducting the operation and maintenance costs from the total revenue surplus, as the increased capital investment will lead to an additional burden of operation and maintenance expenses on revenue expenditure.

The above table indicates that there is a considerable difference between the required level of Investment and the actual available surplus. Some of the measures recommended to augment shortfall in revenue are mentioned below.

(i) Enhanced Recovery of Operation and Maintenance Costs - The note on reform action by Government of Andhra Pradesh under the JNNURM recommends that reasonable user charges

should be levied as a mandatory measure for the recovery of full operation and maintenance costs within 2012. This would involve suitable revision in tariff rates and user charges. Hence, it is recommended to prepare a road map for tariff and user charges revision to rationalise tariffs for possible sectors, upto the levels of making operation and maintenance financially sustainable, and gradually increasing so as to achieve capital investment sustainability.

(ii) *Public Private Partnership* - Evaluating the options of Public Private Partnership, wherever possible and feasible, is another innovative means of addressing the investment gap. Annexure to this CDP identifies projects with a potential for financing under PPP. These opportunities have been indicated in terms of high, medium and low. While the projects with high and medium opportunity for PPP should necessarily be carried out through PPP, the low opportunity projects should be strictly evaluated to ensure commercial and economic viability under the PPP route.

(iii) *Leveraging Municipal Assets* - The Municipal assets (such as Land) can be leveraged so as open up a funding stream, which in turn can be used as their respective contribution.