TABLE OF CONTENTS

PART B: URBAN INFRASTRUCTURE AND GOVERNANCE

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

LIST OF ANNEXURES

1 Project Perspective

1.1 Introduction

Urbanization is an inevitable process due to high pressure on land, low agriculture income, excessive population growth and the difference between rural and urban living standards. As per 2001 census approximately 28% of total population of India is residing in urban areas and it is expected to reach 40% by the year 2050. It is not only the percentage but also the shear of actual number i.e. 285.35 million in 2001, which is mind-boggling. Urban areas play a vital role in Indian's socio-economic transformation and contribute 50-55% of the Gross Domestic Product (GDP).

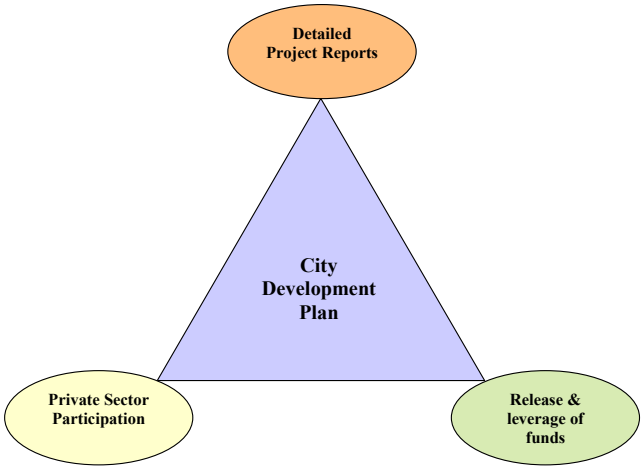
The role and importance of urban sector was first recognized by Government by way of constitution of National Commission on urbanization in 1987 followed by passage of 74th Constitution Amendment Act (CAA) 1992, which provided momentum to urban sector reforms in the country. But an indifferent implementation of the 74th CAA has resulted in continuation of statues, systems and procedures that impede the operation of land and housing market. As a urban households particularly urban poor have limited access to potable water, sanitation, drainage, waste disposal facilities etc.

In order to cope with massive problems that have emerged as a result of rapid urban growth, it has become imperative to draw up a coherent policy/strategy to implement projects in cities on mission mode. In the light of this situation, Jawaharlal Nehru National Urban Renewal Mission (JNNURM) has been initiated by Government of India, which aims at creating efficient, equitable and responsive cities.

The Mission's statement is: *Reform driven, fast track, planned development of identified cities with focus on efficiency in urban infrastructure & services delivery mechanism, community participation and accountability of Urban Local Bodies (ULBs) &Parastatals towards citizens.*

Government of India has framed the JNNURM guidelines in such a way that applicant Urban Local Bodiess will be eligible for grant assistance provided cities take under certain reforms; the objective behind this is to improve infrastructure along with long-term sustenance of the ULBs. Thus in order to be eligible for the grant assistance under JNNURM, the Government of India requires eligible cities to –

Figure 1: Overview of CDP



- Formulate a medium-term City Development Plan (CDP) to align with citizen's interests and priorities;
- Prepare project proposals in accordance with CDP;
- Draw up a timeline for implementing urban sector reforms.

As mentioned above, the preparation of CDP of the city is the first step towards achieving the Mission objective, which shall further call for preparation of Detailed Project reports (DPRs) for the identified projects, as per priority in the CDP. The duration of the Mission is seven years beginning 2005-06. During this period, the Misiion shall seek to ensure sustainable development of select cities. If need be, the program shall be calibrated before the commencement of the Eleventh Five year plan.

1.2 Objectives, Process and Permissible Activities

The CDP will be the guiding document that presents the vision of a desired future. It also gives how the Municipal Corporation together with other stakeholders, intends to work towards achieving their long-term vision by year 2031. The CDP thus prepared should translate the mission into actions and actions into outcomes. The objective of involvement of the stakeholders, through consultation process and being endorsed by the local body and other implementing agencies who have committed themselves to action to realistically achieve the mission statements, actions and expected outcomes.

1.2.1 Mission objectives

- Focused attention to integrate development of infrastructure services in the cities covered under the Mission;
- Secure effective linkages between asset creation and asset management so that the infrastructure services created in the cities are not only maintained efficiently but also become self sustaining over time;
- Ensure adequate investment of funds to fulfill deficiencies in the urban infrastructure services;
- Planned development of identified cities including peri-urban areas, out growths, urban corridors, so that urbanization takes place in a dispersed manner;
- Scale up delivery of civic amenities and provision of utilities with emphasis on universal access to urban poor; and
- To take up urban renewal program i.e. redevelopment of inner (old) cities areas to reduce congestion.

1.2.2 The Process

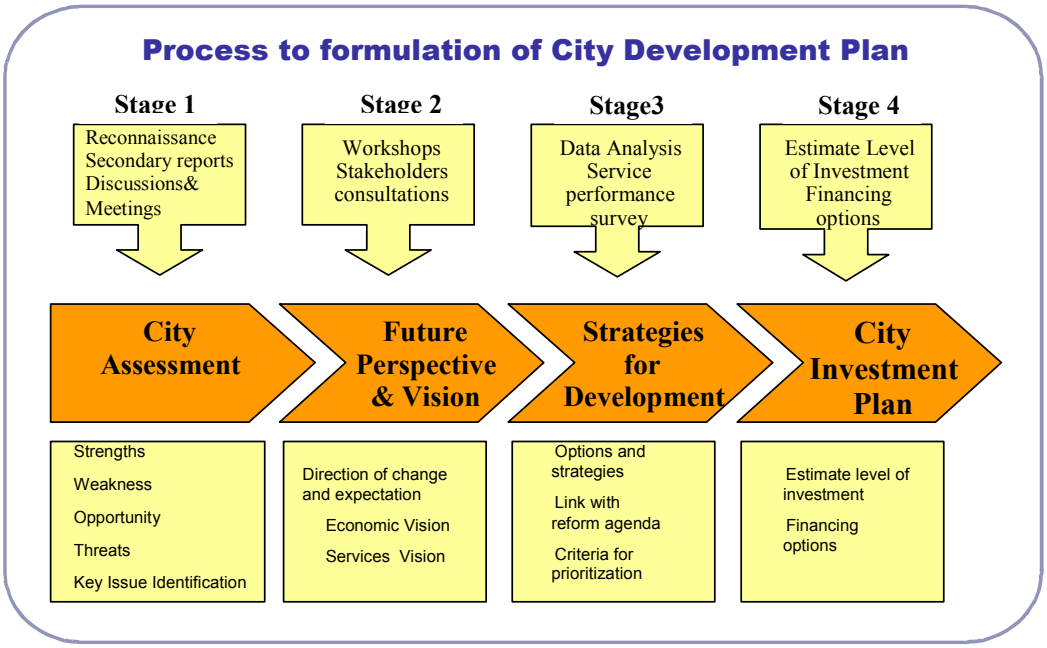
The CDP provides both a perspective and vision for the development of a city. It presents the current stage of city's development, sets out directions of change, identifies thrust areas, suggests alternate routes & strategies & interventions for bringing about the change, provides framework and vision within which projects need to be identified and implemented. It establishes a logical and consistent framework for evaluation of investment decisions.

Anchored on the Mission goal of creating economically productive, efficient, equitable and responsive cities, the CDP 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 system and procedures, creation of structures for bringing in accountability and transparency and elimination of legal and other bottlenecks that have shifted 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 process of preparation of CDP is a multistage exercise. For Varanasi it has been divided in four stages. These steps are Reconnaissance survey for City assessment, workshops and stakeholder consultations for future perspective and vision formulation, data analysis and service performance surveys to finalise the strategies for development of city and sector in particular and final step is to estimate level of investment and financing options for preparation of city investment plan. The graphical representation of the process is as shown below:

Figure 2: Process of Preparation of CDP



Step 1: City Assessment

A detailed reconnaissance survey of the city has been carried out as a part of city assessment. In depth analysis of existing situation, covering various aspects like demography, economic base, financial situation, infrastructure availability, environment and institutional roles and responsibilities were analysed. Key issues of each of these aspects were identified and based on the detailed analysis Strength, Weakness, Opportunity and Threats (SWOT) at city level and specifically at institutional level were identified.

Step 2: Future Perspective and Vision

Findings of the reconnaissance survey carried out in first step were then presented in various workshops to different stakeholders. Focus of these presentations was to make consensus on the key issues identified, and to have an open discussion on ***"Where are we now? and Where we want to go in the future?"*** Individual stakeholder

consultations were also done so as to know the future perspective of the sector and their vision for future. The vision at city level is also discussed in these workshops and the final outcome of the vision at city level is ***"Economically Vibrant, Culturally Rich and Liveable tourist city"***.

Step 3: Strategies for Development

Based on visions of the city as a whole and sectors in particular, strategies have been formulated. Strategies are the actions that need to be taken by each sector to achieve the desired vision for the city. The actions will be in the form of project identification; their prioritisation and working out feasibility costs are also discussed with various stakeholders. The strategies thus formulated will be used for bridging the gap between existing and required facilities, and to achieve the desired Vision.

Step 4: City Investment Plan

In this step identification of types and sources of financing for priority projects and reforms required from internal resources, state and central governments, local financial institutions, donors, and through public-private partnerships for each of the priority actions have been done. Apart from that assessment of the risks and measures required for risk mitigations for debt financing of commercially viable project have been done. The financing was structured by ensuring maximum leverage of local financial resources, through GoI viability gap financing/grant, private sector investments.

1.2.3 Permissible Activities

- Urban renewal i.e. redevelopment of the inner (old) city areas (this would include items like widening of narrow streets, shifting of industrial/commercial establishments from non confirming ares to confirming areas to reduce congestion, replacement of old and worn out water pipes by new/higher capacity ones, renewal of sewerage/drainage/solid waste disposal system, etc).
- Water supply including setting up de-salination plants, where necessary
- Sewerage and solid waste management
- Construction and improvements of drains/storm water drains
- Urban transport
- Laying/improvement/widening of arterial/sub-arterial roads and bridges to remove transport bottlenecks
- Laying of ring roads and by-passes around cities, provided certain cost recovery measures like toll charges are built in
- Construction and development of bus and truck terminals
- Environmental improvement and city beautification schemes
- Construction of working women hostels, marriage halls, old age and destitute children's homes, night shelters with community toilets.

1.3 Stakeholders Consultation

Stakeholders consultations forms the most important part of the CDP preparation. Consultations, be at government level or individual level are important as the plan

will be prepared for betterment of People of Varanasi. Consultations in Varanasi are done at two levels i.e. during Workshops and during Individual consultations. Five workshops were conducted at different places. Workshops were conducted at all the levels of CDP preparations viz., at assessment level, at project identification level, for defining Vision for the city as a whole and sectors in particulars.

2 City Profile

2.1 About Varanasi

The ancient city of Varanasi was not built in a day. The city has two remnants of a holy past: the first being Rajghat plateau, where the archeological findings of wares date back to the period of very existence of urban settlement and the second being Sarnath, where Buddha gave his first sermon, "Turning the wheel of law" in 528 BC. Later during 3rd century King Ashoka built a monastery township there, which continued its existence till 12th century and was later destroyed.

Since ancient times the natural and cultural landscapes of the city have retained an active social role in contemporary society closely associated with the traditional way of life. The city is a place of pilgrimage and a holy site for sacred baths in the Ganga River, to have a good death, to get relief from transmigration, to learn and receive spiritual merit, etc. The city has still maintained its traditions. In spite of several downfalls and upheavals, traditions are fully alive even today[1].

Pilgrimage taking scared bath in Holy Ganga

Being the holiest city of Hinduism, the impact of the religion is found everywhere in the city – the chanting bells and the monotonous, but oddly soothing, chant of Sanskrit hymns, in the fragrant flower offerings, and the colored powders that are sold in a myriad roadside shops which decorate the foreheads of the devout, in the tens of thousands of worshippers and the thousands who offer them salvation or services.

Ghats with stairways along the Ganga with presence of "dying homes", charitable homes, pilgrims' rest houses, are some of the city's unique characteristics. Apart from that, silk weaving and sari making, metal, wood and terracotta handicrafts, toy making, particular painting forms, etc., comprise the continuity of historical and cultural tradition. Varanasi is famous for its fairs and festivals with respect to variety, distinction, time, sacred sites, performers, viewers and sideshows.

2.2 Location

Varanasi town lies between the $25^0$15' to $25^0$22' North latitude and $82^0$57' to $83^0$01' East longitude. The River Ganga only here flows South to North having the world famous ghats on the left bank of the river. The highest flood level of river Ganga was 73.90m (1978) and the lowest river water level is approximately 58m. It is at an elevation of 80.71 metres above mean sea level.

[1] *Prof. Rana B P Singh (2005), "Life in Historic Urban Landscape of Varanasi, a Heritage City of India", Geography Department, Banaras Hindu University, Varanasi, UP*

2.3 Linkages and Connectivity

Varanasi is well connected by road, rail and air with other parts of the country. The distance from the major cities are Delhi-750 km, Lucknow-286 km and 125 km from Allahabad. There are three national highways i.e. NH-2, NH-56 and NH-29 and four state highways i.e. SH-87, SH-73, SH-74 and SH-98 passing through the heart of the city. The linkages provided by the National highways are:

i. NH 2- G.T. Road from Mughal Sarai to Allahabad;
ii. NH 29- Varanasi to Gorakhpur, Kushinagar; and
iii. NH 56- Varanasi to Jaunpur Lucknow,.

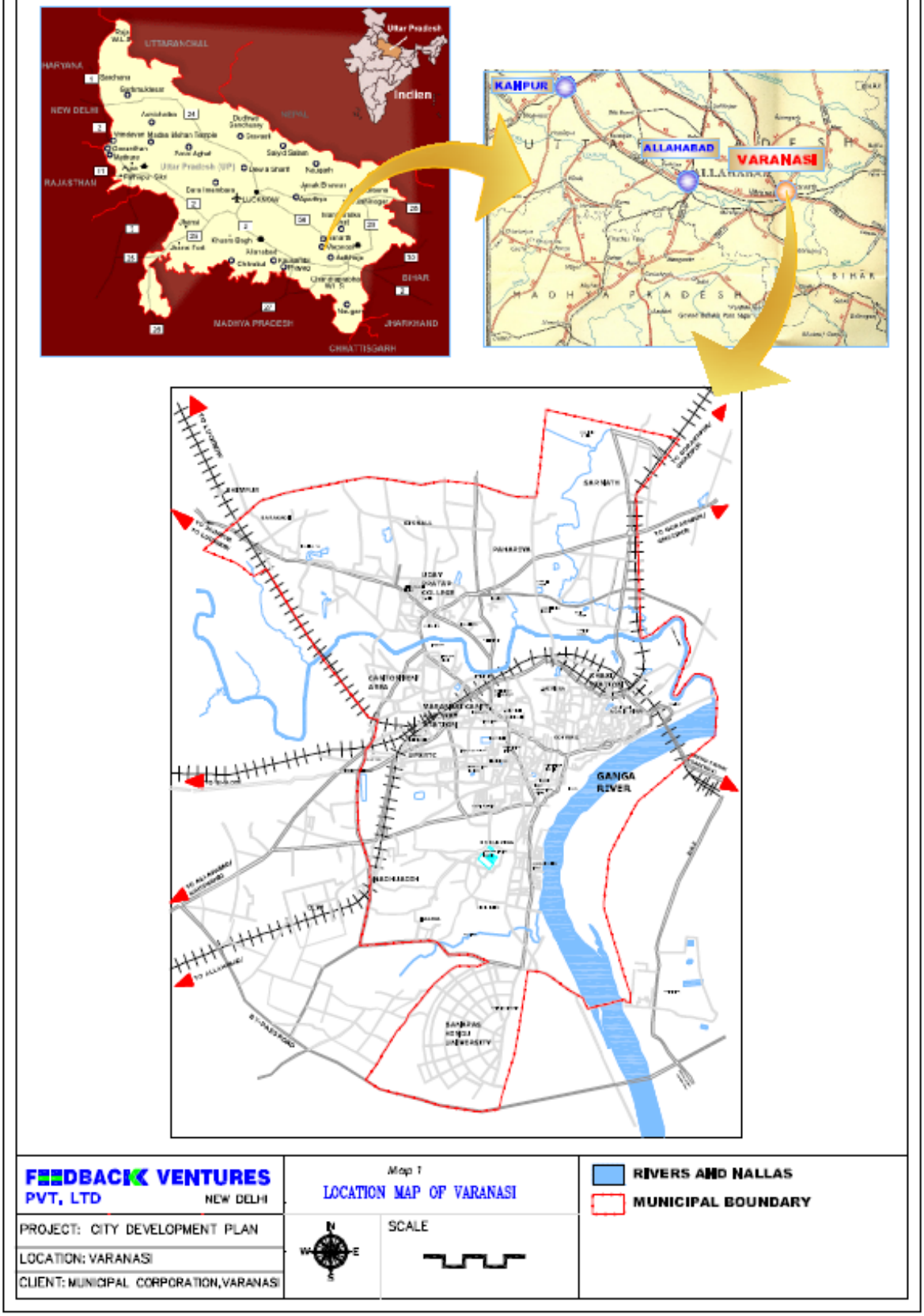
These National Highways and state highways have high passenger traffic as these roads provide a good connectivity to the surrounding areas in the U.P. state as well as to metropolitan cities like Delhi and Kolkata. The Grand trunk road or NH2 forms the main transportation spine of the city.

A bypass is being constructed along the Eastern edge of the city to relieve the burden off NH-2. Another ring road is under consideration along the Western edge of the city to divert the traffic and provide better connectivity to the newer developments coming up in the Trans Varuna Region.

Varanasi is well connected by railways with broad gauge. There are three rail lines entering to the city from Lucknow, Bhadoi and Allahabad and is diverted in two lines to Gorakhpur and Mughal Sarai. The city lies on Delhi-Kolkata rail route of North Eastern Railways, which is the broad gauge. A rail line connects the town with Sarnath. The other cities having good connectivity through railways are Patna, Guwahati, Chennai, Mumbai, Gwalior, Meerut, Lucknow, Kanpur and Allahabad.

Main Railway station – Varanasi

The town also has an airport at a distance of about 24 km away from the city. There are flights to Varanasi from Agra, Bhubaneshwar, Kolkata, Delhi, Gorakhpur, Khajuraho, Lucknow, Raipur and Kathmandu (Nepal). It is on a regular aviation route of Delhi to Kolkata and Bhuvaneshwar. It is also the aviation gateway to Nepal. ***Map 1*** shows the regional setting of Varanasi.


Uttar Pradesh
Indian
UTTARANCHAL
HARYANA
NEW DELHI
RAJASTHAN
BIHAR
JHARKHAND
MADHYA PRADESH
CHHATTISGARH
KANPUR
ALLAHABAD
VARANASI
GANGA RIVER
FEEDBACK VENTURES
PVT, LTD
NEW DELHI
Map 1
LOCATION MAP OF VARANASI
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION,VARANASI
SCALE
RIVERS AND NALLAS
MUNICIPAL BOUNDARY

Topography, Geology and Climate

A ridge runs almost 200m to 400m away from the western bank of Ganga and the area between the river and the ridge slopes towards the river Ganga. With vast expanse of gently undulating plain, most of the area beyond the ridge slopes towards the river Assi in the South and towards Varuna River in the North. The general ground level varies from RL 71.0m to 80m.

Geologically it is situated in the fertile alluvial Gangetic plains and is under laid with sediments deposited in successive stages. Layers of clay, fine sand, clay mixed with kankar and stone bazari is met with during drilling operations.

The climate of the town is of tropical nature with temperature varying from 5°C in winter to 45°C in summer. The annual rainfall varies from 680mm to 1500mm with large proportion of its occurring during the months of July to September.

3 Demographic Profile

3.1 Population Growth & Composition

3.1.1 Population Growth

The present area under Municipal Corporation of Varanasi (MCV) jurisdiction is 79.79 sq km with a population of 1.2 million in 2001[2]. Owing to its rich tourism potential, the estimated daily flow of tourists and pilgrims to the city is 25,000[3].

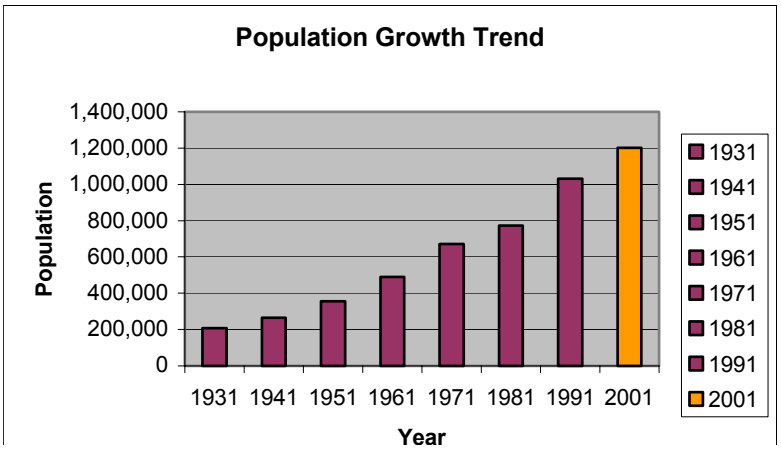
Varanasi town shows a constant increase in the population with varying rate of increase from decade to decade. In last seven decades the population has grown almost six folds, with increase in population from 207,650 in 1931 to 1,202,443 in year 2001. The growth of the population can be seen from the table below ***(Table 1, Figure 3)***

Table 1: Population of Varanasi

Year	Population	Increase	% Increase
1931	207,650	--	--
1941	266,002	58,352	28
1951	355,771	89,769	34
1961	489,864	134,093	38
1971	671,934	182,070	26
1981	773,865	101,931	25
1991	1,030,863	256,998	33
2001	1,202,443	171,580	17

Source: Census of India, 2001

Figure 3: Population Growth Trend



It can be observed that there is a sharp drop in the growth rate of the town in the last decade although the trend is not unusual and can also be seen in the past.

[2] *Census of India, 2001*

[3] *Revitalization of Varanasi as a Tourist Destination for Ministry of Tourism and Culture, Govt. of India, February 2006*

As compared to the KAVAL cities of Uttar Pradesh, Varanasi is the second least populated city (second only to Allahabad) and exhibits the lowest decadal growth rate for 1991-2001***(Table 2).***

Table 2: Population Growth in KAVAL Cities

KAVAL Cities	1981	1991	2001	Growth Rate	
				81-91	91-01
Kanpur	1,639,064	2,029,889	2,555,811	23.84	25.91
Lucknow	1,007,604	1,669,204	2,185,927	65.66	30.96
Agra	741,318	948,063	1,275,134	26.86	34.50
Varanasi	773,865	1,030,863	1,202,443	33.00	17.09
Allahabad	650,070	844,546	1,081,622	29.92	28.07

Source: UP Census Handbook 1991

3.1.2 Population Density

Present area under MCV jurisdiction is 79.79 sq km. The area under jurisdiction of the Municipal Corporation is a function not of its population growth or densities, but of political and administrative changes related to development/urbanization of the urban fringe areas. Planning area has changed from 56.65 sq km to 79.79 sq km over the last decade. Overall population density of the town is 150,70 persons per sq km (i.e. 150 persons/ha), which is considerable, compared to other class B cities. Change in the gross density of Varanasi over the last decade is shown in ***Table 3.***

Table 3: Population Density of Varanasi

Year	Population	Area (sq km)	Gross Density (Pop/sq km)
1991	1,030,863	56.65	18,197
2001	1,202,443	79.79	15,070

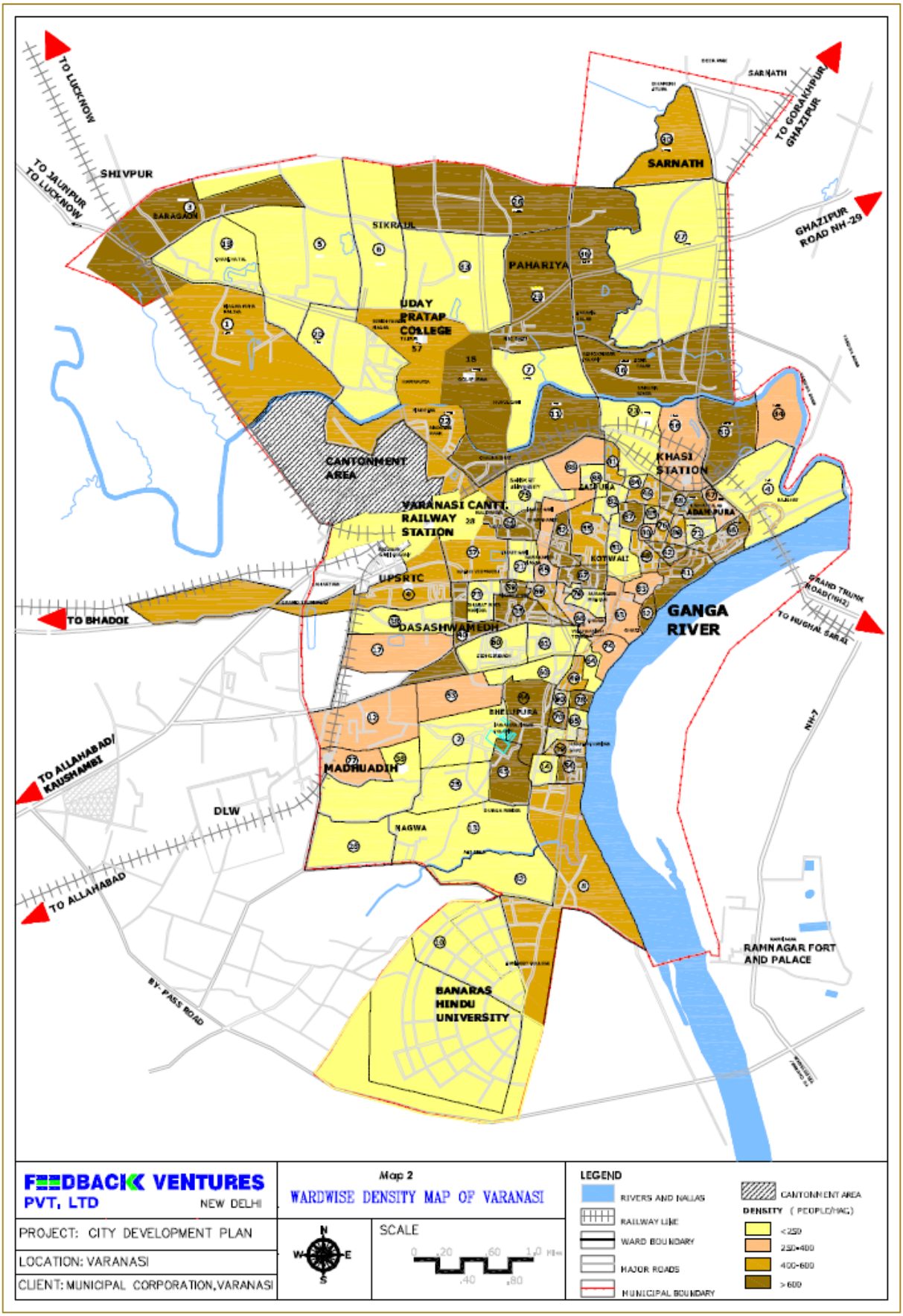
Source: Master Plan of Varanasi, 2011

The city of Varanasi is broadly divided into two zones: the Cis Varuna and the Trans Varuna zone. Most part of the city is presently confined within the Cis Varuna area but with the provision of infrastructure facilities (as per Master Plan 2011) and the construction of the ring road, the city is expected to grow towards the Trans Varuna area. The city had 40 municipal wards (1991), which have now been increased to 91. The population density in these wards varies significantly and are as shown in the following table. ***(Table 4, Map 2)***

Table 4: Ward wise population densities

Ward No.	Population	Density	Ward no	Population	Density	Ward no	Population	Density
1	12384	427	32	11847	146	63	12788	388
2	15694	67	33	13490	225	64	11142	139
3	13135	1459	34	15920	300	65	18082	176
4	14313	77	35	9441	858	66	13397	1489
5	13027	30	36	14588	1042	67	6039	671
6	12877	165	37	11206	560	68	14414	262
7	20506	128	38	19675	133	69	8281	460
8	15874	529	39	11719	533	70	9187	707
9	14561	455	40	12275	767	71	13862	87
10	14608	239	41	9700	462	72	9303	137
11	15758	927	42	10749	1792	73	13076	108
12	13989	350	43	11476	1913	74	14865	275
13	15854	148	44	9640	1377	75	19864	168

					Density	Ward no	Population	Density
						273	76	7319	523
						492	77	10398	230
16	11945	1991	47	8177	303	78	9193	766
17	22373	254	48	11621	581	79	10183	196
18	12678	1585	49	9433	472	80	8319	347
19	15708	126	50	9401	1343	81	8594	409
20	16228	49	51	9273	98	82	7907	104
21	13826	94	52	9841	757	83	6908	345
22	11052	425	53	5339	334	84	12316	99
23	11881	105	54	9284	928	85	10386	142
24	7193	654	55	8269	413	86	12018	240
25	13169	27	56	17068	263	87	8297	638


TO LUCKNOW
TO JAUNPUR TO LUCKNOW
SHIVPUR
SARNATH
TO GORAKHPUR GHAZIPUR
GHAZIPUR ROAD NH-29
SARNATH
SIKRAUL
PAHARIYA
UDAY PRATAP COLLEGE
CANTONMENT AREA
KHASI STATION
VARANASI CANTT. RAILWAY STATION
UPSRTC
DASASHWAMEDH
GANGA RIVER
GRAND TRUNK ROAD(NH2)
TO MUGHAL SARAI
NH-7
TO BHADOI
TO ALLAHABAD/ KAUSHAMBI
DLW
TO ALLAHABAD
MADHUADIH
NAGWA
BY-PASS ROAD
BANARAS HINDU UNIVERSITY
RAMNAGAR FORT AND PALACE
FEEDBACK VENTURES PVT, LTD NEW DELHI
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION, VARANASI
Map 2
WARDWISE DENSITY MAP OF VARANASI
N
W
E
S
SCALE
LEGEND
RIVERS AND NALLAS
RAILWAY LINE
WARD BOUNDARY
MAJOR ROADS
MUNICIPAL BOUNDARY
CANTONMENT AREA
DENSITY (PEOPLE/HAG)
<250
250-400
400-600
>600

3.1.5 Literacy Rate

Across districts, Varanasi district has moderate literacy rates (67.2 percent, as per 2001 census). Current total literacy rate within the MCV area is high (72 percent) as compared to state urban average of 56.3 percent and national urban average of 70.1 percent but low as compared to the prevalent literacy rates in the other KAVAL cities ***(Table 6).***

Table 6: Literacy Rates in KAVAL Cities

City	Total literacy rate
Kanpur	78.8
Agra	70
Varanasi	72.0
Allahabad	80.9
Lucknow	77.1

Source: Census of India, 2001

Like KAVAL cities, Varanasi also has low female literacy rate. This is a cause of concern considering the fact that the city is renowned for its education and philosophy.

3.1.6 SC/ ST Population

The SC population in Varanasi Municipal area is 81,704 (Census of India, 2001), approximately 7.4% of the total Municipal area population. As per the census 2001, ST population in the city stands at 483, which is a mere 0.04% of the municipal population. The sex ratio for the ST population in the city stands at 1021, which is much higher than the total sex ratio of the city ***(Table 7).***

Table 7: SC/ST population for Varanasi Municipal area

Category	Total Population	% to Total Population	Break up			
			Male	%	Female	%
Municipal	1,103,952	-	588,554	53.3%	515,398	46.7%
SC Population	81,704	7.4%	43,850	53.6%	37,854	46.4%
ST Population	483	0.04%	239	49.48%	244	50.52%

Source: Census of India, 2001

3.2 Social Composition

Varanasi, also known as the cultural capital of India, is a predominantly Hindu city. The city is bound to the River Ganga as the focus of the city.

- River Ganga is considered sacred as per Hindu Mythology and tradition and several tourists and pilgrims visit the ghats daily for religious offerings, bathing, prayers, funeral pyres, etc.
- Hindi is the local and official language
- Owing to its proximity to the Buddhist holy place of Sarnath, the city also attracts several national and international Buddhist tourists. Apart from Buddhists, it is also a favoured religious destination for Jains. It is a birthplace of 23rd Thirthankar.
- The city is also known for its music, literature, Vedic philosophy and architecture

- The city is a famous centre for Sanskrit education and at many a places in Varanasi; the Guru Shishya Culture is still being practiced.
- Some of the major festivals celebrated in and around Varanasi include:
  - Ganga Mahotsav in Oct - Nov
  - Bharat Milap at Nati Imli in Oct – Nov
  - Panchkroshi Parikrama
  - Mahashivratri in Feb - March
  - Buddha Purnima at Sarnath in May
  - Ramlila of Ramnagar in Oct – Nov
- Daily *aartis* are offered on the ghats of the sacred River Ganga in morning and evening
- It is believed that nearly 60,000 people take a bath daily in the River Ganga, which is believed to absolve one from all the sins.
- There are some specific days in the year when Hindus take dip in holy river Ganga. Important among them are *Paush Purnima and Makar Samkranti* in January *Mouni Amvasya, Basant Panchami* and *Magh Purnima* in February and Mahashivaratri in March.

3.3 Population Projections

Population projection is important and basic requirement for the provision of basic services to the people. It is also required to plan for service provision and revenue realization from the users in a city, which is the direct function of the population and population growth. The city of Varanasi has a uniquely different growth character, complemented by the movement of people from surrounding areas for occupational reasons, tourist traffic as a result of its heritage value, and special events of spiritual importance of the Ganga at Varanasi. The proximal townships of Ramnagar and Mughalsarai, both of which lies across the Ganga River, east of Varanasi, complement the growth of the Varanasi region.

The base data used for population projection is the data obtained from the Census of India, with detailed urban area population and municipal ward for 2001 and the 1991 census data summaries. This data provided the numeric basis for benchmarking the actual population and its decadal growth for the past decades.

Different population projection methods like incremental increase, geometric methods and exponential method have been used to calculate future population. As different methods will have a different projections, average of all the methods is considered for CDP population projection. Projected populations by different methods are as shown in ***Table 8:***

Table 8: Population projections by different methods

Methods	Population		
	2011	2021	2031
Geometric	1,489,931	1,846,154	2,287,544
Incremental increase method	1,995,366	3,311,161	5,494,624
Exponential	1,576,734	2,067,531	2,711,102
Average Population	**1,687,344**	**2,408,282**	**3,497,757**

Looking at the decadal growth rate variations from 1931 till 2001, one can conclude that there are huge fluctuations in decadal growth rates, and since 1961 it reflects

declining trend. Looking at the growth trend over the last 7 decades, it can be said, that the population projections thus achieved are on a higher side. The declining decadal growth rate for Varanasi can be attributed primarily due to the sluggish growth of industrial sector of the city. Other major reasons contributing to this declining trend are the dying traditional small-scale industries, heavy dependence on tourism sector and the crumbling physical infrastructure of the city.

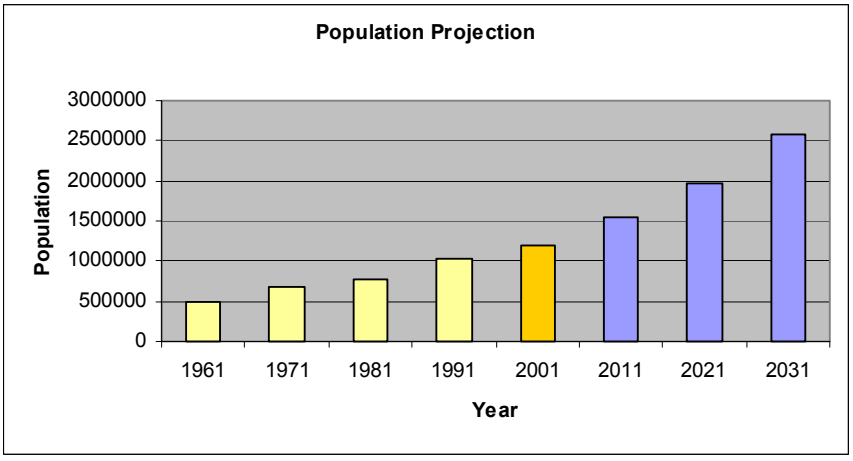
Keeping these factors in mind and with the intent of being more realistic in population projections, which will form the basis of subsequent design efforts; these higher end-point populations have been used as the basis of refining the population growth and dispersion.

Based on the assumption that the same declining trend has and will continue till 2011, **present (2006) population should be around 1,370,785,** and considering the decadal growth rate at 14%, population for 2011 should be around 1,535,279. Also, with the induction of different revenue generating projects that has been identified under JNNURM, **population growth rate** should increase over next decades and reach **28% by 2021 and 31% by 2031.** A small increase of 3% is assumed for year 2031 keeping in mind that the satellite towns like Ramnagar and Mugal Sarai will also be developed and there will be less developmental pressure on Varanasi. Reanalyzing the data for population projections, it can be estimated that population for year **2021** should be around **1,965,157** and for year **2031** it should be around **2,572,356**. ***Table 9 and Figure 4*** shows population projection on decadal growth rate.

Table 9: Population projection on decadal growth rate

Year	Population	Decadal growth rate %
1961	489,864	37.69
1971	671,934	26.14
1981	773,865	25.23
1991	1,030,863	33.21
2001	1,202,443	16.64
2006	**1,370,785**	**14.00**
2011	**1,535,279**	**12.00**
2021	**1,965,157**	**28.00**
2031	**2,574,356**	**31.00**

Figure 4: Population Projection



3.4 Key Issues

Based on the above analysis following issues have emerged with regard to the demographic characteristic of the City.

- Although there is a sharp decline in percentage population growth compared to previous decades there is an absolute increase in population of Varanasi during the last decade. This is due to natural growth and migration of people from surrounding areas in search of job.
- The migrant population is likely to increase the demand for housing particularly EWS/LIG. If not planned for this section of population then slums or unplanned growth will be expected.
- The positive feature of Varanasi is that a large parcel of vacant lands are available along outskirts of the city and current densities are low, except the core old city, hence there is no issue of land availability, but the affordability is area of concern.
- The growth in population is also likely to stress already stressed public transport and will have impact on other services, hence planned efforts are required to direct the growth of the city in right direction.

4 Economic Base

4.1 Introduction

The economy of the city is based on various sectors like tourism; export of famous Banarasi saari, musical instruments and also on the education sector, with world famous universities present in the city. The overall economy of the region is dominated by tourism, with tourist coming not only from all parts of India but also from different countries.

The huge dependence on informal sector for the industrial development has led to an overall stagnation of the secondary sector. The preponderance of the informal economy makes Varanasi distinct. However, Varanasi's informal economy has not developed in relation to or as an adjunct to large industrial centres, making complimentarily between formal and informal sectors hazy. Cottage industries along with Small-scale industries form an important base for the economy of the city.

4.2 Workforce Participation

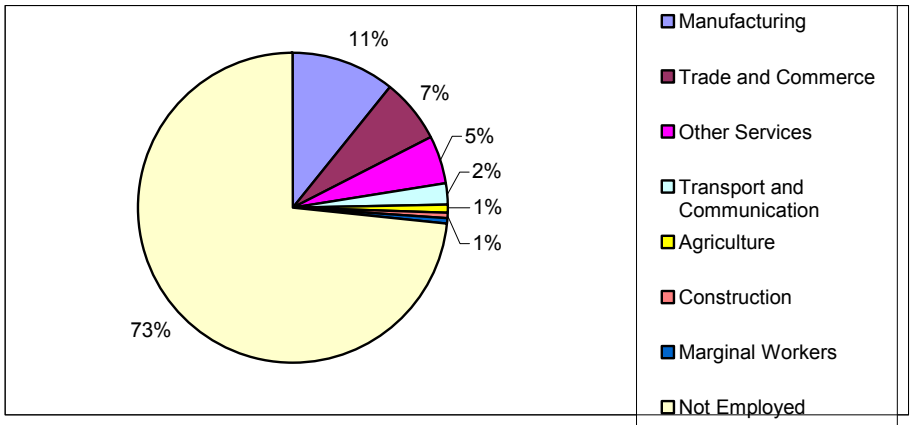
The composition of the work force conveys a picture of quality of life people maintain and their social and economic activities. Around 11% (10.69%) of the total population is engaged across different manufacturing activities whereas the tertiary sector accounts for 6.80% of the total employment. ***Table 10 and Figure 5*** provides the city's employment profile in detail.

Table 10: Employment Profile of Varanasi City

Category	No. of Employees	Percentage Share
Manufacturing	128,930	10.69
Trade and Commerce	82,035	6.80
Other Services	60,466	5.01
Transport and Communication	24,235	2.01
Agriculture	12,239	1.01
Construction	7,028	0.58
Marginal Workers	5,938	0.49
Total Employed	320,871	26.60
Not Employed	885,425	73.40
Total	**1,206,296**	**100.00**

Source: Vision 2025, ICRA report, 2006

Figure 5: Employment Profile of Varanasi City



Work participation rate, (which is defined, as the percentage of total workers (main and marginal) to total population of Varanasi city for 2001 is 28.7 percent. The work participation rate is low compared to both state (32.5%) and national (39.9%) as per 2001 census. ***Table 11*** gives the work force participation in terms of main and marginal workers for last two decades:

Table 11: Workforce Participation composition

Year	Main Workers	Marginal Workers	Total Workers
1991	283,287	4,933	288,220
2001	314,933	5,938	320,871

Source: Census 2001

It can be seen from the above table that there is marginal increase in number of workers both main and marginal over the last decade. Workforce participation rate has marginal increased by 0.74 compared to last decades work participation rate of 27.96. The reason for this marginal increase is due to the very fact that there is overall stagnation of the secondary sector in the city.

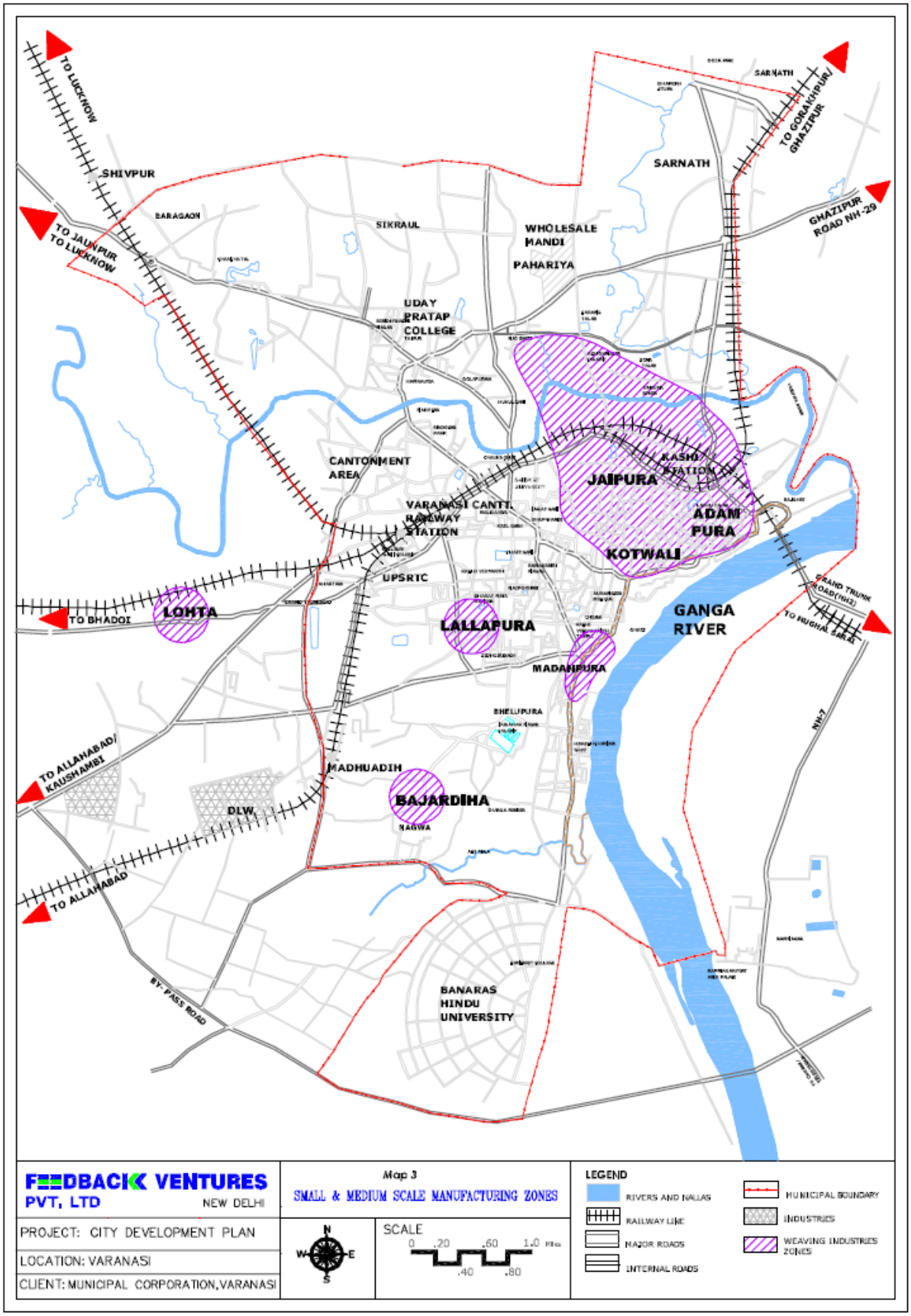
4.3 Dominant Sectors & Activities

During eighties the major thrust was on industrial development of the city, when number of industrial units and that of industrial workers had shown an upward trend. Household industries were predominant and constituted about 29% of the total working population with large-scale industries employing about 11% of the workforce. However, the late eighties and early nineties were the era of significant downfall of industrial development of the city. Currently, it is the household sector, the informal sector that accounts for over a third of the total industrial workforce of the city.

The city is renowned for its silk weavers who prepare the finest types of woven silk fabrics. Silk weaving in Varanasi is a cottage industry, which is found in many areas of the city, and one can see looms at work all days. But today, Varanasi silk industry is in turmoil. Emergence of power looms and use of computer-generated designs has hit the business of these silk weavers. In 1995, there was a sudden influx of Chinese silk traders, who imported cheap yarn to local market and even competed against Varanasi traders by hiring local weavers from the city.

Varanasi does not show signs of a matured economy. It has been primarily dominated by the Small Scale Industries (SSI) sector and household industries (***Fig 5***). The traditional industry of silk sarees will tend to become sick and the city will lag within the region if investment in the power and the registered manufacturing sector does not pour in.

Varanasi is also famous for its trade in wholesale commodities. Having trade links not only in different parts of country but also abroad, major commodities traded are Banarasi Saree, Betel leaves, handicrafts, carpets, rugs, and durries. Silk weaving is perhaps the most coveted art of Varanasi. Besides Banarasi sarees and brocades, exquisite pieces of brassware, copperware, wooden and clay toys and antique designs of heavy gold jewellery are also traded in the city. ***Map 3*** shows manufacturing zone in Varanasi.


TO LUCKNOW
SHIVPUR
BARAGAON
TO JAUNPUR
TO LUCKNOW
SIKRAUL
WHOLESALE MANDI
PAHARIYA
SARNATH
TO GORAKHPUR/ GHAZIPUR
GHAZIPUR ROAD NH -29
UDAY PRATAP COLLEGE
CANTONMENT AREA
VARANASI CANTT. RAILWAY STATION
KASHI STATION
JAIPURA
ADAMPURA
KOTWALI
UPSRTC
TO BHADOI
LOHTA
LALLAPURA
GANGA RIVER
GRAND TRUNK ROAD(NH2)
TO MUGHAL SARAI
MADANPURA
BHELUPURA
NH-7
TO ALLAHABAD/ KAUSHAMBI
MADHUADIH
BAJARDIHA
NAGWA
DLW
TO ALLAHABAD
BY PASS ROAD
BANARAS HINDU UNIVERSITY
FEEDBACK VENTURES PVT. LTD NEW DELHI
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION, VARANASI
Map 3
SMALL & MEDIUM SCALE MANUFACTURING ZONES
N
W
E
S
SCALE
0 .20 .60 1.0 Kms
.40 .80
LEGEND
RIVERS AND NALLAS
RAILWAY LINE
MAJOR ROADS
INTERNAL ROADS
MUNICIPAL BOUNDARY
INDUSTRIES
WEAVING INDUSTRIES ZONES

Other commodities include the hand-knotted carpets of Mirzapur, musical instruments, the 'khatta-meetha' (sweet 'n' sour) 'Langda Aam', a popular variety of mangoes available during summer season and the famous betel leaf that is considered a speciality of the region. There are different Mandis in the city dealing with different commodities at various places. Some of these mandis are present in areas like Pahadiya (fruit and vegetable mandi), New Pan Duriya (Pan Mandi), Vishnunath Gali (Toys mandi), Gola Dinanath (masala mandi) and Chauk for silk.

The areas of retail business in Varanasi city are Chowk, Gyan Vapi, Vishwanath Gali, Thatheri Bazar, Lahurabir, Godoulia or Dashswamedh Gali and Golghar. Practically all these areas are unplanned. This is because that most of the structures exists since early days and front side of these dwellings have been converted into shops which is a common feature in such type of developments of the towns. The haphazard development of shops along roads has created problems of parking and traffic congestions. From the above analysis it can be concluded that the wholesale business is spread out along main roads and petty shops are springing up indiscriminately. Non-availability of parking space for vehicles is also a problem in the retail and wholesale business areas.

4.4 Industrial development

Over the last decade the industrial development has shown a declining graph, due to the very fact that there is declining share of land for industrial development. A major emphasis was given in the Master Plan 1991 to promote the industrial area in Varanasi but since the industrial base in the city could not be developed as expected, the area allocation under the Master Plan 2011 for industrial use has been reduced significantly. While provision for absolute area has gone down from 981.37 hectares to 656.19 hectares, the share of industries has declined from 6.77% to 4.52%.

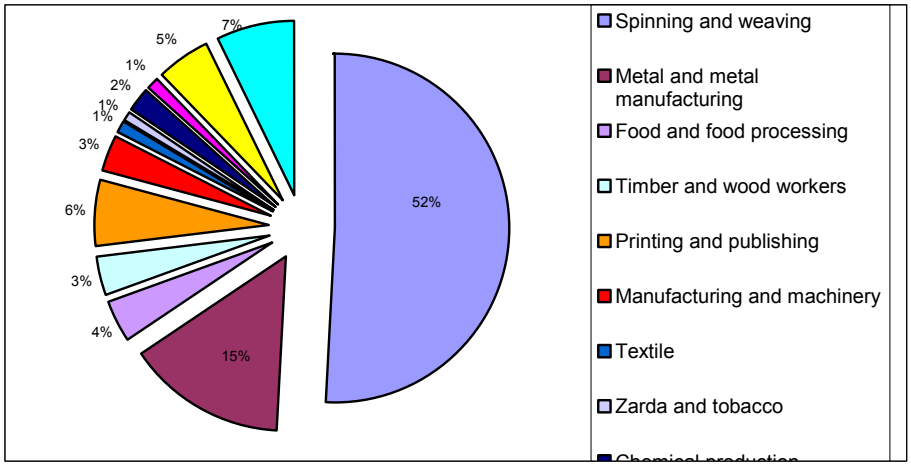
Amongst manufacturing units, spinning and weaving alone accounts for 50.70% of the existing employment in Varanasi followed by metal and metal products industry, accounting for almost 15% of the manufacturing employment of the city. These two activities account for over 2/3rd of the total manufacturing employment of the city. Apart from other industries, Diesel Locomotive Works (DLW) continues to be a major industry in the city. ***Table 12 and Figure 6*** shows category wise industries and number of employees in each category.

Table 12: No. of Employees in Different Industries

Category	No. of Employees	Percentage to total
Spinning and weaving	65368	50.70
Metal and metal manufacturing	19223	14.91
Food and food processing	4938	3.83
Timber and wood workers	4487	3.48
Printing and publishing	7981	6.19
Manufacturing machinery	4435	3.44
Textile	1354	1.05
Zarda and tobacco	1147	0.89
Chemical production	2669	2.07
Transport equipments	1405	1.09
Electric machinery	6472	5.02
Miscellaneous	9451	7.33
Total	**128930**	**100.00**

Source: Varanasi Vision 2025, Draft Final Report, ICRA, 2006

Figure 6: Employment in Different Industries



Apart from cottage industries, small-scale industries also form an important part of the economy of the city. Both registered and unregistered units exist in this sector with unregistered sector being more prominent than the registered sector. Varanasi district ranks at the eighty-first position in terms of number of SSI units present in registered sector. The estimated number of such units in Varanasi is slightly less than 30,000, which forms approximately 0.7% of the total number of unregistered units in top 100 Indian districts in terms of number of units in unregistered SSI sector (Annex I).

There are few clusters available in Varanasi, which include agricultural implements, fans, power looms and sheet work. Varanasi power looms cluster is the largest among all the clusters. The latter two clusters have the huge potential of exports. Thus, there is a need to tap this potential by providing incentives to these sectors. But this should not be done at the cost of the traditional handloom industry, which is already suffering. The clusters with their export potentials are as shown in ***Table 13***:

Table 13: Clusters and their export potential in Varanasi

Name of Cluster	Type of Cluster	Product Group	Export potential	Potential for technology up gradation
Agricultural Implements	SME	Base metals, products thereof & machinery equipment & parts thereof, excluding transport equipments	Low	High
Electric Fan	SME	Base metals, products thereof & machinery equipment & parts thereof, excluding transport equipments	Medium	Medium
Powerloom	SME	Textile and Textile Articles	High	Medium
Sheetwork (Globe, Lamp etc)	SME	Base metals, products thereof & machinery equipment & parts thereof, excluding transport equipments	High	Medium

Source: Vision 2025, Final Report, ICRA, 2006

4.5 Key Issues

- The percentage of working population in the informal sector (HH industry workers) is close to 33%
- The city is not a major manufacturing base for both private and public entity
- The weaving and handicraft industry and the associated SSI sectors are not showing any signs of growth
- Workers are employed without secure contracts and limited access to public infrastructure and benefits
- Workers do not have access to markets for proper sell of their finished products and work under a 'ties regime'
- Limited access to the credit market/institutional market for setting up self-employment ventures.
- No proper revival policy in place for sick SSI units

5 City Development and Land Use

5.1 Introduction

The city of Varanasi has grown along the arc of Ganges with River Ganga as a focal point in one direction and growth of the city taking place in semi-circular direction. The city has a radial development pattern with areas like BHU, Manduadih, Sheopur and Sarnath emerging as new growth centres in all directions. Over a period of time, with the inclusion of a large number of villages and urban settlement, the city development has resulted in irregularly shaped built up areas along peripheries of the central areas of the city. The coming up of the Diesel Locomotive works and residential colonies over an area of 250 ha in the Southwest and the Soda Ash factory along the GT road in the East mark the development around the rural city fringe.

5.2 Morphological Development of Varanasi

The renowned American novelist Mark Twain once wrote, ***"Banaras is older than history, older than tradition, older even than legend and looks twice as old as all of them put together."*** Any history buff will be delighted to learn that this ancient city finds mention in most of the great epics of India. Hindu legend has it that Varanasi is the center of the universe, the first city created by the gods on Earth, and it is certainly true that it was already an old city when Rome was created.

The History of Varanasi dates as far back as the Aryan culture in the second millennium B.C. It was already an old city and was a flourishing centre of trade when Buddha came to Sarnath, some 10 km away, to preach his first sermon in 500 B.C. The Afghans completely destroyed the city in the 1400's AD and it had to be completely rebuilt.

Dashawamegh Ghat: A view in 1820s,
by James Prinsep, 1830

Varanasi comprises of the old city area, central area and new area. Architecture in the old city area dates back to just after Afghan invasion, and in the central and new city, it is less than 150 years old. In the 2nd century, for the first time we find description of Dashashvamedha Ghat with reference to the great horse sacrifice ritual performed by the kings of Naga dynasty. During the Gupta period, 3rd to 6th century AD, the ghats became the centre of economic and cultural activities. The Puranic literature describes its glory vividly in various contexts. In the Gahadavala period, 11th-12th century, as much as five ghats were mentioned in several inscriptions, viz. Adi Keshava, Vedeshvara, Kapalamocana, Trilocana and Svapaneshvara. From the inscriptions it is also clear that on solar and lunar eclipses and

on some other family celebrations people were going to the ghats for performances and giving donations to the Brahmins.[4]


Re-construction of Ghats, Varanasi in 1922

By 17th century the riverfront landscape (ghats) became prominent in the overall arena of Varanasi. Varadaraja's *Girvana-padamanjari* (17th century) gives a full account of the ghats, rituals and festivals associated to them. The palatial buildings along the ghats were built under the patronage of the Marathas during 18th -19th centuries. Even in 19th-20th century many ghats were re-constructed, re-named and reshaped too. Since 1950 the state government of Uttar Pradesh has been deeply involved in making the ghats stone stairs (*pucca*) and their repairing. During the period between late 18th and 20th century, along the riverfront many monasteries (*ashramas*), Sanskrit schools, temples, and pilgrims rest house were built by principalities, of different parts of India, like Peshvas of Pune (Gujarat), Holkar of Indore, and Scindhias of Gwalior (Madhya Pradesh), Bhonshalas of Nagpur (Maharashtra), Sursand, Bhabhua, and Darbhanga estates of Bihar, Rani Bhavani of Bengal, kings of Nepal, etc.[5]

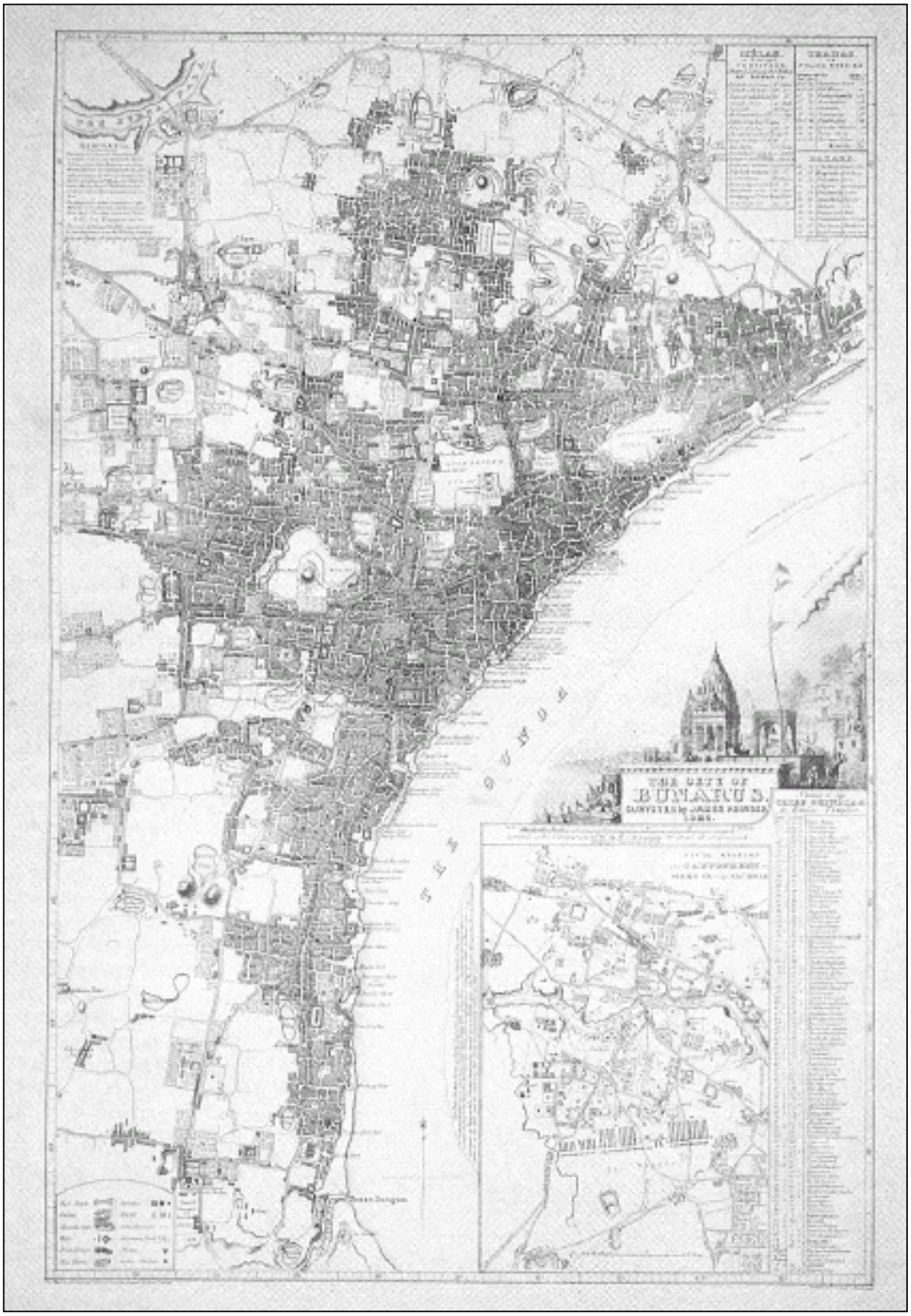
By far and large, the charm of Varanasi is in the old city. This extends maybe 2 km back from the river and is home to a maze of alleyways and streets, so narrow, only bicycles can negotiate them. The Muslim quarter, most of the temples, mosques, *ashrams* (learning centres), the vegetable shops and budget accommodation can be found here giving it a typical characteristics.

The central and new area is a home to banks, cinemas, administration, train station and world famous Banaras Hindu University (BHU). Pandit Madan Mohan Malviya in year 1916 founded BHU in 1300 acres, which is the greatest centre of leaning in India. It has attracted a major migrating population during that period and the city started to grow in all directions. Britishers also stayed in an area, which is now Cantonment area of the city. With the influx of population, the city has developed naturally over a period of time resulting in haphazard development of the city. ***'James Prinsep'*** prepared the first map in year 1822, showing the development of the city.

The first development plan was prepared in the year 1948 by the Improvement Trust area of Varanasi, which was again revised and approved in the year 1973 on the basis of extended areas in the year 1958. Preparation of Master Plan-2011 for the city of Varanasi started in the year 1988, and was sanctioned in year 2001. The city is expanding beyond central city area. The municipal city limits have been extended as and when the need was felt to regulate the extensions. There are markets and industrial establishments in this area. This area is an emerging area for the future development of the city.

[4 & 5] *Prof. Rana B P Singh (2005), "Life in Historic Urban Landscape of Varanasi, a Heritage City of India", Geography Department, Banaras Hindu University, Varanasi, UP*

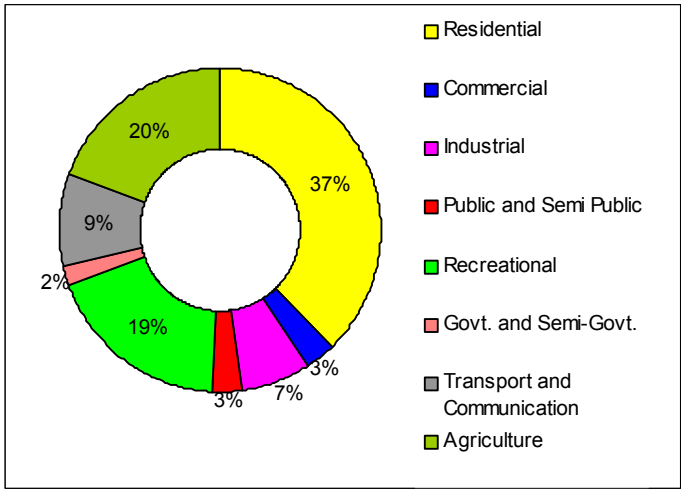
Figure7: First Map of Varanasi Prepared by James Prinsep in year 1822.



5.3 Present Scenario

Land management is a critical element in the city's development. Also in the pretext of urban expansion, valuable agricultural lands are converted into urban lands. Urban land is a scarce and costly resource and needs to be apportioned to various uses very judiciously. In order to plan the future land uses, a study of the existing land use is necessary.

Figure 8: Land Utilization – Previous Master Plan



The Varanasi Development area has been broadly divided into 2 zones: Zone A and Zone B. Zone A comprising of the area to the left of River Ganga (comprising of areas like BHU, Varanasi Municipal area) and Zone B along the right bank of river Ganga (including areas like Ramnagar and Mughal Sarai). The Master Plan 2011 has been prepared for zone A. As per this Master Plan of Varanasi, total area under planning jurisdiction was 14494.40 hectors for 1991.

Out of this total, developed area was 11662.34 ha, and is 80% of total area. Remaining 20% area is under agricultural belt around the city. Out of the total developed area residential use constitutes maximum of 38% area (i.e. 5457.24 ha) followed by parks and playgrounds, which constitute 19% (i.e. 2705.76 ha). The land utilization details for the entire town as per the master plan report for year 1991 are as follows ***(Table 14, Figure 8)***

Table 14: Land Use Pattern- Previous Master Plan

Sl. No.	Land Use	As per 1991	
		Area in Ha	Percentage
1	Residential	5457.24	37.65
2	Commercial	475.10	3.28
3	Industrial	981.37	6.77
4	Public and Semi Public	450.42	3.11
5	Recreational	2705.76	18.67
6	Govt. and Semi-Govt.	292.18	2.02
7	Transport and Communication	1300.27	8.97
8	Agriculture	2832.06	19.54
	Total area	**14494.40**	**100.00**

Source: Master Plan-2011, Varanasi

5.4 Master Plan 2011 Proposals

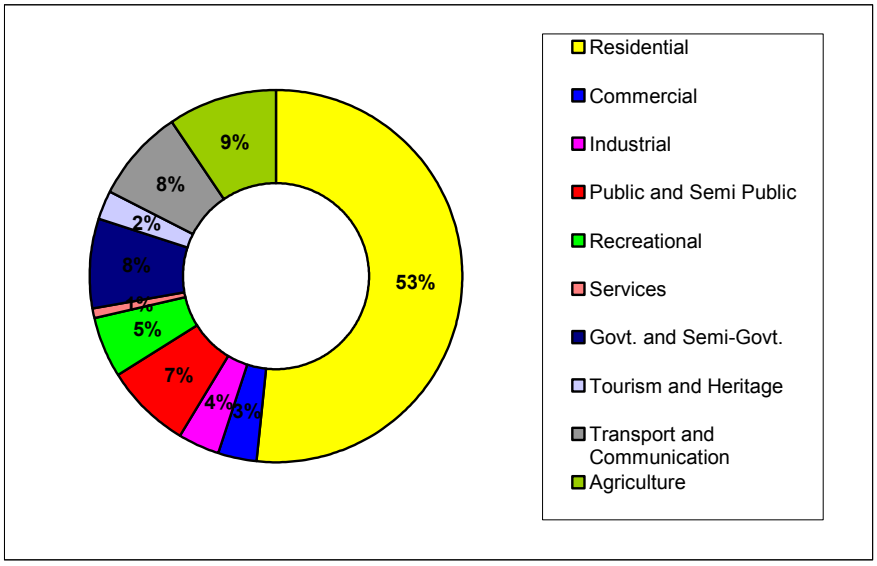
Varanasi Development Authority (VDA) has prepared a Master Plan 2011 for the future development of the city, which states that total area of the city will increase from 14494.40 ha to 17927.22 ha. This increase in total area is very nominal with 23.68% compared to pervious master plan. ***Table 15 and Figure 9*** shows the detailed land utilization proposed for year 2011.

Table 15: Land Use Pattern – Existing Master Plan

Sl no	Land Use	Proposed for 2011	
		Area in Ha	Percentage
1	Residential	9254.61	51.61
2	Commercial	618.23	3.45
3	Industrial	656.19	3.66
4	Public and Semi Public	1309.07	7.30
5	Recreational	984.47	5.49
6	Services	103.97	0.58
7	Govt. and Semi-Govt.	1433.15	7.99
8	Tourism and Heritage	423.73	2.37
9	Transport and Communication	1460.35	8.15
10	Agriculture	1683.45	9.39
	Total	**17927.22**	**100.00**

Source: Master Plan-2011, Varanasi

Figure 9: Land Utilization – Existing Master Plan



The land use pattern as proposed for year 2011 for the city of Varanasi revealed that:

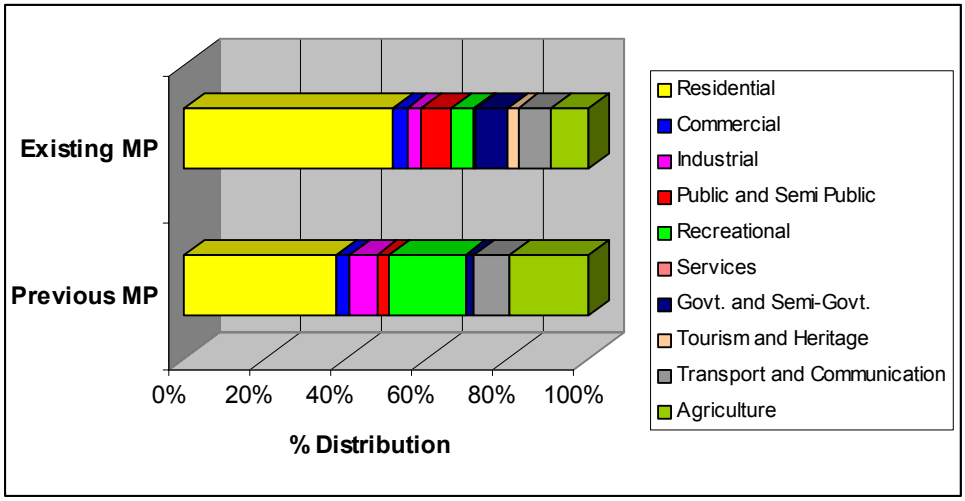
- Considerable change in residential land use, which in the existing Master Plan account for almost 52% of the total land use. This increase would be due to pressing demand for residential purposes.
- Industrial area constitute on 3.66% of total land use, which has been drastically reduced by almost 46%. Industrial and commercial land use together account for marginally over 7% of the total land use and is far below compared to other cities like Haridwar (12.2%), Agra (15.9%) and other industrialized cities (11%).

- The total area under tourism/heritage is at alarmingly low levels (less than 3%), compared too similar placed cities are 6%.
- It can be seen from the above tables that there is reduction in the agricultural land use, which depicts that rural agricultural land on the fringe and suburbs are gradually being used up for building new colonies.

The major drawbacks of Master Plan 1991, which have been reflected upon in the Master plan for 2011 are:

- Under utilization of area prescribed for industrial land use,
- Unauthorized constructions, developments which came up due to the construction of the bye-pass and
- Under utilization of areas under green/recreational use.

Figure 10: Comparative Land Utilization of Master Plans



The analysis of MPV-1991 and the targets achieved shows that almost all the land uses could not be developed to the expected levels. Major gaps can be observed in residential, recreational, PSP and industrial uses where the development was less than the prescribed levels. Emphasis has been laid on the development of residential, industrial and recreational uses in MPV-2011 ***(Figure 10).***

5.5 Key Issues

- The primary issue with regards physical planning and growth management in Varanasi is that physical development and growth is haphazard and uncontrolled.
- Master plan needs to be implemented correctly and reserved lands have to be used for specified purpose.
- Master Plan should be implemented in time bound manner.
- The planning department to have a planned development does no proper assessment of the land requirement
- Under utilization of land uses like recreational, industrial resulting in the shift of land use pattern

6 Urban Characteristics and Housing

6.1 Urban Profile

Understanding the urban character of Varanasi is very important while preparing the CDP. The existing urban setting and growth trends of Varanasi can be classified into three main categories. These areas are as shown in ***Map 4***.

1. The Old City consisting of the Ghat area including Chauk, Kotwali, Adampura, etc.,
2. The Central City comprising of the area beyond the old city and bound by NH-2 along the western and northern edge
3. Peripheral area comprising of the trans Varuna area.

6.1.1 The Old City

The urban character of Varanasi is very complex. The traditional typical old city of Varanasi has undergone transformations over time, still retaining its original character and ethos. Areas adjacent to Ghats and the old city exhibit dense development due to its proximity to Ghats and their longevity of existence, which have become the cultural fabric of the city. Predominant characteristics of the old city include:

- Dependence on River Ganga as the sacred lifeline of the entire city
- Proximity to Ghats which are the nodes of religious and tourist activity in the city
- Rich built heritage representative of various traditional building styles.
- Pollution of River Ganga due to intense load of tourist and religious activities
- Dotted with temples of high religious significance all along the ghats
- Bazaar street pattern catering mainly to religious and tourist population
- High density core area with narrow and inorganic street patterns
- Encroachment by commercial and informal sector on the roads
- Slow moving traffic and lack of parking spaces leading to congestions and chaos
- Major concentration of retail and wholesale trade of Handlooms (including Banarasi sarees) and brassware
- Haphazard cabling including electric and telephone wires.
- Open drains with grey water and solid waste dumps along internal streets
- Need for improvement in infrastructure, traffic facilities and utilities.
- Need for provision of infrastructure to cater to the tourist load, conservation and adaptive reuse of heritage buildings.

6.1.2 The Central City

Areas adjacent to the city core are constantly under great development pressure due to close proximity to the core areas. This is because of availability of all services, cultural attractions and Varanasi is no exception to this. These areas have been categorized as “proximal areas” in developing the growth analysis. Predominant characteristics of the newer city include:

- Focus on religious character reduces considerably.
- Lower density development as compared to the old city
- Relatively wider roads with lesser encroachments

- Vulnerable to high potential for growth.
- Relatively less disorganized compared to the old city area and the built form is less congested. The development pressure on these areas remains high and is likely to impose additional burden on existing limited infrastructural facilities available.
- Institutional areas like Kashi Vidyapeeth, BHU and Sanskrit University
- Railway station and Cantonment area form a considerable part of this zone
- The plantation levels and green areas are higher than those in old city but roadside plantation needs to be provided
- Major traffic congestion points like railway station, Chaukaghat and Andhrapul fall in this one. The GT road itself carries significant amount of traffic and needs to be decongested
- The marked reduction in the number of cycle rickshaws plying on the roads in this zone leads to an increase in the average flow of traffic.
- Lack of public transport facilities
- Diesel Locomotives Factory lies in this zone and forms a major industrial zone on the western side
- Newer constructions coming up in the areas near Madhadhi and BHU

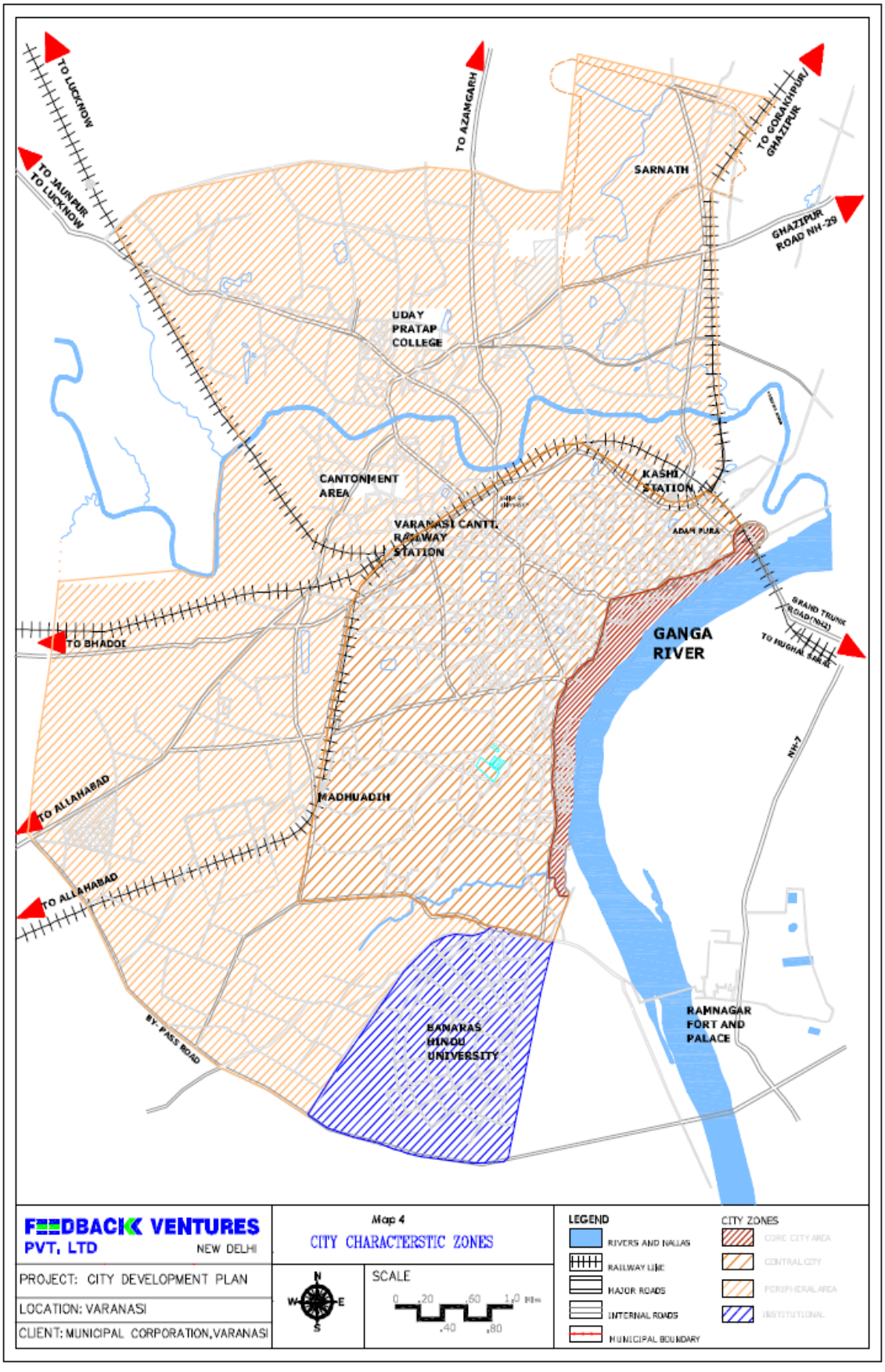
6.1.3 Peripheral areas

The peripheral areas encompassed by the municipal wards have a strikingly different development pattern than the rest of the city. These areas are becoming more popular among the citizens as they provide more organized development pattern with infrastructure being relatively in better conditions. The State Housing Board, through the Varanasi Development Authority, undertakes these developments. The demand for such development is increasing and with the participation of governmental and private development groups, the growth of peripheral areas is likely to be much higher in comparison to other parts of the city. The proposal for the construction of ring road in this zone has further accelerated the development process. The development in this zone is the most planned and organized in the whole city but there is a relative lack of recreational/green spaces in this zone.

Major catalyst for urban growth will be development of new ring road to the north of the city, which will over the next decade comes into developed form. Greater urban development will take place along this in the northern part of Varanasi. Along with this development of major road systems connecting to the National Highways on the southern extent of the city is already causing a spurt in development in this area. Combined with plans for a transport nagar in the western extremity of Varanasi and the connectivity across the Ganga to the eastern bank (to Ram Nagar and Mughal Sarai) the growth of urban areas and the population of Varanasi outside the municipal wards are likely to continue to accelerate.

6.2 Housing

Housing, one of the basic services, which is to be provided for better quality of life, shall be given the importance in the plan. The increasing level of urbanization has created the stress on housing sector in Varanasi. As indicated by the last two decades population demographic data, it can be seen that there is a high increase of 33% population from 1981-1991 while it came down to 17% in next decade, but the increase in housing cannot catch the pace of increasing population hence resulting in the housing gap.


TO LUCKNOW
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COLLEGE
CANTONMENT
AREA
KASHI
STATION
VARANASI CANTT.
RAILWAY
STATION
ADAM PURA
GRAND TRUNK
ROAD(NH2)
TO BHADOI
GANGA
RIVER
TO MUGHAL SARAI
NH-7
TO ALLAHABAD
MADHUADIH
TO ALLAHABAD
BY-PASS ROAD
BANARAS
HINDU
UNIVERSITY
RAMNAGAR
FORT AND
PALACE
FEEDBACK VENTURES
PVT, LTD
NEW DELHI
Map 4
CITY CHARACTERSTIC ZONES
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION, VARANASI
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LEGEND
RIVERS AND NALLAS
RAILWAY LINE
MAJOR ROADS
INTERNAL ROADS
MUNICIPAL BOUNDARY
CITY ZONES
CORE CITY AREA
CENTRAL CITY
PERIPHERAL AREA
INSTITUTIONAL

6.2.1 Housing Densities

The average housing density is approximately 2167 HH/sq.Km. The core area of the city is very congested, which is highly densified. Though there is no scope for further development in the old city area, developmental activities taking place in these areas are causing more stress on present infrastructure. As the city is growing, new extension areas has low housing densities, some of the people are shifting from old area to these areas in search of better living conditions. ***Table 16*** shows the change in household densities for last three decades.

Table 16: Household densities

Particulars	Area	1971	1981	1991 (Undivided)	1991 (After division)	2001
Area in Sq. Km	Urban	129.2	157.7	156.15	96.1	79.79
	Total	**5091**	**5091**	**5092**	**1550.3**	**1449.44**
Number of households	Rural	344339	401578	476612	192705	147457
	Urban	132632	154999	178030	143453	172975
	Total	**476971**	**556577**	**654642**	**336158**	**320432**
HH/Sq.km.	Urban	1026.56	982.87	1140.12	1492.75	2167.88
	Total	93.69	109.33	128.56	216.83	221.07

Source: Report on District land Use Plan by State Land use board, 2005

6.2.2 Housing Shortage

The city faces an acute housing shortage. As per study conducted by ICRA there is a huge gap between housing supply and demand. The housing demand is increasing at the rate of 16% (approximately) yearly. According to the data there is nearly shortage of 90,000 houses in year 2001, which is expected to be 119,954 in 2011 and further to 139,657 in 2025 as shown in ***Figure 11 & 12***.

Figure 11: Housing Stock Varanasi

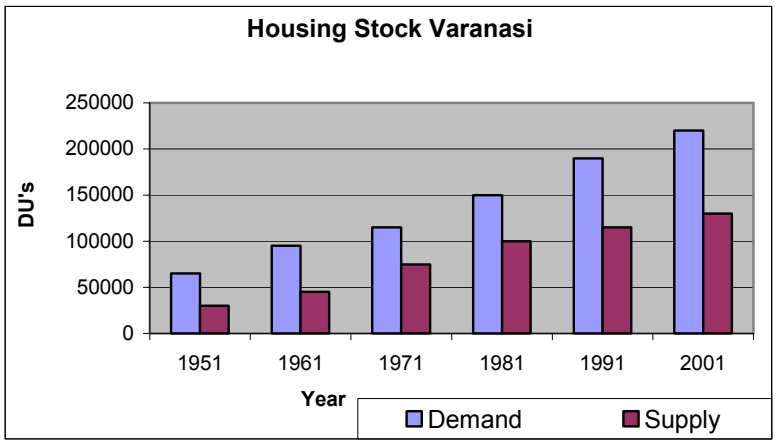
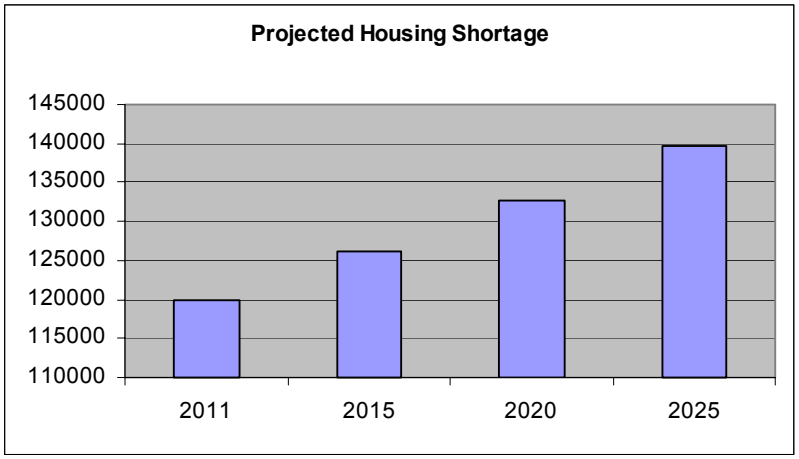


Figure 12: Projected Housing Shortage



6.2.3 Distribution of households by size

Due to acute shortage of housing Varanasi city faces the problem of overcrowding. With the average Household size of Varanasi being 7.3, the condition of the people is very bad and overcrowded. There are 47% of the households, who live in one room or two rooms. Five and six dwelling rooms are found in only 7% and 14% of the households respectively. ***Table 17*** shows distribution of HHs by size and number of dwelling rooms.

Table 17: Distribution Of Households By Size And Number Of Dwelling Rooms

Household size	Total number of Households	Households having number of dwelling rooms							Median number of rooms
		No exclusive room	One room	Two rooms	Three rooms	Four rooms	Five rooms	Six rooms and above	
All Households	145,150	1,856	32,020	35,516	24,779	19,875	10,140	20,964	3
1	4,032	837	1,963	644	241	157	61	129	1
2	7,255	115	3,026	1,961	937	540	236	440	2
3	9,136	74	3,212	2,563	1,455	870	361	601	2
4	16,796	119	4,586	4,974	2,898	2,087	832	1,300	2
5	20,087	118	4,945	5,804	3,657	2,560	1,216	1,787	2
6-8	45,889	266	9,565	12,230	8,593	6,663	3,104	5,468	3
9+	41,955	327	4,723	7,340	6,998	6,998	4,330	11,239	4

Source: Census of India, 2001

Assuming that two persons can live in one room, with better living conditions, the overcrowding data can be calculated for Varanasi. Total overcrowding population in Varanasi is approximately 447,026. Thus there is a need to provide more housing to keep the pace with increasing population and avoid overcrowding.

6.2.4 Distribution of census houses by their usage

As per census 2001, a 'census house' is defined as "A building or part of a building used or recognised as a separate unit because of having a separate main entrance from the road or common courtyard or staircase, etc. It may be occupied or vacant. It may be used for a residential or non- residential purpose or both". There are 184,833 census houses in Varanasi out of which 67% houses are put to residential use and are predominant in the city. Vacant houses constitute 4%, which can be put to residential use, to reduce the housing demand of the city. ***Table 18*** shows the use of census houses in Varanasi.

Table 18: Census houses and the uses to which they are put

Total number of census houses		184,833
Total number of vacant census houses		7,826
Total number of occupied census houses		177,007
Occupied census houses used as	Residence	117,699
	Residence-cum other use	24,399
	Shop, Office	21,491
	School, College, etc.	735
	Hotel, Lodge, Guest House, etc.	430
	Hospital, Dispensary etc.	708
	Factory, Work-shop, Work-shed etc.	1,734
	Place of worship	1,745
	Other non-residential use	8,066

Source: Census of India, 2001

6.2.5 Distribution of houses by type of structure

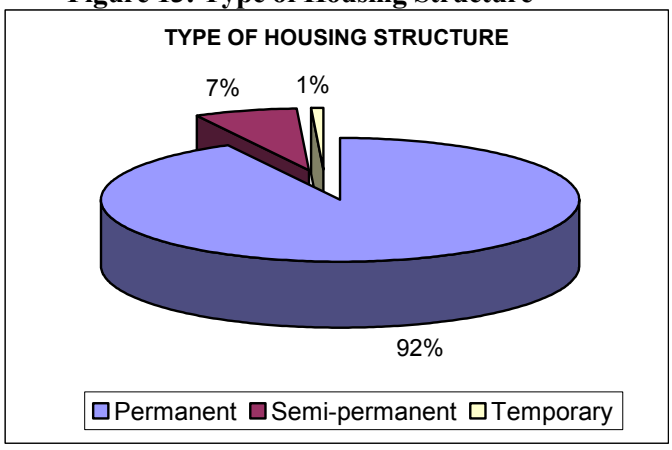
Condition of houses in the city has been assessed based on the type of structure. As there are 92% houses are pacca houses, overall condition of housing in Varanasi is better. Out of total only 7% constitute semi-pacca houses and 1% constitutes temporary housing structures. Distribution of census houses by residence, residence-cum-other use and type of structure is as shown in ***Table 19 and Figure 13***.

Table 19: Distribution of census houses by residence, residence-cum-other use and type of structure

Total number of census houses			141,953
Type of census houses	Permanent		131,017
	Semi-permanent		9,641
	Temporary	Total	1,281
		Serviceable	877
		Non-serviceable	404
	Unclassifiable		14

Source: Census of India, 2001

Figure 13: Type of Housing Structure



Out of total housing structures 62% houses are in very good conditions, 34% are in livable conditions and the remaining 4% are in dilapidated conditions. People living in the dilapidated housing structures should also be included for the proposed housing stalk required for the future population.

6.2.6 Ownership status of the houses

Ownership status is one of the major components as it helps to determine the housing demand of the city in future. It has been noted that 83% population owns the house, 14% people live in rental accommodation and remaining 3% population live in other form of housing. Housing demand in the city is increasing at a higher pace but the supply is at very lower pace. ***Table 20*** shows distribution of HH by ownership & no. of dwelling rooms

Table 20: Distribution of households by ownership & number of dwelling rooms

Ownership status	Total number of households	Households having number of dwelling rooms							Median number of rooms
		No exclusive room	One room	Two rooms	Three rooms	Four rooms	Five rooms	Six rooms and above	
Total	145,150	1,856	32,020	35,516	24,779	19,875	10,140	20,964	3
Owned	120,056	1,463	20,973	28,045	21,834	18,300	9,601	19,840	3
Rented	20,085	271	8,617	6,230	2,386	1,222	448	911	2
Any other	5,009	122	2,430	1,241	559	353	91	213	1

Source: Census of India, 2001

6.2.7 New Development

Varanasi Development Authority (VDA): VDA is responsible for overall planned development of the city. Presently VDA has few new housing schemes in the Varanasi areas viz., Lodhan housing scheme and Unitech housing scheme. Awas Vikas Parishad has appointed VDA for the devolvement of these areas. The area of the Lodhan scheme is 40-50 acre and the Unitech scheme has an area of 2200acre. These two schemes are located in the southwest region of Varanasi.

Awas Vikas Parishad- Awas Vikas has an active role in meeting the housing demand of the city. The details of the properties declared completed up to May 2006 are given in ***Table 21***:

Table 21: New Housing schemes

Name of Scheme	Category of property	Properties declared complete upto 05/06
Kabir Nagar	M.I.G	384
	M.I.G	64
	H.I.G	96
	EWS	76
	Total	**620**
Jawahar Scheme	Residential plots	22
	Total	**22**
Pandeypur yojna	H.I.G	42
	E.W.S	69
	L.I.G	106
	M.I.G	204
Total	**421**	

Source: UP Housing Board, Varanasi

Keeping in view the future needs and demand of the city, six housing schemes have been proposed, in the areas namely, G.T. Road By Pass Scheme, Housing at Allahabad-Jaunpur road, Dharupur Yojna, Gopiganj housing Scheme, Mehuri Khurd Land development and Housing scheme, Pusauli Land development Housing Scheme. Although there is no data available about the housing provided by private developers and builders, the private sector plays and important role in meeting the demand of the city.

6.2.8 Housing In Varanasi Master Plan 2011

In Master Plan 1991, 5457.24 ha of land is proposed for residential development out of which only 47.9% i.e. 2615.64 ha of land is developed. The rest 52.1% or 2841.6 ha land is left undeveloped. As per the plan the densities in several congested areas have exceeded more than 1000 persons/ha hence they have identified the need for decentralization. Thus for the planned development of the city they have identified the total land of 9254.61 ha for residential use in Master Plan 2011.

6.3 Key Issues

- Housing stock is not available to cater the increasing population.
- Overcrowding in the residential areas of the city
- Housing densities is very high in inner city and need to be decongested
- The city has major area under unplanned residential housing.
- New housing development schemes should be linked with proper transport facilities;
- The land allocated under residential use in the Master Plan 2011, shall be optimally used to bridge the housing gap.

7 Tourism and Heritage Conservation

7.1 Background

The ancient city of Varanasi is believed to have existed since beginning of the earth and finds its mention in the Arthavedas[6]. Varanasi, owing to its rich traditional fabric and ghats, attracts more than 30 lakh domestic and international tourists each year. The city, an important centre for religious tourism in India is also a gateway to the Buddhist circuit; with significant foreign tourist coming from Japan, China, Malaysia, etc.

Painting showing Kashi on Trishul of Lord Shiva

Being the holiest city of Hinduism, the impact of the religion is found everywhere in the city. The city of Varanasi is unique in the architectural, artistic and religious expressions of traditional Indian culture and is, even today, a living example of this culture.

7.2 Tourism

7.2.1 Destinations within Varanasi

7.2.1.1 Ghats

Varanasi is famous for its Ghats. Ghats are steps that lead down to River Ganga. The crescent shaped bank of river Ganges houses 84 ghats on the western bank spread over a distance of 6.8 km. Several rituals and religious ceremonies are associated with these ghats and pilgrims travel from all over the country for prayers, holy dip in the river Ganga, cremation, religious offerings, etc. The most important ghats are Dasaswamedh, Harish Chandra, Manikarnika, Panchaganga, and Assi ghat.

- **Dasaswamedh Ghat**: It is one of the most important ghats of Varanasi. It is located near '*Kashi Vishwanath Temple'*. It is belived that on this very Ghat ten horses were sacrifised by Lord Brahma to allow Lord Shiva to return from a period of banishment. In spite of the fact that Dasaswamedh is one of the oldest ghats of Varanasi, dating back to many thousand years, the ghat has remained unspoilt and clean.

View of Dasaswamedh Ghat

[6] Revitalization of Varanasi as a tourist destination, Ministry of Tourism and Culture, GoI, Feb 06, HUDCO

Dasaswamedh provides a beautiful and colourful riverfront view. A large number of Sadhus can be seen performing religious rites on this ghat. Devotees must not miss the opportunity of visiting this ghat in the evening when the Aarti is performed. During *Dipawali festival*, thousands of earthen lamps are immersed in the waters of the holy Ganges and the floating lamps give a divine look to the river at dusk.

Aarti at Dasaswamedh Ghat

- **Harish Chandra Ghat**: Harish Chandra Ghat is name after a mythological King Harish Chandra, who once worked at the cremation ground here for the perseverance of truth and charity. It is believed that the Gods rewarded him for his resolve, charity and truthfulness and restored his lost throne and his dead son to him. Harish Chandra Ghat is one of the two cremation Ghats (the other being Manikarnika Ghat) and is some times referred as Adi Manikarnika (the original creation ground). Hindus from distant places bring the dead bodies of their near and dear ones to the Harish Chandra Ghat for cremation. In Hindu mythology it is believed that if a person is cremated at the Harish Chandra Ghat, that person gets salvation or "moksha". The Harish Chandra Ghat was somewhat modernized in late 1980's, when an electric crematorium was opened here[7].

Cremation at Harish Chandra Ghat

- **Manikarnika Ghat**: It is one of the oldest and most sacred Ghats of Varanasi. People belive that being burned here provides an instant gateway to liberlisation from the cycle of births and rebirths. Lying at the centre of five tirthas, ghat symbolises both creation and destruction. At Manikarnika Ghat, the mortal remains are consigned to flames with the prayers that the souls rest in eternal peace. It is also believed that fire does not extinguish at this Ghat. There is a sacred well at the Manikarnika Ghat, called the Manikarnika Kund. Manikarnika Kund is said to be dug by Lord Vishnu at the time of creation while the hot ashes of the burnt bodies makes one remember the inevitable destruction of everything in the world.

Wooden logs at Manikarnika Ghat

[7] http://www.varanasicity.com/harishchandra-ghat.html

- **Panchaganga Ghat**: As the name suggests, it is belived that five rivers Kirana, Ganga, Yamuna, Saraswati and Dhuta-papa converge here. Dominating the ghat is Auangazeb's smaller mosque, also known as the Alamgir Mosque, which he built on the site of large Vishnu temple erected by the Maratha chieftain Beni Madhav Rao Scindia.

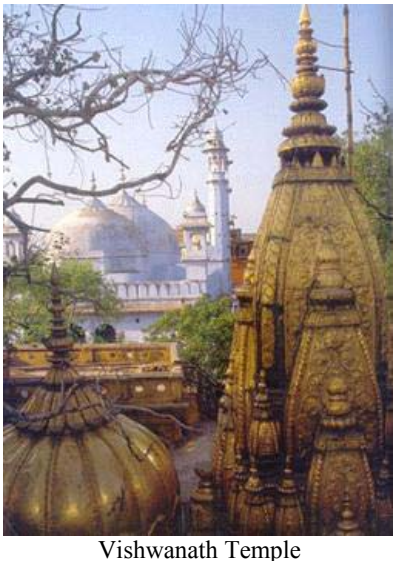

Panchganga Ghat

- **Assi Ghat**: This Ghat marks the confluence of the Assi canal with the River Ganga. It is believed that when Lord Durga killed the demons Shunga and Nishunga, her sword fell in Varanasi creating a depression in the form of Assi canal.

Out of these ghats Manikarnika, Panchganga, Adi Kesava, Dasaswamedha and Assi Ghat comprise the "Pancha Jala Tirthas".[8]

7.2.1.2 Temples

Apart from the Ghats, there are around 2000 temples, small, medium and big in size throughout the city. Many important temples are located along the ghats of Ganga River, adding to the religious value to the holey river. Some of the important temples are Kashi Vishwanath, the Sankat Mochan temple, The Tulsi Manas temple, the Durga temple, the Kal Bhairav temple and the Mritunjaya temple.


Vishwanath Temple

- **Kashi Vishwanath Temple**: Located almost centrally on the west bank of River Ganga, this is the most important temple in the city. It is also known as the Golden Temple dedicated to Lord Shiva, the founder of the city. It is believed that Aurangzeb destroyed the original temple and the stones were used to build a mosque next to the temple. The rear wall of the temple was left untouched by Aurangzeb and Queen Ahilya later on built a new temple close to the old one.

- **Sankat Mochan Temple**: Sankat Mochan temple is one of the sacred temples of Varanasi. It is located in the southern part of Varanasi, near the Banaras Hindu University. It is dedicated to the Hindu God, Hanuman. The word "Sankat Mochan" means one who helps in removing sufferings i. e. Lord Hanuman. Tulsidas, the author of the famous Hindu epic Ramacharitamanasa, founded the Sankat Mochan temple. According to Hindu mythology, one who visits the Sankat Mochan temple regularly, his wishes get fulfilled.

[8] Revitalization of Varanasi as a tourist destination, Ministry of Tourism and Culture, GoI, Feb 06, HUDCO

Every Tuesday and Saturday, thousands of devotees queue up in front of the Sankat Mochan temple to offer prayers to Lord Hanuman. According to Vedic Astrology, Hanuman protects human beings from the anger of planet Saturn and those who have ill placed Saturn in their horoscope visit the Sankat Mochan temple to get remedy. People put "Sindoor" on the statue and offer "laddoos" to Lord Hanuman. The "Sindoor", from the statue of Lord Hanuman is put on the foreheads of devotees[9].

- **Tulsi Manas Temple**: Tulsi Manas temple is one of the most famous temples of Varanasi. It is also an important tourist attraction of the holy city. The Tulsi Manas temple is located near the famous Durga temple. It was built in white marble in the year 1964. The temple has been made more charming by the magnificent landscaping around it. The Tulsi Manas temple is dedicated to lord Ram. It is believed that temple is built at the same place where Tulsidas wrote the famous Indian epic, **Ramcharitamanasa**. The walls of the Tulsi Manas temple are engraved with verses and scenes from the Ramcharitammanasa, the Hindi version of the Ramayana[10].

7.2.1.3 Old city

Narrow lanes characterize the old city of Varanasi and its rich architectural legacy allures the travelers into the religious and cultural mosaic that forms an integral part of Varanasi's tradition. Several old temples and *Havelis* still adorn the built fabric. The area comprising of the gnats, the temples and the old city has been identified as a Cultural Heritage zone.

7.2.1.4 Sacred Kunds

The city is interspersed with sacred kunds mostly within the temple complexes or along the ghats. These kunds are associated with religious rituals having tremendous historical and religious significance. Over a period of time due to tremendous pressure on land, some of these kunds have been steadily engulfed within the built up areas. Even today, many of these tanks face the danger of encroachments or extinction. Some of the important kunds are Lolar Kund, Durga Kund and Pittar Kund. The riverfront is dotted with temples representing varied architectural styles.


Deteriorated condition of Kunds

7.2.1.5 Pilgrimage Routes

Varanasi has five sacred territories or Khandas and each Khanda has a sacred yatra associated with it. These yatras are: Chaurassikosi yatra, Panchkroshi yatra, Nagar Pradakshina, Avimukta yatra and Antargraha Yatra. Most of these yatras are concentrated in the old city area along the riverfront.

[9] http://www.varanasicity.com/temples/sankat-mochan-temple.html
[10] http://www.varanasicity.com/temples/tulsi-manas-mandir.html

7.2.1.6 Banaras Hindu University

The university founded in 1917 by Pandit Madan Mohan Malviya is the most famous institution in Varanasi and the largest residential university in the country. The university also houses attractions like a New Vishwanath temple (an architecturally significant temple) and the Bharat Kala Bhavan, which has a vast collection of Hindu and Buddhist Sculptures.

7.2.2 Destinations in the vicinity of Varanasi

Apart from Varanasi, the other major tourist destinations in the vicinity of the city are:

7.2.2.1 Sarnath

Located 10km from the city of Varanasi, this place is a prominent Buddhist holy place. It is here in Sarnath that '*Gautam Buddha'* first preached his doctrine to the world and is one of the four holiest places of Buddhist pilgrimage. This is the major tourist place, which has been identified as a Heritage zone as per *Master Plan 2011*.


Buddhist Stupa at Sarnath

There are archeological remains of Buddhist Monastery built by the King Ashoka. Apart from this there is Sarnath Museum, which is a treasure trove of Buddhist sculptures, inscriptions and pottery. Some of the finest images of the Buddha and panels depicting important episodes from the life of Sakyamuni can from the Gupta period, carved in the fine-grained Chunar sandstone. In Sarnath Museum one can see the magnificent Lion Capital, which once crowned the Ashoka pillar at Sarnath and which today is the official symbol of the Indian State.

7.2.2.2 Ramnagar

For a 17th century fort, this one is seriously well preserved, probably because the king -- the former king -- still resides here. 14 km from Varanasi the fort at Ramnagar houses a museum displaying the Royal collection which includes old silver and brocade palanquins for the use of the ladies of the court, elephant howdahs made of silver brocades, a replica of the royal bed and an armoury of swords and guns, vintage cars, royal palkies, an armory of swords and old guns, ivory work and antique clocks. Ramnagar Fort was the home of the Maharaja of Banaras. The Durga Temple and Chhinnamastika Temple are also located at Ramnagar.


Entrance of Ramnagar Fort

Located across the river on the Ram Nagar road that leads east from the BHU, the fort comes into its own during the annual Dussera festival. Ramangar houses the residential palace of the king of Banaras, which is presently being used as a museum (exhibiting palanquins, swords, etc.). Dussehra celebrations at Ramnagar are worth watching. Ramnagar fort and palace was built in 1750 A.D. by the king of Banaras. This fort located on the right bank of Ganga is primarily made of red sandstone. Apart from this, the fort also houses an astronomical clock, which transpires several astronomical wonders.

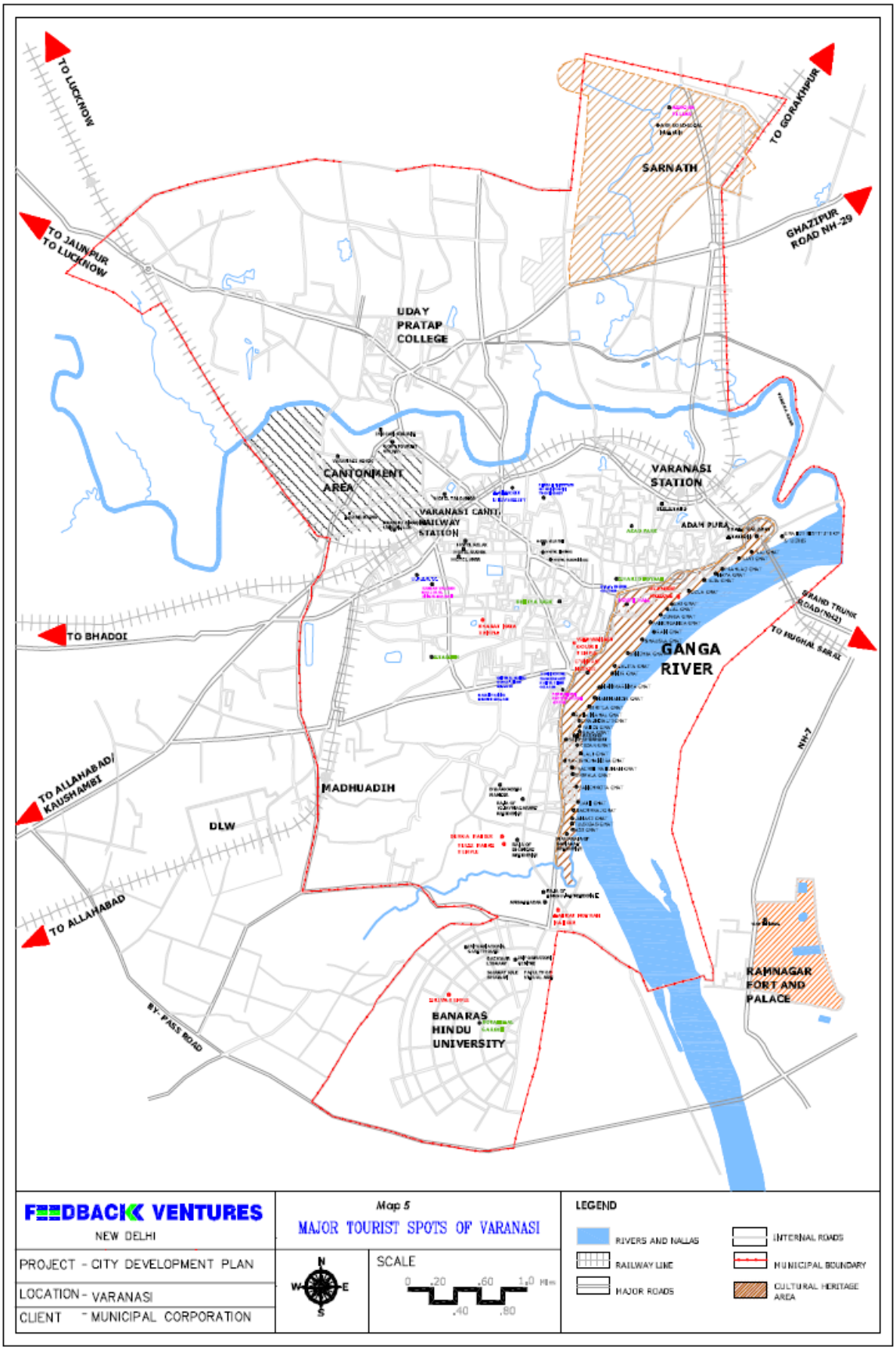
Major tourist destinations in and around the city are as shown in the ***Map 5***

7.2.3 Fairs and Festivals

Varanasi, the sacred corridor (tirtha) is the embodiment of living sacred heritage and hosts a large number of fairs and festivals throughout the year. The importance of these festivals can be seen from the number of pilgrims arriving and attending the fairs. During the greatest festivals when more than 2500 people arrive per hour, the self-organization of the Varanasi pilgrimage system intensifies partially due to increased mutual interaction of pilgrims who arrive in informal groups of family and friends or various kinds of pilgrimage tours. ***Table 22*** shows the fares and festivals that take place in Varanasi, with their venue and period during which they occur:

Table 22: Important festivals and the venue in Varanasi city

Festivals	Venue	Period of Occurrence
Paush Poornima	Ghats	January
Makar Sankranti	Ghats	January
Mauni Amavasya	Ghats	January/February
Magh Poornima	Ghats/Ravidas Mandir	February
Ganga Water Rally	Ghats	February
Dhrupad Mela	Tulsighat	March
Mahashivaratri	Ghats & temples	March
Navratra (Chaitra)	Ghats / Temples	April
Ram Navami	Tulsi Manas Mandir & Ghats	April
Sankat Mochan Music Festival	Sankat Mochan Mandir	April
Buddha Poornima	Sarnath	May
Ganga Dussehra	Ghats	June
Ramlila, Ramnagar	Ramnagar	September-October
Dhanush Yagya	Ramnagar	September
Ram Vivah	Ramnagar	September
Nakkataiya	Ramnagar	September
Pitra Visarjan	Ghats	September
Navaratra(Ashwin)	Ghats & Temples	October
Vijaya Dashmi / Dussehra	Ramnagar D.L.W Vidyapeeth	October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TO GORAKHPUR
SARNATH
GHAZIPUR ROAD NH -29
TO JAUNPUR
TO LUCKNOW
UDAY PRATAP COLLEGE
CANTONMENT AREA
VARANASI CANTT. RAILWAY STATION
VARANASI STATION
ADAM PURA
GRAND TRUNK ROAD(NH2)
TO BHADOI
TO MUGHAL SARAI
GANGA RIVER
NH-7
TO ALLAHABAD/ KAUSHAMBI
MADHUADIH
DLW
TO ALLAHABAD
BY-PASS ROAD
BANARAS HINDU UNIVERSITY
RAMNAGAR FORT AND PALACE
FEEDBACK VENTURES
NEW DELHI
Map 5
MAJOR TOURIST SPOTS OF VARANASI
PROJECT - CITY DEVELOPMENT PLAN
LOCATION - VARANASI
CLIENT - MUNICIPAL CORPORATION
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RIVERS AND NALLAS
RAILWAY LINE
MAJOR ROADS
INTERNAL ROADS
MUNICIPAL BOUNDARY
CULTURAL HERITAGE AREA

7.3 Heritage

Heritage areas were classified in three different zones. These zones are Riverfront heritage zone, core city heritage zone and Sarnath heritage zone. These zones are elaborated as follows:

7.3.1 The Ganga River and the Riverfront Heritage Zone

Riverfront heritage zone can be divided in two parts. First being the Eastern side of Ganga, where heritage zone is flanked by the strip of green belt of trees along the sand belt of the river. Second being on the Western side, where the road that connects the Assi locality to Rajghat delineates it. The Eighty-three-riverfront ghats cover a length of 6.8 km along the crescent-shaped bank of the River Ganga comes under Western side heritage zone and is very important.

7.3.2 Core Heritage Area

The core heritage area lies within the Old City Heritage Zone. The path linking Vishalakshi Devi, Dharmakupa, Vishvanatha, Annapurna, Adi Vishwanatha, and Razia Bibi Mosque demarcates it. The Vishvanatha temple is the nucleus. There are about 70 important shrines and temples in this area.

Most of the heritage properties in the old city belong to individual owners, substantial holdings by the Vishvanatha Temple Trust, non-government organisations and charitable trusts. A few tangible heritage sites falling within the Riverfront & Old City Heritage Zone such as Manmandir Observatory on Dashashvamedh Ghat, Aurangzeb's mosque and the Jnana Vapi mosque have been declared as Monuments by the Department of Archaeology, Govt. of India under the Ancient Monuments and Archaeological Sites and Remains Act 1958 Act No. 24 & 1958 (Central Act) and the said sites and its buffer zone are maintained and conserved by the Department of Archaeology.

7.3.3 Sarnath Heritage Zone

ASI has also declared Sarnath as a Heritage zone. Some of the archeological remains that can be seen in Sarnath Heritage Zone are as follows:

a) **The Ashoka pillar** and its famous lion capital were discovered in 1904. Later Saka and Kushan monarchs also patronised Buddhist monks and promoted Buddhist art in Sarnath.

b) **The Dhamekha stupa** is considered to be the sacred place where the voice of Buddhism was first heard. Many dignitaries of Buddhist countries visit this place for circumambulation of this sacred stupa and to worship the Buddha.

c) **Dharmarajika Stupa** marks the site where the Buddha gave his first sermon. It was broken down in the 18th century by an officer of the Maharaja of Benaras who was looking for building material for constructing a bazaar. Alexander Cunningham found a marble casket beneath the stupa during excavations in the late 19th century.

d) **Chaukhandi-** The first landmark that visitors see on their way to Sarnath from Varanasi is a high mound with the remains of a brick stupa built in the Gupta period. Today the site is called Chaukhandi. It marks the spot where the Buddha first met his five companions on arriving in Sarnath. Govardhan added a Mughal style octagonal tower, son of Raja Todar Mal, in 1588, to celebrate a visit by the Mughal Emperor Akbar to the city.

Archeological remains of the Buddhist Monastery built by the King Ashoka

7.3.4 Current Scenario/Threat to Heritage

- Increase in population trend has led to the threat of these heritage areas and zones.
- The riverfront and old city heritage zone of the city is densely populated (above 1000 persons/ha), and it is here that development pressures are altering irreversibly the socio-culture of the city.
- The city is converting into concrete structures with no or less open spaces left which has deteriorated the living condition and the structures are getting affected as the affordability of people is getting poorer.
- The modification of urban spaces in the old city centre of Varanasi could also negatively alter the religious and cultural life can destroy the tourist attractions – both of which are the major sources of earning for its population.
- Increasing population is leading to more number of vehicles and traffic congestion, not only at peak hours but at most hours of the day leads to noise pollution and smog.
- The rapid increase in the number of tourist every year (around a million pilgrims) has created a stress on the city heritage areas and infrastructure. Tourism and related activities are major source of city's economy. Thus it is important to create harmony with the existing cultural and religious atmosphere of the city.
- The river eco-system is facing pressures in the riverfront heritage zone and also from other parts of the city whose sewage flows directly into the river.

7.4 Tourist Inflow

The city has a magnetic attraction for people all over the world. It is an important centre for religious tourism in India and also the gateway to the Buddhist circuit. The majority of domestic tourists are from Bihar, West Bengal, Madhya Pradesh and other parts of Uttar Pradesh. While the foreign tourist are basically from Sri Lanka followed by Japan and then by other parts of world. Approximately the entire foreign tourist visiting Varanasi visits Sarnath additionally. The peak season is regarded as October to March with tourist inflow being 60% of the total domestic tourist coming in a year while for foreign tourist it is 71%. The average stay is 2-3 days for both domestic and

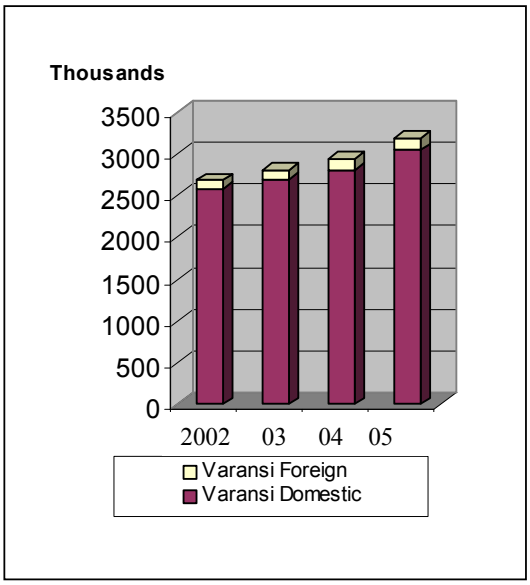
foreign tourists. ***Table 23*** shows the annual tourist inflow in Varanasi during last 4 years.

Table 23: Annual Tourist Inflow

Year (Jan to Dec.)		2002	2003	2004	2005	2006 (Till march'06)
Varansi	*Domestic*	25,88,178	27,01,716	28,09,422	30,49,980	9,69,909
	Foreign	98,765	1,08,017	1,41,328	1,43,993	44,000
	Total	26,86,943	28,09,733	29,50,750	31,93,973	10,13,909
Sarnath	*Domestic*	4,39,099	4,45,334	5,04,833	5,72,650	1,51,250
	Foreign	1,47,173	1,72,872	1,99,413	2,01,725	49,102
	Total	5,86,272	6,18,206	7,04,246	7,74,375	2,00,352
Total	Domestic	30,27,277	31,47,050	33,14,255	36,22,630	11,21,159
	Foreign	2,45,938	2,80,889	3,40,741	3,45,718	93,102
	Total	32,73,215	34,27,939	36,54,996	39,68,348	12,14,261

Source: Uttar Pradesh State Tourism Department Corporation, 2006

Figure 14: Tourist Inflow of last four years



Tourism is the second most dominant sector in Varanasi. A major portion of the tourist traffic comprises of domestic tourists who visit Varanasi for religious activities/purposes. A significant percentage of foreign tourists also visit the city due to its characteristic Ghats and proximity to Sarnath. The foreign tourist comprises nearly 15% of the total tourist coming to Varanasi. The tourist inflow is increasing at the rate of average 4% per year with the last year increase of 8% last year. The major increase is in number of foreign tourist till 2004. Although in the year 2005 there was an increase in number of foreign tourist, the percentage had drops drastically as compared to previous two years.

7.5 Tourism Infrastructure

The average duration of stay for the tourist is 2-3 days. A few five star hotels, large number of 2 to 3 star hotels and Dharamashalas are located in the vicinity of the riverfront to cater to the tourists while the rest of the hotels are near Cantonment

railway station. There is a pronounced lack of infrastructure and accommodation facilities in the old city. The supportive infrastructure to the tourist accommodation like electricity supply and water is also poor.

Total beds within the city are 12077 per day and nearly 33% of the whole accommodation facilities are in Dharamshalas. On overall basis the 50% of the accommodation are cheap budget hotels concentrated in old city area. ***Table 24*** shows availability of rooms in Varanasi.

Table 24: Availability of Rooms in Varanasi.

Type	Number of Rooms	Bed Availability/day
5 Star	254	517
4 Star	85	170
3 Star	223	446
2 Star	104	208
Non Star	1868	3736
Dharamshalas	_	4000
Unregistered Hotels	_	3000
Total		**12077**

Source: ICRA report, 2006

7.6 Tourist Projection

On the current trend of the tourist inflow in the city, in the next year the tourist is expected to increase at 10.4% and the approximate tourist inflow is expected to be 43,83,834. As the tourist inflow increases, there will be stress on infrastructure facilities like accommodation, tourist hotels and facilities. The total number of tourist accommodation required for the next 15 years will be nearly 10,000. ***Table 25*** shows the demand in the next few years of development:

Table 25: Demand pattern of tourist accommodation:

Peak demand	Till 2008	2008-2013	2013-2020
5 Star	407	55	97
4 Star	325	44	78
3 Star	407	55	97
2 Star	407	55	97
Star Hotels	1545	208	368
Economy Hotels	2439	329	582
Dharamshalas	1171	158	279
Total	**6700**	**903**	**1597**

Source: ICRA report, 2006

7.7 Tourism Policy

To promote tourism with the tourist and pilgrim as the focus U.P. State Tourism department has prescribed the strategies and policies. Some of the policy has been listed below: -

- To develop the necessary infrastructure facilities through private-public partnership. Special importance would be given to facilitate investment by NRI.

- To develop and publicise new tourism products and attractions like Yoga, Spiritual knowledge, Ayurveda, naturopathy, adventure sports, eco-tourism, water cruises, film locales, diverse cuisines, traditional attire, and crafts, village life etc.
- Promotion of eco-tourism in the hills, forests and areas with water bodies to preserve the environment.
- Restoration of ancient places, havelies, buildings, forts, and introduction of a Heritage Hotel Subsidy scheme.
- Formulation of standards for tourism units and introduction of an incentive scheme to facilitate their adoption by the private sector.
- Extensive projection of the available facilities, tourist sports and attractions of the state domestically and internationally through advertisements, films, C.D's, cassettes, website etc. Effective marketing through participation in domestic and international travel trade conferences, fairs and world marts, and organization of Uttar Pradesh shows in identified cities of important countries.
- To create sufficient facilities for tourism related human resources development upgrading and improving the management of the Tourism Management Institute and Food Craft Institute, besides establishing new ones, if necessary.
- Strengthening and expansion of the departmental tourism organization through a modern work culture and qualitative improvement in employees, better organization of festivals, incentives to the tourism industry, and establishment of special cell for efficient collection of data and research work.

7.8 Key Issues

- Intensive pollution of River Ganga due to discharge of untreated sewage and religious activities
- Subsidence of Ghats due to influx of river water into the Ghat area
- Unhygienic conditions on ghats, approach roads
- Uneven risers of steps to Ghats
- Shifting course of River Ganga
- Unorganized tourist and religious activities leading to chaos
- Lack of public facilities on Ghats
- Lack of maintenance of traditional architectural facades
- Tourists are left on the mercy of boatmen and pujaries who greatly harass the tourists
- Stress on infrastructure due to heavy tourism load.
- Lack of maintenance
- Unregulated tourist traffic
- Lack of organized spaces for informal sector
- Unorganized commercial activities encroaching upon the road
- Scheme for dealing with encroachments of permanent and temporary nature
- Lack of maintenance of traditional Havelis and temples.
- Lack of proper infrastructure
- Visual potential of the area is destroyed due to littered solid waste.
- Lack of maintenance
- Threat of encroachments and drying up
- Eutrophication is taking place in the kunds and the condition is getting worst day by day.
- Lack of dedicated route
- Chaos due to clashes with informal activities and traffic

8 Water Supply

8.1 Brief History

Water supply system for Varanasi is as old as 100 years when it was introduced in **year 1892**. It was designed for the population of **2 lacs** with a treatment plant of **33mld** constructed at Bhelupur. In the early years, treatment of water was done through slow sand filters but at the later stage rapid gravity filters replaced it. With increase in population and corresponding water demand of the city, capacities of different units were increased from time to time in stages along with reorganization and extension of distribution system to make equitable distribution of supply and to meet out the demand in different zones.

After the introduction of water supply system, the main reorganization of the system was done in 1954 with per capita water supply at the rate of 200 lpcd and the scheme was executed for 4.6lac population. The whole city as per reorganization was divided in to 7 zones, which are as follows;

- Sikraul (Civil lines)
- Cotton mills
- Rajghat
- Benia park
- Neechibagh (Chowk)
- Bhelupur
- London Mission

The scheme was supplying water to the entire city except distant areas of Sikraul (Civil Lines) and Cotton mill zones, which were covered by the ground supply. Following improvements were made to improve the water supply scheme in this reorganization.

- Raw water carrying capacity was improved to 90 MLD.
- Effective filtration capacity was improved to 90 MLD.
- Clear water pumping capacity was improved to 32 MLD.
- Distribution system was improved to serve more population.

In later stages, with increase in population and demand, additional tube wells were constructed in different parts of the city to supplement the surface/river water supply especially in the high zone areas. Water supply schemes for the Lahartara, Shivpur, Bazardiha, Jalalipura etc. areas were executed in the year **1967-1968** due to extension of Municipal boundaries and increase in the population of the out skirt areas. These reorganizations were followed by Master plan proposals for the river water districts and ground water districts were drawn up in the year **1972 – 1973**. Based on these proposals, work for augmentation and reorganization of water supply were taken up in Cotton mill, Maidagin and Jaitpura zones. Similarly, in Shivpur, Rajghat, and Lanka zones, additional tube wells were constructed for the augmentation of water supply.

A comprehensive scheme for **7.82 lac** anticipated population for the year **1981** under the World Bank program was prepared in the year **1977** with a water supply rate as **225 lpcd**. The scheme was divided in to three subprojects as subproject-1,

subproject-2, subproject-3 and the city was divided in to two parts as Cis- Varuna and Trans – Varuna. Cis – Varuna area included the old city where as the Trans – Varuna included Civil lines, Shivpur, U.P.College, Pandeypur, and Paharia areas. The following works were executed under this scheme:

- Tube wells #12.
- Overhead tanks #12.
- Clear water reservoirs # 2.
- Distribution system in different diameters the city. #234.00 km in various areas of

Further at the later stage in the period of **1983 to 1992** some more works has been executed to accommodate the increasing demand due to the increase in population of the city, which are as follows:

- Tube wells # 26
- Under ground clear water reservoir # 1 of 1500 kilolitres.
- Zonal pumping stations and distribution system in Jaitpura zone has also been completed.

One more project was prepared by Varanasi Jal Sanstha in **1985** to supply **150mld** clear water. The project was executed with the financial aid from the World Bank (Under U.P. Urban Development project) The estimated cost of the project was Rs. 1214.05 lac. and the main works under this project were:

1) Construction of an intake well at Bhadaini and installation of 4 pumps each of pumping capacity 40 kl./min. of raw water against a head of 35 meters with the assumption that it would be sufficient to fulfill the demand up to 2031.
2) Construction of raw water rising main of 1200mm diameters from Bhadaini to Bhelupur water works.
3) Replacements of 5 nos. clear water pumps of Bhelupur water works.
4) Conversion of two nos. settling tanks in to flocculation cum settling basin with the provision of hydraulic de-sludging arrangement.
5) Construction of 100 MLD and 150 MLD rapid gravity sand filters.
6) Construction of 25000 Kl clear water reservoir at Bhelupur water works.
7) Laying of 29.85 Km feeders main to London mission, Lahartara, Rajghat, Maidagin, Jaitpura, Cotton mill, and Lanka zones.
8) Installation of 5.0 nos. C.W. pumps of capacity 40 Kl./min. with 40m head.
9) Laying of 18.84 Km distribution system in Trans Varuna area.

Deteriorated Conditions of Pumps

For the purpose of extending adequate and safe water supply facilities to the entire area of the Master plan, the city has been divided into following 16 water supply zones of which 5 zones lie in the Trans-Varuna area and the remaining 11 zones in the Cis-Varuna area and are as follows. These zones are as shown in ***Map 6.***

Trans Varuna District

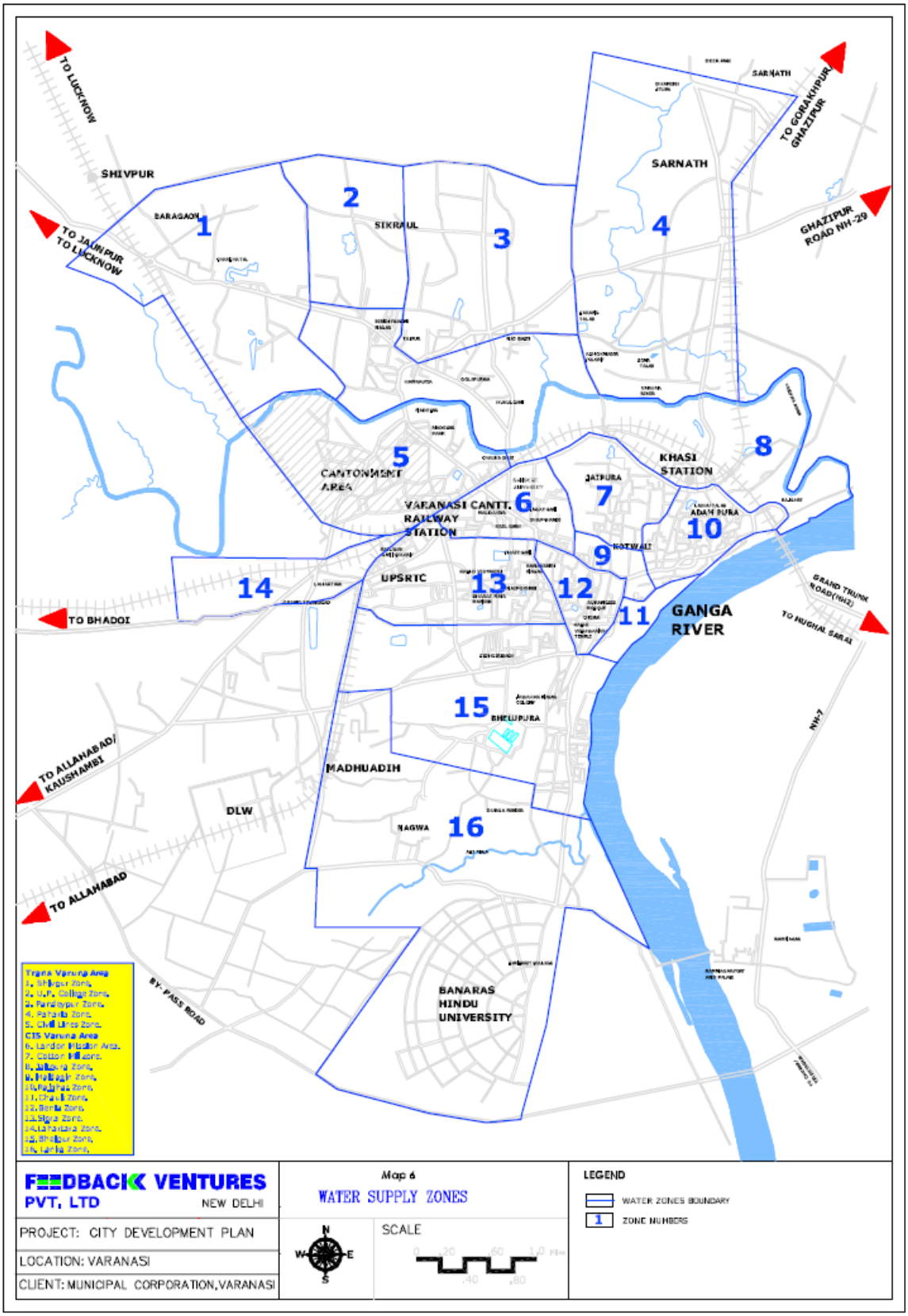
(i) Shivpur Zone
(ii) U.P. College Zone
(iii) Pandeypur Zone
(iv) Paharia Zone
(v) Civil Lines Zone

Cis Varuna District

(i) Lahartara Zone
(ii) Landon mission Zone
(iii) Cotton mill Zone
(iv) Jaitpura Zone
(v) Rajghat Zone
(vi) Maidagin Zone
(vii) Chaok Zone
(viii) Benia Zone
(ix) Sigra Zone
(x) Bhelupur Zone
(xi) Lanka Zone

With all these developments over last couple of decades, total production of treated/clear water is 280mld and total requirement based on 150 lpcd supply rate is 207mld, is quite higher than the requirement. Presently the average per capita water production (excluding Cantonment and BHU campus) is approximately 275 lpcd. Actual water consumption is not possible to determine since most services are un-metered. Assuming UFW of 30% (as estimated by Jal Sansthan), the actual consumption would be in the order of 212 lpcd.

As noted in a recent report "Report on State of the Environment for Varanasi", by CPCB, there is acute shortage of water because the distribution system is not well developed. Findings from the CPCB report indicate that supply of water is only 60 lpcd in the trans-Varuna area, which is on very lower side of the norms.


TO LUCKNOW
SHIVPUR
BARAGAON
1
2
SIKRAUL
3
SARNATH
4
TO GORAKHPUR
GHAZIPUR
GHAZIPUR ROAD NH-29
TO JAUNPUR
TO LUCKNOW
5
CANTONMENT AREA
VARANASI CANTT. RAILWAY STATION
6
JAITPURA
7
KHASI STATION
8
ADAM PURA
10
KOTWALI
9
UPSRTC
13
14
12
11
GANGA RIVER
GRAND TRUNK ROAD(NH2)
TO MUGHAL SARAI
TO BHADOI
15
BHELUPURA
NH-7
TO ALLAHABAD/ KAUSHAMBI
MADHUADIH
DLW
NAGWA
16
TO ALLAHABAD
BY-PASS ROAD
BANARAS HINDU UNIVERSITY
FEEDBACK VENTURES
PVT. LTD
NEW DELHI
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION, VARANASI
Map 6
WATER SUPPLY ZONES
N
W
E
S
SCALE
LEGEND
WATER ZONES BOUNDARY
1
ZONE NUMBERS

8.2 Present Scenario

8.2.1 Water Sources

The town has adequate perennial source of water. The lifeline of the town is River Ganga, which takes care of approximately 45% of the water supplied of the town. 50% of the water supplied is met out of 112 deep tube wells operated by Jal Sansthan and remaining 5% is supplied by publicly and privately owned 1559 hand pumps ***Table 26*** shows water supply sources and percentage of water extracted from each source.

Table 26: Water Supply Sources

Source	Capacity (MLD)	Percentage	Remarks
Ganga River	125	45	Water supplied to Bhelupur Water Works.
Tube wells (112 nos)	145	50	Operated by Jal Sansthan
Hand pumps (1559)	10	5	Some are privately owned
Total Municipal Water Supply	**280**	**100**	

Source: Report Prepared by Ganga Pollution Prevention Unit, Varanasi, "Pre Feasibility Report for Water Supply component under JNNURM", 2006

Raw water is lifted and pumped at Bhadeni raw water pumping station and taken to Bhelupur Water Works where it is treated stored and distributed. The entire trans-Varuna area and some recently developed localities in cis-Varuna are supplied exclusively by ground water. Presently, approximately 145mld is extracted from 112 deep tube wells operated by Jal Sansthan. In addition to tube wells operated by Jal Sansthan (JS), there are many privately owned and institutional tube wells that provide around 5% of the total supply. A total of 1,559 hand pumps provide an estimated 10mld of water in places of water scarcity.

BHU (Banaras Hindu University) has its own water supply network with about 15 tube wells, two used exclusively for the farms and the remaining for drinking water supply. Water production at BHU has been estimated at 23.5 MLD based on an installed pumping capacity of 259,000 gallons per hour x 20 hours per day. BHU authorities estimate that approximately 50% of the water is used for gardening, farming and other horticultural purposes; therefore about 11.75 MLD is used by the BHU campus residents.

8.2.2 Water Treatment Plant

The raw water extracted from Ganga River at Bhadeni gets treated at two water treatment plants at Bhelupur water works. Capacities of the Water Treatment Plants (WTP) are 60mld(1954) and 250mld(1994). Water treatment comprise of rapid sand filters, and clear water sumps. There are 35 sand filter beds, 9 for old WTP, and 26 for new WTP. Out of 9 beds of old WTP, only 5 are in working conditions and remaining 4 beds are under

Water Treatment Plant at Bhelupur

maintenance (change of filter bed), which can be used after modifications. For new WTP, all the filter beds are in working conditions. Depth of these filter beds is 1.2meters, with one layer of sand (750mm) and four layers of gravel (3 layers of 100mm and one layer of 150mm).

Treated water from these treatment plants is then stored in two under ground sumps of 25ML capacity each, and one OHT of 1.2ML at Bhelupur, which serves 50% population of the city. Water is also distributed to other storage tanks all over the city.

8.2.3 Storage Tanks

There are 17 Over Head Tanks (OHTs) with total storage capacity of 17.8mld along with 7 Under Ground Reservoirs (UGRs) with total storage capacity of about 62mld. Total storage capacity including both OHTs and UGRs is about 79.8mld. Details of OHTs and GLSRs are as below ***(Table 27).*** Location of these reservoirs can also be seen in ***Map 7***.

OverHead Tank at Chetganj

Table 27: Location and capacity of Overhead tanks

Sl no	Location	Storage type	Capacity	Areas Covered
1	Bhelupur	UGR	2 nos X 25 ML	Bhelupur ward, Part of Nagwa ward, Chauk, Chetganj, Jaitpura, Kotwali and Adampur ward.
2	Maidagin Old	UGR	1.5 ML	Daranagar, Ausanganj, Maidagin, Ishwariganga, Jaitpur, Salempura, Madhyameshwar and other Mahals
3	Maidagin New	UGR	1.5 ML	
4	Rajghat	UGR	1.5 ML	Rajghat, Pralhad ghat, Part of Madhyameshwar, Kayastha tola, Chhitanpura, Jalalipura
5	Gopal Bagh	UGR	1.25 ML	Sheshman Bazar, part of Ishwariganga, Udhavpura, Gopal Bagh, Dingiaagaganj, Azad park
6	Beniya	UGR	0.75 ML	Muletan, Haripura, part of Chauk, Resham Karta, Thatheri Bazar, Golagali Mikhadidas, Nandan Sahu lane, Hadaha Sarai,
7	Bhelupur	OHT	1.14 ML	Bhelupur and Water works area
8	Tulsipur	OHT	1.0 ML	Tulsipur, Raghunath nagar colony, Navodit nagar colony, Ranipur, Patiya Virdopur area
9	Mogawir area	OHT	1.0 ML	Mogawir colony, Nariya area, Rashmi nagar colony, part of Lanka, Shukulpura, Sankatmochan area
10	Sundarpur area	OHT	1.0 ML	Sundarpur, Brig enclave colony, Sundarpur village, Dashmi, Batuapura, Gayatri nagar colony, Teliyana square
11	Nagar Nigam Park	OHT	1.0 ML	Madhopur
12	Lahartara area	OHT	1.0 ML	Lahartara complete area

Sl no	Location	Storage type	Capacity	Areas Covered
13	Sonia area	OHT	1.5 ML	Sonia, Kazipura, Lallapura, part of Aurangabad
14	Beniya area	OHT	1.5 ML	Badi Piyari, part of Kabir chura, Chetganj
15	Banaras Club	OHT	1.2 ML	Golghar, Pakki Bazaar, DIG colony, Varuna Pul, Sikril village, Ardali Bazaar, Khajuri, Makbul Alam road, Pahadpura
16	Mint House area	OHT	0.80 ML	Nadesar, Raj Bazaar, Ghausabad, Mint house area
17	Maladhiya	OHT	1.25 ML	Maladhiya
18	Natiniya Dai	OHT	1.0 ML	Nitiniya Dai, Gautam Vihar, Mirapur Basahi, Taktakpur
19	UP college	OHT	1.0 ML	Bhojubir, Chuppepur, Sushma nagar, Laxmanpur
20	Kadipur	OHT	1.0 ML	Kadipur, Shivpur Bazaar, Shivpur kote, Bharlai
21	Lalpur	OHT	1.0 ML	Pandaypur, Chota Lalpur, Soyepur, Pandaypur colony
22	Pahadiya	OHT	1.0 ML	Ashapur, Mawaiya, Sarnath, Purana pul, Pulkohana, Ashok Vihar, Chanda Chauraha, Paigambarpur
23	Chaukaghat	OHT	1.25 ML	Dhelwariya, Nakkhighat, Shakkar talab, Badi Bazaar, Usmanpura, Kamalgaddha, Sanjay Apartment, Aghaganj, Nagkuan, Alayipur
Total		**24**	**79.8 ML**	

Source: Jal Sansthan, Varanasi, 2006

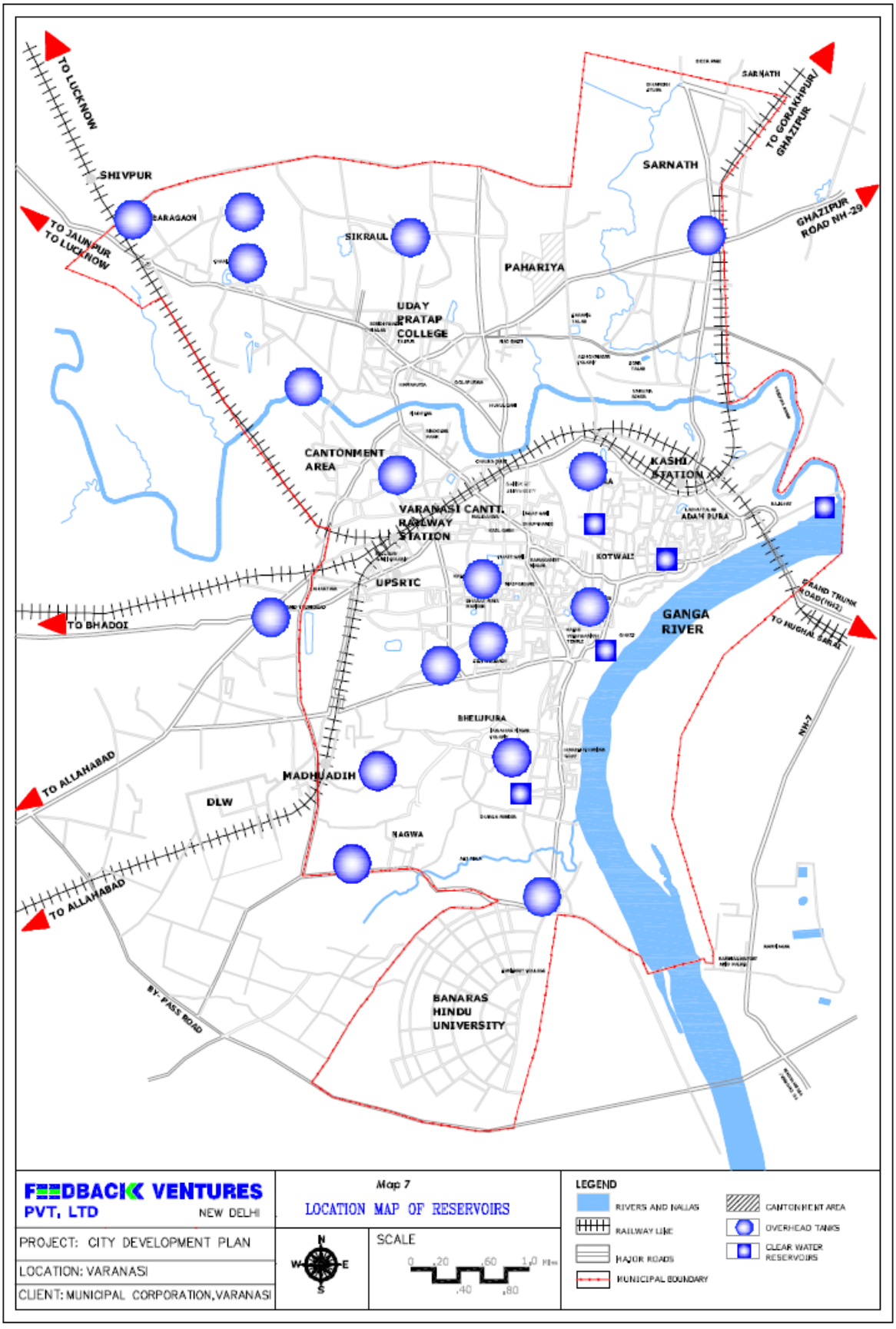
Present storage available is 79.8 ML, which is only 57% of the daily demand of 280ML in two fillings. The present storage capacity is insufficient to take care of the present as well as the future demand of the city.

8.2.4 Distribution Network

The length of the distribution network as of now is 590km. A major length of the distribution system i.e. 234km was installed in year 1977, under a comprehensive scheme prepared under the World Bank program. Diameter of the pipes varies from 90 to 7500mm in different parts of the city and system consists of CI and PVC pipes. With increase in the city limits distribution system is provided to new extension areas under different development programs.

Rising mains are in good condition as they were reorganized from time to time under different schemes. One of the problems of the rising mains is the alignment of rising mains in some parts of the city, especially in the old town area. Distribution mains in some parts of the city are in bad condition. Some of the problems related to the distribution network is:

- Some of the lines are as old as 100 years, which are broken as they are deep down the ground due to landfilling and needs replacement.
- In some parts of the city the distribution lines are passing through sewer lines, open drains, nallas contaminating drinking water due to seepage of sewage in the pipes


TO LUCKNOW
SHIVPUR
BARAGAON
TO JAUNPUR
TO LUCKNOW
SIKRAUL
PAHARIYA
UDAY PRATAP COLLEGE
CANTONMENT AREA
VARANASI CANTT. RAILWAY STATION
UPSRTC
TO BHADOI
SARNATH
TO GORAKHPUR/ GHAZIPUR
GHAZIPUR ROAD NH-29
KASHI STATION
ADAM PURA
KOTWALI
GRAND TRUNK ROAD(NH2)
TO MUGHAL SARAI
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FEEDBACK VENTURES
PVT, LTD
NEW DELHI
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION, VARANASI
Map 7
LOCATION MAP OF RESERVOIRS
N
W
E
S
SCALE
0 .20 .60 1.0 Kms
.40 .80
LEGEND
RIVERS AND NALAS
RAILWAY LINE
MAJOR ROADS
MUNICIPAL BOUNDARY
CANTONMENT AREA
OVERHEAD TANKS
CLEAR WATER RESERVOIRS

8.2.5 Quality of Water

Japan International Cooperation Agency (JICA) has conducted a detailed study on "Water Quality Management Plan for Ganga River" covering entire stretch of Ganga River from Rishikesh to Calcutta. Under this study, Varanasi was also covered. During the study it has been observed that water quality of the upper stretch of Ganga River is good because there is less pollution load discharged into the river and the self-purification capacity is also very high.

Disposal of Open drains in River Ganga

The condition, however, worsens in the middle stretch (from Kanpur to Varanasi) because a large quantity of water is withdrawn for irrigation and domestic purposes thereby deceasing the dilution or self-purification capacity of river water. Furthermore, a large quantity of untreated wastewater is discharged into the river from the cities located on the bank of River Ganga and its tributaries and hence the section of Ganga from Kanpur to Varanasi and the downstream section of Gomati from Lucknow are excessively polluted.

Pollution load from point source

Quality of water in Varanasi is found to be far below the ISI standards and even after 17 years of implementation of GAP, some researchers have declared that Ganga water in Varanasi also is not fit even for human bathing. The main reason for the pollution of Ganga water is the pollution coming from industries and urban wastewater and is very significant.

Contamination of Water

It is estimated that out of the total pollution load runoff reaching the river stream, the load from point sources (urban wastewater and industrial effluent) is significantly high (94%), including 79% load from municipal sewage and 15% load from industries. The industries that are contributing to high pollution content are mostly dying industry, which is associated with making of Banarasi Saare and are located in old city area. The remaining 6% is observed to be contributed by non-point sources such as agricultural and forestry runoff, livestock, rural households, etc. The seasonal mean concentrations of DO & BOD along with total & Faecal coliforms are found to be much higher (of the water samples collected on the ghats) than the respective tolerance limits as given by the WHO and ISI standards.

At city level, Jal Sansthan is responsible for monitoring the water quality, as 45% of the total water supplied to the city is extracted from River Ganga. Jal Sansthan, in every 15 days test the quality of water and the reports of these tests are found to be satisfactory. The reason for satisfactory results is due to the very fact that water is extracted from the centre of the river, where the depth of river is more. Since the Jal Sansthan does not have their own laboratory, the collected water samples are sent to Lucknow for testing. It is observed that during rainy season there is lot of turbidity in the raw water and the treatment units becomes ineffective resulting in supply of untreated water.

8.2.6 System Maintenance

There are two organizations responsible for water supply in the town. Jal Nigam (UPJN) is responsible for planning and execution of water supply schemes and Jal Sansthan (UPJS) is responsible for the operation and maintenance of the system. No standard procedure is been followed for proper and regular maintenance of the existing system. Operating staff is responsible to maintain the existing system. Present system lacks any kind of preventive maintenance. Maintenance is taken up as and when breakages occur. One of the problems for improper maintenance of the system is lack of skilled manpower, which is leading to almost 40% water losses in the system, which can be stopped by providing adequate skilled manpower.

8.3 Future Demand

It is important to calculate the future water demand, as it will form the basis for identification of facilities that will be required for proper delivery of water supply to the city. Projected population for the years 2011, 2021 and 2031 will be used to calculate the future water demand/requirement. Apart from that there are certain assumptions made to calculate the water requirement for the future. These assumptions are:

- Water supply for the future population will be at the rate of 150 lpcd for domestic use.
- Another 23% of the total domestic demand is added to cover the water demand of Institutions, commercial establishments and floating population. In addition to this 1% of total domestic water demand is added for fire fighting purpose in the city.
- Provision for UFW in accordance with planning guidelines should be made and an additional 15% of total water demand should be included.

Table 28 gives the future water demand of the city, which will be used for calculating the facilities required to serve uninterrupted water supply to the city.

Table 28: Future water requirement of the city

Year	Population	Water Requirement (mld)	Water Production Capacity* (mld)	Deficit	Storage Requirement (mld)		
					Existing	Required	Deficit
2006	**1,370,785**	**293.75**	**250.00**	**43.75**	**79.80**	**96.94**	**17.14**
2011	**1,535,279**	**329.01**	**240.00**	**89.01**	**79.80**	**108.57**	**28.77**
2021	**1,965,157**	**421.13**	**200.00**	**221.13**	**70.00**	**138.97**	**68.97**
2031	**2,574,356**	**551.68**	**160.00**	**391.68**	**55.00**	**182.05**	**127.05**

**Note: Assumed that some of the existing facilities would complete their design period during the implementation of the program and in case renovation/ rehabilitation is not undertaken Water production will decrease with time.*

8.4 Key issues

Some of the problems identified regarding water supply in the city are as follows:

- One of the major problems is about the quality of water. This is because Assi Nalla discharges its waste ½ to 1km upstream of water intake works.
- Contamination of river water by throwing burn/un-burnt human and animal dead bodies in to the river Ganga.
- Pollution of Ganga water by throwing flowers and garbage at the Ghat areas.
- Pipe network is passing from the nallas and drain and there are chances of contamination of supply water from the damaged portions of the line.
- There are some local dying industries in the city, which are polluting the river water.
- Some of the distribution lines are as old as 100 years and are deep down the ground, which are difficult to maintain and needs replacement.
- Sewers disposing in to the rivers are contaminating the river water.
- Treated water gets contaminated as the distribution lines pass through sewer lines, open drains and nallas. Major reason for the seepage is due to intermittent water supply to the city.
- There are alignment problems in the distribution system leading to water losses
- Storage capacity is insufficient in the new extension areas of the city.
- Lack of skilled manpower leading to improper operation and maintenance of the system.
- No proper water supply system for slums.
- Leakages in the water supply network.
- There are in excessive number of animals in the city and are dependent to the river water. These animals go to the river Ganga for bathing and drinking. Animal dung flows in to the river through nallas and drains and pollute the river water.

9 Sewerage and Sanitation

9.1 Present Scenario

The situation and coverage of the sewerage network in Varanasi city is rather very poor. Presently only 30% of the total area is provided with underground sewer network with total length of about 400km. The existing sewer network caters primarily to the old city, comprising mainly of the Ghat area. Entire trans Varuna and nearly 50% part of Cis -Varuna area is un-sewered. Total sewage generated in the city is 240mld of which only 90mld is treated in Sewage Treatment Plants (STPs) and the remaining 150mld is directly discharged into River Ganga and Varuna through open drains.

Underground sewer network was first provided to the town during the year 1891-1917. Under this project three sewers were provided viz. the Main Sewer, Orderly Bazaar Sewer and Ghat Intercepting sewer. Total length of the sewer covered under this project was 16.52km.

- The main sewer starts at Assi and passes through thickly populated areas of the town and is a circular brick sewer in lime mortar. Total length of the main sewer was 7.4km and the size varies from 750mm at the head to 2400mm dia at the tail (outfall). The sewer was finally commissioned in the year 1917 and is still in working condition.
- Orderly bazaar sewer starts from a little beyond the Collectors Office and passes through the railway track. It finally discharges into the main sewer near the Ishwari Memorial hospital. Length of this sewer was 4.94km and size varied from 300mm SW pipe at the head to 600/900mm dia., at downfall. The construction was completed in 1917 and is still in working condition.
- The Ghat intercepting sewers were for the specific purpose of intercepting the sewer discharge to the River Ganga from number of old drains between Meer Ghat and Trilochan Ghat. The interceptor sewer serves Ghat portion of the town, which cannot be drained into the main sewer. It consists of a 300mm C I S/S pipe, 1.18km in length and the outfall of the sewer is at the Trilochan Ghat directly into the River Ganga. Several branch sewers and laterals have been laid from time to time after construction of trunk/main sewers.

The existing city's sewerage system was designed exclusively to carry domestic sewage only, but owing to the traditional pattern of open drains laid in the core city area, storm water also enters the trunk sewer directly or through manholes and branch sewers. This leads to tremendous pressure on the sewerage network, especially during monsoons. Due to combined system, the STPs' become ineffective during rainy season leading to more pollution of River Ganga and Varuna. Apart from that the areas, which are not served by the sewer network, discharge the sewage directly into River Ganga, Varuna or Assi Nalla, polluting the rivers.

The existing sewer lines in the city are more than 100 years old and are prone to chocking and leakages. Due to presence of silt and garbage in the sewer lines, the carrying capacity gets drastically reduced and during the reconnaissance survey of the city it was found that most of the sewerage system was chocked and the sewage was flowing on the roads. Cleaning and maintenance of sewer lines is not done properly

resulting in reduced section and less carrying capacity of the system. The clogging of these drains due to polythene and waste dumps lead to formation of stagnant pools of water leading to foul smell. The nallahs and rivers of the city are in a critical state due to the quantum of untreated sewage and waste entering the rivers on a daily basis.

Leaking sewer line in the city

9.1.1 Main Existing Nallas and Sewers

Main existing sewers and nallas of the city are given in the table below showing their names, flows, type and point of discharge ***(Table 29 & Map 8).***

Table 29: Main existing Nallas and Sewers

Sl No	Name of Drain/Nalla	Type of sewer	Measured flow		Point of Discharge	Remarks
			1986	2000		
1	Nakkhi drain	Open channel	-	0	Ganaga River	Running almost dry
2	Samne ghat drain	Circular pipe	-	0	Ganaga River	Running almost dry
3	Assi Nala	Open Channel	22	44.5	Ganaga River	
4	Shivala Drain	Circular pipe	1	5.5	Ganaga River	Intercepted in to main sewer
5	Harish Chandra ghat Drain	Rectangular	1.5	2.5	Ganaga River	Intercepted in to main sewer
6	Mansarovar Drain	Circular pipe	2.5	2.5	Ganaga River	Intercepted in to main sewer under GAP-1
7	Dr. R.P.Ghat Nala(Ghora Nala)	Rectangular	20	25	Ganaga River	Intercepted in to main sewer
8	Jalesan Drain	Rectangular	2.75	3.75	Ganaga River	Intercepted in to main sewer
9	Sankatha ghat	Rectangular	-	0.3	Ganaga River	Intercepted in to main sewer
10	Trilochan ghat Drain	Rectangular	2	3.5	Ganaga River	Intercepted in to main sewer
11	Telia Nala	-	1	3	Ganaga River	Intercepted in to main sewer undr GAP-1
12	Bhainsasur Nala	-	-	0.4	Ganaga River	-
13	Rajghat Railway Nala	Circular pipe	-	0.03	Ganaga River	-
14	Rajghat Outfall	Circular pipe	100	130	Ganaga River	Intercepted in to main sewer under GAP-1
15	Phuwaria Nala	Open channel	3.2	7.6	Varuna River (Right bank)	
16	Sadar Bazar Nala		0.9	2	Varuna River (Right bank)	
17	Drain of hotels		0.2	0.2	Varuna River (Right bank)	
18	Raja Bazar Nala		0.1	0.1	Varuna River (Right bank)	

			Measured flow			
19	Teliabagh Nala		10.8	18	Varuna River (Right bank)	
20	Nala near Nakhi Ghat		0.1	0.1	Varuna River (Right bank)	
21	Konia bypass		-	50	Varuna River (Right bank)	
22	Central Jail Nala	-	2.8	6.5	Varuna River (Left bank)	
23	Orderly Bazar Nala	-	2.2	7	Varuna River (Left bank)	
24	Chamrautia Nala	-	1.3	3	Varuna River (Left bank)	
25	Nala of Khajuri Colony	-	1.2	1.5	Varuna River (Left bank)	
26	Banaras Nala No. 5	-	0.8	1	Varuna River (Left bank)	
27	Hukulgang Nala	-	1.9	2.5	Varuna River (Left bank)	
28	Nala of Nai Basti	-	0.3	3	Varuna River (Left bank)	
29	Narokhar Nala	-	-	7.5	Varuna River (Left bank)	

Source: The Study on Water Quality Management Plan for Ganga River in the Republic of India, Final Report, Vol.3, JICA

There are some big nallas in the city, which are very dangerous to human and animal lives.

9.1.2 Sewage Pumping Stations

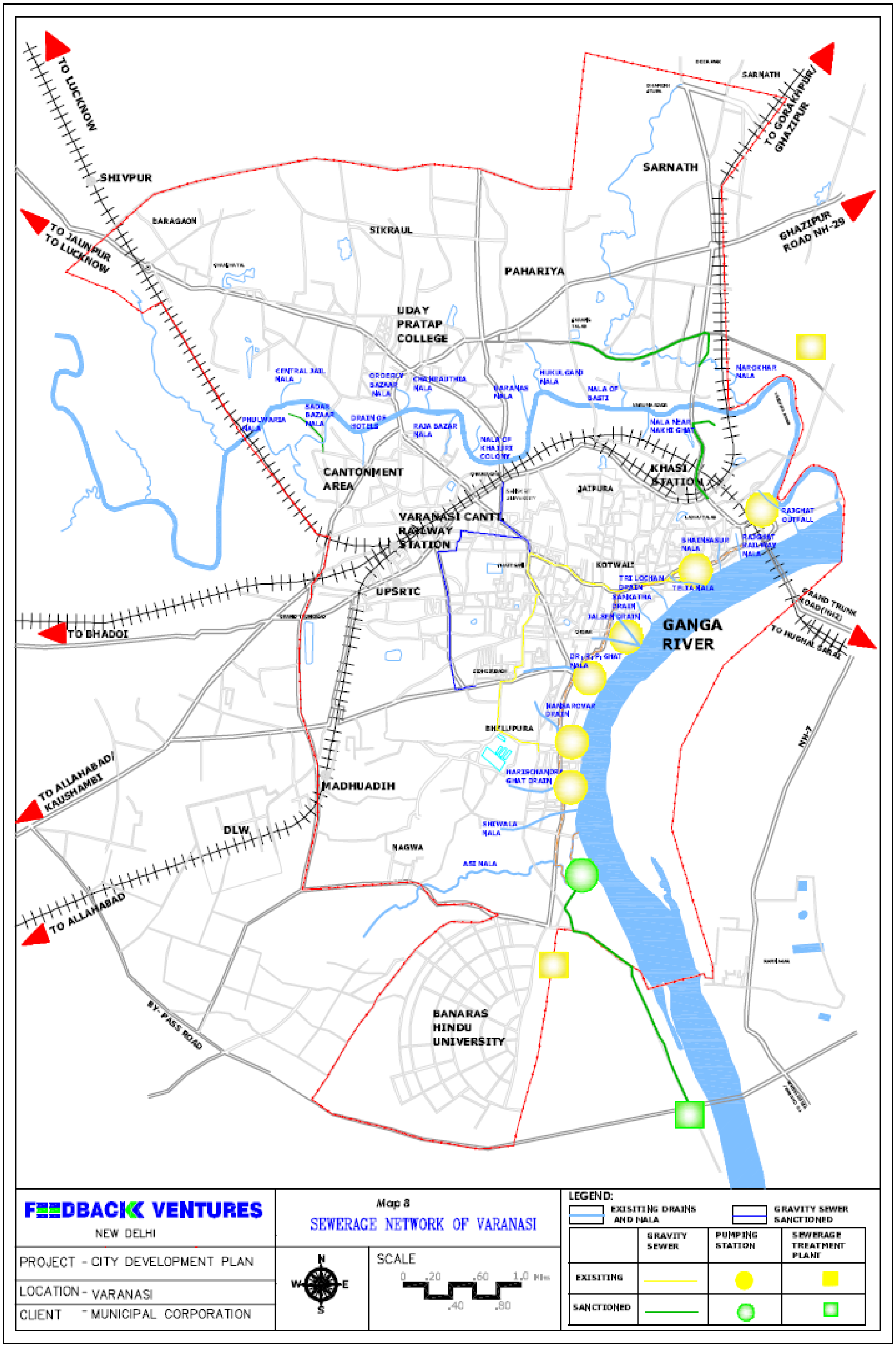
There are two main and five intermittent Pumping Stations (PS) in Varanasi city. Two main pumping stations are Konia and Assi pumping stations and five intermittent pumping stations are Harischandra Ghat IPS, Mansarovar Ghat IPS, Mansarovar Ghat IPS, Jalesan Ghat IPS, and Trilochan Ghat IPS.

Konia Main Sewage Pumping Station

The Konia Main Sewage Pumping Station (MPS) is located in northern part of the Central City Sewerage District, and is isolated with the river Varuna on one side and railway track at Konia near Rajghat. This MPS was built during the GAP Phase-I. The pumping station has a capacity to pump 100mld of sewage. It has two stage pumping arrangement having three screw pumps in the first stage and a battery of centrifugal pumps in the second stage. The sewage lifted by the screw pumps passes through the grit chamber and during high flow period part of the sewage pumped is bypassed into the river Varuna. The battery of the centrifugal pumps lifts the de-gritted sewage to the Dinapur main Sewage Treatment Plant through 1200 mm rising main about 2.9 km long. Details of pumping plant are as below:

First stage pumping

3nos, screw type pumps, 215 HP, 1158 lps discharge and 8.51m head – Average pumping 100mld/


TO LUCKNOW
SHIVPUR
TO JAUNPUR
TO LUCKNOW
BARAGAON
SIKRAUL
PAHARIYA
SARNATH
TO GORAKHPUR/ GHAZIPUR
GHAZIPUR ROAD NH-29
UDAY PRATAP COLLEGE
CENTRAL JAIL NALA
ORDERLY BAZAAR NALA
CHANDAUTHIA NALA
VARANAS NALA
HUKULGANJ NALA
NALA OF BASTI
NAROKHAR NALA
PHULWARIA NALA
SADAR BAZAAR NALA
DRAIN OF HOTELS
RAJA BAZAR NALA
NALA OF KHAJURI COLONY
NALA NEAR NAKHI GHAT
CANTONMENT AREA
KHASI STATION
JAITPURA
RAJGHAT OUTFALL
VARANASI CANTT. RAILWAY STATION
SHAHNASIR NALA
RAJGHAT RAILWAY NALA
KOTWALI
TRI LOCHAN DRAIN
TELIA NALA
SANKATHA DRAIN
JALSEN DRAIN
UPSRTC
TO BHADOI
GANGA RIVER
GRAND TRUNK ROAD(NH2)
TO MUGHAL SARAI
HANSAROWAR DRAIN
BHELUPURA
HARISCHANDRA GHAT DRAIN
NH-7
TO ALLAHABAD/ KAUSHAMBI
MADHUADIH
DLW
SHIWALA NALA
NAGWA
ASI NALA
TO ALLAHABAD
BY-PASS ROAD
BANARAS HINDU UNIVERSITY
FEEDBACK VENTURES
NEW DELHI
Map 8
SEWERAGE NETWORK OF VARANASI
PROJECT - CITY DEVELOPMENT PLAN
LOCATION - VARANASI
CLIENT - MUNICIPAL CORPORATION
SCALE
LEGEND:
EXISITING DRAINS AND NALA
GRAVITY SEWER SANCTIONED
GRAVITY SEWER
PUMPING STATION
SEWERAGE TREATMENT PLANT
EXISITING
SANCTIONED

Second stage pumping

3nos, Non-clog horizontal centrifugal pumps, 215 HP, 740 lps discharge and 3nos, Non clog horizontal centrifugal pumps, 150 HP, 420 lps discharge – Average pumping 100mld

Assi Main Sewage Pumping Station

Assi main pumping station is located on the bank of Assi River (now converted to Nalla) adjacent to the BHU-Godauliya road. This PS intercepts sewage from Assi nalla and pumps to the Bhagwanpur STP through a 400 mm diameter, 1940 meters long, pre-stressed concrete pipe rising main for treatment. The capacity of the Assi MPS is 9 MLD. Details of the pumping plant are as below:

- 3 pumps, 50 HP, 5000lpm discharge and 24m head.
- 1 pump, 22.5 HP, 3000lpm discharge and 15m head.
- 1 Diesel generating set of 70 KVA capacities

Details of intermediate pumping stations (IPS) on the Ghats along the left bank of the river Ganga are as follows:

1) Harish Chandra Ghat IPS (Capacity: 4mld; Rising main: 200 mm, CI)

Pump house = 6.0m dia pump house cum sump.
Pumping plant = 1 No.50 HP, 5000 lpm at 24.00m head.
= 1 No.25 HP, 2600 lpm at 13.50m head.
= 1 No.10 HP, 1150 lpm at 9.50m head.
Diesel Generating set = 1 No. of 70 KVA capacity


Intermittent Pumping Station at Ghat

2) Mansarovar Ghat IPS (Capacity: 6mld; Rising main: 400 mm, CI)

Pump house = 9.0m dia pump house cum sump
Pumping plant = 2 No.10 HP, 1300 lpm at 15.00m head.
= 3 No.25 HP, 2600 lpm at 21.0m head.
Diesel Generating set = 1 No. of 100 KVA capacity

3) Dr. R. P. Ghat IPS (Capacity: 25mld; Rising main: 600 mm, CI)

Pump house = 6.1m dia pump house cum sump
Pumping plant = 2 No.125 HP, 15000 lpm at 23.00m head.
= 2 No.75 HP, 8800 lpm at 22.00m head.
Diesel Generating set = 1 No. of 160 KVA capacity

4) Jalesan Ghat IPS (Capacity: 5mld; Rising main: 250 mm, CI) and

Pump house = 6.1m dia pump house cum sump
Pumping plant = 2 No.30 HP, 3600 lpm at 20.00m head.
= 2 No.55 HP, 1200 lpm at 15.00m head.
Diesel Generating set = 1 No. of 70 KVA capacity

5) Trilochan Ghat IPS (Capacity: 5mld; Rising main: 300 mm, CI).

Pump house = 6.1m dia pump house cum sump
Pumping plant = 2 No.35 HP, 4100 lpm at 20.50m head.
= 2 No.12HP, 1365 lpm at 18.00m head.
Diesel Generating set = 1 No. of 70 KVA capacity

9.1.3 Sewage Treatment Plants

There are three Sewerage Treatment Plants (STPs) in Varanasi viz. Dinapur, Bhagwanpur and Diesel Locomotive Works (DLW) STP. Capacities of these STPs are 80mld, 9.8mld and 12mld respectively. Dinapur and Bhagwanpur STPs are under direct control of UP Jal Nigam for operation and maintenance purpose, whereas DLW is operated and maintained by railway authority.

The Dinapur STP was initiated in 1988 and commissioned in 1994. The STP consists of primary clarifiers, aeration tanks, secondary clarifiers, and anaerobic sludge digesters. Major liquid process components of the STP consist of head works, primary treatment and secondary treatment.

The Bhagwanpur sewage treatment plant was commissioned in the year 1988 under Ganga Action Plan. The plant receives sewage from two pumping stations within BHU campus and from Assi pumping station. The design capacity of the plant is 9.8 mld (8 mld activated sludge process and 1.8 mld trickling filter). The present wastewater treatment process consists of three overall process stages: preliminary treatment, primary treatment, and secondary treatment. The major liquid process units of Bhagwanpur STP consist of head works, primary system, and secondary system.

Sewage Treatment Plant at Bhagwanpur

Sewage treatment plant at Diesel Locomotive Works receives the raw sewage from DLW compound and treats the sewage by biological treatment process.

9.2 Sewerage Districts

The city is presently divided into four sewerage districts. Three sewerage districts 1, 2 (Zone 2A, Zone 2B& Zone 2C) and 3 are located within current municipal corporation limits whereas sewerage district 4 is not with in the present municipal limit ***(Map 9*)**. These Districts are described as follows:

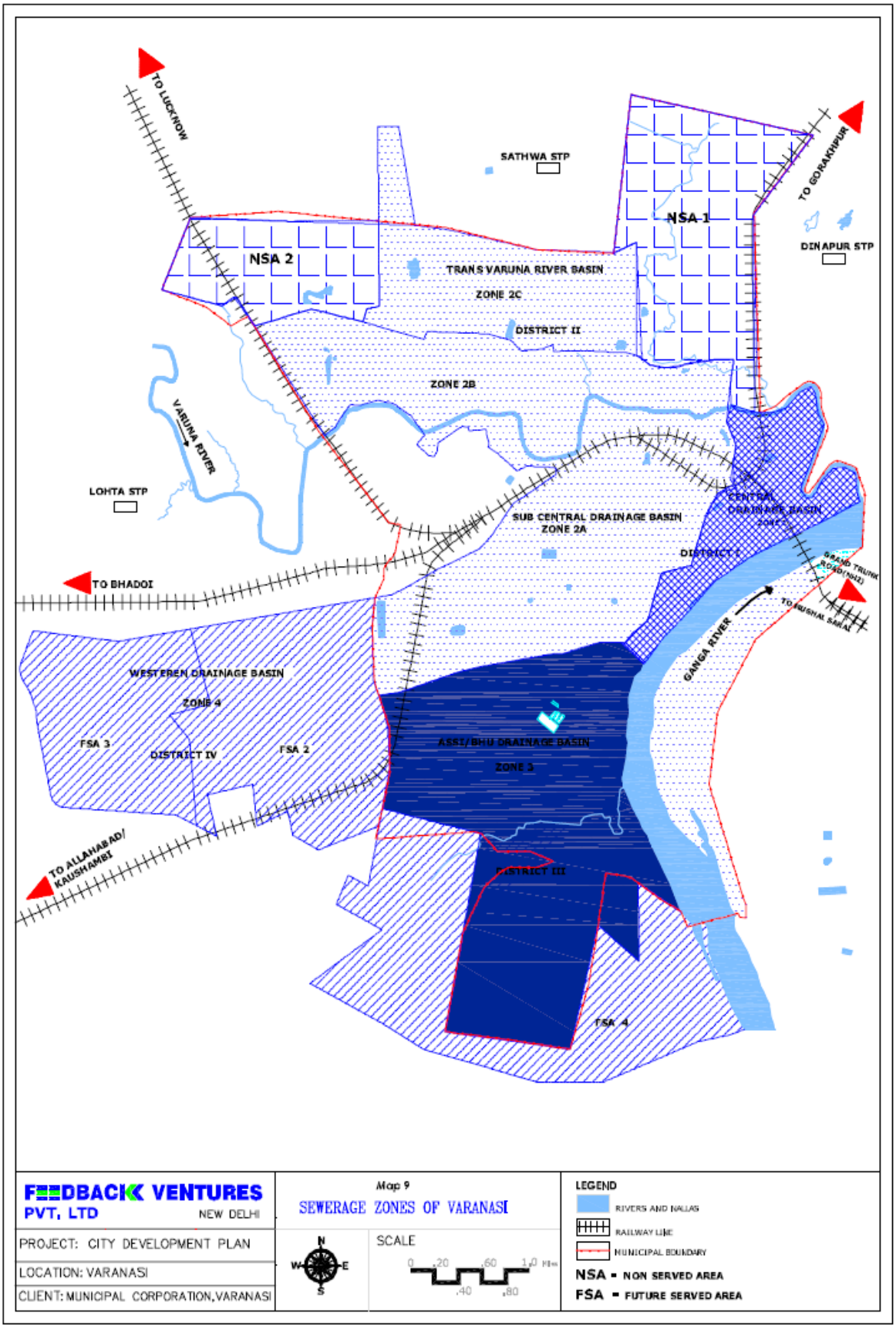
- **District 1** is the Central City sewage district draining to Dinapur STP. This area includes the old city, about 1km in breadth and 5km along the Ganga River from Assi to Raj Ghat. Branch sewers connecting to the old trunk sewer and the Orderly Bazaar trunk sewer cover this area. Wastewater that does not enter the sewerage system follows open drains. These open drains discharge to Ghat Pumping stations along the Ganga River. Densities in this area are very high and this area urgently requires reinforcement of branch sewers and household connections.

- **District 2:** Zone 2A is the sub-central district on the CIS-Varuna side west of the city centre and zone 2B is a slice of the Trans-Varuna district along the Varuna River up to the ridge line defined by the Jaunpur road. Wastewater in these two zones will be collected at Chakaghat MPS. Wastewater that does not enter in to the sewerage system follows natural drainage patterns and discharging in to the Varuna River and Assi Nala. In this District, many new colonies have been developed but there is no sewerage system. In a few localities branch sewers were laid and have either been connected to the old trunk sewer or to open drains. Densities in this area are generally greater than 500 persons per hectare therefore this area should be sewered as soon as possible.

  Zone 2C is the Trans-Varuna district north of the Jaunpur road. Wastewater in this area generally falls to the north east direction. This area is experiencing rapid growth and projected populations indicate that densities will be much greater than 120 persons per hectare before 2015 therefore this area should be sewered as soon as possible.

- **District 3** is the BHU/Assi district south of the City. At present this area is mainly the Banares Hindu University campus, which is fully sewered. The other areas around and near the campus up to the riverbank are developing rapidly. Only one sewer was laid for Lanka area. There is development of residential colonies beyond Municipal Corporation limits leading to Ramnagar pontoon bridge and Bhagwanpur village behind the university campus. The area between DLW and University is already built up but there is no sewerage system. Wastewater discharged in this area follows natural drains flowing into Nagwa/old Assi Nala and Nakkhi Nala.

- **District 4** covers Manduwadeeh, Shivdaspur & Lohta area out side the present municipal limit. These areas are fully urbanized and sewerage facilities are proposed after the year 2015.


TO LUCKNOW
SATHWA STP
TO GORAKHPUR
NSA-1
NSA 2
DINAPUR STP
TRANS VARUNA RIVER BASIN
ZONE 2C
DISTRICT II
ZONE 2B
VARUNA RIVER
LOHTA STP
SUB CENTRAL DRAINAGE BASIN
ZONE 2A
CENTRAL DRAINAGE BASIN
ZONE 1
DISTRICT I
GRAND TRUNK ROAD(NH2)
TO BHADOI
TO RAJGHAT SARAI
GANGA RIVER
WESTEREN DRAINAGE BASIN
ZONE 4
FSA 3
DISTRICT IV
FSA 2
ASSI/BHU DRAINAGE BASIN
ZONE 3
TO ALLAHABAD/ KAUSHAMBI
DISTRICT III
FSA 4
FEEDBACK VENTURES
PVT. LTD
NEW DELHI
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION, VARANASI
Map 9
SEWERAGE ZONES OF VARANASI
N
W
E
S
SCALE
0 .20 .60 1.0 Kms
.40 .80
LEGEND
RIVERS AND NALLAS
RAILWAY LINE
MUNICIPAL BOUNDARY
NSA - NON SERVED AREA
FSA - FUTURE SERVED AREA

9.3 Future Service Areas

Future service areas outside the current Municipal Corporation limit are described as follows:

- **FSA1** is north of the Trans-Varuna district just outside the current Municipal Corporation limit. Wastewater generated in this area tends to flow north and east towards Sathwa.
- **FSA2** is west of the current Municipal Corporation limit, and bounded by Northeastern railway. Wastewater in this area tends to flow north to the Varuna River near Lohta.
- **FSA3** is west of FSA2 and bounded by the Northern railway line. Population projections indicate that densities in this area could reach 120 persons per hectare around 2020.
- **FSA4** is outside the current Municipal Corporation limit and surrounds the area occupied by BHU campus. Wastewater in this area drains to Assi Nala and Nakkhi Nala which discharge to Ganga River upstream of the water supply intake and Ghats.

9.4 Key Issues

Some of the problems identified regarding Sewerage system are as follows:

- The existing sewerage system is inadequate with 70% area of the city uncovered with sewer system leading to discharge of untreated sewage in open drains polluting River Ganga and Varuna.
- Capacity of STPs is inadequate to treat the existing sewage leading to disposal of untreated sewer into River Ganga and Varuna thus polluting the river water.
- Combined system of disposal putting more pressure on the system and STPs especially during the rainy season.
- Present sewer infrastructure including sewer network (branch/main/trunk sewers), and pumping stations is old and renovation/rehabilitation is required.
- Frequent clogging of sewerage system due to combined sewer and storm water drainage and waste dumps, especially during monsoons.
- Considering the huge quantum of wastewater being discharged into the Rivers of Varanasi, namely River Ganga, Varuna and Assi, there is an urgent need to intercept the flow of wastewater into these water bodies to prevent further pollution.

10 Storm Water Drainage

10.1 Present Scenario

Varanasi lacks a proper storm water drainage system. Though a significant part of the city has open drains, they are used for carrying wastewater and during monsoon season they carry both wastewater and storm water putting more pressure on the sewerage network. The open drains carry a mix of storm and wastewater and empty into the sewer lines increasing the load on the sewage pumps and STPs especially during rainy season. Apart from this, some storm water drains also empty directly into river Ganga and river Varuna.


Choked open drains due to waste

Most of the open drains are unlined and contaminate the ground water owing to the porous nature of alluvium. These drains carry the grey water discharged from the settlements along their path and is also used as dumps for solid waste. The Assi nallah also acts as a major outlet for the city's storm and wastewater. The drains and nallahs of the city are prone to chocking owing to the unregulated solid waste dumping by the citizens. This leads to stagnant puddles of water, which lead to health hazards, unhygienic conditions and act as breeding grounds for mosquitoes. The existing drain network cannot be used for water harvesting owing to the heavy siltation, quantum of grey water and solid waste in the drains.

There is a need for a dedicated storm water network for the city which would not only be instrumental in avoiding water logging during monsoons but would also provide a scope for water harvesting along these drains.

10.2 Key Issues

The main issues, which need to be addressed for storm water drainage, are:

- Lack of lined drainage in the city leading to contamination of ground water
- Frequent clogging of drains due to dumping of waste in the drains which lead to unsanitary conditions
- Siltation reduces the carrying capacity of drains leading to water logging, particularly during monsoons.
- Need for a dedicated storm water network to reduce the load on sewer network

11 Solid Waste Management

Solid waste management consisting of collection (at primary and secondary sources), transportation and disposal is an obligatory function of MCV. To understand solid waste management there are different components viz. generation, composition, storage treatment and disposal.

11.1 Present Scenario

11.1.1 Generation and Composition of Waste

Municipal solid waste mainly comprise of waste generated from household, markets, commercial establishments, hotels, hospitals, and small scale industries in the town. It has been assumed that the local residents of towns generate solid waste at the rate of about 425 grams per capita per day on an average. This average generation of solid waste includes local inhabitants (comprising the wastes generated by the resident population, shops and commercial establishments, vegetable and fruit markets, construction and demolition and hospital wastes - non-infectious and infectious) and the floating population in the town.

Varanasi is a prominent tourist place therefore it receives significant floating population. Floating population also contributes to waste generation in the town. Total quantity of waste generated in Varanasi is about 600MT/day, out of which approximately 450MT/day of waste is collected[11]. This constitutes to 75% of the total waste. Road sweeping waste and commercial waste comprises the maximum percentage of solid waste generated. Waste generated by different activities is as shown in ***Table 30*** and ***Figure 15.***

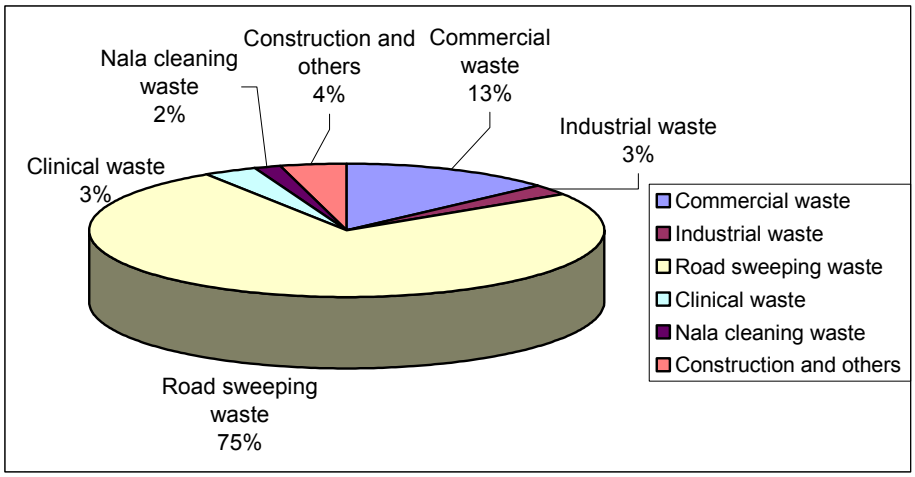
Table 30: Estimated waste generation

Category	Generation amount (ton/day)	Percentage
Commercial waste	80	13.33
Industrial waste	15	2.5
Road sweeping waste	450	75
Clinical waste	20	3.33
Nala cleaning waste	10	1.66
Construction and others	25	4.16
Total	**600**	**100.00**

Source: The study on Water Quality Management Plan for Ganga river in the Republic of India; Final report Volume I, Summary, July 2005, JICA, NRCD, MOEF

[11] Source: Study on Water Quality Management Plan for Ganga river in the Republic of India, Volume I summary, JICA, NRCD, MoEF, July 2005

Figure 15: Composition of Waste generated by different activities



Most of the waste generated in the city comprises of biodegradable, compostable and recyclable material. This is due to the high quantum of religious and vegetables waste along with the high amount of waste generated due to plastics. A small percentage of waste also comprises of debris and inert material generated from construction, repair and maintenance activities. These wastes contain bricks, cement concrete, stones, tiles, wood, etc. and the storage of this waste at the time of its generation is totally neglected. By and large, people deposit construction waste, after salvaging useful material, on the road.

11.1.2 Storage at Source

The waste generated from different sources, is either thrown on the streets, (which is the normal practice) or is disposed in the dustbins (if located near the house, shops or restaurants). There is no scientific and systematic storage of waste at source.

It was observed during the primary surveys that there are very few bins for storage of domestic, trade and institutional wastes at source. It was also observed during the survey that even when the dustbins were put at various places in the city, they were never properly utilized. The waste used to be strewn all over the area in and around the dustbins. Furthermore, the waste is dumped everywhere such as vacant lots, dilapidated buildings without tenants etc.

Dustbins in deteriorated condition

The habit of throwing the wastes to the streets and/or drains was more prevalent in case of small restaurants and eateries. Clogging of drains due to wastes thrown was a common scene in the town. It was also observed that the local inhabitants and the shopkeepers alike caused the frequent clogging of drains due to excessive use of polythene.

11.1.3 Collection of Solid Waste

At the primary stage, the waste collected from the roads is put in dustbins on streets, and transported to secondary collection depots. There is no door-to-door collection system in Varanasi. Varanasi has total thirty secondary collection depots for the solid waste, and concrete walls similar to the cases in other cities surround most depots.

Since the collection sites are fit into the open spaces, they have various shapes and sizes. Several roofed collection depots are established on various locations. Although three kinds of containers with volumes of 0.75m3 to 4.5m3, are placed on 137 spots, all containers are very old and deformed. At many secondary depots, the waste is littered around. Some places are not only unsanitary but also the littered waste hinders the approach to the collection depots. This causes the vicious cycle of waste-litter-spread.

Secondary collection point with litter around

The new roofed secondary collection depot is built in parallel with a road. One side has a small door where handcarts can approach, and the other side has a large door to enable vehicles for carrying out waste to approach backward. Scavengers collect valuable things at dustbins, containers and secondary collection depots. Valuable martial are also collected in roofed collection depots[12].

New secondary collection depot

At present there is no segregation of waste done at household, shops and commercial establishments in Varanasi city. Such waste on the streets or in the municipal bins goes to disposal sites un-segregated. In absence of the practice of segregation of waste at source, rag pickers pick up part of this waste in soiled condition. Currently, there is no system of door-to-door collection of wastes and source segregation of wastes, though these practices are considered as the best for effective solid waste management.

11.1.4 Transport and final disposal

The waste collected to secondary collection depots and containers is loaded into dumper trucks by various shovel loaders or manually, and transported to final disposal sites. Arm system container trailers are used for the loading of containers. Most of the

[12&3] Source: Study on Water Quality Management Plan for Ganga river in the Republic of India, Volume I summary, JICA, NRCD, MoEF, July 2005

present machinery looks very old. The loaded waste is transported to final disposal sites by open dumper trucks. Since many trucks have no plates or sheets covering the back, there is a high possibility that litter fall out during transportation[13].

11.1.5 Final Disposal Sites

There were three final disposal sites, which are now abandoned. These sites were located in Palang Shahid (10 acre), Nahi ghat (2 acre) and Kabir Math (1 acre). The landfill system was open dumping system with gentle slopes. The leachate from the waste at the disposal site may be directly discharged in the Nalla and the River Ganga, thus polluting the river. The present disposal site is located along Ramnagar road near Mugal Sarai. Municipal Corporation of Varanasi has adopted only dumping as method of disposal of the waste as of today.

11.1.6 Tools and equipments

Under the Municipal Act, road/street sweeping and drain cleaning are the obligatory responsibilities of the MCV and the solid waste generated in the town shall be collected and removed by the sanitary workers of the Public Health Division. For solid waste management of Varanasi city there are about 2,000 employees at all the levels. The break-up of the staff & equipment available is as shown in ***Table 31& 32***:

Table 31: Staff employed for Solid Waste Management

S.No	Designation	Sanctioned Posts	No. of Workers Employed	Vacant Posts
1	Sanitary Worker	2320	1909	411
2	Sanitary Supervisor	104	66	38
3	Food and health Officer	19	12+2	5
4	Chief Health Supervisor	4	--	4
5	Zonal Sanitary officer	2	--	2
6	Driver	35	25	10
7	Cleaner	31	28	3
8	Bhisti	133	125	Nil
9	Main town health Officer	1	1	--
10	Nagar Health Officer	1	1	--
11	Upper Nagar Heath Officer	--	1	Nil
	Total	**2650**	**2170**	**473**

Source: Health Department, Municipal Corporation Varanasi, 2006

Table 32: Availability of Equipment with MCV for Solid Waste Management

S.No.	Vehicle type	Total no. of vehicles	Off - road vehicles	On - road vehicles	Requirement/ Shortage
1	J.C.V. Loader	8	4	4	3
2	Robot Loader	3	2	1	1
3	Dumper	19	6	13	10
4	Dumper Placer	12	4	8	--
5	Tractor	15	2	12	
6	Haper	17	2	14	
7	Rickshaw Trolley	120	10	110	
8	New handcarts	400	100	300	
9	Old handcarts	600			
10	Container (Garbage bin)	62			

Source: Health Department, Municipal Corporation Varanasi, 2006

Currently, the wastes are not treated in a systematic and scientific manner while disposing. As a result, the whole area in and around the disposal site is unhygienic and poses serious threat to the environment and to public health. No treatment methods are adopted for disposing the waste. The wastes are just dumped without segregating biodegradable and non-biodegradable wastes.

11.1.7 Workshop

A municipal workshop is located near the Raja bazaar road and Patel road in the central district of the city. The repair equipment includes grinder, hand grill, air compressor, etc. most of the vehicles are old and need maintenance.

11.1.8 Street Cleaning

Under the Municipal Act, road/street sweeping and drain cleaning are the obligatory responsibilities of the Municipal Council. The streets of Varanasi are cleaned on a daily basis around 6 to 9am and made into small piles of waste by the Municipal sweepers but due to high intensity of activities, the roads are generally dirty by the afternoon.

11.2 Key Issues

Some of the problems faced by the Municipal Corporation of Varanasi in the solid waste management are as follows:

- Currently, there is no proper system of collection and transportation of the waste. Loading and unloading is fully manual causing health hazard to the workers.
- Varanasi has not provided adequate number of dustbins for storage of wet and dry wastes for the clearance through their regular primary collection process.
- As per the norms/standards Municipal Corporation of Varanasi has to provide containers, for proper collection of waste wherever possible throughout the city for better management of the waste.
- The vehicles are not covered resulting in spread of foul smell as the vehicle moves around the town for collection and disposal of the waste also the lighter waste materials fly and fall down the way.
- There is not enough staff for sweeping the roads of Varanasi, making it difficult to clean the city.
- Condition of the vehicles carrying waste is very poor and needs proper maintenance/replacement.
- An important issue here is that, the bio-medical waste is also disposed off along with the municipal solid waste at this site. Monitoring process is also non-existent at the dumping site.
- Lack of formal sanitary landfill site
- Lack of segregation of waste and need to introduce composting to minimize the quantum of waste going to landfill.
- Waste dumps in nallahs and rivers lead to water logging and unsanitary conditions

12 Traffic and Transportation

12.1 Present Situation

Traffic and transportation plays an important role in the overall functioning of the city. It is an integral part of urban planning and is responsible for the smooth functioning of the city. It is also responsible, besides other factors, for the spatial growth of the city by increasing the accessibility of sites on the periphery of the city.

A study of the transport infrastructure for Varanasi is crucial for the understanding and analyzing micro level (within the different zones of the city – linkages between the old city and the newer developments) as well as macro level (linkages to Sarnath, etc) functioning and linkages of the city.

12.1.1 City Level Road Network

Total length of the roads within the MCV area is 1170 km, which constitute roads maintained by NHAI i.e. Bye-Pass and CPWD i.e. National Highways No.2, 29 and 56, roads maintained by state PWD department and other roads maintained by MCV. Out of total length of the roads, MCV maintains approximately 70% roads, which are internal arterial roads & narrow streets in the old town area are as shown in ***Table 33***

Table 33: Road lengths in Varanasi

Category	Length in Kms.	Percentage	Remarks
Kuchha Roads	104	8	National Highways are maintained by PWD while MCV maintains rest nearly 70% of arterial and other roads.
Water Bound Macadam Roads	-	-	
Black Topped Road	649	55.4	
Other roads	417	35.6	
Total	**1170**	**100**	

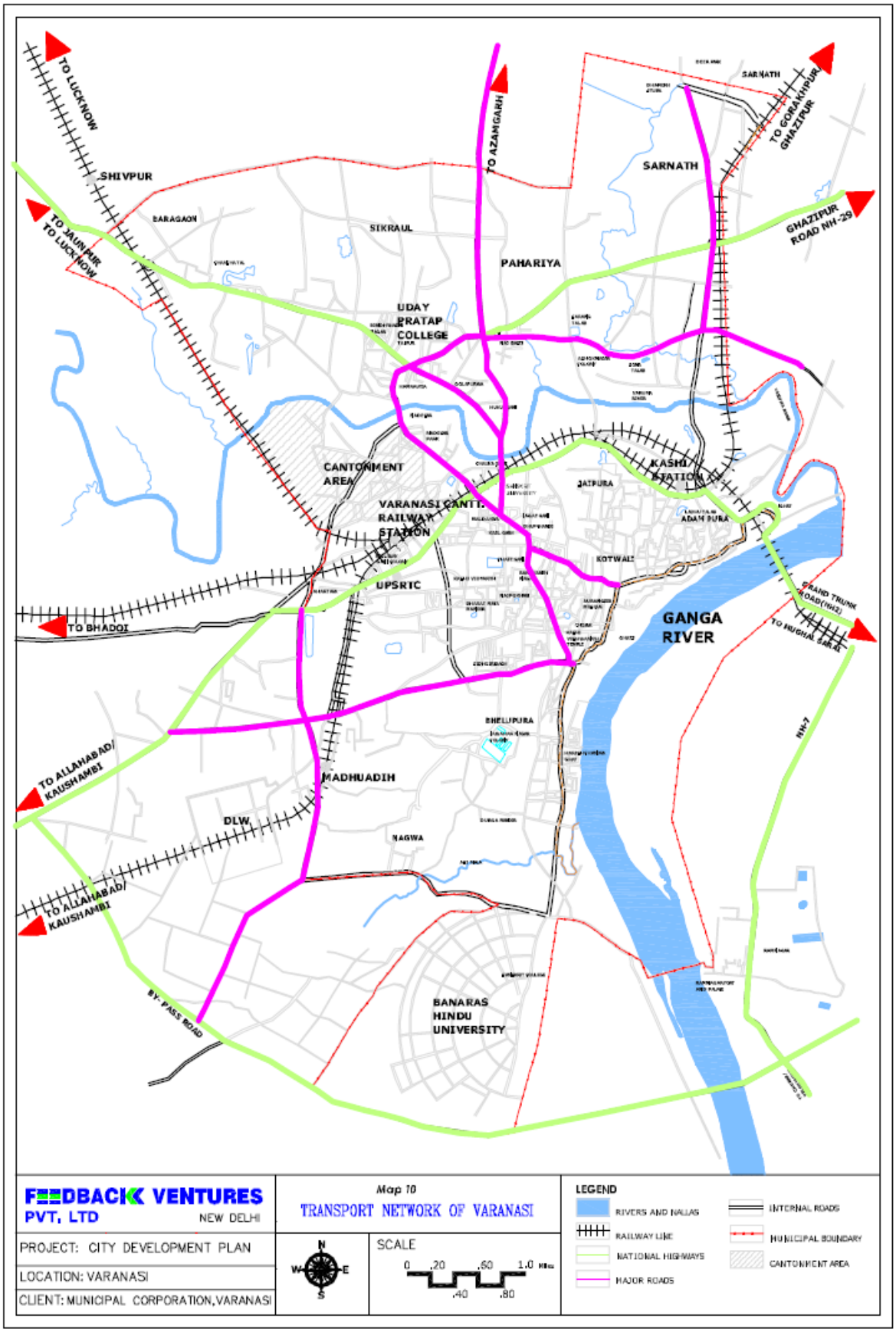
Source: Municipal Corporation of Varanasi, 2006

Map 10 shows the major road network of Varanasi. Based on traffic characteristics, the town can be divided into three zones. First zone consisting of old city area near Ghats, second consisting of area from old city to the G.T. Road while the third being the new areas on the northern side of the railway line.

The Old City Area

The old town area includes very congested areas like Chauk, Kotwali, Adampura, etc., having very narrow streets and mixed land use. Narrow, irregular lanes leading to the Ghats are typical of this area. The width of these lanes varies from 1 to 2 meters and only pedestrian movement is possible however, people do ply two wheelers making it difficult for the pedestrians to walk. The presence of wholesale trade and Mandis in the old city adds to the congestion.

Commercial encroachments considerably reduce the available RoW on all the roads leading to the Ghats. There is a high degree of conflict between pedestrians and vehicles in the old town area. The high density of the area coupled with encroachment, heavy movement of cycle rickshaw and pedestrians make it the most chaotic and congested area in Varanasi.


TO LUCKNOW
SHIVPUR
BARAGAON
TO JAUNPUR
TO LUCKNOW
SIKRAUL
TO AZAMGARH
SARNATH
TO GORAKHPUR
GHAZIPUR
SARNATH
GHAZIPUR
ROAD NH-29
PAHARIYA
UDAY
PRATAP
COLLEGE
CANTONMENT
AREA
VARANASI CANTT.
RAILWAY
STATION
JAITPURA
KASHI
STATION
ADAM PURA
KOTWALI
UPSRTC
TO BHADOI
GRAND TRUNK
ROAD(NH2)
TO MUGHAL SARAI
GANGA
RIVER
BHELUPURA
NH-7
TO ALLAHABAD/
KAUSHAMBI
MADHUADIH
DLW
NAGWA
TO ALLAHABAD/
KAUSHAMBI
BY- PASS ROAD
BANARAS
HINDU
UNIVERSITY
FEEDBACK VENTURES
PVT, LTD
NEW DELHI
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION, VARANASI
Map 10
TRANSPORT NETWORK OF VARANASI
N
W
E
S
SCALE
0 .20 .60 1.0 Kms
.40 .80
LEGEND
RIVERS AND NALLAS
RAILWAY LINE
NATIONAL HIGHWAYS
MAJOR ROADS
INTERNAL ROADS
MUNICIPAL BOUNDARY
CANTONMENT AREA

Satellite image of old city area showing high density and small lanes

Slow moving traffic causing chaos in old town

Central City Area

The second zone comprises of the area beyond the old town area up to G.T. road in the north. In this zone road widths are more as compared to the old town area, but the roads are still congested. The roads leading to the inner city are wider but are fully encroached on both sides creating chaos for the movement. Roadside parking and street vendors add to traffic problems in the area reducing the road width available for movement. The two central bus stands on G.T. road: one of U.P. State Transport Corporation and another private (Ghazipur bus stand) add to the problems of the traffic and restrict smooth vehicular movement on the main road.

Traffic congestion at Andhra Chowk

The area near railway station on either side of G.T. road has no organized parking and creates havoc outside the railway station. The movement is not smooth in these areas

Roadside parking of private buses causing congestion

Roadside parking at Railway Station

because there is mismanagement of traffic, absence of traffic signals along with absence of auto rickshaw stand and the roadside encroachments. The lack of organized parking spaces at the railway station, leads to conflict of traffic and pedestrian traffic. Since the railway station has main opening towards the south of the city, the northbound traffic also has to pass through the southern side leading to severe traffic congestions. Another hindrance to the traffic flow in the city is the presence of streetlights and transformers in the middle of the roads.

Peripheral Newly Developed areas

This area comprises of the Nadesar, Police lines, Tajpura etc. that characteristically have reasonable road widths with few encroachments but no traffic signals. The major problems areas in the zone are Pandeypur chowk, Andhra Bridge and Chauka Ghat. There should be traffic management exercises for these areas.

In general, traffic condition in Varanasi city is poor as most of the roads are narrow and congested. To aggravate the problem of traffic flow is a mix of slow and fast moving traffic. The mixed traffic mode with variable speeds like rickshaws and cars/lorries on the roads during the peak hours causes most congestion/traffic jam on the roads.

12.2 Signalized Intersections

Traffic intersections and rotaries play an important role in better traffic management. Varanasi has no signalized intersections except four, namely MariMai Ka Temple, Kabir Chaura, Rath Yatra, Maldahiya area. These signals are not in working condition and lacks maintenance. Apart from these, there are about 32 intersections, which are manually operated by traffic police. There is no proper traffic management plan put in place for better traffic management, which is one of the major reasons for congestion in the city. The city lacks street furniture on almost all the roads of the city.

The junctions, having the highest traffic volume are identified as Golghar Chowk, Pandeypur Chowk, Andhra Pul, Chowka Ghat, Gadaulia, Ramapura, Kabir Chaura, Lanka, Maldahiya, Sigra, Golgadda, Rathyatra, Dharamshala Chowk. These intersections are problem areas in terms of design and/or management and are unsuitable to meet the rapidly changing requirements of vehicle traffic. Most of the intersections are full of encroachments and lack of traffic sense amongst the people make it difficult to manage the traffic movement especially during peak hours.

12.3 Traffic Characteristics

The traffic composition in the city varies with area. Traffic in the city comprises mostly of motorized (comprising mainly of two wheelers and autos) as well as non-motorized (comprising of cycle rickshaws and bicycles) vehicles. The main reason for congestion in the city is due to the unregulated movement of cycle rickshaws followed by two wheelers and autos. Traffic volume at major intersections is as shown in ***Table 34***.

Table 34: Traffic volume at major intersections

Areas	Truck	Bus	Tractor	Bullock Carts	Jeep	Car	Auto Rickshaw	Rickshaw	2-Wheeler	Cycle	Total
Sigra	69	221	60	26	1594	3942	7302	12824	22732	24039	**72809**
Dharamshala	1226	886	225	214	2154	2303	12017	10073	13253	11293	**53644**
Rathyatra	12	203	10	8	1508	3044	8248	12354	2519	20417	**70994**
Gurubagh	25	75	18	12	918	2893	4801	9089	12017	13262	**43110**
Kamachha	30	117	15	14	1240	2318	5086	5118	15413	14995	**44346**
Lahurabir	147	142	47	33	931	2316	10269	20069	30871	32445	**97270**
Beniabagh	67	86	39	34	392	854	3340	22847	13551	18930	**60140**
Ramapura	30	48	19	26	1198	727	2549	27001	23759	31042	**86399**
Gadaulia	28	23	6	6	793	1192	445	23703	17459	19361	**63016**
Maidagin	71	134	40	212	909	1297	7175	19529	16512	18356	**63936**
Nadesar	58	86	28	1	1019	620	3675	1992	12502	11517	**31498**
Andhra Pul	1175	1612	272	108	4300	4650	10966	9390	20642	20332	**72766**
Englishiya	49	21	38	46	662	998	4717	5194	10510	13044	**39043**

Source: Traffic Police Department, Varanasi, 2002

From the above table it can be seen that traffic volume is very high at all the nodes and intersections and the roads have already exhausted their capacity. Slow moving traffic in form of rickshaws contributes maximum to traffic volume of the city causing congestions at various places. The National Highway 2 from Khazakpura to Lahartara Cantonment has been identified as the most congested highway of the city.

12.4 Vehicular Growth Rate

The total registered vehicles in Varanasi in the year 2001 were 3.3lakh, which has increased to 3.8lakh in the year 2004. As can be seen from the following table, the growth rate of the vehicles is less in Varanasi, compared to other cities. The reason for this can be the non-availability of road space and congestion caused due to Non-motorized traffic i.e. Cycle rickshaws. This very fact is also evident from the traffic survey conducted by traffic police at 13 intersections, which showed that slow moving vehicles constituted 40 to 80% of the total composition, of the vehicles. The following table shows the increase in number of vehicle from 2001 to 2004. ***Table 35*** shows number of registered vehicles in Varanasi.

Table 35:Total no. of registered vehicles in Varanasi {on road vehicles}

Year	Multi axiled Articulated Vehicle	Trucks & Lorries	Light Motor Vehicles (goods)	Total Buses	Total Taxies	Total Light Motor Vehicles (Passenger	Total Two Wheelers	Cars	Jeeps	Tractors	Other Vehs. Not Covered	Grand Total
2001	45	9360	1992	1297	863	6636	270038	17756	2520	20077	949	**331533**
2002	102	2786	2262	986	493	4016	283769	19045	2632	20371	957	**337419**
2003	239	5578	456	1081	688	4972	304724	20694	2699	20705	964	**362800**
2004	420	5845	2567	1234	831	5907	324534	22473	2924	21022	968	**388725**
TOTAL	**806**	**23569**	**7277**	**4598**	**2875**	**21531**	**1183065**	**79968**	**10775**	**82175**	**3838**	**1420477**

Even with the increase in number of vehicles in Varanasi, the annual growth rate of the motorarized vehicles, which include cars, taxis, have shown a downward trend over the period of 17 years i.e. from 1985 to 2002. ***Table 36*** shows the growth rate of motor vehicles.

Table 36: Annual growth rate of motor vehicles

Year	Percentage Growth rate
1985-1990	16.72
1990-1995	10.33
1995-2002	9.96

Source: Vision 2025, ICRA

The percentages of registered vehicles in Varanasi district for the year 2002 are as given in **table 37**. Almost 82% of the total vehicles registered were two wheelers and the remaining vehicles constituted only 18%. The percentage of cars and cabs registered in 2002 were 6%, whereas the corresponding figure for autos and tempos was 2% and are as shown in ***Table 37***.

Table 37: Total number of registered Vehicle in Varanasi District in 2002

Classification of Vehicles	Percentage of total Vehicles
Two-Wheelers	82
Autos/Tempos	2
Cars/Cabs	6
Buses	1
Goods Carriers	2
Tractors and other vehicles	7

Source: Transport Department, Varanasi, 2006

12.5 Parking

Parking facilities constitute an important part of traffic management plan and better traffic management system. In Varanasi city, parking is done in very haphazard manner and generally roadside parking is encouraged. There are no authorized parking spaces in the town and no formal parking spaces for cycle rickshaws and autos. The congested lanes of old city, which is the main market area, have not been provided with any formal parking. Hence, conflict between roadside parking, commercial encroachments and pedestrians for the space availability are rather evident.

Curb parking are provided in the business areas like Chowk, old city area etc. The vehicles are parked on the carriageway resulting in traffic jams and congestion. Traffic movement in most of these areas is very slow, due to roadside parking and causes congestion in the areas. Systematic parking spaces in the business area are needed, especially during peak hours.

12.6 Public Transportation

The city does not have a formal public transport system. The buses plying on the GT road cater more to inter city transport rather than intracity transport. In the absence of a regularized public transport system, autos (for longer distances) and cycle rickshaws (for small distances) act as the most prominent means of public transport. Therefore,

mode of transport in Varanasi is cycle rickshaw, 3-Wheelers and personal vehicles running throughout the city.

Due to lack of public transport, the arrangement of sharing auto is very common with fairs varying from Rs.2 to Rs10 depending up on the distance traveled. Along with auto rickshaw another popular mode of transport is cycle rickshaws, which has increased in past few years and has crossed a limited mark. MCV along with cantonment board has authority to issue new licenses and renew old ones. MCV however, has stopped giving any new licenses for cycle rickshaw but still there are many unauthorized rickshaws that run in the city causing more congestion. This slow moving traffic is the major concern of traffic management.

12.7 Bus & Truck Terminals

At present there are two bus terminals operating in the city namely Cant bus terminal, which is operated by state transport department and Ghazipur bus terminal, which is a private bus terminal. Both these bus terminals are located on NH-2, which is very congested being the major arterial road in the city. Due to improper parking facilities in the terminals the buses are parked in haphazard manner on the main carriageway resulting in long traffic jams. Presently the bus terminal is handling about 400 to 450 buses per day. Apart from these there is another bus terminal at Golgadha, which is now used as a workshop with very few buses operating from this terminal. Therefore, the entire load is on the Cant bus terminal.

Golgadda bus depot

Presently there are no formal truck terminals in the city but there are 5 temporary terminals, which are catering the movement of goods. The loading and unloading is done during the night. The five temporary truck terminals located in the city are at Pahadia, Visheswar Ganj, Maheshpur, Chandasi, Padao.

For efficient functioning the Uttar Pradesh State Road Transport Corporation (UPSRTC) has been divided into regions totaling 15. Each region has been further divided into operational units called depots. The total number of depots in the corporation is 97. Each depot has a depot workshop attached to it to provide supportive maintenance facilities. Varanasi region has seven such depots.

In most cities, improvements mean increased investments in urban bus systems that carry the vast majority of low-income riders. For this fixed-route public transit excels, and indeed has numerous advantages in providing urban transportation.

12.8 Key Issues

- Mixed traffic volume with large number of slow moving traffic mainly rickshaws
- Encroachments in form of temporary shops and extensions of existing shops on roads reducing the road width for movement
- Geometry and Design of roads is not complying with norms and standards, making it very low visibility at intersections
- Roadside parking causes traffic jams in all the areas and there is lack of adequate parking spaces
- Absence of auto stands at major intersections and market has left the city in chaos.
- Heavy traffic moving through the city on GT road creating problem for the intra city traffic movement.
- Non-signalized intersections have lead to mismanagement of traffic in the city.
- Presence of Two bus stands in center of the city has created problems in the city.
- High level of environmental pollution
- Traffic volume is very high on several roads exhausting the road capacities.
- The road conditions and the level of services are poor.
- Absence of footpath for pedestrian movement

13 Street Lighting

13.1 Present Situation

Varanasi Municipal Corporation has an obligatory function of provision and maintenance of street lighting in the city area. The electricity department of the PMC is responsible for installation, replacement, repairs, operation and maintenance of streetlights in the city. The composition of streetlight includes provision of tube lights, bulbs, sodium vapour lamps, metal high lamps and high mast installations and is as shown in the ***Table 38***:

Table 38: Street lighting facilities in Varanasi

Composition	Number	% Working	% to total
Tube Lights	20436	70	52
Bulbs	14268	70	36
Sodium Vapour lamps	3488	60	9
Metal high lamps	770	70	2
High Mast Installations	48	90	1
Total	39,010		100.00

Source: Municipal Corporation of Varanasi, 2006

The town has total 39,010 streetlights spaced at a varying distance of 30-50m, as against the norms of 30m. The newly formed extension areas are not well illuminated where the distance between the poles is very high. Almost all the roads are illuminated by streetlights and streetlights are also provided along ghats of Varanasi.

After a reconnaissance survey conducted in the town, it has been found that 35-40% streetlights are not in working conditions. MCV is responsible for street light management, which includes maintenance, repairs and replacement of the streetlights. As per the discussions with official of MCV, 30% bulbs need to be replaced every 3-4 days, which increases the operation costs.

For the overall management of the streetlight, MCV has a staff of 86 persons, of which 56 staff is regular, staff of 5 linemen is hired on daily basis and remaining 25 staff is hired on the contract basis. Out of these 25 staff, 13 staff is lineman and remaining staff is helper. For the last financial year Rs. 8.69 lacs have been spent on the salaries of the hired staff under contract apart from the salaries paid to the regular staff and material worth Rs. 48.43 lacs has been purchased.

13.2 Key Issues

At the overall city level the level the provision of street lights is fairly good, but MCV needs to review the following for improving the service further and other issues related to the operation and maintenance are:

- Improve the coverage at ward level particularly in extension areas
- There are many poles and transformers in the middle of road, which needs shifting for smooth traffic flow.
- Carrying out a detailed assessment of spacing and energy audit to assess the power consumption and implement efficient automatic switching operations as energy cost will be very high for this level of service and also need to explore solar lighting.

14 Environmental Aspects

14.1 Present Situation

The population of Varanasi has nearly doubled over the last three decades but the area under the city has increased marginally (1.5 times). This can be attributed to the religious fervor of the city and the belief that living and dying in Varanasi leads to salvation. This has led to reluctance of the citizens to shift out of the area bound by Varuna and Assi leading to high population density laying stress on the already existing infrastructure and poor environmental conditions in the city.

In the absence of a primary waste collection system in the city, the roads and drains act as the waste dumps. This leads to unsanitary conditions and water logging. The city does not have a separate network for storm water and sewerage, leading to frequent blockages and backflows (especially during monsoons). Most of the city roads are congested and narrow but on the other hand the high number of vehicles and cycle rickshaws lead to congestions and pollution (air/noise). The narrow Right of Way (RoW) of roads is utilized for parking and by vendors leading to chaos and congestion.

a) Core Area

The city of Varanasi is one of the most ancient living cities in India and hence, the design of the city, though unique in itself is struggling to cater to the increasing infrastructural demands and population pressure. The core city area or the Cultural Heritage zone, which comprises of the Ghats and the inner city areas are under maximum environmental stress. More than 1 lakh people visit this area daily and at least 60,000 people bathe in Ganga everyday. The intense tourist and religious traffic to this area has led to an increase in the traffic movement in the narrow lanes and an increase in the intensity of commercial activity. The heritage structures in the city, especially along the Ghats have extreme potential for development as tourist spots. The religious activities performed daily on the Ghats add to the pollution load to the river deteriorating the water quality to such an extent that at several places the Ghats are not even fit for bathing. The lack of proper sewerage and waste collection facilities in the area lead to pollution on river Ganga. The quality of living in the core city area is poor and needs immediate attention.

b) Solid Waste Management

The narrow lanes and water bodies of the city are used as dumping grounds for solid waste in the absence of a proper waste management system. On an average nearly 10tonnes of waste per day is collected only from nallah cleaning.[14] Dumping of solid waste in the nallahs and rivers of the city leads to health hazards and hampers flow of Nallahs. The city does not have a formal sanitary landfill site. Waste is dumped at a site near Rajghat and in the absence of any preventive measures, the leachette generated finds its way into the ground water and the nallahs leading to river Ganga.

[14] Source: Study on Water Quality Management Plan for Ganga river in the Republic of India, Volume I summary, JICA, NRCD, MoEF, July 2005

A high percentage of waste generated in the city comprises of recyclable plastics and compostable religious and domestic waste, which at present is either dumped into the landfill or in the river.

c) Sewerage

Only 30% of the city is connected to a sewerage network. (mainly along the old city). Inspite of the three STPs constructed in Varanasi under the GAP (STP at Dinapur – 80 MLD, STP at Bhagwanpur – 8 MLD and STP at DLW – 12 MLD), only around 90MLD of the total wastewater generated is treated. The rest finds its way into the Ganga River either through river Varuna (after it is given primary treatment at Konia) or directly through open drains discharging into the river.

Since, the existing sewer network serves as a storm water cum sewerage network, the capacity of the STPs is reduced, especially during monsoons and this inturn leads to extensive pollution of River Ganga.

GAP has proposed a Sewerage Management plan for Varanasi, which proposes phase wise construction of STPs to intercept untreated sewage entering the river. This scheme, if implemented, would considerably bring down the pollution load on the river.

d) Drainage

The city has an intensive network of open drains which act as outlets for waste water discharge and solid waste dumping. Since most of these drains are unlined, they lead to ground water contamination. Siltation and blocking of drains due to solid waste disposal is leading to unhygienic conditions.

e) Ground Water Resources

The water supply to the city is heavily dependant on ground water, especially for the trans Varuna area and institutional areas leading to depletion of water table. Contamination of water table due to discharges from open drains, nallahs and waste dumps is a major cause of concern.

f) Open Spaces

The city lacks formal open spaces under recreational or green spaces. The proposed Master Plan provision for green areas is only 5.49%[15] of the total area. There is a need for provision of more green areas in the city, especially in the Trans Varuna Region. Extensive roadside plantation programs also need to be undertaken to maintain the ecological balance of the city.

[15] *Source: Master plan for Varanasi, 2011*

g) Slums

The city has 227 slums, which are mainly concentrated on the Cis Varuna side and need provision of proper infrastructural facilities and in-situ upliftment.

h) Industries

Varanasi does not have a major industrial base. Most of the small-scale industries in Varanasi have installed combined ETPs and DLW, which is the largest industry in the city, has its own STP and chemical treatment plant. Thus, the industrial waste generation in the city is negligible (only 2.2%) 16.

The handloom industry deploys coal fired boilers to generate steam leading to intensive point source air pollution but due to efforts made by the SPCB, these industries have reverted to the use of air pollution control mechanisms to bring down the pollution levels.

i) Tourism

The tourism in Varanasi is mostly religious. The high tourist influx to the city has put a tremendous pressure on the existing infrastructure facilities in the city leading to unhygienic conditions.

14.2 Water Resources

a River Ganga

Varanasi lies on the banks of the sacred River Ganga. The river, though the lifeline of the city also has to face the brunt of city's pollution. NRCD (National River Conservation Directorate) studies under GAP (Ganga Action Plan) have revealed that a major contributor to the pollution load on Ganga is untreated sewage (90%), which is discharged into the river from the open drains of the city.

Location of Varanasi on Ganga stretch

As per CPCB studies, the desirable designated best use for Varanasi is B (outdoor bathing) but contrary to this, the existing designated best use at Assighat (upstream) and Malviya Bridge (downstream) is D (fit for wildlife and fisheries) due to high levels of total Coliform at Assighat and high BOD levels at Malviya bridge. ***Table 39*** shows the quality of water of river Ganga in Varanasi compared to standards

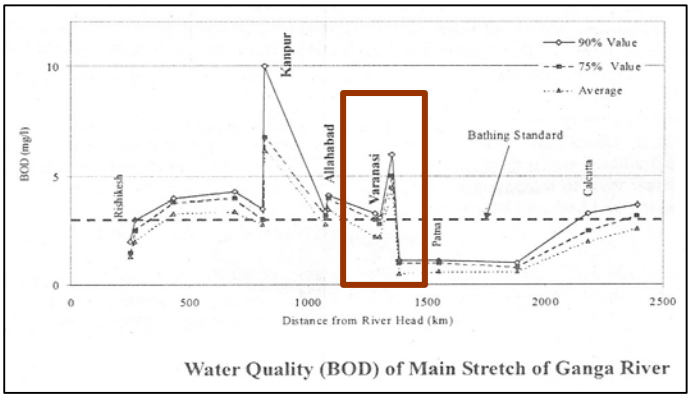
[16] UPPCB

Table 39: Water quality of river Ganga in Varanasi

	Temperature (deg. C)	PH	BOD (mg/l)	Faecal Coliform (/100ml)	D.O. (mg/l)
Up Stream	27	7.4	2.8	9340	8.8
Down Stream	28	8.5	16.3	106300	7.3
Standards	27	6.5 to 8.5	3	500	5

Source: CPCB, 2003

Religious activities like cremation, bathing, etc. performed on the banks of the river contribute to the BOD and Coliform load on the river. The faecal Coliform load at the downstream end of the city have been recorded as 1.5 million/100 ml. Even the average BOD load at Varanasi exceeds the permissible bathing quality standards of 3 mg/l and is at times as high as 16mg/l.



Source: Study on Water Quality Management Plan for Ganga river in the Republic of India, Volume I summary, JICA, NRCD, MoEF, July 2005

The Ghats of the river are exposed to the load of religious offerings and activities associated with the river, namely, offerings of flowers and diyas, bathing, washing, cremation, etc. These activities add to the waste content in the river, which requires regular cleaning.

b) **Varuna and Assi**

Wastewater discharge into the two major tributaries of Ganga in Varanasi, i.e. River Varuna and Assi nallah are steeply increasing. So much so, that over the past decade, Assi has been converted into a Nallah. The open drains carrying the grey water from the city also open up in these rivers. The quantum of solid waste discharged into these rivers/ nallahs on a daily basis nears approximately 10 tonnes/day thereby polluting them further and leading to choking of flow. The upcoming developments in the north and south of the city close to river Varuna and Assi nallah are insensitive to the catchment area of the water bodies.

c) **Kunds**

The city also has several shallow ponds/ Kunds, some of which are of religious significance. But most of these ponds are in a state of poor maintenance and face the threat of drying up or reclamation due to upcoming settlements in the periphery.

14.3 Air Pollution

As per CPCB report, air pollution levels in the city are high and significant concentrations can be witnessed at major traffic intersections during peak hours. The major contributor to air pollution in the city is vehicular emissions from petrol and diesel vehicles which contribute to high Carbon Monoxide, Sulphur dioxide and

Nitrogen dioxide levels. Suspended Particulate Matter (SPM) levels in the residential areas of Varanasi are high. High SPM levels in the city can be attributed to vehicular emissions, unpaved roads, high dust content in the air due to lack of plantation and proximity to river.

The low traffic movement speed in the old city area leads to discharge of harmful fumes from the vehicles leading to concentrated pollution loads. The compact built fabric of the city and narrow lanes lead to limited air circulations, thereby, acting as a hindrance to the dispersal of pollution load. Frequent power cuts in the city have propagated the use of diesel gensets, especially in the old city area, which add to air and noise pollution levels. Industrial pollution levels in the city are insignificant.

UPPCB study also shows that diesel powered vehicles are the most polluting vehicles in the city. Thus, there is a need to check the number of diesel autos and four wheelers plying in Varanasi. Vehicular emission loads in Varanasi are as shown in ***Table 40***

Table 40: Vehicular emission load in Varanasi

	Particulates (kg/day)	SOx (kg/day)	NOx (kg/day)	Hydrocarbon (kg/day)	CO (kg/day)
Light duty gasoline powered	12.04	3.24	62.01	87.29	2269.43
Light duty diesel powered	84.66	335.11	388.02	91.71	1534.47
Heavy duty diesel powered	485.44	970.88	13592.25	1359.22	8220.08
Motorcycles	216.48	21.65	75.20	10823.94	18400.71
Total load/day	**798.62**	**1330.88**	**14117.48**	**12362.16**	**30424.69**

Source: UPPCB

Coal is the most critical fuel used in Varanasi from the perspective of environmental pollution followed by Kerosene. The high CO emissions can be attributed to the use of coal in roadside commercial activities and ghats. Emissions from fuels in Varanasi are as shown in ***Table 41***

Table 41: Emissions from fuels in Varanasi (Kg/day)

Domestic and commercial emission sources	Emission rate (kg/day)				
Type of fuel	Consumption/day	PM	SOx	NOx	CO
Coal	30 T	150	228	45	1342
Kerosene	50 KL	101	170	78	10
LPG	125 T	54	0.07	225	54

Source: UPPCB

14.4 Noise pollution

The noise pollution levels are perceivably high at major traffic intersections namely, core area, Chauka Ghat, Andhra Pul and the Railway Station. The high number of diesel autos and cycle rickshaws leading to traffic congestion contribute to city's noise pollution.

The noise pollution levels in the city are also perceivable higher even outside the core city area. The major factors contributing to this are the heavy traffic volume on the

narrow roads leading to persistent honking and the high intensity of commercial activities on the roads.

14.5 Key Issues

- Pollution load on Ganga river due to untreated waste discharge and religious activities associated with the river
- Encroachment on the Catchment areas of Varuna and Assi and their tributaries reducing the runoff to the rivers
- Solid waste and wastewater discharge into water bodies. Lack of maintenance of ponds, which face the threat of extinction and encroachments.
- Lack of facilities on the ghats to reduce the pollution load on the river.
- Ground water depletion due to extraction of ground water through tube wells and hand pumps to supply water to the trans Varuna areas and institutional areas.
- Lack of plantation and open spaces, especially in the old city
- High SPM levels due to vehicular emissions, unpaved roads, proximity to the river and lack of plantation in inner city areas
- High CO, NOx and SOx levels at main intersections namely, Railway station, Chauka Ghat and Andhra Pul
- High number of diesel autos plying the roads not only lead to traffic congestions but also to high SOx and Nox levels.
- Lack of air quality monitoring stations.
- Concentration of commercial activity and heavy traffic intensity on the roads
- Unorganized religious and tourist traffic to the ghats
- Lack of noise buffers.

15 Urban Governance and Institutional Framework

15.1 Introduction

There is a large number of institutions in Varanasi responsible for urban development and service delivery. This section examines the key institutions responsible for service delivery in terms of their organisational structure and functions and concludes with highlighting the key governance issues that need to be addressed for smooth implementation of the CDP.

15.2 Institutions for Urban Governance and Service Delivery

Urban development and service delivery in Varanasi is the combined responsibility of a set of state level and city level institutions. These institutions and their key functions are listed in **Table 42** segregated in terms of institutions functioning at the state level and city level.

Table 42: Institutions and Their Functions

Institution	*Key Function*
State Level	
UP Pollution Control Board (UPPCB)	Pollution control and monitoring especially river water quality and regulating industries
Public Works Department (PWD)	Construction of roads main roads and transport infrastructure including construction and maintenance of Government houses and Institutions
State Urban Development Authority (SUDA)	Apex policy-making and monitoring agency for the urban areas of the state. Responsible for providing overall guidance to the District Urban Development Authority (DUDA) for implementation of community development programs
Town and Country Planning Department (TCPD)	Preparation of Master Plans including infrastructure for the state (rural and urban)
UP Jal Nigam (JN)	Water supply and sewerage including design & construction of water supply, sewerage networks and treatment plants. In the last two decades 'pollution control of rivers' has become one of their primary focus areas
UP Avas Vikas Parishad (AVP)	Nodal agency for housing in the state. Additionally involved in planning, designing, construction and development of almost all types of urban development projects in the state. Autonomous body generating its own resources through loans from financial institutions
City Level	
Varanasi Jal Sansthan (JS)	Nodal agency for water supply in the city. Key functions include O&M of water supply and sewerage assets. JS proposes tariffs and collects revenues – however, tariffs need to be approved by the UP Jal Nigam and the State Government)
Varanasi Municipal Corporation (MCV)	Nodal agency for municipal service delivery and O&M. Its key functions include:

	• Primary Collection of Solid Waste • Maintenance of Storm Water Drains • Maintenance of internal roads • Allotment of Trade Licenses under the Prevention of Food Adulteration Act • Collection of Property tax • O&M of internal sewers and community toilets • Management of ghats • Construction of Community Toilets
Varanasi Development Authority (VDA)	Responsible for preparing spatial Master Plans for land use and development of new areas as well as provision of housing and necessary infrastructure
District Urban Development Authority (DUDA)	Implementing agency for plans prepared by SUDA. Responsible for the field work relating to community development – focussing on the development of slum communities, construction of community toilets, assistance in construction of individual household latrines, awareness generation etc.

15.3 Institutional Roles and Responsibilities

15.3.1 Municipal Corporation of Varanasi

Clarity of roles and responsibilities of institutions is a pre-requisite for good governance. This clarity is conducive for role separation that in turn is an enabling factor for a host of good governance practices like accountability, transparency etc – factors that lead to efficiency in service provision as well as efficiencies in institutions. As an introduction to examining issues of governance in Varanasi, the following **Table 43** identifies the roles and responsibilities of the various institutions in terms of planning, implementation and maintenance.

Table 43: Roles and Responsibilities of Various Institutions

Function	Planning & Design	Implementation	Maintenance
Land Use/ Master Plan/ Building Permission	VDA	VDA, MCV	VDA, MCV
Water Supply	JN	JN, JS	JS
Sewerage	JN	JN, JS	JN, JS
Roads and Transportation	AVP, VDA, TCPD, PWD, MCV	AVP, VDA, TCPD, PWD, MCV	AVP, VDA, TCPD, PWD, MCV
Street Lighting	VDA, AVP, MCV, PWD,	VDA, AVP, MCV, PWD,	AVP, VDA, TCPD, PWD, MCV
Drainage	VDA, JN, JS, MCV, AVP	VDA, JN, JS, MCV	AVP, VDA, TCPD, PWD, MCV
Solid Waste Management	MCV	AVP, VDA, TCPD, PWD, MCV	AVP, VDA, TCPD, PWD, MCV
Parks and Green Spaces	VDA, AVP, MCV, PWD,	AVP, VDA, TCPD, PWD, MCV	AVP, VDA, TCPD, PWD, MCV

Pollution Control	UPPCB	UPPCB, UPJN, JS, MCV	PCB, JN, JS, MCV
Slum Development	SUDA, DUDA	JS, JN, PWD, MCV	JS, JN, PWD, MCV
Community roads, toilets, water-supply	SUDA, DUDA, MCV, JS	JS, JN, PWD, MCV	JS, JN, PWD, MCV
Heritage Conservation	ASI	ASI	ASI

It may be noted that there are functional overlaps between institutions in the realm of functions that have been transferred to the local government under the 74th CAA.

VDA is actively involved in the development of residential colonies and also provides the infrastructure in these colonies as well as environmental services like construction of parks etc. The functions of the VDA include –

- Preparation of Master Plan and Zonal Development Plans for the city;
- Maintenance and improvement façade of certain buildings and abutting arterial roads;
- Acquisition, disposal and development of land;
- Construction of Housing (units/ colonies) to meet the housing demand of the growing population;
- Provision of infrastructure facilities (roads, sewers, water supply) as per the population needs; and
- Provision of bus stands outside the dense city pockets for proper transport infrastructure.

The VDA does not have a separate cell for handling complaints. All complaints have to be addressed to either the Joint Secretary or Secretary. Most of the complaints that VDA receives pertain to roads, water supply, street light maintenance etc. The VDA maintains an Asset Register and follows a system of double entry accounting.

15.3.2 Jal Sansthan

Jal Sansthan is responsible for O&M of water supply and sewerage systems installed and transferred to it by JN and other state level organisations like DUDA, VDA etc. Although the JS is legally a part of the MCV since 2002, in practice, the two organisations (MCV and JS) still operate independently and are technically separate entities. JS maintains independent accounts and has a separate revenue collection unit.

The water supply wing is well developed with separate administration, finance, planning and construction, operation and maintenance divisions. However, for sewerage services, such a structure does not exist and this function is considered to be a minor function for most water supply engineers. The organisation has been engaged in sewerage management for quite a number of years and therefore has the technical capabilities and manpower to plan, develop and maintain such facilities. The infrastructure and equipment available with the organisation are quite old and not much addition of equipment has taken place during last few years.

JS regularly conducts media campaigns on storage practices and water pollution. It also has a 24-hour complaint cell that registers people's grievances.

Water Tax and water charge form the major source of revenue for JS contributing to approximately 85% of its total revenue. In the absence of water metering, the tax is assessed as percentage of the annual rental value of residents' property. One of the major issues has been the problem in assessment of annual rental value and 5-yearly reassessment, which has not been practiced by MCV. This is leading to low revenue for the JS, whose charges are a fixed percentage of property tax. Further, increase or revision of tax rates is not taking place, mostly due to political reasons. Due to insufficient revenues JS ends up with non-payment of electricity bills at times.

The current maintenance practices are reactive rather than preventive and routine as per manual. Most of the maintenance is carried out in response to customer complaints related to overflows etc. These problems are normally resolved by clearance of blockages in sewers, pipeline repairs against leakages etc. There is no evidence of a planned regime of cleaning or inspection of the system.

15.3.3 Jal Nigam

JN is a State Government organisation responsible for the management of water supply, sewerage and sewage treatment facilities. The main fixed assets of JN are the water works including own scheme's hand pumps. The sewage treatment works created under Ganga Action Plan are operated and maintained by JN. As per the UP Water Supply and Sewerage Act, 1975 the key functions of JN are –

- Preparation, execution, financing and promotion of schemes of water supply and sewerage and sewage disposal;
- To render necessary services in regards to water supply and sewerage to state government and ULB's and on request to private institutions;
- To prepare state plans for water supply, sewerage and drainage;
- To review and advise of tariff, taxes and charges on water supply;
- To access material requirements and arrange for their procurement;
- To establish state standards for water supply and sewerage services;
- To review annually the technical, financial, economic and other aspects of water supply and sewerage system of JS and ULB;
- To operate, run and maintain any waterworks and sewerage system on request by the state government;
- To access requirements of manpower and training in relation to water supply and sewerage services in the state; and
- To carry out applies research for efficient discharge of functions of MCV or JS.

The Board of Directors at JN comprises of the Chairman (JN), Managing Director (JN), Finance Director (JN) as the permanent members. The nominated members on the board include the State Principal Secretary for Urban Development, State Principal Secretary for Planning, State Principal Secretary for Finance, State Principal Secretary for Rural Development, Director (Health and Medical) and Director (Local bodies). Other invitees are the Principal Secretary Public Enterprises Bureau and Secretary Water supply (Uttaranchal Government).

Current functioning of the JN displays a 'reactive' approach rather than a 'preventive' one. The JN has a Human Resource Development Cell that is in charge of specific public participation programmes. They conduct programmes for creating awareness regarding water conservation etc. and also conduct training programmes for capacity building of JN staff to undertake community participation related activities in their programmes. There is no separate complaint cell at JN. The Executive Engineer receives the complaints and forwards it to the respective department.

15.3.4 Town and Country Planning Department

Varanasi has a divisional office of the State TCPD. This office is responsible for the provision of various services in the city and is headed by the Commissioner. VDA and TCPD perform similar functions and the commissioner decides as to which of these department shall take up an assigned task. The Chief Town & Country Planner is the technical head next to the Commissioner.

15.3.5 Public Works Department

The State PWD is primarily responsible for construction and maintenance of roads, state government institutions and state government housing in the city. The CPWD is responsible for the construction and maintenance of only central government buildings and institutions.

PWD operates under the State PWD Minister and State-level Secretary and Principle Secretary. At the district level the Superintending Engineer heads either one or two districts. There is one Executive Engineers (Ex En) for every 3 to 4 election constituencies. The total administrative and technical staff up to the Junior Engineer level is around 250 followed by a fleet of 3000 workers and sub-staff in the entire state.

The PWD is responsible for the maintenance of the main city roads with the MCV responsible for the internal roads. There are no criteria for categorising the roads to be maintained by PWD or MCV. The DM assigns the responsibility to either of the departments based on the primacy of the road stretch. PWD has a better reputation over MCV in road maintenance.

PWD maintains a complaint cell. People usually post their complaints to the executive Engineer of their area, who forwards these complaints to the cell, from where they are passed on to the Assistant or Junior Engineer. PWD faces work overloads during the Kumbh festival on account of a large number of complaints received. This indicates lack of a pro-active maintenance strategy.

15.3.6 Uttar Pradesh Awas Vikas Parishad

The UP Awas Vikas Parishad (AVP) is the nodal agency for housing in the state. It was established in April 1966 to work towards housing solutions. Besides housing projects it has diversified its activities to planning, designing, construction and development of almost all types of urban development projects through out the state. In addition, AVP plans and executes projects for the development of health and education. It is also handling new district head quarters projects with the execution of

large number of schemes. AVP has constructed multi storied office buildings and commercial towers for its own and public use. Providing public facilities is also a priority function of AVP. It develops market areas and convenient shopping. AVP also indulges into housing for the shelter-less .It has constructed 8480 dwelling units under 'Aashraya Yojana' at different places.

The AVP is an autonomous and raises its own resources. With a budgetary turnover of about Rs. 3463 millions for year 2000-01, AVP has a very strong finance base. AVP has notified 137 cities for its activities in the state. It has acquired 13500 acres of land in 78 cities where housing schemes are being developed and Varanasi is one such city.

AVP is a professionally managed organization with specialists working in different fields viz – Architecture, Town Planning, Construction Technology, Infrastructure Design, Execution and Maintenance, Estate and Financial Management etc. The AVP has an Engineering, and Architecture & Planning wing.

There are specific rules and regulations for all activities undertaken by the AVP board. All rules and regulations of the board are made public through Gazette notifications. To look into the difficulties of the allottees and landowners etc. a public Redressal systems known as 'Parishad Bandhu' is operating in Board since 1997. There is a face-to-face hearing and spot decision. This helps in prompt public redressal.

15.3.7 State Urban Development Agency

The institutional responsibility for slum improvement vests with the SUDA that operates through a network of the District Urban Development Authorities (DUDA). SUDA executes various government schemes for urban renewal like – Balmiki Ambedkar Awas Yojana, Integrated Urban Slum Sewerage Plan, National Slum Development Program, and Golden Jubilee Urban Employment Scheme etc.

The State Secretary for Urban Employment and Poverty Alleviation is appointed as Chairman SUDA and is responsible for the acceptance and approval of all the schemes being implemented by SUDA. Other members in SUDA are Secretaries for Health, Education, Urban Development, Housing, Youth-development and Social Development. SUDA operates through a series of community structures like –

- Community Development Societies (CDSs) – (1350 in the state)
- Neighbourhood Committees (NHCs) – (10009 in the state)
- Neighbourhood Groups (NHGs) – (100963 in the state)

SUDA executes all its programs using beneficiaries for prioritization of needs and execution of schemes.

15.3.8 District Urban Development Agency

DUDA has been constituted for effective execution of the SUDA undertakings in all the districts of the state. DUDA members include the DM or Chairman DUA, Municipal Commissioner as Vice Chairman DUDA and other district level officers. It is primarily responsible for works relating to community development, in the

respective districts of the state, which includes development of slum communities, construction of community toilets, assistance in construction of household latrines, creation of awareness etc. They also work for provision of sewers, tube-wells etc in slum localities. The assets thus created are finally handed over to JS for maintenance purpose. DUDA has also taken up a series of activities for infrastructure improvement in slums.

DUDA coordinates with CDSs for community participation in various initiatives undertaken by DUDS in these communities.

15.4 Overlapping of Roles & Accountability

Within the MCV at the departmental level, there are functional overlaps; for example, both PWD and the Street Lighting departments are undertaking the construction and maintenance of streetlights and municipal properties; MCV as well as PWD clean drains; etc. These overlaps cost the MCV in terms of revenues as well as manpower and are often subject to problem arising from a lack of coordination – a situation that is not conducive to institutional efficiency.

The MCV faces a shortage of sanitation staff. The Public Health Department is responsible for cleanliness in several wards. The numbers of sweepers available in the MCV and the PHE are way below the standards set in the Government Health Manual. The key issue is to decide on the trade-offs between hiring full time staff versus outsourcing. The latter will mean that the liabilities of the MCV will be reduced but, experience of similar attempts in other municipalities have shown that outsourcing is difficult to implement both because of the legal aspects involved as well as the opposition from existing staff. While this is difficult to implement, the long term advantages of outsourcing definitely outweigh the initial teething troubles.

Despite the very large size of the MCV, all functions are performed out of the main office of the MCV. There is no decentralization in either the Execution or Elected Wings and therefore no Zonal Offices or Ward Committees. This centralized approach is not very amenable to efficient working.

The MCV has set up three cells to handle customer complaints. All complaints have to be made either in person or through regular post since the MCV does not have a system of online grievance handling. The length of time for registering complaints and their resolution is therefore quite long and could be a deterrent for customers.

Quite like the other development authorities, the VDA functions as the 'Developer to the Government'. Functional overlaps are seen between the VDA and the TCPD with both being responsible for spatial planning. Functional overlaps are also seen in the implementation and maintenance functions that are performed by both the VDA and the MCV. As a parastatal, the VDA is supposed to hand over sectors that have already been devolved to the MCV for service provision and in order to ensure that levels of service are satisfactory, it needs to take the MCV into confidence while developing sectors. There is a possibility that sectors be developed in places where infrastructure is deficient.

The VDA is focusing on developing the outlying areas since the inner areas of the city are already developed. While planned development is taking place there is a high possibility that this is encouraging unplanned growth with unauthorised colonies coming up through the conversion of designated agricultural land to residential use.

JS's cost recovery through user charges is inadequate compared to the cost of service delivery because of poor billing systems and low user charges. JS has poor coordination with the MCV and because of this, functional inefficiencies arise. JS is unable to rationalize user charges because of its lack of power in this connection. Levels of accountability in the JN are low because it is a state department.

This lack of accountability arises from a lack of role separation since the JN is responsible for both policy making for the sector as well as implementation of the policy – therefore regulation is non existent. Being a state department, its functioning is also subject to a high degree of political interference. Dependence on state budgets means that there are limited resources available for capital investment for preventive maintenance and its functioning is therefore more reactive.

The absence of criteria for classification of roads to be maintained by the MCV and the PWD is not an enabling framework for efficient functioning by either agency. As a corollary to the above, neither agency (MCV/ PWD) is able to plan its work in advance leading to a reactive mode of functioning.

The functions of the AVP, the VDA and the MCV are similar. All the three agencies are involved in planning and development of land for residential and commercial purposes. The linkage of these agencies with the TCPD is also indicative of overlaps.

15.5 System Deficiencies

Few prominent system deficiencies in ULBs/ parastatals are listed as follows:

- MCV and JS are public service organisations but they work in isolation and do not interact much with public or call for their opinion in operational matters and development issues;
- All the organisations are primarily conducting breakdown maintenance work. Routine and preventive maintenance seems to be lacking;
- Most of these institutions spend 30-40% of their expenditure on manpower at worker level. Several activities of MCV and JS are similar and carried out separately;
- There are issues related to transfer and O&M of the assets created previously;
- As a check against depleting ground water table, JS has submitted a proposal of imposing a tax on boring in the city. However, the authorities have not taken any further action on this;
- Most of the institutions do not have proper asset records and no efforts have been initiated so far for asset inventory;
- MCV does not have zonal offices and Ward Committees have not been constituted so far;
- Most of the institutions including VDA and MCV do not have any website. These organisations still depend a lot on paper work in the absence of computerisation and e-governance; and
- MCV is short of sanitation staff. Lack of manpower for sanitation services is leading to ineffective sanitation and solid waste facilities in the city.

15.6 Key Issues

Issues that need be attended to with regard to better and effective urban governance are –

- MCV collects Property Tax and JS collects Water Tax, Water Charge and Sewer Tax from the residents. Tax Collectors of both the departments visit the same household separately and the tax payer has to visit two different offices for payments or complaint redressal;
- VDA collects development charges for plot development whereas all infrastructure/ services are provided and maintained by MCV and JS;
- VDA uses JS water supply for housing development. An amount fixed up as certain percentage of cost of construction is paid by VDA to JS for this service. However, this payment often gets delayed adding to the financial problems of JS
- MCV shows several interdepartmental overlaps. These overlaps in the absence of co-ordination can lead to inefficient service delivery; and
- Inter-institutional overlaps are common between VDA and TCPD, JS and MCV, JN and JS, PWD and MCV, DUDA and JS etc.

16 Financial Profile and Credit Worthiness

16.1 Existing Practices

There is an increased role of urban government/ governance with increase in urban population. With advancement in science and technology, man's concept of minimum amenities for acceptable living conditions has undergone changes. It has now become utmost important to provide quality services to the urban dwellers in order to increase the competitiveness in the city and attract investment on a continuous basis. The municipal corporation, to estimate the affordability of capital investment and debt servicing, has not properly appreciated the importance and benefits of better financial planning.

The existing budgeting practices of MCV involved planning and budget estimates preparation of the forthcoming year only, which is shortsighted approach. The revenue and expenditure are generally estimated on *ad hoc* basis from the previous year expenditure. This previous year expenditure is also not analyzed in great detail i.e. trend analysis, to understand the factors influencing the revenue and expenditure, to rationally estimate the future trends of these major items.

MCV like any other municipal corporation of India is not able to recover the cost of service rendered by it. There is big resource gap for performing the basic core functions like public health, sanitation, and waste management. In order to bridge the gap all the three tiers of the Government have to cooperate and work in this direction.

JNURM Mission is one of the initiatives by the Central Government for enhancing the service levels of ULB in the different cities of India by establishing a vision of the city and d then plan for revenue and expenditure of future years.

MCV maintains records on single entry cash based system of accounting. The output of this cash basis of accounting is a Statement of Receipts and Payments that classifies cash receipts and cash payments under different heads. A statement of assets and liabilities is not prepared.

The cash basis of accounting fails to meet most of the financial reporting objectives. It is due to the reason that the timing of cash payments and cash receipts does not coincide with the earning of revenues or expenses. Further more, making small change in the timing of cash receipts or payments can change measures of performance based on cash basis of accounting. For example postponing the payment of certain bills by a few days can conceal a budgetary deficit. Also under Cash basis of accounting no distinction is made between the expenditure on construction of roads, water sewerage system and bridges and expenditure on routine items such as salaries, rents etc. The limitation of cash basis of accounting for proper measurement of performance and financial position has led to the adoption of accrual basis of accounting in the Government organizations.

For better financial management of any organization, information of overall financial position of the entity and current assets and liabilities and changes in financial position is necessary prerequisite.

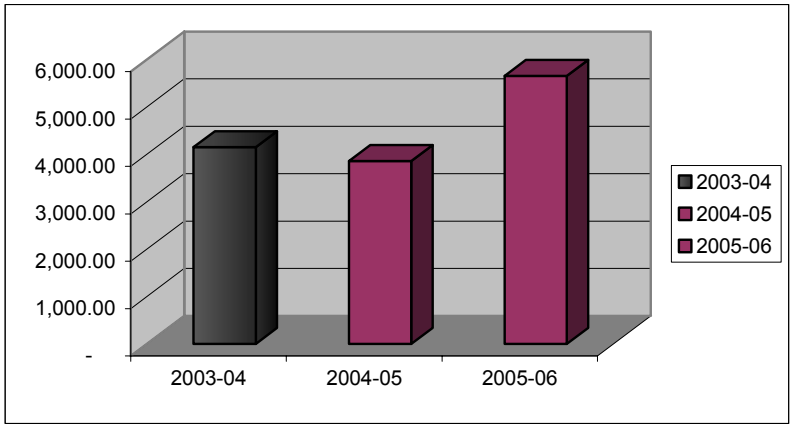
The Corporation accounts of receipts and expenditure shall be maintained in such a manner as prescribed as per section 142 of Municipal *Adhiniyam* Act 1959. There is no mandatory provision for the maintenance of accounts on double entry accrual based system of accounting as per Municipal Act. Recently great development has taken place in all over the country in this regard. UP Government has issued an order for switching over the accounts from single entry to Double entry accrual based system.

16.2 Finances of MCV

Since the fiscal decentralization is in the early process of devolution in Uttar Pradesh, MCV is facing the problems of poor financial status, absence of regular maintenance and high operating cost. Lack of capacity and capability of MCV to mobilize the resources due to undue pressure by the elected body would result in low investment for creation of new infrastructure.

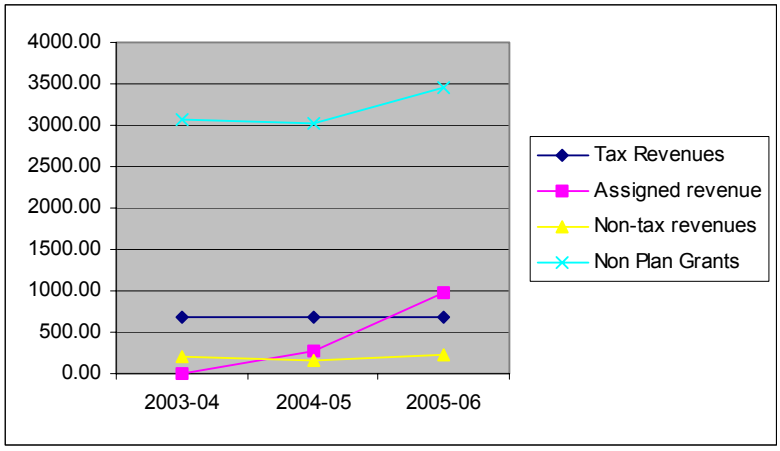
Revenues of MCV primarily comprises the revenues from the Governmental transfers in the form of grants and revenue from own sources in the form of tax and non-tax revenues. Capital receipts (*Annex II*) consist of loan from the government and revenues earned from sale of land and grants received on account of MP and MLA funds.

Figure 16: Trend in Revenue Receipts



There is no increase in own revenue sources of MCV in the last three years not in terms of tax revenues and non-tax revenues. Government is also not able to help the municipal corporation in the last years. Increase in assigned revenues in terms of stamp duty on transfer of properties is also not significant that in the year 2003-04 MCV is not able to get its share in transfer duty. MCV is providing all the major services to the urban citizens with a maximum coverage of area in the city. But due to specific rule in the U.P. this share in transfer duty is one third out of total percent which is very less if we want to link the revenue with the related service expenditure. Out of total revenues of MCV grants from the government is 64.07% and balance 36% is from tax and non-tax revenues. Further MCV is not able to revise its tax rates from the year 1976, which is acting as main negative factor for the performance of MCV.

Figure 17: Composition of Revenue Receipts



The revenue expenditure comprises salary expenditure and non-salary expenditures comprising expenses on service provision by MCV (*Annex III*). Capital expenditure consists of repayment of loans. Establishment costs and normal maintenance expenses can be met out of owned revenue sources of MCV. The most attending point is that establish costs or the salary expenditures constitutes 66% of total expenditure of the corporation.

Figure 18: Trend in Revenue Expenditure

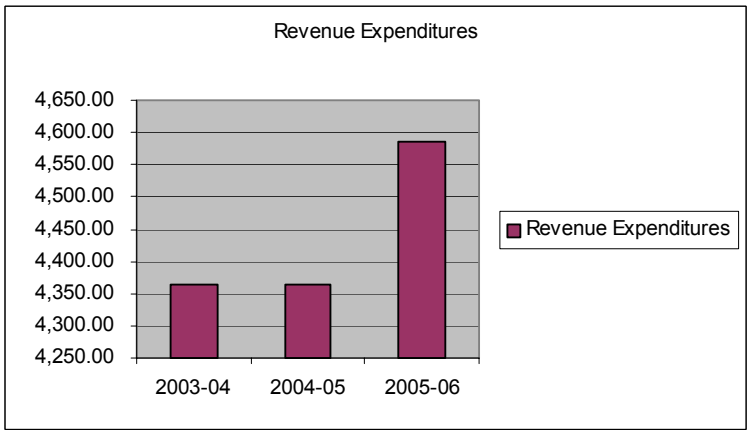
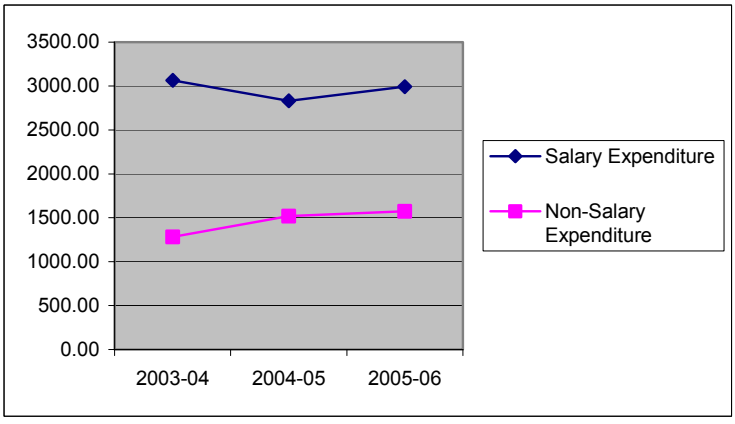
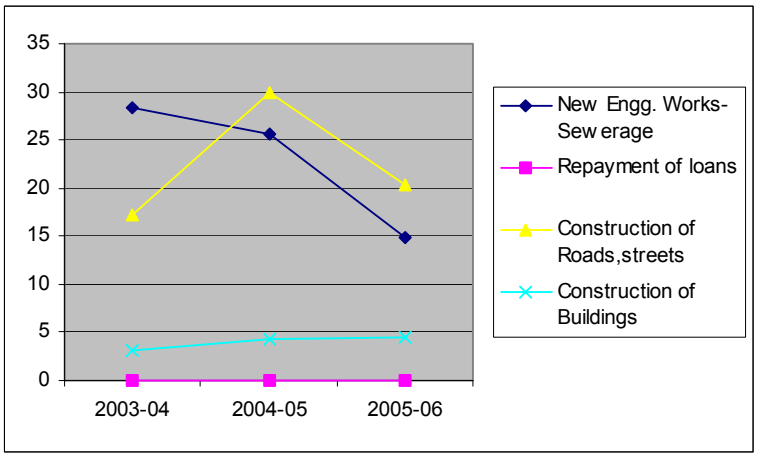


Figure 19: Composition of Revenue Expenditure



Capital Expenditure in terms of addition in the assets is negligible in MCV. It consists of repayment of loans also which is also nil since it is loan on revolving fund from the government on which no interest is required to paid to the government

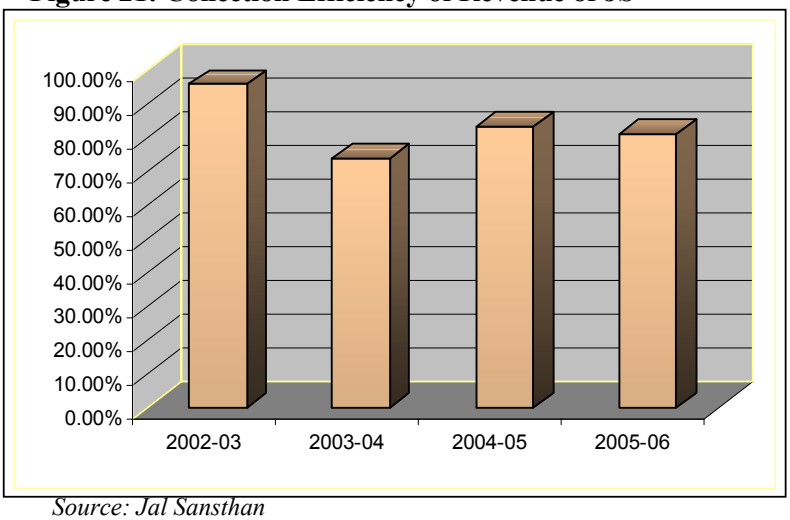
Figure 20: Composition of Revenue Expenditure of MCV



16.3 Finances for Water Supply and Sewerage

Water Tax and Water Charge form the major source of revenue for Jal Sansthan contributing to about more than 90% of the revenue in 2005-06. Sewer tax and charges form the major part of the remaining revenue contributing to around 9% of the total revenue. In the absence of water metering, both taxes are assessed on percentages of the annual rental value of residents' property. One of the major issues has been the problem in assessment of annual rental value and 5-yearly re-assessment, which has not been practiced by MCV. This is leading to low revenue for the Jal Sansthan, whose charges are a fixed percentage of property tax. Further, they are also not allowed to increase the rates, mostly due to political pressure from the year 1976. There is decrease in collection efficiency percentage of revenue from 2003-04 to 2005-06 (*Annex IV*).

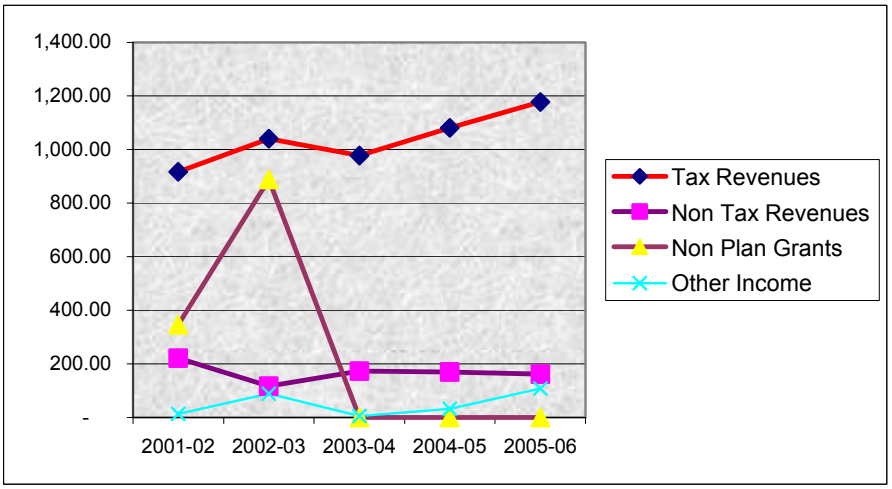
Figure 21: Collection Efficiency of Revenue of JS



Source: Jal Sansthan

There is no significant increase in revenues of Jal Sansthan in recent years.

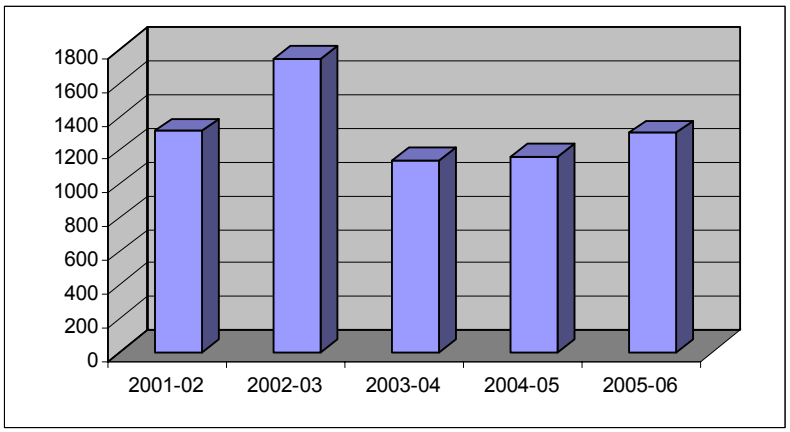
Figure 22: Trend in Collection Efficiency of JS



Source: Jal Sansthan, 2006

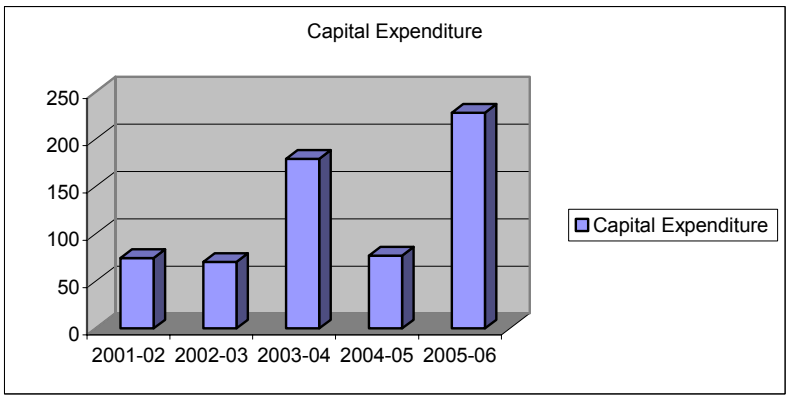
The major expenditure heads of VJS are establishment and electricity charges accounting for an average of 46% and 32% of the total expenditure in 2003-04. Due to insufficient revenues VJS ends up with non-payment of electricity bills, which are finally paid by the UP State Government. Up to 2003-04 for paying electricity dues the state government has given the grant to the JS to pay off its liabilities. After that liability for electricity expenditure is continuously standing in the books of VJS. Since no grants have been received for paying off that liabilities it has not been reflected as payment in those years (*Annex V*).

Figure 23: Trend in Revenue Receipts of JS



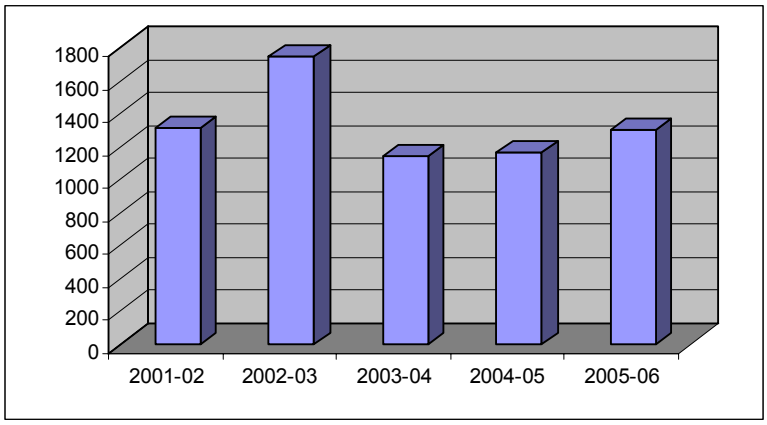
Source: Jal Sansthan

Figure 24: Trend in Capital Expenditure of JS



Source: Jal Sansthan

Figure 25: Trend in Revenue Expenditure of JS



Source: Jal Sansthan

16.4 Key Issues

- Financial reforms – mandatory and optional
- Double entry system
- Property tax collection reforms
- Public private participation

17 Basic Services for Urban Poor

17.1 Introduction

This section deals with the general characteristics of slums and urban poor in Varanasi and their access to basic services drawing from secondary information and interactions with stakeholders. The aim is to identify the gaps in service delivery to poor in Varanasi and arrive at key issues for which strategies will be suggested that would enable the Varanasi Municipal Corporation to address the issues and fulfill the mandate of provision of basic services to urban poor.

Census definition of Slum

Slums as defined in Census of India, is a compact area of at least 300 population or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities.

With the increase in population of the city, housing needs of the city also grew, which could not be met out by the formal housing market. Migrating population, which could not avail the facilities of formal housing market, satisfied their needs by occupying vacant land and this has resulted in formation of slums. Another factor, which contribute in the formation of slums, is proximity to work place and low level of income and un-affordability of pucca houses.

Some of the factors which have contributed to the development of slums in Varanasi are as mentioned below:

- Migration of people especially from Eastern State of India in search of job to the city.
- Availability of cheap living alternatives as most of the people stays outside the temples where they get food from the offerings of the pilgrim tourists
- Another major reason for migration is due to flourishing nursing colleges and demand of health facilities in the city.

Slums in the city are a very significant problem as they put more pressure on the existing facilities and covers large part of the city. The following sections deal with the overview of slums in Varanasi, their characteristics and spatial distribution in the city. Also the assessment of present infrastructure along with identification of gaps in the slums is done for analyzing the future requirements.

17.2 Slums of Varanasi

Varanasi has 227 slums spread all over the city, either on government or private lands. Total population in slums is about 453,222, which is about 37.69% of the total population. These 227 slums have formulated 21 Community Development Centres (CDC), which are responsible for the overall development of the slums along with Slum Urban Development Authority (SUDA). Population in the slums varies from 200 to almost 9,000 people with varied densities. Rapid growth of slums in Varanasi has put a lot of pressure on the existing land resources and infrastructure and has led to deterioration of its physical environment.

Majority of slums have very poor water supply and sanitation facilities; most are either un-sewered or partially sewered, with disposal of household wastewater and solid wastes taking place directly into open nallas. This phenomenon has adversely affected drainage system in these areas and led to water logging in different areas. The poor environmental conditions within the slum areas have adversely affected the health of the residents. Financial constraints on the part of civic authorities and un-authorized nature of the slums have also contributed to non-delivery or partial delivery of basic amenities.

The slum population in the city accounts for about 37.69% of the city population and some of the factors, which are responsible for this, are:

- Maximum percentage of people living in the slums is employed with the MCV as *Safai Karamcharis.* Labour employed with the Handloom industry account for the second highest concentration followed by rickshaw pullers, which account for nearly 10 to 15% of the slum population.
- The existing tourism base of the city creates opportunities for employment generation, especially for unskilled labour
- Lack of development opportunities in the hinterland

17.3 Development of Slums

Slum locations are spread all over the city but major concentrations can be found in the old city area near the ghats, areas near small scale industries (as a high percentage of slum dwellers are weavers working in Handloom industry) as well as in the Rajghat area ***(Map11)*** The main factor attributing to this concentration is proximity to work place. In case of the old city area, the employment generation due to religious and tourist traffic and in case of Rajghat area, the availability of open land has led to indiscriminate squatting.

But the slum concentration in these areas has not only led to poor living conditions for the slum dwellers but is also responsible for the general deterioration of the living environment of the city. This is primarily due to lack of proper infrastructural services in these areas and considering the fact that most of these slums have 1000+ populations ***(Figure 26).*** This is leading to tremendous pressure on the city infrastructure and resources.

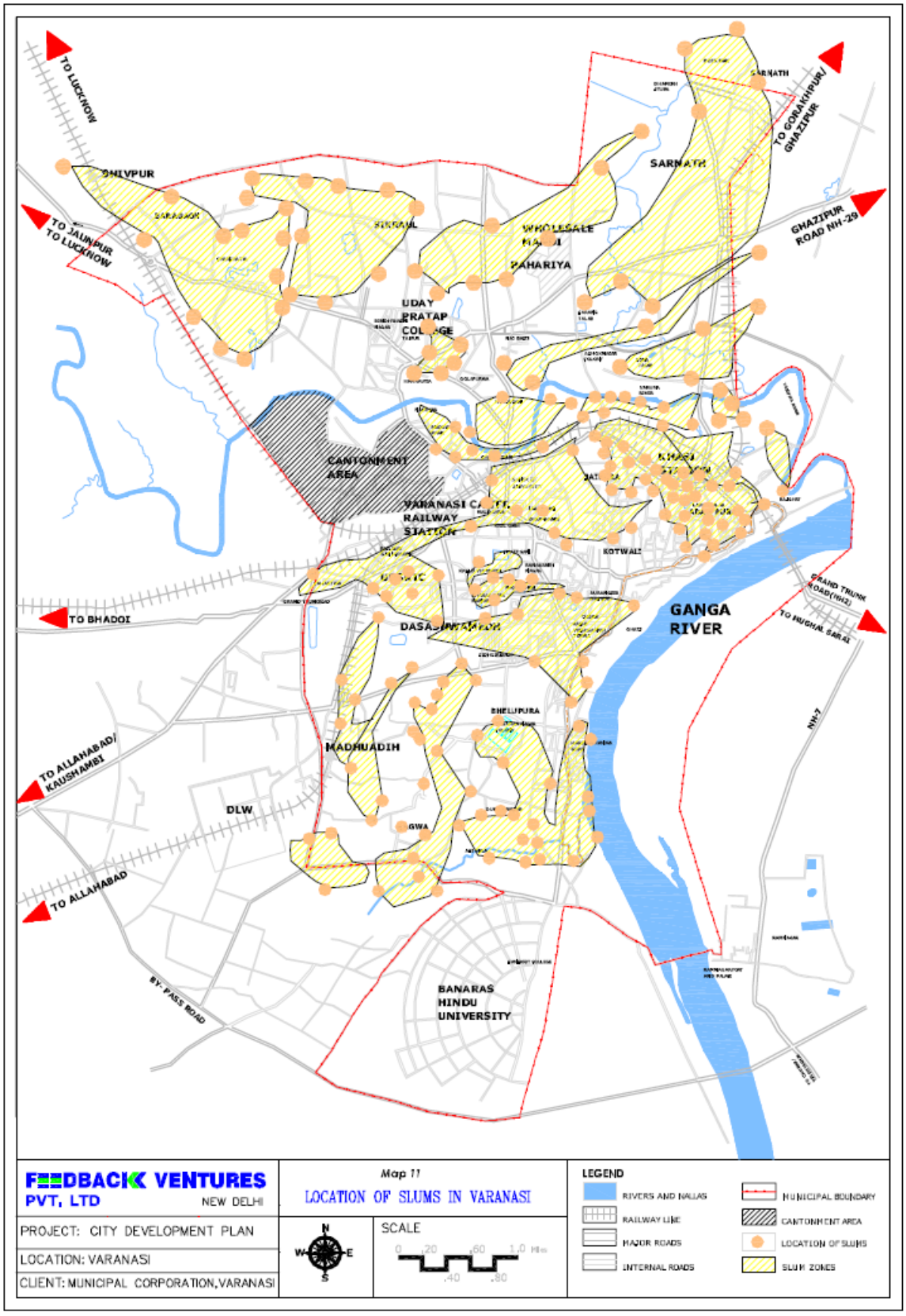
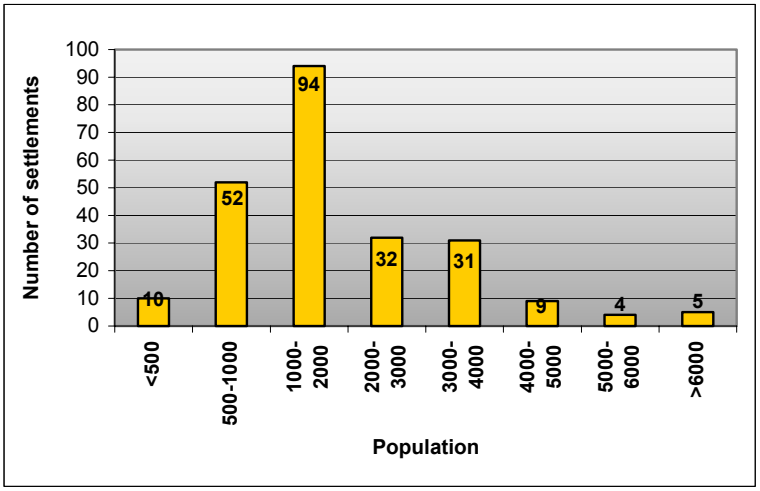

TO LUCKNOW
SHIVPUR
TO JAUNPUR
TO LUCKNOW
SARNATH
TO GORAKHPUR/
GHAZIPUR
GHAZIPUR
ROAD NH-29
WHOLESALE
PAHARIYA
UDAY
PRATAP
CANTONMENT
AREA
RAILWAY
STATION
KOTWALI
TO BHADOI
GANGA
RIVER
GRAND TRUNK
ROAD(NH2)
TO MUGHAL SARAI
NH-7
BHELUPURA
MADHUADIH
TO ALLAHABAD/
KAUSHAMBI
DLW
GWA
TO ALLAHABAD
BY-PASS ROAD
BANARAS
HINDU
UNIVERSITY
FEEDBACK VENTURES
PVT. LTD
NEW DELHI
Map 11
LOCATION OF SLUMS IN VARANASI
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION,VARANASI
N
W
E
S
SCALE
LEGEND
RIVERS AND NALLAS
RAILWAY LINE
MAJOR ROADS
INTERNAL ROADS
MUNICIPAL BOUNDARY
CANTONMENT AREA
LOCATION OF SLUMS
SLUM ZONES

Figure 26: Population concentration in Slums



Source: DUDA Varanasi

A significant portion of the waste dumps and untreated sewage discharge in the river comes from the slum concentration in the old city area. *Annex VI* gives the list of slums in Varanasi. It can be observed that the concentration of slums is more in areas which have small scale manufacturing units like: Madanpura, Adampura, etc. Hence, a significant portion of the weavers working in the small scale-manufacturing units, especially handlooms, live in slums near the workplace.

17.4 Characteristics of Slums

The total population of slums is concentrated mainly in central city and peripheral development. 50% of total Slums are located in central city while 37% in peripheral area. The number of BPL families comprises nearly 20% of the total slum population while the number of EWS household is more in central city than peripheral areas. The total number of slum households is nearly 56652 covering approximately 1372.6 hectares of land (approximately 17%) in the city. The average gross density in slum areas is approximately 330persons/ha in the city area. The average household size in slums is approximately 8 as compared to the city's average of 7.3, which is comparatively high. The average income of a slum household ranges from Rs.100-150 per day. ***Table 44*** shows the overview of slums in Varanasi

Table 44: Slums an Overview

	No. of HH	Population	Area (Ha)	Density (Persons/Ha)	HH size	Average Income (Rs./Day)
Varanasi City	151654	1202433	7979	150	7.3	NA
Slums	57055	453222	1372.6	330	8	100-150
Percentage	37.6%	37%	17%	-	-	-

Source: DUDA, 2006

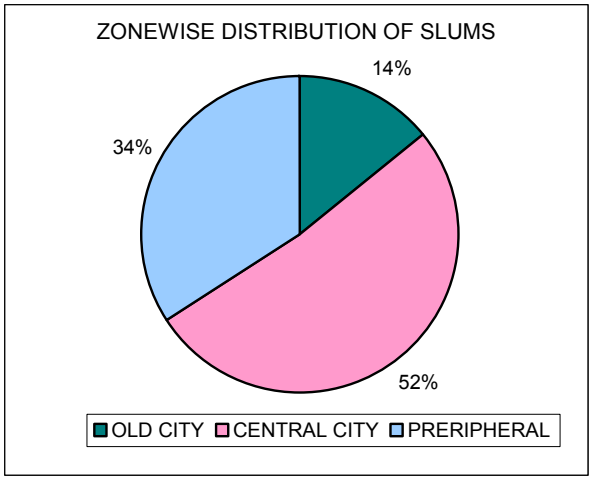
For a detailed study understanding of the characteristics of slums, the city has been divided into three areas – Old city, the central city and the peripheral developments. Thus a comparative scenario is developed to assess the situation of slums in the city in the ***Table 45***:

Table 45: Slum population Data

	Old City	Central City	Peripheral development
No. of Slums	32	118	78
EWS HH	485	4078	3993

Source: DUDA Varanasi, 2006

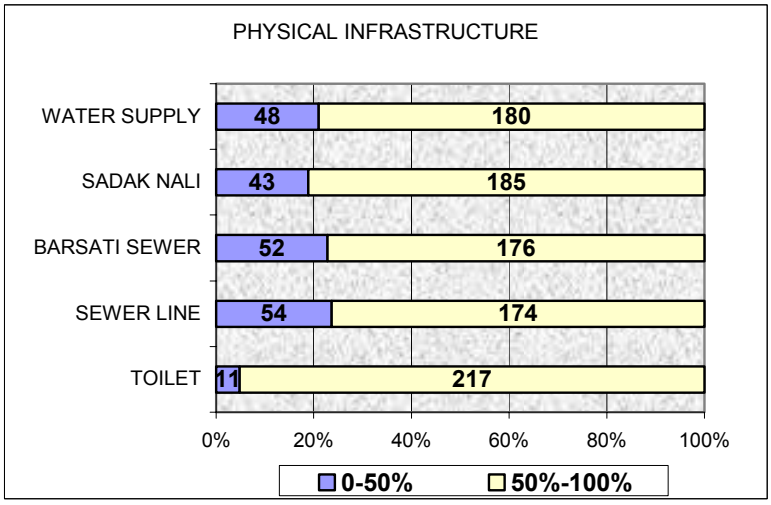
Figure 27: Zone wise Distribution of Slums



17.5 Status of Community Facilities

A detailed study of slums has been conducted by DUDA in Varanasi. According to the study, nearly 59.5% of the population in these slums belongs to the SC category. Though attempts are being made by the government authorities to upgrade the living environment in the slums, the general living conditions in most slums needs improvement. The lack of formal solid waste collection facilities leads to littering and open roadside dumping of waste and water logging due to lack of sewerage and drainage facilities leads to health hazards. Out of the slums studied by DUDA, nearly 65% of the slums have been provided with a sewer line and individual toilets. Almost 80% of the slums have storm water drainage but these are roadside drains and are connected with sewerage network ***(Figure 28, Map 12 &*** *Annex VII*)

Figure 28: Availability of Physical Infrastructure in Slums



The major inferences from the data provided (by DUDA) are:

- Individual household toilets are present in most of the slums. Out of 227 slums in Varanasi, 216 slums have more than 50% coverage and the remaining 11 slums has less than 50% coverage in terms of individual toilets.
- Out of total 227 slums, 177 slums have sewerage network, Basti nallas/drainage, which constitute 77.6% in terms of slum coverage.
- Water supply is present in 192 slums, which is 82.4% in terms of coverage. Thus, water supply network is present in most of the slums. 36 slums do not have any proper water supply network, as these areas are not under the coverage zone.
- Majority of the slums lack public conveniences in terms of community toilets. Community toilets are present in 45 slums (20%) and the remaining slums lack the facility. Therefore, it is required to provide public conveniences wherever required in different slums.
- Streetlight is presently lacking in most of the slums with uncovered slums to the extent of 77.4%.

The condition of roads is worst in these areas. The roads are mainly kutcha roads made up of bricks with no proper drainage system, and the condition gets worse in rainy seasons. The drainage system has added to the problem of these areas and has caused concern for public health. Slums are provided with two hours of water supply per day, which does not fulfill the requirement of slum dwellers and slum dwellers have to rely on other sources of water supply like hand pumps. In some cases, water has to be transported from more than half a km. In terms of lack of facilities, most slums in central city lack infrastructural facilities followed by peripheral city slums. The slums located in the core city have maximum facilities owing to the relatively well developed sewerage and water supply network in the core area.

DUDA is the primary agency responsible for provision of community toilets in Varanasi. Till December 2003, 24 CTCs had been constructed in various slums all over the city. Inspite of this, the demand and supply gap is huge and results in open defecation by slum dwellers. DUDA has also provided 21 Community Centers under Community Development Scheme (CDS) in the slum areas.

The tenure status for all the slums is from birth and the ownership status is private. This indicates that the people living in slums have been living in unhygienic conditions with inadequate infrastructural facilities for a long time and thus immediate attention needs to be given to uplift their quality of life.

17.6 Housing Scenario

In the absence of detailed information regarding housing conditions in all slums, analysis of housing scenario is done based on 109 slums, whose data was available. Out of 109 slums 64% of slums have pucca houses, 22% have semi-pucca followed by 14% *Jhuggi Jhopri*. The housing is made up of make shift material like sandstone tiles, thatches.

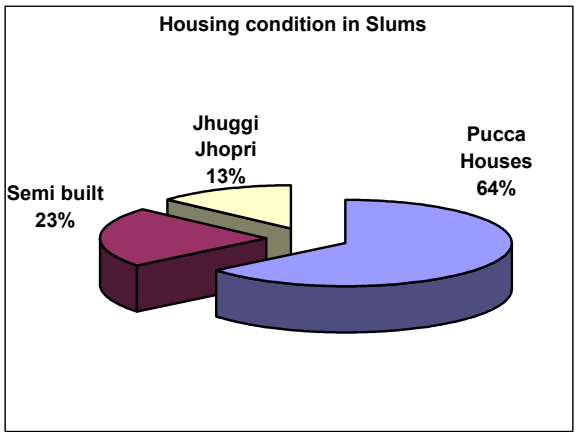
The conditions are similar in all the three areas.

Table 46: Structural Condition of slums

Type of Structure	Old City	Central City	Peripheral development	Overall
Pucca Houses	64%	67%	61%	64%
Semi built	22%	23%	23%	22.6%
Jhuggi Jhopri	14%	10%	16%	13.3%

Source: DUDA Varanasi

Figure 29: Structural condition of Houses in Slums



17.7 Housing requirement for Urban Poor

EWS Housing:

Provision of housing for urban poor forms an important component of JNNURM and since, slum population forms nearly 40% of Varanasi's population, a major emphasis has to be given to housing for urban poor. The slum population of Varanasi is nearly 4.5 lakh and approximately 21% of the slum population lives in below poverty line.

Out of the total slum population, 30% of the slum population would have to be provided with EWS Group housing DUs (with adequate infrastructural facilities) through Ex situ development (relocation) whereas, the remaining 70% would be improved insitu. PPP can be used to cross subsidize the cost of provision of EWS housing. These housing units can be provided along the periphery while laying emphasis on the **workplace-residence proximity** to reduce transportation costs incurred by the slum dwellers.

70% (3.2lakh or 40,041 DUs) of the slum population needs to be provided with insitu development. Out of 40041 DUs, considering that 60% of DUs are Pucca (as per Table 46) and can be upgraded by minor repairs and up gradation, a cost of Rs. 1000/sqm has been considered to assess the total cost of upgradation of houses. The remaining 40% DUs (out of 40,041) would have to be rebuilt on site through construction of new DUs (G+3 units). The number of DUs for *insitu and exsitu* development have been calculated (Table 48).

Table 47: Population projection on decadal growth rate

Year	Total Population	Slum Population	BPL Population	Requirement for EWS DUs
2001	**12,02,443**	**4,53,222**	**96,344**	**13,763**
2006	**13,70,785**	**5,16,648**	**1,09,787**	**15,684**
2011	**15,35,279**	**5,78,646**	**1,22,962**	**17,566**
2021	**19,65,157**	**7,40,667**	**1,57,391**	**22,485**
2031	**25,74,356**	**9,70,274**	**2,06,183**	**29,455**

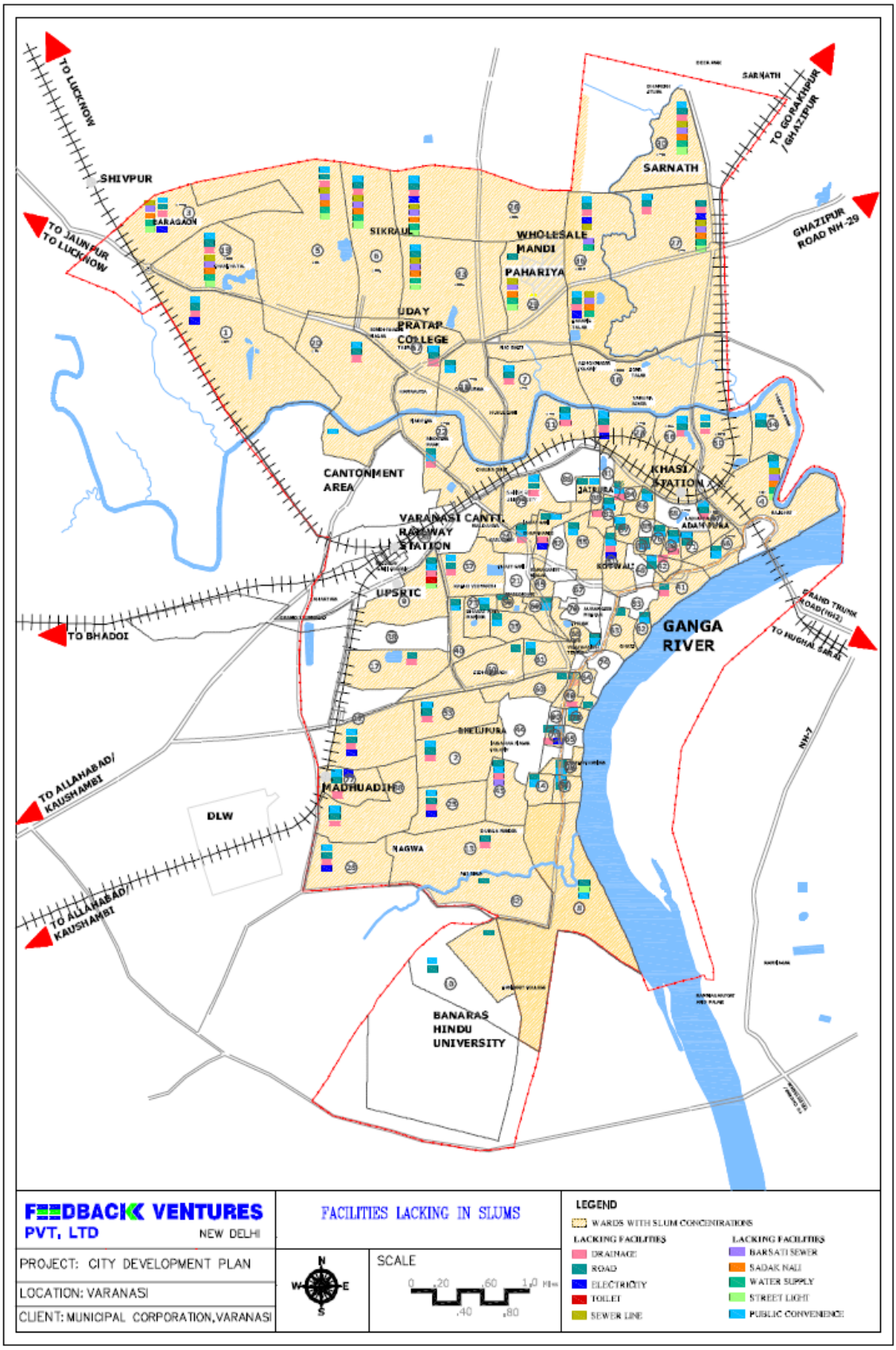
Table 48: Housing for Urban Poor

Housing for Urban Poor		
Total Slum Population	457,613	
Average Household size	8	
Total number of Households	57,202	
Total BPL Population	96,344	
Total number of BPL Households	12,043	
	Exsitu Development	**Insitu Development**
Total Population	30%	70%
Total Population	137,284	320,329
Number of Households to be relocated	17,160	40,041
Insitu upgradation of houses	-	60%
	-	192,197
Number of DUs	-	**24,025**
Total number of EWS Dwelling units (DUs)required	100%	40%
	17,160	128,132
		16,016
Minimum area required per DU	25 sqm	25 sqm
	EWS Housing	**Insitu Housing**
Minimum Plot size per DU	0.4 ha	0.4 ha
Maximum Permissible FAR	133	133
Total number of floors	4	4
Permissible Ground Coverage	33%	33%
Number of DUs per floor	4	4
Area under DUs per floor	4 x 25 = 100sqm	4 x 25 = 100sqm
Area under serivces	22sqm	22sqm
Area per floor	122	122
Total covered area per building	122 x 4 = 488 sqm	122 x 4 = 488 sqm
Maximum number of buildings permitted per plot	11	11
Total built up area (sqm)	5368	5368
Total number of DUs per building	16	16
Total DUs per plot	176	176
Population accomodated per plot	176 x 8 = 1408	176 x 8 = 1408
Population to be accomodated in new plots	137,284	128,132
Number of plots required	98	91
Total area required (ha)	39	36
Cost of upgradation of houses	-	1000/sqm
Cost of constrcution of new houses	3,500/sqm	3,500/sqm
Total floor area to be constructed	523395.25	488503.25
Total cost of construction	1831883375	1709761375
Cost of upgradation of Houses (at 25sqm per dwelling)	-	600,617,063
Cost of construction of new houses	1831883375	1,709,761,375
Total cost	1831883375	2,310,378,438
	say 183.2 crore	say 231 crore

17.8 Key issues

For the reason that the lack of infrastructure facilities leads to pollution of Ganga River and deterioration of living environment of the slums, the following issues need to be addressed:

- *In-situ* up-gradation of slums, wherever possible, with provision of basic facilities needs to be taken up
- Ex situ -Relocation and rehabilitation plan for slum dwellers
- Open defecation by the slum population due to lack of provision of CTCs and IHHLs
- Lack of piped water supply in the slum areas leading to high dependence on ground water and other sources
- Lack of means of waste disposal leading to open dumps which lead to clogging of drains and act as breeding grounds for mosquitoes
- Lack of sense of ownership among the residents – facilities are looked upon as something that has been provided by the government, and it is the government's responsibility to "run" the CTCs;
- Provision of CTCs and water supply lines to slum dwellers


TO LUCKNOW
SHIVPUR
TO JAUNPUR
TO LUCKNOW
SARNATH
TO GORAKHPUR
/GHAZIPUR
GHAZIPUR
ROAD NH-29
SIKRAUL
WHOLESALE
MANDI
PAHARIYA
UDAY
PRATAP
COLLEGE
CANTONMENT
AREA
KHASI
STATION
VARANASI CANTT.
RAILWAY
STATION
UPSRTC
TO BHADOI
GANGA
RIVER
GRAND TRUNK
ROAD(NH2)
TO HUGHAL SARAI
NH-7
TO ALLAHABAD/
KAUSHAMBI
DLW
MADHUADIH
NAGWA
BANARAS
HINDU
UNIVERSITY
FEEDBACK VENTURES
PVT. LTD
NEW DELHI
FACILITIES LACKING IN SLUMS
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION,VARANASI
SCALE
LEGEND
WARDS WITH SLUM CONCENTRATIONS
LACKING FACILITIES
DRAINAGE
ROAD
ELECTRICITY
TOILET
SEWER LINE
LACKING FACILITIES
BARSATI SEWER
SADAK NALI
WATER SUPPLY
STREET LIGHT
PUBLIC CONVENIENCE

18 SWOT Analysis into Service Delivery

18.1 Introduction

The. Strength, Weakness, Opportunity and Threat (SWOT) analysis is necessary to get the complete picture of the city and forms the basis for formulation of Vision. The analysis helps to get the clear picture of the existing situation as well as possible scenarios and potentials for the development of the city. For Varanasi, the SWOT analysis has been carried out at two levels, i.e. City as a whole and Institutional level.

18.1.1 City as a whole

18.1.1.1 Strengths

a) Good connectivity by air, rail and road
b) Connectivity by three National Highways (NH-2, NH-29, NH-56) and four State highways (SH-73, SH-74, SH-87 and SH-98) passing through the city.
c) Diverse economic activities like weaving handlooms, wholesale trade.
d) Established educational centre with universities like BHU etc.
e) Strong heritage and religious tourism potential, and natural beauty.
f) Proximity to Sarnath and other tourist places like Ramnagar and Chunar.
g) Religious potential and significance
h) Large tourist influx, domestic as well as foreign tourist.
i) Architectural wealth in the form of Ghat areas and old city
j) Presence of natural water bodies and sacred kund.

Thus the strengths of the city are in form of heritage, tourism and related activities. The city can march upon these strengths to develop in the coming future.

18.1.1.2 Weaknesses

a. Urban Chaos in old city, narrow streets-high density.
b. Poor condition of urban infrastructure in the city
c. Bad road conditions in the old and central city.
d. Only 30% of the city is covered by sewage network and lack of dedicated sewer lines.
e. Heavy dependence on ground water depleting the water table in the city
f. Poor condition of existing water supply network, which is more than 50 years old
g. Kuccha, unlined drains in the city leading to unhygienic conditions and ground water contamination
h. Lack of maintenance and poor condition of water bodies and heritage buildings.
i. Pollution load on River Ganga, Varuna and Assi
j. Traffic congestion, bottlenecks, roadside parking and traffic jams are the usual scenes due to lack of traffic management.
k. Increased number of registered vehicles in the city has led to traffic congestion, which creates air and noise pollution.
l. Lack of sanitary landfill site and waste management system
m. Lack of open spaces and road side plantations

n. Unauthorized constructions and encroachments on roads in the inner and central city create havoc and restrict smooth movement of the traffic.
o. Nearly 37% of the population lives in slums with lack of infrastructure facilities
p. Unplanned growth of the city, majority of residential areas are unplanned.
q. No proper lighting, absence of signals and road markings always leaves the traffic in chaos.

Thus the city has a huge gap in present infrastructure facilities to cater to the needs of the city. The city lacks basic infrastructure mainly in urban transport and management. Also the city lacks in full coverage of physical infrastructure.

18.1.1.3 Opportunities

a. Potential for development of both religious and institutional tourism
b. Potential for establishment of Apparel Park
c. Potential for Industrial Development to boom the economic activities in the city.
d. Potential for development of Freight complex to decongest the old city and bring all the wholesale as well as trade activities at a common platform out of the city.
e. Potential for development as a high tech city and a knowledge hub
f. Passenger terminals for better traffic management in the city.
g. Potential to develop amusement parks and water transport near the Ganges.

Thus the city has a huge potential to grow as a major tourist destination and trade center to cater to the needs of the surrounding areas. The promotion of tourism can help the city to generate the revenue as well as to support the city's economic profile.

18.1.1.4 Threats

a. The rate of increase in population being very high in past two decades.
b. High rate of population growth in Slums.
c. High floating population leading to stress on the city's infrastructure
d. Increasing demand and supply gap in urban services
e. Depletion of ground water table in fast pace can cause scarcity of water supply in the coming future.
f. Deterioration of heritage due to lack of maintenance can leads to the loss of heritage areas.
g. Threat to Ghats due to changing course of River Ganga and seepage of river water into the Ghat area
h. Unregulated developments and encroachments in the Catchment area of Varuna and Assi
i. Intense pollution load on River Ganga and Varuna can lead to the degradation of living environment for the water species.
j. Drying up and encroachments on ponds/water bodies.

The existing scenario establishes that there is lack of maintenance in each sector that if not taken care off can lead to the worst of the situation.

18.1.2 Institution Level

A SWOT analysis of the city's institutional framework has also been done. It aims at analysing Strengths, Weaknesses, Opportunities and Threats of different government, parastatal and other concerned agencies in the city regarding services delivery, operation and maintenance etc. For the purpose of this analysis, MCV, JS and JN have been taken into account.

18.1.2.1 Strengths

- Strong technical setup and expertise with experience personnel (civil and environmental engineers)
- Water tax and water charge form the major source of revenue for JS contributing 85% of the revenue
- Sewer tax and charges form the major part of the remaining revenue for JS
- Ganga pollution unit to execute sewerage work – design, execution, transportation and treatment
- Existing laboratory setup
- Human Resource Development cell existing to conduct periodic training to improve technical skills and know-how on current technology

18.1.2.2 Weaknesses

- There is no provision of water metering and water charges are not raised due to political pressures which result in low revenue for the JS
- Due to insufficient revenues JS ends up with non-payment of electricity bills, which are finally paid by the state government
- Insufficient manpower – technical and non-technical
- Poor financial status of MCV, JS and absence of regular maintenance and high operating costs
- Lack of industrial base in the city
- No distinction is made between expenditure on construction of infrastructural facilities such as roads, JSCs, MTVs, night shelters etc. and expenditures on routine items such as salaries, rents etc
- Big resource gap for performing basic core functions like public health, sanitation, and waste management
- Finance records area maintained on single entry cash based system
- Statement of assets and liabilities not prepared
- Cannot assess the accountability of all the resources that MCV controls and the deployment of those resources
- Not able to assess the financial performance, financial position and cash flows of the entity
- Partial coverage of city by sewerage network
- Complete dependence on government funded projects
- Poor resource management
- Poor personnel management
- Lack of willingness

18.1.2.3 Opportunities

- Increased role of urban governance with increase in urban population
- Challenge of providing quality services to urban dwellers in order to attract investment on a continuous basis
- Challenge of switching over from cash to accrual system of accounting
- Established institutional setup

18.1.2.4 Threats

- MCV is not able to recover the cost of services rendered by it
- Striking feature of MCV accounts is that the salary expenditures take away major portion of the total expenditure
- Stagnation and lack of growth opportunities for personnel
- Loss of technical skill due to stagnation and poor utilisation

18.2 Key Issues

- Development of tourism potential of the city
- Provision of better infrastructure facilities, especially in slum areas
- Minimizing stress on the water bodies of the city
- Provision of basic services to the urban poor and ensuing delivery of other already existing services
- Urban reforms (mandatory and optional) at city and state levels for improved governance and financial strength
- Governance/ e-governance through application of GIS and MIS
- Accrual based double entry system of accounting
- Property tax collection reforms through use of GIS
- Reforms relating to public private participation

19 Critical Assessment of Development Challenges & Resource Requirements

19.1 Introduction

The main thrust of the strategy of urban renewal is to ensure improvement in urban governance so that the ULBs and parastatal agencies become financially sound with enhanced credit rating and ability to access market capital for undertaking new programs and expansion of services. With this improvement, public-private partnership (PPP) for various services would become feasible. To achieve this objective, the state government, the ULB and parastatal agencies in the city will be required to accept implementation of reform agenda. This section focuses on critically assessing the development challenges faced with Varanasi.

19.2 Short-term Challenges

- Pollution of River Ganga
- Poor delivery of services;
- Damages and leakages in the existing water supply and sewerage networks;
- Low coverage of sewer network
- No separate storm water drainage system available;
- Poor solid waste management system in practice; lack of sanitary landfill site
- Poor Operation and Maintenance of services
- Subsidence of Ghats due to seepage of river water.
- Chaos on Ghats;
- Services to meet tourist demands
- Poor management of resources;

19.3 Medium term Challenges

- Inadequacy of the water supply and sanitation schemes;
- Partial coverage of city by sewerage network;
- Areas with poor and inadequate infrastructure;
- Excessive use of ground water may cause depletion of ground water;
- Inefficient use of existing water treatment plant;
- Existing water bodies under threat of extinction and encroachment
- Poor drainage network, also carrying sewage, may cause health hazards;
- Poor solid waste management system may cause health hazards and epidemic.
- No solid waste treatment system in practice;
- Encroachment on Catchment area of river Varuna and Assi nallah and disposal of untreated waste may cause a threat to their existence
- Deterioration of old city fabric and Ghats due to lack of maintenance

19.4 Long term Challenges

- Due to inadequate water supply and sewerage networks/ systems, tourism shall be seriously effected
- Extensive pollution of the river may lead to diversion of religious tourists to nearby locations like: Allahabad

- High volume of waste discharge and encroachment along Varuna and Assi may cause serious damage to these water bodies.
- Poor condition of Ghats and built fabric of the city due to lack of maintenance.
- Extensive air and noise pollution
- Poor O&M of water supply network may result in its failure;
- Partial coverage of city by sewerage network shall cause increased uncollected and untreated sewage which would cause more pollution of water bodies and create increased health hazards;
- Poor O&M of sewerage network may cause blockage and flood during the rainy season and calamity;
- Poor and inefficient drainage network may cause flooding and damage of the roads and streets in the city;
- Inefficient drainage network may cause stagnation of water in low-lying areas leading to health hazards and epidemic.
- Seepage from the unpaved *nallas* and drains may pollute the underground water strata

19.5 Key Issues

- Heritage zone comprising of Ghat area and old city to be considered as special zone
- Inventory of heritage buildings in the city to be made
- Provision of open spaces
- Action plan for protection of rivers and water bodies
- Making inventory of the existing networks/ schemes;
- Verification of technicality/ adequacy of the scheme;
- Identify areas with poor/ inadequate infrastructure;
- Renewal/ rehabilitation of inadequate infrastructure/ network;
- Optimum utilization of existing infrastructure;
- Prepare/ plan schemes as per demand/ requirement;
- Propose separate storm water drainage and sewerage networks;
- Propose efficient collection and treatment system for sewage;
- Propose efficient solid waste management scheme;
- Allocation of fund/ investment plan and strategy;
- Prioritized and phased implementation;
- Efficient O&M mechanism;
- Governance/ e-governance through application of GIS and MIS
- Reforms relating to public private participation;

20 Stakeholder Consultations

20.1 Introduction

The process of CDP, being a multi disciplinary platform includes various stakeholders who work towards the development of the city. As the stakeholders know the city better and are responsible citizens, their views are important at every step, while preparing the CDP. Consultation process for Varanasi can be divided in two stages, (first being the stakeholder workshops and second being individual consultations) to understand the city, and their problems at grass root level within quick time frame.

Identification of stakeholders was the most important part of stakeholder's consultation. In case of Varanasi the identification of stakeholders was done wisely, so that the complete picture of the city can be assessed in terms of existing situation and their problems. The main stakeholder comprises of the Government officials covering all sectors, local people including academicians, local elected representatives, NGO's, prominent citizens, etc. The meetings were conducted with different stakeholders to know their views and vision about the city.

The involvement of stakeholders was at two level i.e. consultation and participation. The consultation process was basically to explain them about the Mission and to understand the existing situation of each sector and the city as a whole. The participation process is more than consultation and in this process the stakeholders have been involved in taking decisions. **Detailed consultations are put in** *Annex VIII*

20.2 Stakeholder Workshops

As part of CDP preparation, five stakeholder workshops have been conducted during the month of May and June for Varanasi city at different places. Details of these workshops are as follows:

Table 49: Details of Workshops conducted in Varanasi

Date	Venue	Presided by	Purpose
3rd May 2006	Varanasi Municipal Corporation,	Mr. S P Singh *Special Secretary*	➢ Introduction of JNNURM in Varanasi and discussion on exiting situation of different sectors in Varanasi.
8th May 2006	Divisional Commissioners Office, Varanasi	Mr. C N Dubey *Divisional Commissioner*	➢ Situation analysis of different sectors ➢ Identification of Key issues through discussions on various sectors like Traffic and transportation, Water Supply, Solid waste management, etc.
11th May 2006	District Magistrate Camp office, Varanasi	*Mr. Rajiv Aggrawal District Magistrate*	➢ Preliminary analysis by consultants about the city and different sectors ➢ Discussions on key issues identified in the previous workshop ➢ Identification of projects at broad level.
7th June 2006	Varanasi Municipal Corporation,	*Mr. S N Srivastava Municipal Commissioner*	➢ Presentation on Rapid Assessment done by consultants, ➢ Identification and finalization of the project at sector level ➢ Formulation of **Vision** for the city as a whole and sectors in particular
20th	Regional	*Mr. A K Verma*	Presentation on

June 2006	centre for Urban & Environmental Studies, Lucknow	*Principal Secretary (MoUD)*	➢ Rapid Assessment done by consultants, ➢ Vision and Strategies of the city as a whole and sectors in specific ➢ Projects identified under JNNURM
20th July	Varanasi Municipal Corporation	*Mr. S N Srivastava Municipal Commissioner*	➢ Presentation on Vision & strategies ➢ Presentation of the project at sector level identified by consultants
21st July	Divisional Commissioners Office, Varanasi	Commissioners & DM	➢ Presentation of the project at sector level identified by consultants ➢ Discussion with Concern Departments
26st July	Regional centre for Urban & Environmental Studies, Lucknow	*Mr. A K Verma Principal Secretary (MoUD)*	Presentation on ➢ Vision and Strategies of the city as a whole and sectors in specific ➢ Projects identified at sector level by consultants

Workshop 1: This workshop was basically a kick-off meeting with the VMC officials, and officials from other organizations to make them aware of JNNURM and CDP process. The objective of the workshop was to get the implementing agency's view on issues such as the areas, which need to be focused upon for the development of Varanasi. The workshop was held on 3rd May 2006, which was chaired by Mr. S P Singh, Special Secretary, UP government and was attended by about 40 officials including the Municipal Commissioner, Additional Municipal Commissioner and Head of Departments and other Officers.

The meeting started with a brief introduction to JNNURM highlighting its features, objectives, the reforms, which need to be fulfilled, and the importance of CDP. It was conveyed why JNNURM is important and how CDP forms a crucial part of it. After the brief introduction, departmental heads of each sector were asked to highlight some of the important features of their sectors so that the existing situation of the city is brought out. This is the first hand information that has been received from the individual departments. The meeting ended with a note from Special Secretary saying that all the help needed for preparation of the CDP should be given to consultants so that the project can be completed in short time period and sent for approval.

Workshop 2: This workshop was held on 8th May 2006, at Divisional Commissioners office, which was chaired by the then Divisional Commissioner, Mr. C N Dubey. More than 30 officials including District Magistrate, Municipal Commissioner, Additional Municipal Commissioner attended the meeting, along with some of the well know professionals from the city.

The basic objective was to understand the situation of each sector through discussions with different government officials. Meeting started by presenting the process of preparation of the CDP by consultants and explaining them the importance of JNNURM. After that some of the sectors, which were discussed, are Water Supply, Sanitation, Traffic and Transportation, Solid Waste Management, Decongestion of the Old city area, and also some of the reforms, which the municipalities will have to adopt during the process of implementation of the projects. During the discussions on each sector, key issues of these sectors were identified.

Workshop 3: The District Magistrate, Mr. Rajiv Aggrawal, who chaired the meeting, has called this workshop at his Camp office on 11th May 2006. Various officials attended the meeting.

The main objective of the meeting was to present the preliminary assessment done by the consultants about the city, discuss the key issues identified in the last meeting in more details and identify preliminary projects that can be taken up under JNNURM. The main projects, which were discussed, were shifting of wholesale trade from the city to outskirts of the city, construction of flyovers at intersections, which are congested, and provision of underground parking at various parks etc.

Workshop 4: A whole day workshop was conducted on 7th July 2006, in Varanasi Municipal Corporation, which was chaired by Municipal Commissioner Mr. S N Srivastava. Local representatives, and government officials attended this workshop, the basic objective of which was to formalize the Vision for the city.

The meeting was divided in two sessions, first being the presentation of the assessment done, projects identified and second session was to formulate the Vision for the city as a whole and sectors in particular. In the first session, meeting started with presenting the Rapid Assessment done by the consultants about the city as a whole and sectors in particular. Detailed discussions were held about each sector regarding the gaps identified by the consultants and identification of the projects to fill up the gaps. In the second session, participants were asked to suggest their vision statement for the city as a whole. Apart from that, vision for each sector was also formulated.

Workshop 5: Regional Centre for Urban and Environmental Studies, Lucknow, conducted a half-day workshop on 20th July 2006. Principal Secretary, Ministry of Urban Development, chaired the workshop and some of the participants includes, Special Secretary, Divisional Commissioner, District Magistrate of Varanasi, Municipal Commissioner etc.

The main objective of the meeting was to present the city assessment, Vision and Strategies formulated at city level and at sectoral level, projects that will be considered under JNNURM and those which will not be considered under JNNURM but will form part of the CDP. Meeting started with the presentations from the consultants' side about existing situation, followed by Vision and Strategies. Identified projects were presented for the detailed discussions. After detailed discussions, projects were finalized, which will be taken under JNNURM. A comment was made to identify few more projects of short durations, which can be taken up immediately that will make visible impact on the city structure.

Workshop 6: Workshop was conducted on 20th July 2006, in Varanasi Municipal Corporation, which was chaired by Municipal Commissioner Mr. S N Srivastava. Local representatives, and government officials attended this workshop;
The main objective of the workshop was to present detailed projects at sector level. Vision & strategies were also presented in the stakeholder meeting. Comments were taken from different government officials, councilor of the municipal corporation & representative of different non-governmental agencies, which later were included in the reports & projects were reformulated accordingly.

Workshop 7: Regional Centre for Urban and Environmental Studies, Lucknow, conducted a half-day workshop on 26th July 2006. Principal Secretary, Ministry of Urban Development, chaired the workshop and some of the participants include, Special Secretary, Divisional Commissioner, District Magistrate of Varanasi Municipal Commissioner etc

The main objective of the meeting was to present the final proposals at different sector levels comments, which were received in the stakeholders meeting at MCV on 20th July, were included in the presentation, reforms which were introduced at different levels were also presented, ULB share of MCV was also presented in the meeting

20.3 Individual Consultations

Apart from stakeholder workshops, where we got first hand information, preparation of CDP is also based on information collected from secondary sources. Thus to collect the information, various teams were formulated that dealt with the different sectors. Each team has visited related institutions for collection of secondary data and in the process interviewed key persons for better understanding of the sector and issues pertaining to it.

Individual consultations were not restricted to the government officials but also with individuals who are experts in their field. These consultations helped in formulating the Vision for the city and identify some of the issues, which are directly or indirectly related to development of the city. For example, consultation with *Mr. Atiq Ansari*, who is weavers representative helped understand the problems faced by the traditional Saree business in Varanasi and expressed the desire that he would like to see ***Varanasi as a major economic base of the region.***

21 Vision and Strategies

21.1 Introduction

Developing a vision for the city is central to the preparation of CDP. It defines the potential of Varanasi and reflects its unique attributes in terms of comparative and competitive advantage, values and preferences of the city's residents. The JNNURM has two sub missions:

- Urban Infrastructure and Governance
- Basic services and the Urban Poor

The city of Varanasi is the oldest living city and dates back to the period of very existence of urban settlement. The life of residents of Varanasi revolves around the sacred river Ganga. The life of the city starts in the early houses of the day and continues till late in the night. It had been centre of learning from ancient times and an authority on the entire activities of citizens. The city is now taking shape of a modern city with various diversified activities – tourism being one of them. It is also the economic capital of Eastern UP. It has following attributes:

- Centre of hand-loom industries
- Major tourist destination for national and international tourist

21.2 City Level Vision and Strategies

21.2.1 Vision at City Level

For articulating the Vision for Varanasi, various issues have been discussed and debated during the workshops and individual consultations. It was stressed upon that aspects such as Culture of the city, its Tourist potential and Revival of traditional household industries along with provision of basic services to all, should be taken into consideration. With this background "The Vision" for the city that emerged by consensus is:

"Economically Vibrant, Culturally Rich, and Liveable Tourist City"

This vision statement will be further articulated with a large group of stakeholders to reflect the futuristic desires of all 'Banarasi's'.

21.2.2 Strategies at City Level

With the above ambitious vision in mind following strategies have been evolves in consultation with Varanasi Municipal Corporation and other agencies. These strategies are for city level vision.

- To decongest the old city area by providing suitable alternatives especially for wholesale activities
- To promote traditional Small Scale Industries to enhance the economic base
- To promote Varanasi as major tourist destination – Nationally and Internationally
- To provide safe, equitable and sustainable basic services

- To provide effective transportation system for smooth traffic movement in the city
- To protect water bodies to maintain environmental balance
- To enhance quality of life of slum dwellers by providing accessibility to basic services

21.3 Sector wise Vision and Strategies

As mentioned above, JNNURM has two sub missions and in case of Varanasi, the sector vision and strategies have been given for these two sub missions separately.

21.3.1 Sub Mission I – Urban Infrastructure and Governance

21.3.1.1 Vision and Strategies for Traffic and Transportation

Developing a safe and efficient traffic and transportation system for the city of Varanasi

- To provide adequate parking facilities throughout the city
- Construction of flyovers to reduce congestion and stoppage time at intersections
- To improve road geometric and Implement computerized signaling for better traffic management
- To develop multi modal transport terminal to facilitate inter and intra city traffic movement
- To construct new roads to improve connectivity and accessibility of the city
- To prepare a traffic management plan for the whole city
- To provide Mass public transport system to reduce congestion

21.3.1.2 Vision and Strategies for Physical infrastructure

Provision of adequate, reliable and affordable physical infrastructure services to all citizens of Varanasi

- To cover 100% population by piped water supply and sanitation network
- To reduce the usage of underground water sources by renovation/ rehabilitation of existing infrastructure facilities and by providing new water works
- To refurbish old distribution systems both for Water supply and Sanitation
- To reduce transmission and distribution losses
- To provide adequate and separate storm water drainage system
- To provide Universal access to clean, affordable sanitation facilities at public places
- To provide clean and affordable Basic services to Urban poor
- To provide efficient wastewater treatment facilities and safe disposal of treated waste
- To provide skilled technical manpower for Operation & Maintenance (O&M) of both the water supply and sanitation systems
- To provide proper solid waste management system, including collection, transportation and disposal of waste

21.3.1.3 Vision and Strategies for Urban Renewal and Environment

Decongestion of the Old City Area and Improvement of Environmental Quality of the city of Varanasi

- To shift wholesale markets from core area for decongestion of area
- To create integrated complex for common activities (such as Dying and Polishing) for weavers
- To provide space for new weavers near the integrated complex
- Complete Pedestrianization
- Paving of lanes in the Old city area
- Provision of 'Gaushala' for stray animals causing nuisance and congestion in the Old city area
- Conserve natural environment of city, most importantly river and other water bodies, by providing STPs and restrict inflow of sewage into it.
- To implement more stringent norms for pollution control
- To provide eco friendly fuel for vehicles like CNG and phasing out of old vehicles
- To provide new and improve existing gardens, open spaces and green cover in and around city
- To create awareness among people towards pollution free environment
- Restricting diesel generating sets in the city
- Removal of slaughterhouse from the city area
- Controlling noise pollution

21.3.1.4 Vision and Strategies for Heritage and Tourism

Preservation of Cultural Character with more encouragement of tourism in the city

- To promote Varanasi as major tourist destination – Nationally and Internationally
- Identification of heritage structures and integrating heritage conservation with developmental activities
- Upliftment of ghats and surrounding areas
- To formulate circuit joining Sarnath, Ghats and Ramnagar fort
- Development of Riverfront to attract more tourist

21.3.1.5 Vision and Strategies for Urban Governance and Finance

Development of institutions in the city to be more Proactive and Financially Sustainable

- Establish clarity of roles and responsibilities between different institutions
- To provide proper training to staff for enhanced capacity building
- Develop Double entry accounting system for fool-proof & better management of accounts
- Initiation of Public-Private Partnerships to fund large infrastructure projects
- Provision of graded tariff/ tax system for various services offered by ULBs
- Provision of GIS platform for control of theft and identification of problem areas
- Rationalization of Property tax
- Provision of e-governance for transparent system

21.3.2 Sub Mission II– Basic Services to Urban Poor

Enhanced quality of life for Urban Poor by provision of Basic Services

- In-Situ and Ex-Situ development/Rehabilitation of slum dwellers
- To provide adequate core amenities like water supply, street light etc
- To provide community toilets for better sanitation
- Reservation of 10% for development of any new housing stock for future migrants on rental/ownership basis.
- Registration and Regulation of all workers in the informal sector

Introduction

This section of the report will deal with identification of projects, their prioritization, costing of each project and phasing in terms of implementation of projects; which is the most important component of JNNURM. This forms the basis for preparation of Capital Investment Plan (CIP) and also for suggesting Institutional Reforms required for proper implementation of the projects. Identification of projects under each sector has been done based on the following factors:

- Rapid assessment of levels and condition of basic services,
- Vision and Strategies adopted for the development of the city, which have been evolved as "outcomes" rather than "inputs"
- Future requirements in terms of normative standards, which helped understand the gaps in the service delivery

All projects have been grouped into two categories i.e. Urban Infrastructure and Governance, and Basic Services to Urban Poor as per JNNURM guidelines. Under each sub mission, the projects are further classified based on Phase I (2006-2012) and Phase II.

The Costing for the Projects under Phase I has been subdivided into two Categories: First 2 years (Financial Year 2006 – 07 and 2007 – 08) and Rest of Phase I (2008 – 09 to 2010 – 12).

Prioritization of Projects

Sector specific key issues identified during the situation analysis have been taken forward towards formulation of vision/ strategies and identification of projects. Various activities under the broad head of a project have then been identified. Each project has been attached with a weight vector by various stakeholders at the city and state levels, and the consultant himself, which reflects intensity of requirement/ significance of a particular infrastructure project in the city. There is another vector attached to each project, which is called as sign vector, meaning that a project would have positive or negative impacts in terms of economic, social, environmental and visual image/ appeal. The two vectors (sign vector and weight vector) taken together help quantify priority of a project in a manner as follows –

$$\frac{1}{n1}\sum_{a=1}^{n1} a_{n1} \cdot \frac{1}{n2}\sum_{b=1}^{n2} b_{n2} = x$$

where,
a represents the sign vector,
b represents the weight vector, and
x is the aggregate score.

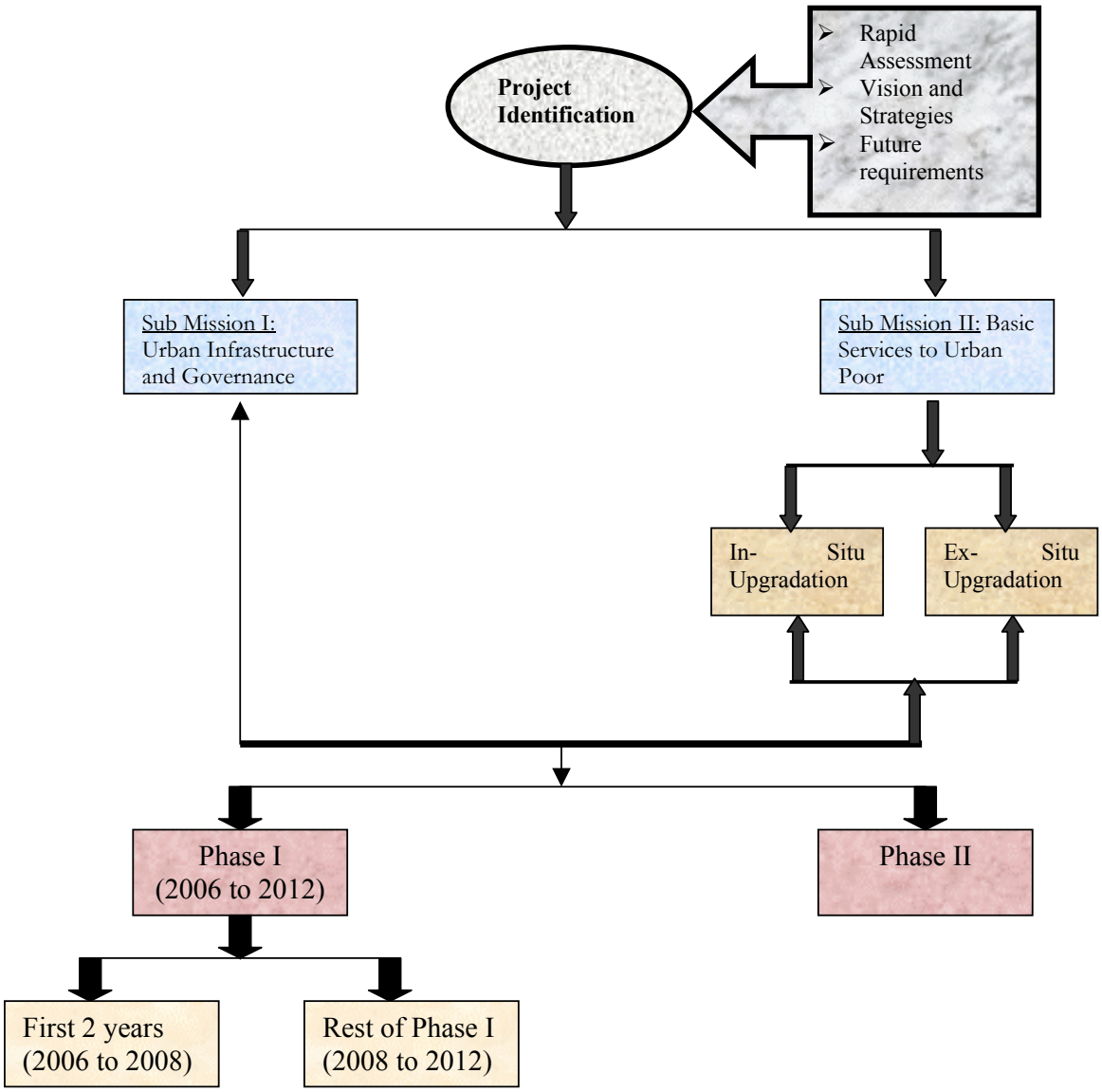
Using this equation, all projects have been valued on a ten-point scale against these two vectors and the quantified priorities achieved. In *Annex X11* are given classified projects for each sector. Depending on the aggregate score achieved, all projects have been put in three categories as follows:

- Low priority – aggregate score of 0-3;
- Medium priority – aggregate score of 4-6; and

- High priority – aggregate score of 7 and above.

Projects that are required to be completed in Phase I and costs likely to be incurred into their implementation have been determined. The share of contributions from the Centre and State governments and the ULB under the heads of (i) urban infrastructure and governance (50%/ 20% /30%), and (ii) basic services for urban poor (50%/ 50%), has been computed. Effort is being made on the part of Consultants towards determining sources (revenues, grants, foreign funding etc) to support the 30% funding to the projects from the concerned local body/ parastatal agency.

Figure 30: Graphical representation of the process of project identification



22 Urban Renewal

The ultimate aim of the mission is to ease out pressure from the city by way of urban renewal/ city regeneration. As a part of under renewal major emphasis has been given to decongestion of old city area, by shifting industrial/commercial activities especially wholesale activities from nonconforming to conforming areas i.e. from old city area to outskirts of the city. Major projects identified to decongest the core area include shifting of wholesale trade, paving the congested narrow lanes, proper traffic management, pedestrianization of Dashasvamedh ghat, improvement of ghat areas, etc.

Total amount estimated for Urban renewal is about **Rs. 62.71 Crores**. Identified projects under Urban Renewal and Environment are given in *Table 50* & *Map 13*.

Table 50: Projects Identified for Urban Renewal

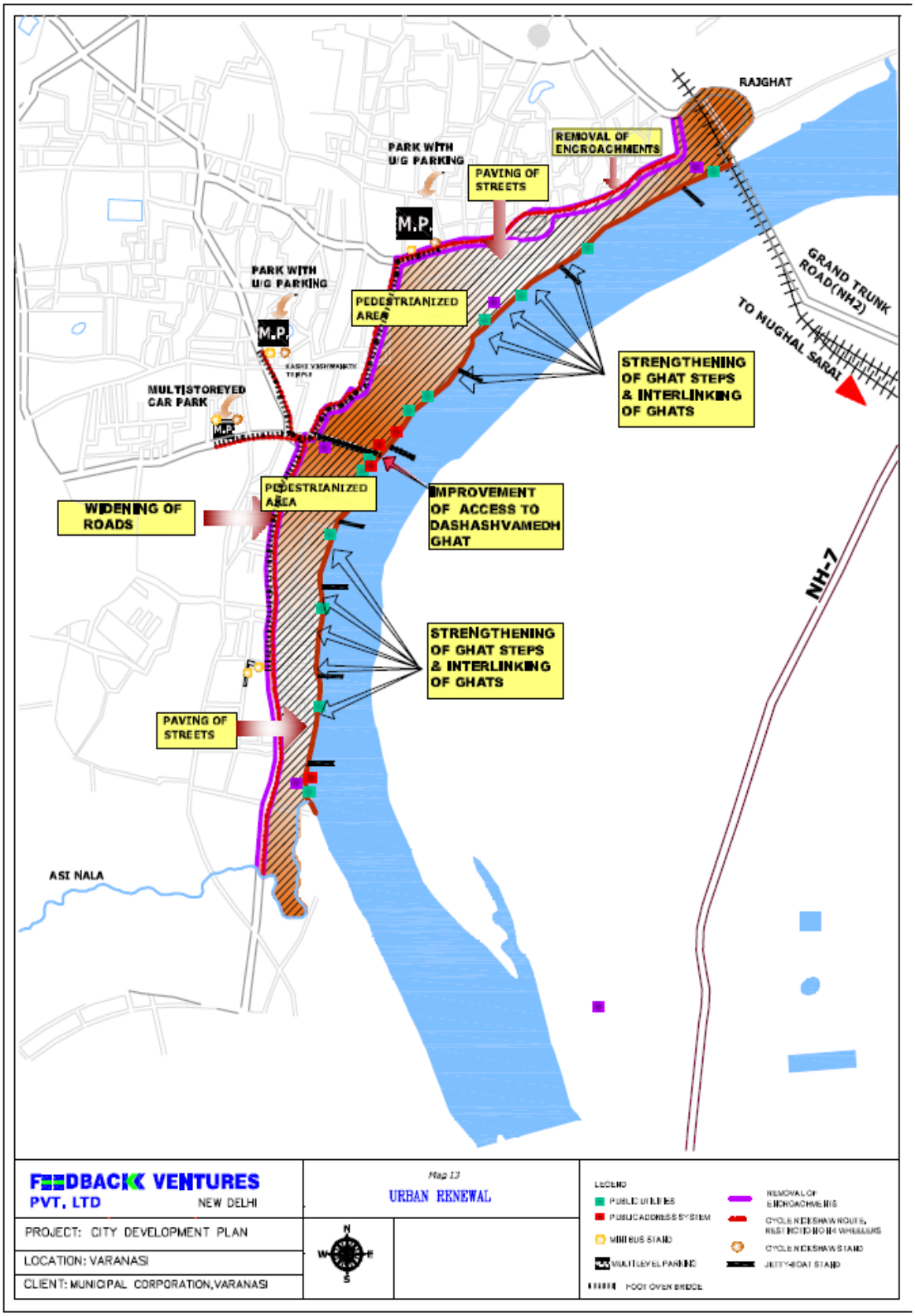
Projects	Location	Benefits	Sub Projects
Improvement of access to Dashashvamedh Ghat	Access road from Gaudauliya to Dashashvamedh Ghat	Improvement of the most prominent axis leading to Ghats	➢ Hard landscaping of access road from Gaudauliya to Ghat ➢ Street lighting ➢ Designed structures for selective informal sector ➢ Street furniture ➢ Storm water drains ➢ Specially designed waste bins
Provision of foot over bridge	Dashashvamedh Ghat to Maidagin	➢ Smooth pedestrian movement ➢ Reduced vehicular and pedestrian traffic conflicts	-
Widening of carriage way of roads	Roads leading to Ghats	Clearing of RoW	➢ Removal of encroachments ➢ Widening of carriage ways ➢ Provision of designated spaces for informal sector
Illumination and Street lighting along Ghats	From Asi Ghat to Rajghat	➢ Accessibility during night ➢ Safety ➢ Enhance the tourist attraction	--
Strengthening of existing fruit *Mandi* and relocation of wholesale *Mandi*	➢ Pandeypur Madi to be strengthened Relocation: ➢ Mohansarai ➢ Padav (Ramnagar) ➢ Wajidpur	➢ Decongestion of existing Mandi ➢ Decentralization of activities and traffic ➢ Proximity to regional railway stations	➢ Sheds ➢ Truck terminals ➢ Public utilities ➢ Link to road network
Provision of designed/	Along access roads to	➢ Provide proper	--

synchronized signages	prominent Ghats	Direction to major tourist points ➢ Source of revenue through advertising ➢ Increase the urban image of city	
Gaushalas to avoid cattle from entering the core city	Daniyalpur (Near Cantonment) Old City	➢ Restriction on movement of animals on Ghats & bye lanes ➢ Restricted movement of Stray animals in city	Shed for animals Fodder House Veterinary Clinic
Traffic Management Plan	Old city	Smooth traffic flow, reduced congestions	➢ Pedestrianization of stretches ➢ Identification of one way routes ➢ Provision of bollards to prevent entry of two wheelers ➢ Provision of designated spaces for informal sector
Strengthening of Ghat steps	Ghats	Safety of Pilgrims	➢ Rebuilding Ghat steps ➢ Reinforcing the foundation of steps to avoid further subsidence
Provision of Jetty on the Ghats	Along the major Ghats	➢ Create aesthetic look on the Ghats ➢ Increase in the space for taking baths on major Ghats ➢ Ease for tourists & pilgrimages for taking boats ➢ Need to be linked with prepaid counters.	➢ Construction of Jetty with railings and steps for access ➢ Viewing deck ➢ Signages ➢ Street furniture
Provision of 6 Slaughter Houses	Location to be decided by taking a radius of 4 km	➢ Environmental Improvement ➢ Increase cleanness of the area ➢ New modern shops with refreeze facility can be provided at the current site	➢ Slaughter House with proper infrastructure facilities ➢ Provision of proper bins for segregation of bio waste
Development of Small Industries Complex	Between railway line and road to Bhadoi	➢ Promotion of Small Scale Industries ➢ Design and product development center ➢ Handloom cluster Development	➢ Dyeing Industries ➢ Thread finishing industry ➢ Other small scale industries related to Handlooms

		Scheme	➢ Crafts center for weavers to display their skills ➢ Design and product development center. ➢ Railway Siding for future development ➢ Truck / Tempo stand ➢ Public Facilities ➢ CETPs

Table 51: Capital Investment and Phasing required for Urban renewal

URBAN RENEWAL									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultations)**
	First 2 years		**Rest of Phase I**						
	2006- 07	*2007- 08*	*2008 - 09*	*2009 -10*	*2010 -11*	*2011-12*			
Improvement of access to Dashashvamedh Ghat	9	22.5	18.5	-	-	-	-	**50**	**High**
Provision of Foot over Bridge		55	195	150	100	-	-	**500**	**High**
Widening of carriage way of roads leading to Ghats	11	19	23	23	-	-	-	**76**	**High**
Illumination and Street lighting along Ghats	17	29	35	35	-	-	-	**116**	**High**
Strengthening of Existing fruit mandi & relocation of wholesale mandi	-	-	758	1192	1181	-	-	**3131**	**High**
Provision of designed/ synchronized signages	6	14	10	10	10	-	-	**50**	**Medium**
Gaushalas to avoid cattle from entering the core city	-	5	20	25	-	-	-	**50**	**High**
Traffic Management plan for old city	-	18	45	37	-	-	-	**100**	**High**
Strengthening of Ghat steps	20	41	94	117	-	-	-	**272**	**Medium**
Provision of Jetty on the Ghats	100	300	400	500	200	-	-	**1500**	**High**
Provision of 6 Slaughter Houses	-	-	65	80	105	-	-	**250**	**Medium**
Development of Small Industries Complex	-	-	26	44	90	16	-	**176**	**High**
Total Cost	**163**	**503.5**	**1689.5**	**2213**	**1686**	**16**	**-**	**6271**	
Fund requirement for First 2 years	**666.5**								
Fund requirement for Rest of Phase I			**5604.5**						
Say Rs. 62.71 Crores									


RAJGHAT
REMOVAL OF ENCROACHMENTS
PARK WITH U/G PARKING
PAVING OF STREETS
M.P.
PARK WITH U/G PARKING
PEDESTRIANIZED AREA
GRAND TRUNK ROAD(NH2)
TO MUGHAL SARAI
STRENGTHENING OF GHAT STEPS & INTERLINKING OF GHATS
MULTISTOREYED CAR PARK
PEDESTRIANIZED AREA
WIDENING OF ROADS
IMPROVEMENT OF ACCESS TO DASHASHVAMEDH GHAT
NH-7
STRENGTHENING OF GHAT STEPS & INTERLINKING OF GHATS
PAVING OF STREETS
ASI NALA
FEEDBACK VENTURES PVT. LTD NEW DELHI
Map 13
URBAN RENEWAL
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION,VARANASI
LEGEND
PUBLIC UTILITIES
PUBLIC ADDRESS SYSTEM
MINI BUS STAND
MULTI LEVEL PARKING
FOOT OVER BRIDGE
REMOVAL OF ENCROACHMENTS
CYCLE RICKSHAW ROUTE, RESTRICTED NON MOTORISED VEHICLES
CYCLE RICKSHAW STAND
JETTY-BOAT STAND

23 Heritage and Tourism

Varanasi, is known for its cultural heritage, due to the presence of ghats and kunds. A major emphasis has therefore been given on development of ghats, which includes provision of lighting/illumination of ghats, provision of tourist information center, pre paid stand for boat riding, etc. ***(Map 14)*** Total cost estimated is about **Rs. 34 Crores**, towards the development of heritage areas. **Table 52** shows the projects identified for heritage development, their location, targets achieved, justification and facilities/sub projects.

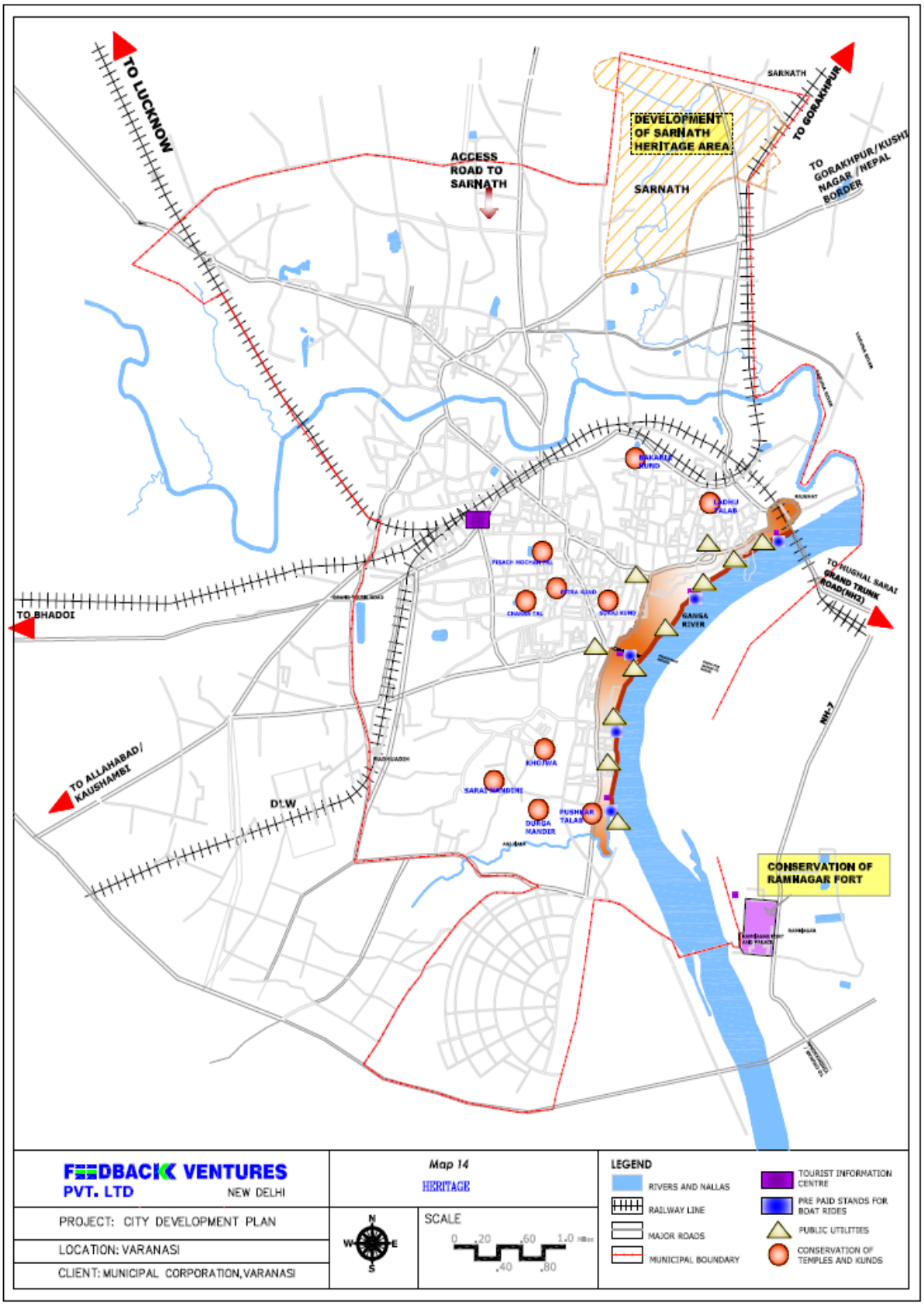
Table 52: Projects identified for Heritage Sector

Projects	Location	Benefits	Facilities / Sub Projects
Provision of Tourist Information Center	➢ Sarnath ➢ Cantonment railway station ➢ Bisheshwamesh Ghat	Tourist Orientation and promotion of important destinations in Varanasi	Booking offices for: Hotels Transport Information office Promotion centers
Upgradation of Kunds and Wetlands	➢ Ramkatora Kund ➢ Karna Ghanta Kund ➢ Kardhameshwar Kund ➢ Kurukshetra Kund ➢ Pisaach Mochan Kund ➢ Pittar Kund ➢ Pushkar Kund ➢ Sankul Dhara Kund ➢ Charka Tal ➢ Wetlands under threat	➢ Revival of Varanasi as a city of Kunds and Gardens ➢ Revival of traditional water bodies ➢ Replenishing Ground water recharge ➢ Tourist attraction	➢ Desiltation of Kunds ➢ Development of landscaped greens around the Kunds wherever possible ➢ Plantation on access roads to Kunds and around the Kunds (wherever possible) ➢ Construction of silt chamber to minimize silt entering the Kunds during rains ➢ Elevation of Kund Boundary ➢ Pucca steps along Kund Boundary ➢ Public Toilets ➢ Street Lighting ➢ Street Furniture
Improvement of *Galis* leading to Ghats	Lanes leading to prominent Ghats	➢ Tourist attraction ➢ Unique identity of each Ghat	➢ Painting of facades along the lanes in separate colors ➢ Traditional paintings on identified spots ➢ Provision of KC drains ➢ Façade improvement ➢ Paving of lanes ➢ Street lighting ➢ Drainage ➢ Street furniture

Pre paid stands for boat rides	Prominent Ghats	➢ Better management ➢ Uniformity in prices paid	-
Renovation and Beautification of Ghats	All ghats	➢ Tourist Attraction ➢ Heritage conservation	➢ Even raiser and treads on Ghats instead of existing steep risers and narrow treads ➢ Strengthening of steps in areas of subsidence
Provision of public utilities	All significant Ghats	➢ Better Hygiene ➢ Environmental Improvement	➢ Public toilets ➢ Changing rooms
Public address system	Major ghats	--	--
Light and Sound Show for the Ghats and Old city	--	Awareness regarding the significance and history of the Ghats and the city	--
Development of Panch Kosi Yatra Route	Panchkroshi road from Rajghat to Asi Ghat	➢ Heritage Walkway along Existing Yatra route ➢ Tourist attraction ➢ Improved facilities along route for pilgrims	➢ Development of dedicated pilgrim avenue on Panchkroshi road ➢ Provision of public amenities en-route ➢ Maintenance of destinations along the Yatra route ➢ Better Signages
Establishment of tourism village	Trans Ganga Area	Tourist attraction	➢ Planned layout ➢ Designed huts ➢ Tourist and public facilities
Provision of signages	All significant heritage and tourist areas	Tourist orientation Improved urban image	-
Night Lighting / Illumination	Tulsi Manas Mandir Sankat Mochan Mandir Significant Heritage structures	Highlighting prominent heritage structures	-

Table 53: Capital Investment and Phasing required for Heritage

HERITAGE & TOURISM									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years		**Rest of Phase I**						
	2006- 07	*2007 08*	*2008 - 09*	*2009 - 10*	*2010 -11*	*2011-12*			
Provision of Tourist Information Center at Cantt Rly Stn, Sarnath & Bisheshwamesh ghat	7	7	7	-	-	-	-	**21**	**High**
Upgradation of Kunds and Wetlands	150	50	75	75	100	-	-	**450**	**High**
Improvement of gali leading to ghats	130	70	70	70	60	-	-	**400**	**High**
Pre paid stands for boat rides	7	7	-	-	-	-	-	**14**	**Medium**
Renovation & beautification of ghats	280	60	150	150	200	-	-	**840**	**High**
Provision of public conveniences	100	50	50	50	50	-	-	**300**	**High**
Provision of public address System (Sound)	3	3	-	-	-	-	-	**6**	**Medium**
Provision of light and sound Shows	300	200	100	100	-	-	-	**700**	**Medium**
Development of Panch Kosi Yatra Route	148	100	102	100	-	-	-	**450**	**Medium**
Establishment of Tourism Village	-	50	50	50	-	-	-	**150**	**High**
Signages	20	20	20		-	-	-	**60**	**High**
Total Cost	**1145**	**617**	**624**	**595**	**410**	-		**3391**	
Fund requirement for First 2 years	**1762**								
Fund requirement for rest of Phase I			**1629**						
Say Rs. 34 crores									


TO LUCKNOW
ACCESS ROAD TO SARNATH
DEVELOPMENT OF SARNATH HERITAGE AREA
SARNATH
SARNATH
TO GORAKHPUR
TO GORAKHPUR/KUSHI NAGAR /NEPAL BORDER
TO BHADOI
TO ALLAHABAD/ KAUSHAMBI
DLW
TO NUGHAL SARAI GRAND TRUNK ROAD(NH2)
NH-7
GANGA RIVER
KHOJWA
DURGA MANDIR
PUSHKAR TALAB
CONSERVATION OF RAMNAGAR FORT
FEEDBACK VENTURES PVT. LTD NEW DELHI
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION, VARANASI
Map 14
HERITAGE
SCALE
LEGEND
RIVERS AND NALLAS
RAILWAY LINE
MAJOR ROADS
MUNICIPAL BOUNDARY
TOURIST INFORMATION CENTRE
PRE PAID STANDS FOR BOAT RIDES
PUBLIC UTILITIES
CONSERVATION OF TEMPLES AND KUNDS

24 Water Supply

Water supply sector shall involve an overall investment of **Rs. 381.35 Cores**. This includes renovation/rehabilitation/reorganization of existing facilities and Construction of new facilities. Renovation rehabilitation includes distribution system in 16 zones; damaged rising mains, reservoirs, booster pumps, existing water treatment plant etc. whereas in provision of new facilities will include construction of intake well near Garhwa ghat, construction of new WTP of 100mld capacity at Garhwa ghat, construction of storage reservoirs, rising mains and distribution system. Construction of 200 MLD capacity water treatment plant for trans Varuna area. Intake well of 225 MLD capacity has been proposed at Chaubepur at d/s of river Ganga and water treatment plant has been proposed in the central zone of Trans Varuna. It would include construction of rising mains, distribution system and electromechanical items like pumps and motors, electrical panels, transformers etc.

Components other than water supply system such as institutional development program, cost towards detail engineering and project management etc, which is necessary for proper operation and management of the system. A detailed list of projects with their location, targets that will be achieved by provision of these projects, justification of each project and facilities/ sub projects that will form the part of main project are given in the following table.

Table 54: Projects Identified under Water Supply component

Projects	Location	Benefits	Facilities / Sub Projects
RENOVATION/ REHABILITATION & REORGANISATION OF FACILITIES			
Reorganization and strengthening of intake works, repairing/ replacement of old pumps and installation of new pumps to enhance the pumping capacity up to 350 mld (App) including Electrical maintenance items, complete in all respect	Bhadeni Intake works	➢ Increase water intake from the perennial source ➢ Reduced Operation and Maintenance cost of existing pumps ➢ Increased capacity of intake pumps ➢ Reduction in losses at extraction ➢ Existing pumps are out dated and are running on 3 KV ➢ Regular maintenance of existing pumps leading to interrupted water supply to the city	➢ Installation of New Pump sets ➢ 11KV transformers and other electro-mechanical equipments ➢ Repairs of pump house/intake works (Civil work) ➢ Misc. items

Replacement of old pumps and motors at Bhelupur Water works	Bhelupur Water Works	➢ Increased water supply and pressure head ➢ Reduced dependence on ground water ➢ Extract more water from the perennial source and reduce ground water abstraction	Provision of booster pumps motors and generators
Rehabilitation of existing water works (60MLD)	60 MLD WTP at Bhelupur Water Works	➢ Improved treatment capacity ➢ WTP not in working condition	➢ Rapid gravity Filters ➢ Clarifloccutators ➢ Clear water reservoirs, etc. ➢ Provision of Settling tanks ➢ Replacement of filter media
Construction of Reservoirs	Extension areas	➢ Enhanced storage capacity ➢ With increase in water treatment capacity and to improve the supply level, storage will be required	Overhead tanks under Ground reservoirs
Conversion of old slow sand filters of size 60m x 30m x 2m into clear water reservoir to enhance storage capacity.	Bhelupur water works	➢ Enhanced storage capacity ➢ Enhancement of Storage capacity since the slow sand filter is not in use	Change of filter beds Conversion of filter bed/filter house in to storage tanks
Distribution System in 16 zones, replacement of old, damaged and in adequate pipes by new one.	Entire city	➢ Adequate water supply to the city due to reduction in losses ➢ Clean potable water supply to the city ➢ Distribution system is very old and deteriorated ➢ Avoid heavy losses and contamination of water	➢ Removal of old damaged pipes by new one ➢ Replacement of small and inadequate pipe by bigger diameter pipes ➢ Reorganization of pipe network
NEW CONSTRUCTIONS			
Construction of Raw water intake works of 110 MLD	Garhwa ghat	➢ Enhanced raw water intake ➢ Required for the future population and reduction of ground water usage	➢ Setup of new water intake works ➢ Pump sets ➢ Electromechanical equipments etc

Provision of new 100 MLD Water Treatment Plant	Garhwa Ghat	➢ Enhanced treatment capacity to meet the additional & future demands ➢ Future requirement of the city ➢ Reduced dependance on ground water	➢ Construction of treatment plant ➢ Clear water storage reservoir cover head & under ground ➢ Rising Main
Construction of Raw water intake works of 225 MLD	Chaubeypur	➢ Enhanced raw water intake ➢ Required for the future population and reduction of ground water usage	➢ Setup of new water intake works ➢ Pump sets ➢ Electromechanical equipments etc
Provision of new 200 MLD Water Treatment Plant	Trans Varuna	➢ Enhanced treatment capacity to meet the additional & future demands ➢ Future requirement of the city ➢ Reduced dependance on ground water	➢ Construction of treatment plant ➢ Clear water storage reservoir cover head & under ground ➢ Rising Main
Provision of distribution lines in unserved areas	Unserved areas	➢ Access to clean potable water to all ➢ Lack of water supply network ➢ Upcoming peripheral developments	Laying of new Distribution System Interconnection with existing system
Rising Mains for raw water and clear water supply	➢ Intake wells to treatment plants ➢ Treatment plant/ clear water storage tanks to overhead tanks	➢ Pumping of raw water from intake works to water works ➢ Pumping of treated clear water to overhead storage tanks and pipes. ➢ Enhanced treatment capacity will require adequate facilities	Rising mains
Storage/ Service reservoirs at different required locations	Extension areas and unserved areas	➢ Enhanced storage capacity ➢ With increase in water treatment and supply level more storage will be required	Construction of OHTs and underground storage reservoirs

Phasing out of existing deep tube wells after completion of their useful life	--	➢ Reduction in the extraction of ground water ➢ To reduce the dependency on ground water	--

Table 55: Capital Investment required for Water Supply Projects

RENOVATION/ REHABILITATION & REORGANISATION OF FACILITIES									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years		**Rest of Phase I**						
	2006-07	*2007-08*	*2008 - 09*	*2009 - 10*	*2010 - 11*	*2011-12*			
Existing Raw water pumping plants reorganization and strengthening of intake works, repairing, replacement of old pumps and installation of new pumps to enhance the pumping capacity up to 350 mld (App) including E/M items, complete in all respect	250	250	-	-	-	-	-	**500**	**High**
Replacement of old pumps and motor at Bhadeni Intake works	50	50	-	-	-	-	-	**100**	**High**
Water treatment plant (Settling tanks/, clariflocculators etc.) Rapid gravity filter of existing plant, this includes repairing of system and the replacement of filter media	100	150	150	100	-	-	-	**500**	**High**
Storage Reservoirs	-	50	100	-	-	-	-	**150**	**High**
Conversion of old slow sand filters of size 60m x 30m x 2m into clear water reservoir to enhance storage capacity of Bhelupur water works by 36 mld, 10 nos	150	250	350	-	-	-	-	**750**	**High**
Distribution System in 11 zones, replacement of old, damaged and in adequate pipes by new one. Good conditioned, old pipe to be provided at the required places including civil works.	500	1000	1000	1000	300		-	**3800**	**High**
Rising mains, replacement of old, damaged and in adequate pipes by new one	50	50	50	-	-	-	-	**150**	**High**
Tube Wells	450	350	-	-	-	-	-	**800**	**High**
Booster pumps, pipes and accessories for clear water as per design requirement.	-	-	-	100	100	-	-	**200**	**High**
O&M of Existing water works	450	450	500	500	500	-	-	**2400**	
Sub Total 1	**2000**	**2600**	**2150**	**1,700**	**900**	**0**	0	**9350**	

CONSTRUCTION OF NEW FACILITIES									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years		**Rest of Phase I**						
	2006- 07	*2007 08*	*2008 - 09*	*2009 -10*	*2010 -11*	*2011-12*			
Construction of Intake well near Garhwa Ghat of 115 mld capacities with all required E/M works including power sub station as per design	-	-	200	500	500	-	-	**1200**	**High**
Construction of 100.00 mld water treatment plant at as per the detailed design.	-	-	-	500	900	-	-	**1400**	**High**
Construction of 200MLD water treatment plant including intake works, treatment units of 200MLD, rising main and distribution systems, etc. as per detailed design for trans Varuna area including staff quarters in Varuna area	800	1600	3000	2400	200	-	-	**8000**	**High**
Rising main, for raw water and clear water as per the detailed design	-	-	-	250	400	-	-	**650**	**High**
Rising mains to pump raw water from intake works to treatment plant and treated clear water to OHTs at different locations in the city as per the detailed designfor Cis Varuna Areas	-	-	500	1500	1500	-	-	**3500**	**High**
Distribution system including all the accessories, Public Connections, water meters and staff quarters etc.	1000	1500	1500	1500	500	-	-	**6000**	**High**
Replacement of old pumps and other mechanical equipments of water supply system	-	-	-	50	100	-	-	**150**	**High**
Installation of Booster Pumps as per the requirements and detailed design including electro-mechanical items, complete in all respect	-	-	-	100	150	-	-	**250**	**High**
Storage reservoirs and pump houses as per the detailed design.	-	-	500	1500	1000	-	-	**3000**	**High**
Sub Total 2	**1800**	**3100**	**5700**	**8300**	**5250**	**0**	**0**	**24150**	

OTHER FACILITIES									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years		**Rest of Phase I**						
	2006- 07	*2007 08*	*2008 -09*	*2009 -10*	*2010 -11*	*2011-12*			
Rain water harvesting arrangement (L.S.)	500	250	250	500	-	-	-	1500	**High**
Power Connection Charges	-	300	400	300	-	-	-	1000	**Medium**
Inventory of the existing scheme @ Rs. 2000.00 per km	200	500	500	-	-	-	-	1200	**Low**
Layout planning, designing, and preparation of DPR (Lump Sum).	35	-	-	-	-	-	-	35	**Low**
Generator set to provide supply during the no supply Hours of the electricity	150	150	-	-	-	-	-	300	**Medium**
Unforeseen items	20	20	20	20	20	-	-	100	**Low**
Construction super vision	-	-	-	100	100	-	-	200	**High**
Training & Capacity building, asset creation, and Information, Education & Awareness	50	100	50	50	50	-	-	300	**Medium**
Sub Total 3	**955**	**1320**	**1220**	**970**	**170**	**0**	**0**	**4635**	
GRAND TOTAL (1+2+3)								**38135**	
Fund requirement for First 2 years	**11775**								
Fund requirement for Rest of Phase I			**26360**						
Say Rs. 381.35 Crores									

25 Sewerage and Sanitation

Projects identified under sewerage are categorized as renovation/rehabilitation and provision of new facilities. The sewerage network covers only 30%of the city, an emphasis has been given for the provision of branch and trunk sewers to cover the entire city by underground sewerage system.

As part of proposals, short-term and long-term measures are given, which includes renovation and rehabilitation of existing facilities and construction of new facilities. Total investment required for sewerage system is estimated at about **Rs. 864.40 crores**. A detailed list of projects are given in ***Table 56***:

Table 56: Projects Identified for Sewerage Sector

Projects	Location	Benefits	Facilities / Sub Projects
Renovation, rehabilitation and reorganization of existing sewerage system of the city	Where there is a need, through out the city	➢ Adequate, Improved and sustainable sewer infrastructure. ➢ Improved collection and transportation of sludge. ➢ Improved and clean environment ➢ Avoid water logging in the city. ➢ Reduced seepage to ground. ➢ Facilities needed for enhancement of existing as well as proposed sewerage facilities ➢ To stop pollution of Rivers Ganga and Varuna. ➢ Avoid seepage of sewage into ground water ➢ Enhancement of life standards	➢ Rehabilitation, renovation and reorganization of branch and lateral sewers ➢ Cleaning of existing sewers ➢ Renewal and up gradation of existing community latrines and bathrooms. ➢ Trunk sewers, Pumping stations, treatment plants, Rising mains, Electro-Mechanical works etc. that has not been taken in JICA. (Cost is based on the preliminary calculations)

Construction of new facilities	For the extension areas Present areas of the city, wherever there is necessity	➢ Complete coverage of the city by underground sewer network ➢ Effective collection and transportation and disposal of sewage to treatment plant ➢ Less pollution of rivers like Ganga and Varuna ➢ Upliftment of standard of livening in slum areas of the city ➢ Avoid water logging in the city ➢ Facilities will be needed for enhancement of existing as well as proposed sewerage facilities ➢ To stop pollution of Rivers Ganga and Varuna by avoiding disposal of sewage in the river ➢ Prevent ground water contamination due to seepage of sewage water ➢ Complete coverage of the city by underground sewer network	➢ Construction of branch and lateral sewer only, which is not considered in JICA Master Plan. ➢ Interconnection of proposed sewer with existing system ➢ Extension of relief trunk sewers ➢ Provision of rising mains, main pumping stations, wherever required as per the design ➢ Construction of community toilets and bathrooms for slum dwellers in existing areas as well as for the new areas ➢ Provision of Diesel generators to operate the system during non supply hours ➢ Construction of new 200 MLD STP Rising Mains and trunk Sewers proposed under JBIC
Development/ introduction of GIS system	For the entire city	➢ Central monitoring and management of system including leakage detection ➢ Make system more Transparent and accessible to every citizen of Varanasi ➢ Present system will be enhanced and better facilities will be provided to the citizens of Varanasi	➢ Complete package of GIS system including inventory, digitization of network, creation of different maps etc. ➢ Proper training to staff of Jal Nigam for better operation and maintenance of the system

Inventory of the existing scheme, Layout planning, designing, and preparation of DPR	For the entire city	➢ Complete database of the assets created till date and also for the assets of the future ➢ Implementation of project will create a complete database of the system and maps can also be prepared	Inventorisation of the system / collection, transportation network and treatment system. Recording and analysis of existing infrastructure of sewerage and sanitation system
Training & Capacity building, Information, Education & Awareness creation program	For the entire city	➢ Proper knowledge about the operation and maintenance of the system ➢ Awareness among people, towards pollution free future ➢ Need to educate people towards pollution prevention of Rivers like Ganga and Varuna	➢ Training programs for the staff on different aspects of operation and maintenance ➢ Roadside plays and distribution of pamphlets towards awareness program ➢ Conducting workshops in schools to create awareness among young children ➢ Procurement of required equipments ➢ Plays to spread awareness amongst the community

Table 57: Capital Investment and Phasing required for Sewerage projects

RENOVATION/ REHABILITATION AND REORGANIZATION WORKS									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years		**Rest of Phase I**						
	2006- 07	*2007 08*	*2008 -09*	*2009 -10*	*2010 -11*	*2011-12*			
Branch sewers and laterals	1000	2000	2000	-	-	-	-	**5000**	**High**
Trunk sewers, Pumping stations, treatment plants, Rising mains, E/M works etc. that has not been taken in JICA.(Cost is based on the preliminary calculations)	500	1000	-	-	-	-	-	**1500**	**High**
Existing sanitation facilities like community latrines, and bathrooms, etc.	50	-	-	-	-	-	-	**50**	**High**
Sub Total 1	**1550**	**3000**	**2000**	**0**	**0**	**0**	**0**	**6550**	**High**
NEW CONSTRUCTION OF FACILITIES									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years		**Rest of Phase I**						
	2006- 07	*2007 08*	*2008 -09*	*2009 -10*	*2010 -11*	*2011-12*			
Branch sewers and laterals, pumping plant wherever required, E/M items complete in all for the complete city	2000	5000	5000	5000	10000		-	**27000**	**High**
Staff quarters @ 3%of total works.	500	500	-	-	-	-	-	**1000**	**High**
Construction of 200MLD STP Rising Mains and trunk Sewers proposed under JBIC	2000	10385	10385	10385	10385		-	**43540**	
Sub Total 2	**4500**	**15885**	**15385**	**15385**	**20385**		**-**	**71540**	**High**
OTHER FACILITIES									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years		**Rest of Phase I**						
	2006- 07	*2007 08*	*2008 -09*	*2009 -10*	*2010 -11*	*2011-12*			
Mechanical equipment needed for the cleaning of Sewers (L.S.)	150	150	100	-	-	-	-	**400**	**High**
Inventory of the existing scheme, Layout planning, designing, and preparation of DPR	20	20	-	-	-	-	-	**40**	**High**
Training & Capacity building, asset creation, and Information, Education & Awareness @1.5%.	80	80	80	160	160		-	**560**	**High**
Misc. items, contingencies, T&P, OH &CP @ 20% complete in all.	1050	1050	1050	2100	2100		-	**7350**	**Medium**
Sub Total 3	**1300**	**1300**	**1230**	**2260**	**2260**	-	-	**8350**	
TOTAL COST (1+2+3)	**7350**	**20185**	**18615**	**17645**	**22645**	-	-	**86440**	
Say Rs. 864.4 Crores									
Fund requirement for First 2 years	**27535**								
Fund requirement for Rest of Phase I			**58905**					**86440**	
GRAND TOTAL	***Say Rs. 864.40 Crore***								

26 Storm Water Drainage

Presently there is no separate system for storm water drainage, which creates havoc during the rainy season. Planning designing of drainage system calls for prepreaing an inventory of existing drains, provision of new drainage network, mechanical equipments required for cleaning drains, etc. Total estimated cost for Drainage system is about **Rs. 305 Crores**. A detailed list of projects are given in ***Table 58:***

Table 58: Projects Identified for Drainage Sector

Projects	Location	Benefits	Facilities / Sub Projects
Rehabilitation/ renovation of existing drains and separation from sewerage system	• Old city • Central city • Other areas with unlined drains	➢ Proper drainage network will be placed in the city ➢ Avoid water logging ➢ Separate water supply and sewerage network ➢ Reduced ground water contamination	➢ Augmentation and improvement of all the existing secondary drains.
Construction of new drains in unserved areas and areas wherever there are no drains	Entire city, wherever there is a need of drains	➢ Proper drainage network ➢ Separate system will be in place ➢ Reduction in seepage of drain water in to the ground ➢ Reduction in ground water contamination ➢ Reduction of pressure on existing water treatment plants ➢ Reduced water logging	➢ Lining of the unlined/kacha secondary drains (along the road and street sides) ➢ Lining of the unlined primary Drains/Nalas ➢ Construction of new secondary drains along the road and street sides ➢ Construction of pumping stations to pump water from low lying areas ➢ Augmentation and improvement of all the existing primary Drains / Nalas and realignment wherever required. ➢ Reduced burden on sewage network

Table 59: Capital Investment and Phasing required for Drainage projects

STORM WATER DRAINAGE									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years		**Rest of Phasse I**						
	2006- 07	*2007 08*	*2008 -09*	*2009 -10*	*2010 -11*	*2011-12*			
Total cost of complete drainage network including rehabilitation, renovation of existing drainage, construction of new drains, pumping system etc (complete in all respect)	1500	5500	5500	6000	6000	5500	-	**30000**	**High**
Mechanical equipment needed for the cleaning of Drains (L.S.)	50	50	-	-	-	-	-	**100**	**Medium**
Inventory of the existing drains, Layout planning, designing, And preparation of DPR (Lump Sum)	50	-	-	-	-	-	-	50	**Medium**
Total	**1600**	**5550**	**5500**	**6000**	**6000**	**5500**	**-**	30150	
Construction super vision @ 1.00%	45	45	45	90	90	-	-	**315**	**High**
Training & Capacity building, asset creation (L.S.)	7	7	7	14	15	-	-	**50**	**Low**
Total Cost	**1652**	**5602**	**5552**	**6104**	**6105**	**5500**	**0**	**30515**	
Fund requirement for First 2 years	**7254**								
Fund requirement for Rest of Phase I			**23261**						
Say Rs. 305.15 Crores									

27 Solid Waste Management

Major component of investment in solid waste management are primary and secondary collection infrastructure (dustbins and vehicles), transportation and sanitary disposal facilities. Estimation of various components is based on CPHEEO manual for Municipal solid waste management. Presently per capita solid waste generated is 425gm and the total waste generated is about 600MT. Taking into account the annual growth rate in per capita solid waste generation as 1.33% (as per Planning Commission), per capita waste generation in 2031 would be about 591gm/capita/day. As per the population projections made in chapter 3, total population of the city would be 25,74,365 in the year 2031 and total waste generated would be about 1522MT.

Capital investment required is estimated for infrastructure requirement to collect and transport waste generated in future i.e. 1522MT. In addition, investment required for setting up sanitary engineered waste disposal facility is also estimated. Total estimated cost for solid waste management is about **Rs. 43.08 Crores**. A list of identified projects under Solid waste management is given in ***Table 60***. Details for solid waste management equipment, etc. are given in *Annex IX*.

Table 60: Projects Identified for Solid Waste Management Sector

Projects	Location	Benefits	Facilities / Sub Projects
Provision of collection bins	On major roads, markets, intersections and throughout the city	➢ Minimization of litter on streets ➢ Proper collection of waste ➢ Presently there are Dustbins in the city and the litter is thrown everywhere	Small collection bins Platform for dustbins
Incinerator for hospital waste, complete with chimney and civil works etc. (100kg/hr. capacity)	Near Bharthara	➢ Treatment facility for biomedical waste ➢ Segregation and proper treatment of biomedical waste	-
Provision of sanitary landfill site	➢ Baniyapur (On Azamgarh Road) ➢ Ramna (Near Byepass)	➢ Sanitary waste disposal ➢ Reduced ground water pollution ➢ Proximity to ring road ➢ Out of planning area boundary ➢ Proposed landfill site as per Master Plan	Segregation facility

Provision of composting site for decomposition of waste through wind rows and vermi composting	Baniyapur (On Azamgarh Road) Ramna (Near Byepass)	➢ Reduced burden on landfill ➢ Composting of waste from vegetable, fruit and grain markets ➢ Near proposed landfill site ➢ Manure can be sold at subsidized rates to farmers in the vicinity	➢ Vermi composting pits ➢ Concrete plinth to avoid leaching
Covered trucks for waste collection	--	Hygienic waste transportation and management	--
Palletization of waste for use as industrial fuel	As decided by MCV	➢ Reduced pressure on Landfill site ➢ Minimal involvement required from MCV ➢ Site identified by MCV	--
Segregation and storage of waste	--	Better solid waste management --	IEC and mass awareness

Table 61: Capital Investment and Phasing required for Solid Waste Management

SOLID WASTE MANAGEMENT									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 Years		**Rest of Phase I**						
	2006- 07	*2007 08*	*2008 -09*	*2009 -10*	*2010 - 11*	*2011-12*			
Dumper Placer Containers of 4.5 cubic meter capacity each	20	40	40	60	40		-	**200**	**High**
Incinerator for hospital waste, complete with chimney and civil works etc. (100kg/hr. capacity)	50	50	-	-	-	-	-	**100**	**High**
Development of landfill sites	50	100	50	-	-	-	-	**200**	**High**
Compost plant with all accessories	0	100	200	250	150	-	-	**700**	**High**
Mechanical Equipments like						-	-		
➢ Dumper Placer with handle						-	-		
➢ Tractors						-	-		
➢ Hydraulic tractor tipping trolley						-	-		
➢ Platforms and ramping for tipping trolleys						-	-		
➢ Skip Lifter for construction debris	50	250	250	250	200	-	-	**1000**	
➢ Skips of 7 cubic meter capacity						-	-		
➢ Hand Carts, JCV, Tipper, Hopper, Loaders						-	-		
➢ Medical waste collection vehicle with fully equipped. etc						-	-		**High**
Depot for the vehicle	-	25	25	25	-	-	-	**75**	**Medium**
Misc. and unforeseen items	5	5	6	5	7	-	-	**28**	**Medium**
Peletisation	50	450	550	550	300	-	-	**1900**	**High**
Total	**225**	**1020**	**1121**	**1140**	**697**	**0**	**0**	**4,203**	
Capacity building and awareness programs, @ 2.50%	5.625	25.5	28.025	28.5	17.425	-	-	**105.08**	**Medium**
Grand Total	**231**	**1,046**	**1,149**	**1,169**	**714**	**0**	**0**	**4,308**	
Fund requirement for First 2 years	**1,276.13**								
Fund requirement for Rest of Phase I			**3031.95**						
Say Rs. 43.08 Crores									

28 Urban Transport

The projects identified under urban transport are estimated to cost Rs **838.61 Crores**. The identified projects include provision of underground parking at identified parks, construction of flyovers, improvement of road geometrics and signalization of intersections, etc. *(Map 15*). Proper implementation of the projects will lead to availability of parking spaces throughout the city, specifically core area, along with decongestion of core area, improved traffic movement, creation of pedestrian friendly environment (especially in core area), reduction in traffic jams and accidents, increased capacity of roads, and overall better management of traffic throughout the city.

A detailed list of projects with their location, targets that will be achieved by provision of these projects, justification of each project and facilities/ sub projects that will form the part of main project are given in the **Table 62**.

Table 62: Projects identified for Urban Transport

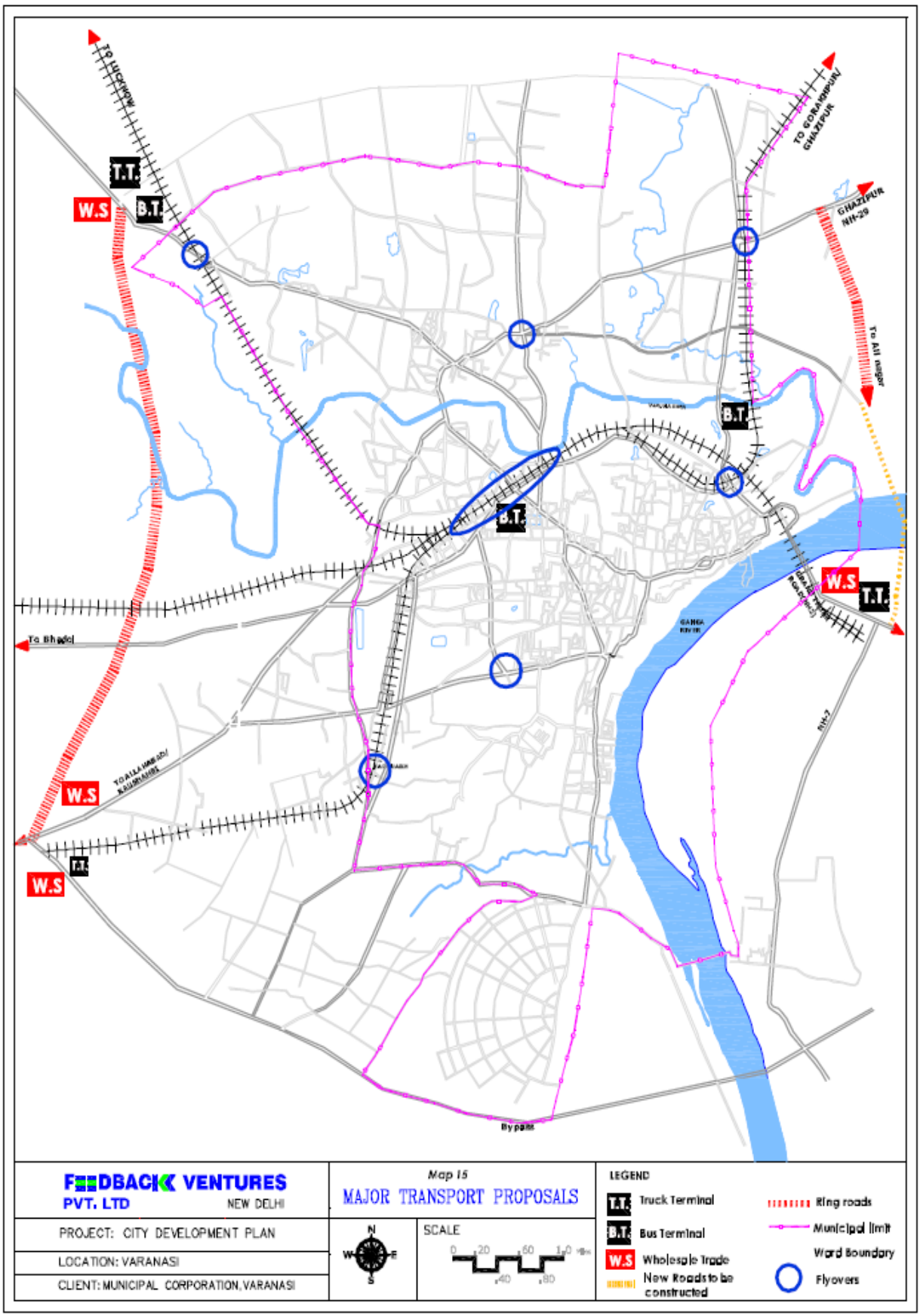
Projects	Location	Benefits	Sub Projects
Construction of Ring Road			
Construction of Ring Road	Provision of outer ring road connecting NH2, NH56 & NH29	➢ Reduction of through traffic ➢ Reduced traffic on NH2 ➢ Direct access to traffic of Trans Varuna area (without entering central city)	Provision of flyovers over railway lines and arterial roads (NH&SH)
Construction of new roads			
30 m wide road (extension of Panchkosi road)	Panchkosi road Towards Mughal Sarai	➢ Use of existing Urban resource in congested area	➢ Construction of bridge over Ganga downstream of existing Malviya (railway) bridge
Widening of roads			
Widening and improvement of the roads	The roads, which are maintained by MCV (100 nos.)	➢ Increased capacity of roads. ➢ Improved urban aesthetics	➢ Resurfacing of roads. ➢ Widening
Flyovers			
Construction of 7 Flyovers at 3 intersections and 4 railway crossings	1. Pandeypur Intersection 2. Lahartara to Chauka Ghat. 3. RathYatra **ROB/RUB** 4. Hassanpur Rly Crossing 5. Kazakpura Rly Crossing 6. Shivpur Rly	Increased capacity of intersection and smooth traffic flow	--

	crossing 7. Ashapur Rly Crossing		
Construction of Subways			
Construction of sub-way at GT Road	At GT Road between Cantt Railway Station and Cantt Bus terminal	Smooth vehicular and pedestrian movement and safety	-
Multilevel parking			
Provision of 9 multilevel parking with integrated Parking for Rickshaws and Mini buses	1. Beniya Park 2. Maidagin/Town Hall 3. Machodri Park 4. Shaheed Park (Sigra) 5. Commissionaire / Collectorate 6. Chitranjan Aprk near Dashashvamedh Ghat 7. Railway Station 8. Cantt. Bus Terminal 9. Saraswati Cinema	Decongestion of old and central city	Provision of underground parking below parks Proper maintenance of parks and parking areas through PPP
Traffic Management			
Traffic Management Plan for Old City area.	Core city	Decongestion of old city	➢ Traffic management schemes (one-way.etc) ➢ Only cycle rickshaws to be permitted
Intersection improvement			
Geometric improvement of 48 identified intersection	48 intersections *(Annex X)*	Smooth flow of traffic and reduction of accidents.	--
Signalization of Junctions	6 intersections	Improved Traffic management	--
Bus terminals			
Capacity augmentation of the existing Cantt Bus Terminal	On G.T Road infront of Railway station.	Integrated facility of bus and railway for the passengers.	Efficient traffic management plan of the entire area with proper integration with railway station.
Two New bus terminal	1. Towards NH-56 2. On the Sarnath Road	Shifting the load from the cantt Bus terminal decentralization concept	Development and construction of the terminal.
Truck terminals			
Capacity augmentation	Pahadia fruit market	Better management and improved	Extension of existing facility.

		efficiency.	
Relocation of the temporary truck terminal from Visheshwar ganj	On NH-2 towards Mugalsarai side.	For better traffic management and decongestion of the core area. Reduction in accidents.	Construction of new facility integrated with wholesale market.
Provision of new Truck terminal	On NH-56	To decentralize the wholesale market activities and better traffic management.	Construction of new facility integrated with wholesale market
Provision of new Truck terminal	At the intersection of Mugalsarai bypass and old G.T Road.	To decentralize the wholesale market activities and better traffic management.	Construction of new facility integrated with wholesale market
Provision for Public Transport			
Bus terminals for public transport to be provided at 4 locations	Routes already identified. *(Annex XI)* 1. Mughal Sarai 2. Babatpur 3. Chaubepur and 4. MohanSarai	Provision of efficient and cheap transport system for city	Provision of bus Stops Street Furniture at Bus stops Kiosks
One workshop for Public Transport	At Mohan Sarai or Babatpur	Better maintenance of vehicles	--
Street Lightning			
Provision for street Lightning	➢ Lighting at Ghats ➢ Lighting of approach lanes ➢ Lighting on main roads ➢ High mast and semi high mast at different crossings ➢ Hydraulic ladder and jeep ladder for maintenance work ➢ Street line wire with automatic switch.	Reduction in accidents and improved aesthetics	High mast light
Construction of Bridges			
Construction of 2 bridges	➢ Samne Ghat ➢ Balua Ghat	Improved access to Ramnagar area	-

Table 63: Capital Investment required for Urban Transport projects

Transport									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years		**Rest of Phase I**						
	2006- 07	*2007 08*	*2008 -09*	*2009 -10*	*2010 -11*	*2011-12*			
Construction of Ring Road	0	500	1000	2000	6500	-	-	**10000**	**High**
Widening and improvement of Nagar Nigam Roads	500	1000	1500	1500	1500	-	-	**6000**	**High**
Construction of 7 Flyovers at 3 intersections and 4 Railway Crossings	100	1000	3000	5506	5394	-	-	**15000**	**High**
Construction of sub-way at GT Road between Cantt Rly Stn and Cantt Bus terminal	10	190	200	-	-	-	-	**400**	**High**
Provision of 11 multilevel parking with integrated Parking for Rickshaws and Mini buses	300	3300	4300	4300	4300	-	-	**16500**	**High**
Traffic Management Plan for Old City area.	-	10	15	-	-	-	-	**25**	**Medium**
Geometric improvement of 48 identified intersection	-	378	422	-	-	-	-	**800**	**High**
Signalization of 6 intersections	-	36	-	-	-	-	-	**36**	**Medium**
Capacity augmentation of the existing Cantt Bus Terminal, Two New bus terminal	154	558	550	672	566	-	-	**2500**	**High**
Capacity augmentation of Pahadia Truck terminal & Provision of 3 new Truck terminal.	216	836	855	893	700	-	-	**3500**	**Medium**
Bus terminals for public transport to be provided at 4 locations.	425	1187	1288	250	250	-	-	**3400**	**High**
Provision for street Lightning	202	767	731	200	100	-	-	**2000**	**Medium**
30.Mts wide Road (Extension of Panchkoshi Road including bridge on Ganga)	988	3082	5425	4505	1000	-	-	**15000**	**High**
Two Bridges on Ganga at Samne Ghat & Balua Ghat	500	1500	2000	3000	1700	-	-	**8700**	**High**
Total	**3395**	**14344**	**21286**	**22826**	**22010**	**0**		**83861**	
Fund requirement for First 2 years	**17739**								
Fund requirement for Rest of Phase I			**66122**						
Say Rs. 838.61 crores									


TO LUCKNOW
T.T.
W.S
B.T.
TO GORAKHPUR/ GHAZIPUR
GHAZIPUR NH-29
To Allahabad
B.T.
B.T.
W.S
T.T.
To Bhadoi
GANGA RIVER
NH-2
TO ALLAHABAD/ RAJMARG
W.S
T.T.
W.S
Bypass
FEEDBACK VENTURES PVT. LTD NEW DELHI
Map 15
MAJOR TRANSPORT PROPOSALS
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION, VARANASI
N
W
E
S
SCALE
0 20 60 1.0 Km
40 80
LEGEND
T.T. Truck Terminal
B.T. Bus Terminal
W.S Wholesale Trade
New Roads to be constructed
Ring roads
Municipal limit
Ward Boundary
Flyovers

29 Environment & Beautification:

The river eco-system is facing pressure from the increasing population in the riverfront heritage zone and also from other parts of the city from where sewage flows directly into the river. It is also facing pressure from the pollutant agricultural run-offs from villages around the city. However, approximately 80% of the pollution in River Ganga at Varanasi is urban waste. Around 60% of the total overall pollution concentrates in the Riverfront and nearby Old City heritage zone of Varanasi. Due to contamination of water, water borne diseases are common in this area. Increasing population is over burdening the carrying capacity of urban environment; the river ecosystem and unplanned mass tourism could potentially have a disastrous impact on the cultural carrying capacity of the old city center and the river ecosystem. Ultimately there is an urgent need to re-vitalize the city with re-establishing the ecological ordering by promoting civic sense and active public participation.

Total amount estimated for Environment and beautification is about **Rs. 12.22 Crores**. Identified projects under Environment and Beautification are given in **Table 64 and Map 16.**

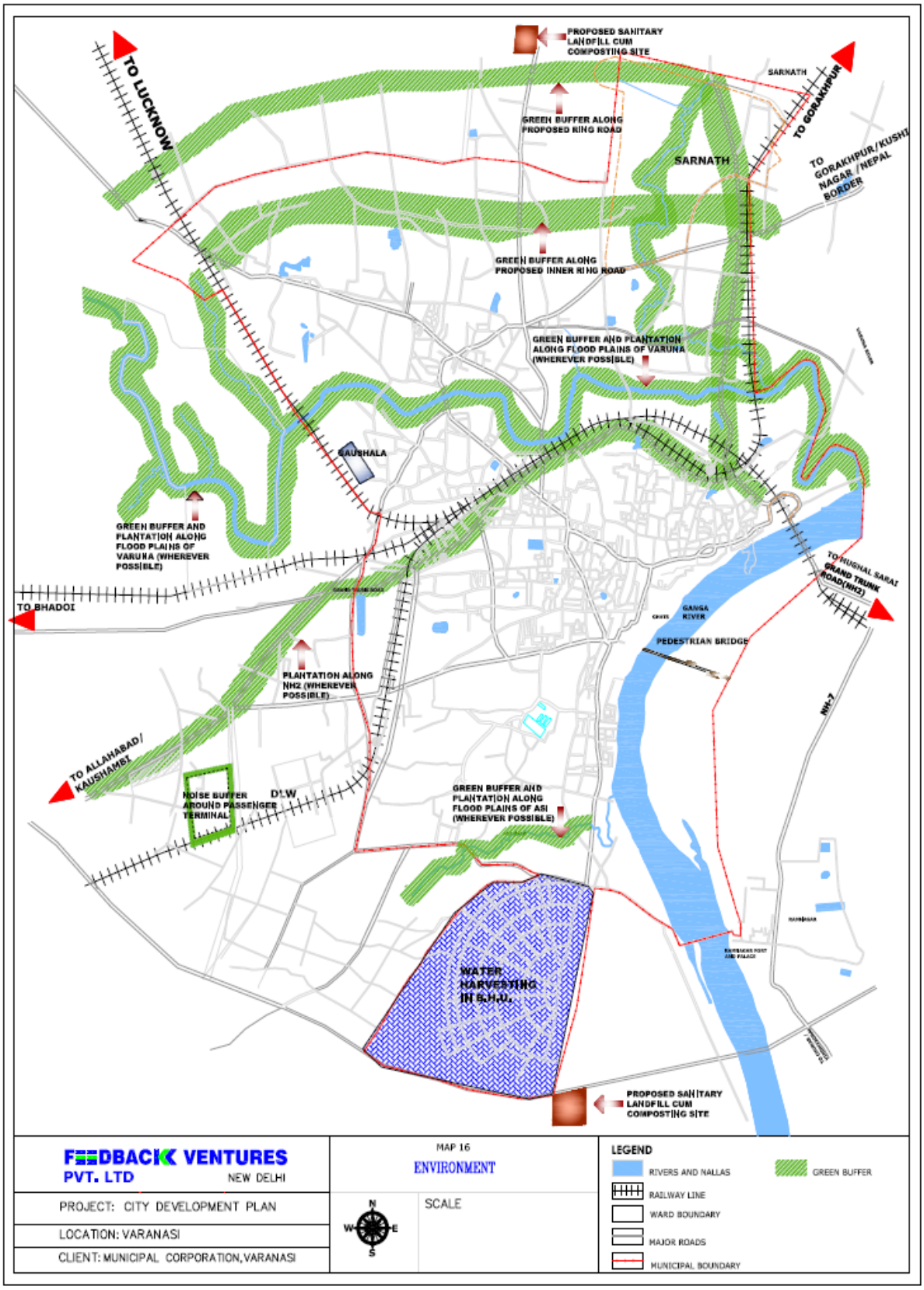
Table 64: Projects Identified for Environment & Beautification

Projects	Location	Benefits	Sub Projects
Environmental Improvement of Varuna	Flood Plains of River Varuna	Improved condition of water body Protection of catchment area to the river	➢ Use of bio fertilizers and pesticides in agricultural lands on the banks of Varuna to reduce eutrophication levels in the river ➢ Creation of green buffer along Varuna for better soil retention (to reduce soil erosion) and reduced siltation of the river bed ➢ Afforestation along banks with deep-rooted trees, wherever possible. ➢ Provision of waste water treatment with promotion of Vermiculture & Reed bed technology ➢ Protection and conservation of tributaries to Varuna
Environmental Improvement of Asi	Flood Plains and Catchment area of Asi	Improved health of water body	➢ Plantation along banks of Asi, wherever possible ➢ Diversion of waste water drains entering Asi ➢ Provision of waste

			water treatment with promotion of Vermiculture & Reed bed technology ➢ Protection and conservation of tributaries to Asi
Tree Plantations / noise buffers	➢ Along major roads and in Trans Varuna area (wherever Possible) ➢ Passenger Terminal ➢ Truck Terminal ➢ Ring road ➢ Byepass	➢ Green buffer ➢ Reduced air and noise pollution ➢ Improved environmental quality of roads	➢ Roadside tree plantation (wherever possible) ➢ Plantation on medians
Water harvesting pits at major water logging points	Water logging points at city level incl. BHU Campus	Environmental improvement	➢ Recharge pits ➢ Sedimentation tank ➢ Sieving to avoid entry of solid waste
Beautification and Upgradation of existing parks	City level parks Open spaces in the core city & along Ghats	Improved Quality of life	➢ Awareness programmes for school children and women. ➢ Lighting ➢ Street Furniture ➢ Landscaping ➢ Kiosks in major parks ➢ Underground parking below major parks.
Awareness Programmes	--	--	➢ Mass Awareness campaigns ➢ Awareness programmes for slum dwellers, school children

Table 65: Capital Investment and Phasing required for Environment & Beautification

ENVIRONMENT & BEAUTIFICATION									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years		**Rest of Phase I**						
	2006- 07	*2007 08*	*2008 -09*	*2009 -10*	*2010 -11*	*2011-12*			
Environmental Improvement of Varuna	108	108	138	246	177	-	-	**777**	**High**
Environmental Improvement of Asi	16	16	21	38	27	-	-	**118**	**High**
Tree Plantations/ noise buffers	15	30	30	30	30	15		**150**	**High**
Water harvesting pits at major water logging points	-	14	17	15	-	-	-	**46**	**High**
Beautification and Upgradation of existing parks	14	16	20	20	30	-	-	**100**	**High**
Awareness programs @ 2.5%	5	6	10	10	-	-	-	**31**	**High**
Total Cost	**158**	**190**	**236**	**359**	**264**	**15**	**0**		
Fund requirement for First 2 years	**348**								
Fund requirement for Rest of Phase I			**874**					**1222**	
Say 12.22Crores									


PROPOSED SANITARY LANDFILL CUM COMPOSTING SITE
GREEN BUFFER ALONG PROPOSED RING ROAD
SARNATH
TO GORAKHPUR
TO LUCKNOW
TO GORAKHPUR/KUSHI NAGAR / NEPAL BORDER
GREEN BUFFER ALONG PROPOSED INNER RING ROAD
GREEN BUFFER AND PLANTATION ALONG FLOOD PLAINS OF VARUNA (WHEREVER POSSIBLE)
SAUSHALA
GREEN BUFFER AND PLANTATION ALONG FLOOD PLAINS OF VARUNA (WHEREVER POSSIBLE)
TO BHADOI
TO MUGHAL SARAI GRAND TRUNK ROAD(NH2)
GANGA RIVER
PEDESTRIAN BRIDGE
PLANTATION ALONG NH2 (WHEREVER POSSIBLE)
NH-7
TO ALLAHABAD/ KAUSHAMBI
NOISE BUFFER AROUND PASSENGER TERMINAL
D.I.W
GREEN BUFFER AND PLANTATION ALONG FLOOD PLAINS OF ASI (WHEREVER POSSIBLE)
WATER HARVESTING IN G.H.U.
PROPOSED SANITARY LANDFILL CUM COMPOSTING SITE
FEEDBACK VENTURES PVT. LTD NEW DELHI
PROJECT: CITY DEVELOPMENT PLAN
LOCATION: VARANASI
CLIENT: MUNICIPAL CORPORATION, VARANASI
MAP 16
ENVIRONMENT
SCALE
N
W
E
S
LEGEND
RIVERS AND NALLAS
GREEN BUFFER
RAILWAY LINE
WARD BOUNDARY
MAJOR ROADS
MUNICIPAL BOUNDARY

30 Basic Services to Urban Poor

In the following section, focus has been made on integrated development of slums through projects for providing shelter, basic services, and other related civic amenities and utilities. It includes slum improvement and rehabilitation projects, provision of water supply, sewerage, drainage, community toilets/baths and identification of areas for sites and services schemes at affordable costs for slum dwellers/urban poor/EWS/LIG categories. Efforts have also been made towards improving environmental conditions and solid waste management in slums.

Total cost estimated for basic services to urban poor is about **Rs. 516.47 Crores**. A detailed list of identified projects, their location, targets achieved, justification and facilities/sub projects is as shown in **Table 66**:

Table 66: Projects Identified for Basic Services to Urban Poor

***IN-SITU* UPGRADATION**			
Projects	**Location**	**Benefits**	**Facilities / Sub Projects**
Provision of Housing	Slums identified by DUDA	Improved quality of life	➢ Upgradation of existing housing stock ➢ Provision of new and *Pucca* DUs ➢ Area Redevelopment ➢ Provision of subsidized building material ➢ Upgradation through PPP
Paving of roads/ paths in slums	Slums identified by DUDA	➢ Better quality of life in slums ➢ Improved environmental conditions	--
Provision of Water supply			➢ Provision of stand posts ➢ Provision of water supply lines and connections
Sewerage			Provision of sewer lines and connections in slums
Provision of proper drainage			Provision of Pucca drains
Provision of street lighting	Slums without street lighting (identified by DUDA)	➢ Better quality of life in slums ➢ Safety	-

Construction of Community Centres	Identified slums (by DUDA) with no Community Centres	➢ Enhanced community interaction ➢ Access to health and education facilities	➢ Educational facilities ➢ Health facilities ➢ Space for social gatherings
Augmentation of existing Community Centres	Existing Community Centers in slums ➢ Sunderpur ➢ Baduapura ➢ Tulsipura ➢ Panchpedwa ➢ Kadauri ➢ Ghasiyari Tola ➢ Durga Kund ➢ Shukulpura ➢ Nagwa ➢ Badi Gaibi ➢ Sarang Talab ➢ Benipur ➢ Saraiya Uttari ➢ Suarbadwa ➢ Pulkohna ➢ Ruppanpur ➢ Bahgatpur ➢ Nakki Ghat ➢ Mirapur Behsi ➢ Ruppanpur ➢ Chotti Maldahiya		➢ Educational facilities ➢ Health facilities
Provision of CTCs in Slums	Wherever presently not provided	➢ Improved standard of living in slums ➢ Better health and environmental conditions	Separate toilets for males and females
Provision of collection bins	All slums		--
Solid waste Management	--		--

***EX-SITU* UPGRADATION**			
Projects	**Location**	**Benefits**	**Facilities / Sub Projects**
Identification and prioritization of slums for relocation	--	Improved quality of life Near work place	Identification of sites for relocation

Relocation of slums and Provision of Housing	➢ To Nazul lands available in: o Ranipur o Dilwariya Sweeper Basti o Newada Mushayar basti ➢ Relocation of slums to MCV lands in: o Senpura o Choti Maldahiya o Nakki Ghat ➢ Near wholesale trade complexes ➢ Near Passenger Terminal ➢ Near small industries' complex	➢ Relocation of slums near work areas ➢ Proximity to work place ➢ Centers generating employment for skilled, semi skilled and unskilled labour	▸ Through PPP ▸ Relocation of slum clusters w.r.t. proximity to work place and skill level of slum dwellers ▸ Provision of Pucca Houses
Transport	Resettlement areas	➢ Enhanced quality of life ➢ Improved environmental conditions	▸ Provision of Pucca roads linked to major city level roads
Waster supply			▸ Provision of water supply lines and connections
Sewerage			▸ Provision of sewer lines and connections
Drainage			▸ Provision of Pucca drains
Street lighting			-
Parks			▸ Provision of street furniture ▸ Kiosks ▸ Play areas ▸ Landscaping ▸ Street lighting
Community centres	Identified slums (by DUDA) with no Community Centres	➢ Enhanced community interaction ➢ Access to health and education facilities	➢ Educational facilities ➢ Health facilities ➢ Space for social gatherings
Collection bins	At regular intervals along the roads	Improved environment and health	-
Solid waste management	-		-

Table 67: Capital Investment and Phasing for Basic Services to Urban Poor

BASIC SERVICES TO URBAN POOR									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years		**Rest of Phase I**						
	2006- 07	*2007 08*	*2008 -09*	*2009 -10*	*2010 -11*	*2011-12*			
***IN-SITU* DEVELOPMENT**									
Housing	2310	5775	5775	5775	3468	-	-	**23103**	**Medium**
Provision of roads/lanes	200	300	310	320	320	-	-	**1450**	**High**
Water Supply	126	252	252	315.25	315.25	-	-	**1261**	**Medium**
Sewerage	100	300	200	200	-	-	-	**800**	**Medium**
Drainage	100	150	155	160	160	-	-	**725**	**High**
Street lighting	60	90	93	96	96	-	-	**435**	**High**
Construction of Community Centres	50	60	100	-	-	-	-	**210**	**High**
Augmentation of existing Community Centres (21)	16	16	-	-	-	-	-	**32**	**High**
Provision of CTCs in Slums	380	380	380	380	380	-	-	**1900**	**High**
Provision of collection bins	10	10	-	-	-	-	-	**20**	**Medium**
Solid waste Management	*No separate costs for this component*					-	-		**High**
Sub Total	**3352**	**7333**	**7265**	**7246.25**	**4739.3**	**0**	**0**	**29936**	
	10685		**19250.5**						
***EX-SITU* DEVELOPMENT**									
Identification and prioritization of slums for relocation	25	25	-	-	-	-	-	**50**	**High**
Housing	1832	4579.5	4579.5	4579.5	2747.7	-	-	**18318**	**High**
Transportation Network	150	250	250	250	250	-	-	**1150**	**High**
Water Supply	108	108	108	108	108	-	-	**540**	**High**
Sewerage	125	125	125	125	-	-	-	**500**	**High**
Drainage	90	150	150	150	150	-	-	**690**	**High**
Street lighting	45	75	75	75	75	-	-	**345**	**High**
Parks	7	13	-	-	-	-	-	**20**	**Medium**
Construction of Community Centres	30	30	30	-	-	-	-	**90**	**High**
Provision of collection bins	4	4	-	-	-	-	-	**8**	**Medium**
Solid Waste Management	*No separate costs for this component*					-	-		**Medium**
Sub Total	**2416**	**5359.5**	**5317.5**	**5287.5**	**3330.7**	**0**	**0**	**21711**	
	7775.5		**13935.7**						
Grand Total	**18460.5**		**33186.7**					**51647**	
Say Rs. 516.47 Crore									

31 Institutional and Financial Reforms

31.1 Institutional Reforms

31.1.1 Introduction

The implementation of urban governance reforms is a difficult and long drawn process. The experience of institutional reforms at various levels has shown that it is necessary to identify a 'mix' of activities – (i) some short-term interventions that yield noticeable results and serve to keep up the interest in the reform process, and (ii) long-term interventions.

For effective urban governance, reforms will be necessary at the state as well as municipal levels. Even at these two levels, the identified reforms can be further classified into **mandatory** and **optional** reforms. In implementing mandatory reforms, the focus is on the state creating the necessary enabling framework for the next lower tiers of government to enact the necessary mandatory reforms. While creating this enabling framework at the state and municipal levels will be time consuming given the fact there shall be heavy political influence, certain smaller interventions will become necessary in preparation for the larger interventions. These smaller interventions will need to be designed and implemented in a manner that results are apparent in a relatively short time period and maintain interest in the process. **Figures 31-32** show a conceptual framework of institution building and accounting for better revenue collection, asset management, grievances addressal and service delivery etc based on public interactions with the ULBs.

Figure 31: Public Interactions with ULBs for Various Reasons of Life

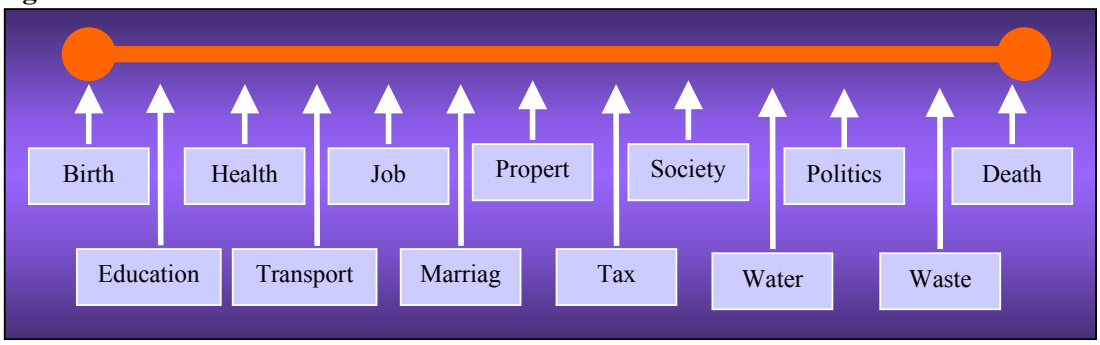
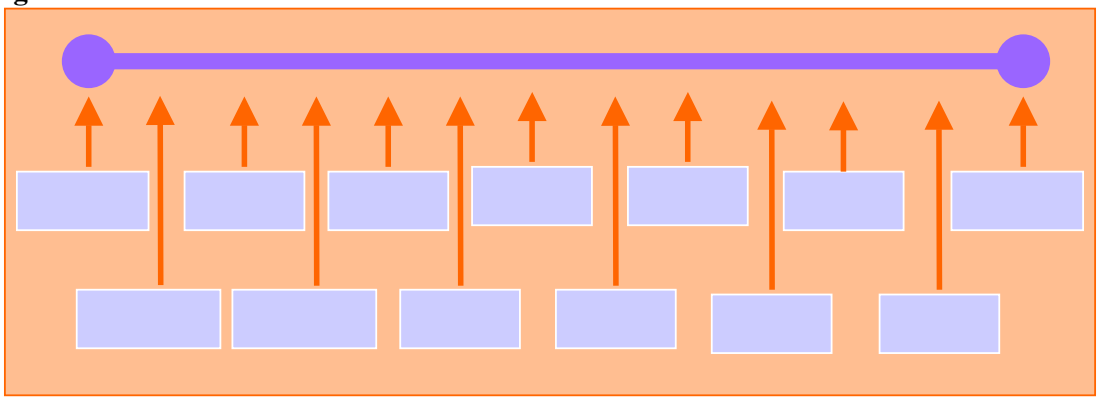


Figure 32: Public Interactions with ULBs for Various Business Reasons



31.2 Mandatory Reforms

31.2.1 At State Level

The majority of state level reforms can be classified as mandatory and are equally applicable to all the cities in the state that are preparing CDPs. These are fundamental reforms and necessary for the enabling framework for the municipal level reforms to take place. While all the reforms are necessary, their phasing will differ from city to city. In the case of Varanasi, the **mandatory reforms identified to be undertaken at state level** shall be as follows:

i. Effective implementation of 74th CAA by way of –
   - Constitution of Ward Committees and DPCs;
   - Complete transfer of funds, functions and functionaries to MCV;

ii. Reform of rent control laws –
   - New development areas exempt from this law for next 10 years;
   - Repeal of law across all areas;

iii. Rationalisation of stamp duty by bringing it down;

iv. Enactment of public disclosure law –
   - Effective implementation of Right to Information (RTI) Act;
   - State level public disclosure law;
   - Effective implementation of law empowering citizens to legal recourse;

v. Institutionalising community participation in decision making –
   - Effective functioning of Ward Committees and DPCs through process of public consultations;
   - Formulation of Citizens Charters that define time bound responses to community needs;
   - Institutionalizing system of undertaking 'Report Cards' across Wards;
   - Enactment of Community Participation Law;

vi. Better coordination between cities –
   - City level coordination committee;
   - Starting process of clear demarcation of roles & responsibilities across city level institutions;
   - Clarity in roles & responsibilities across city level institutions thus eliminating functional overlaps;
   - Effective participatory planning for city development through Ward Committees, District Planning Committees;
   - Regular elections to local government institutions and creation of committees for effective decentralisation;
   - Establishment of 'Association of Municipalities' at state level; and
   - Identification of common agenda that focuses on defining strategies for better city level planning.

31.2.2 At City Level

Mandatory reforms identified to be undertaken at City level in ULB/ parastatal agencies are as follows:

i. Adoption of modern, accrual-based double entry system of accounting in Urban Local Bodies/ parastatals;

ii. Introduction of system of e-governance using IT applications like, GIS and MIS for various services provided by ULBs/ parastatals;

iii. Reform of property tax with GIS, so that it becomes major source of revenue for ULBs and arrangements for its effective implementation so that collection efficiency reaches at least 85% within next seven years;
iv. Levy of reasonable user charges by ULBs/ parastatals with the objective that full cost of operation and maintenance of recurring cost is collected within next seven years;
v. Internal earmarking within local body, budgets for basic services to the urban poor; and
vi. Provision of basic services to urban poor including security of tenure at affordable prices, improved housing, water supply, sanitation and ensuing delivery of other already existing universal services of the Government for education, health and social security.

31.3 Optional Reforms Common to State and City

Any two optional reforms to be implemented together by State and ULBs/ parastatals in each year are as under –

i. Revision of byelaws to streamline the approval process for construction of buildings, development of sites etc;
ii. Simplification of legal and procedural frameworks for conversion of agricultural land for non-agricultural purposes;
iii. Introduction of Property Title Certification System in ULBs;
iv. Earmarking at least 20-25% of developed land in all housing projects (both public and private agencies) for EWS/ LIG category with a system of cross subsidization;
v. Introduction of computerized process of registration of land and property;
vi. Revision of byelaws to make rainwater harvesting mandatory in all buildings and adoption of water conservation measures;
vii. Bye-laws for reuse of recycled water;
viii. Administrative reforms i.e. reduction in establishment by bringing out voluntary retirement schemes, non-filling up of posts falling vacant due to retirement etc., and achieving specified milestones in this regard;
ix. Structural reforms; and
x. Encouraging Public Private Partnership.

31.4 Proposed Urban Governance Reforms

31.4.1 Reforms at State Level

For bringing in mandatory reforms at the State government level, the following activities are identified to be performed:

i. The State Government should establish and continuously update a body of guidelines, policies and processes for decision making, procurement and related issues for urban infrastructure projects;
ii. The State Government should assist in the creation of legislative framework to guide political and bureaucratic decision making for projects; and
iii. The government should provide training to government functionaries (ULBs) to improve understanding of optimum risk allocation and develop credible project structures.

31.4.2 Reforms at Municipal Level

For the citizen of the city, the urban government is the 'Government', because all the basic urban services are provided by these agencies only. In the fast world of today, a normal citizen cannot spare too much time for deposit of taxes by inefficient means and for obtaining the simplest services he is not able to bear the unnecessary delays in execution. Under the present situation, a person has to visit the ULB so many times for calculation of property tax to be paid by him on his property. It is also not easy for him to obtain a birth or a death certificate effectively.

For improving the livability conditions of the city, there should be increased emphasis on the good urban governance and management. Good governance implies the accountability, integrity and transparency in Government actions for defining and pursuing the its desired objectives. Vision of MCV can be visualized as capable urban governance fulfilling all the public responsibilities.

Few interventions towards improved urban governance can be implemented by the MCV at city level by way of adapting to some advanced technologies in information and communication. These interventions are –

- Creation/ construction of ten 'Citizen Service Centres' (CSC)/ 'Lok-Vani Centres' (LVC) at different/ convenient locations in the city over the next seven years;
- One CSC/ LVC may contain five computers and infrastructure set up of an office;
- Consultancy/ design services for so doing;
- System development costs including development of Website of MCV having all types of information related to each function and/ or services performed by it including LAN/ WAN networking;
- Citizen centre should be outsourced and each employee be taken on contract employment; and
- Training/ capacity building programs for various staff.

31.4.2.1 Functions of LVC

Service provision and complaint redressal system of the following functions can be handled through these centers

- Birth and death certificate issues;
- Dangerous and offensive trade license issue;
- Water connection;
- Assessment of property tax;
- Transfer of property title;
- Grant of building permission;
- Advertisement tax;
- Complaint redressal etc

31.4.2.2 Benefits of LVC

The CSC/ LVC is proposed to serve functions as follows:

- Information source to the citizens for adequate addressing of their problems;
- Simplified and standardized application forms;
- Simplified and standardized note files for easy and effective retrieval;
- Removal of non value adding steps in daily procedures; and

- Source of citizen feedback for improved and efficient functioning/ service delivery.

Most of the staff, including the technical one, spends its time in public dealing. Set up and effective functioning of LVC shall help safe time on the part of technical staff for better and dedicated service delivery to the citizens.

31.5 Project Phasing & Costing

Development activities together with costing relating to e-governance have been done in a phased manner (**Table 68)** depending upon the sequence of activities and priorities as per the priority technique. The set up of e-governance is expected to take a timeframe of three years starting from 2007-08 and involving a total cost of Rs. 10.50 crores.

Table 68: Phasing of E-Governance Projects and Costs

E-GOVERNANCE									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years			**Rest of Phase I**					
	2006-07	*2007 08*	*2008 - 09*	*2009 - 10*	*2010 - 11*	*2011-12*			
Construction of LVC	50	150	100	-	-	-	-	**300**	**High**
Infrastructure Setup	25	75	50	-	-	-	-	**150**	**High**
Consultancy service and design	25	50	25	-	-	-	-	**100**	**High**
System development	50	100	150	-	-	-	-	**300**	**High**
Total cost	**150**	**375**	**325**	**0**	**0**	**0**	**0**	**850**	
Capacity Building & Awareness & O &M	50	50	50	50	-	-	-	**200**	**High**
Sub Total	**200**	**425**	**375**	**50**	**0**	**0**		**1050**	
Fund requirement for First 2 years	**625**								
Fund requirement for Rest of Phase I				**425**					
Say 10.50 crores									

31.6 Finance and Accounting Reforms

31.6.1 Introduction

MCV maintains records on single entry cash based system of accounting. The output of this cash basis of accounting is a **Statement of Receipts and Payments** that classifies cash receipts and cash payments under different heads. A statement of assets and liabilities is not prepared.

Due to single entry based cash records, MCV is faced with the following drawbacks:

- Not able to assess the accountability of all the resources that MCV controls and the deployment of those resources;
- Not able to assess the financial performance, financial position and cash flows of the entity;

- Cannot make decisions about providing resources for further capital projects to be undertaken by the MCV;
- Cannot evaluate MCV's ongoing ability to finance its activities and to meet its liability and commitment;
- Plan for future funding requirements of assets maintenance and replacement;
- Plan for the repayment of or satisfaction of existing liabilities;
- Manage its cash position and funding requirement;
- Demonstrate its performance in terms of service costs, efficiency and accomplishments;
- Assess whether current revenues are sufficient to cover the costs of current programs and services;
- Record the total costs, including depreciation of physical assets and amortization of intangible assets, of carrying out specific activities;
- Assess whether it can provide and the extent to which it can afford new programs and services;

31.6.2 Accounting Reforms

Several activities, as discussed in the ongoing section, have been proposed for implementation of finance and accounting reforms in MCV.

31.6.2.1 Double Entry Based Accounting

The objectives and scope of double-entry accrual based system of accounting is to maintain the accounts on generally accepted accounting principles along with the preparation of income and expenditure accounts to know the financial operation during a year and a balance sheet to know the true financial status of ULBs for a given period of time.

31.6.2.2 Asset Accounting & Creation of Fixed Asset Register

This shall mean identification and valuation of all assets and all ongoing works with the MCV. Development of a system is required to this effect so as to have the fixed asset register in place that would show the details of all the classified assets owned and maintained by MCV with due valuations incorporated to the assets.

31.6.2.3 Chart of Accounts

Standardization of a chart of accounts of MCV that would show all the accrual accounting heads is proposed.

31.6.2.4 Accounting Manual

In order to switch over to the new proposed system of accounting, the system itself would be required to be designed with a set of new accounting rules, principles, and policies to be called as **Accounting Manual**.

31.6.2.5 Capacity Building

Switch over to the new system also calls for training and capacity building of accounting staff so as to adapt to the change effectively and perform efficiently.

31.6.2.6 Computerisation of Procedures

All accounting procedure, old and new, together with data entry of all past records shall take place once the system is in place and the concerned finance and accounts personnel is trained. This is aimed at achieving efficiency in procedures and performance.

31.6.2.7 Benefits

The system of accrual accounting as recommended by the Twelfth Finance Commission when fully applied will allow better price calculations, record capital use properly, distinguish between capital and revenue expenditure, present a complete picture of debts and liabilities and present financial position of MCV and not just the cash flows and debts.

31.6.3 Increasing the Revenue Base

Property tax is the product of collection efficiency, tax rate, rateable value and number of assessed properties. The main source of revenue for the MCV is the revenue from property tax. But the capacity to charge property tax is not properly and fully utilized by the MCV due to the element of subjectivity in assessment and collection of these taxes. There is tendency among the public either to evade the taxes or to get it reduced from what it ought to be. The 74th CAA has given more powers and autonomy to the ULB in fixation of user charges, rates etc. The system of assessment and collections has to be improved. It is believed that the property tax of MCV can be more than doubled by introduction of serious tax collection efficiency measures. There is great-untapped potential of property tax available for the MCV. Tax rates have been revised by MCV from time to time including revision (minor increase) in 2001. Surveys conducted by some neutral independent agencies have identified that although there remains huge potential of tax collection, the current tax base is very depleted; as many as 60% properties remain un-assessed till date for property taxes. Several activities have been proposed in the foregoing section for the introduction of property tax reforms in MCV.

31.6.4 GIS Mapping

Property tax collections can be improved by using GIS based property mapping through city sketches and ground surveys. Street naming, property numbering and photographs of the property need to be carried out for each property in the city.

31.6.4.1 Comprehensive Database

MCV has a system of computerized billing and collection. This needs be strengthened for accurate and comprehensive record and listing of all properties under assessment correctly.

31.6.4.2 Self Assessment of Taxes

Under this program, it is proposed that the general citizen is encouraged so that he assesses and deposits his own taxes on time.

31.6.5 Water Supply Management

The total water supply from all resources is 240 mld which is above the current estimated demand. Of the total, 30% is lost in transmission and distribution through leaks and not accounted for which cannot be billed. There are a total of 80,000 metered water connections (flat rate) – domestic, commercial and industrial connections. The main revenue for JS comes from water charges received from the customers. Water tax and water charges revenues constitute 79.03% of the total revenue.

31.6.6 Non Performance

There are several reasons for non-performance. These, *inter alia*, include –

- Weak system operations: Inappropriate handling of pumping lead to high energy bills, inappropriate system management and failure to attend queries and complaints about water quality pressure and damaged water supply resulting in inequitable water supply;
- Lack of energy audits: Failure to reduce energy consumption through regulation of pumping operations and inability to carry out comprehensive maintenance of the pumps and/or install efficient pumping equipment to reduce electricity consumption increased expenditures; and
- Lack of water audits: Failure to detect and rectify leaks and failure to conduct audits to detect illegal use of water, unauthorized connections, and faulty meters led to loss of water and potential revenue.

31.6.7 Proposed Activities

Following specific activities are proposed for improving the efficiency of operations of water supply –

- Maximize the billed portion of water provided to the transmission system to striving to reach 100%;
- Reduce overtime, losses and leakages in the system;
- Detect illegal use of water by the customers; and
- Minimize the consumption of electrical powers.

31.6.8 Project Phasing & Costing

Certain activities have been identified that would help lead towards optimized property tax collection. These activities shall be implemented in the first year itself except for the annual updation of the software/ database. An estimated expenditure of Rs. 3.00 crores is envisaged for this **(Table 69)**. Reforms towards efficient water supply management have been estimated to cost Rs. 0.44 crores and the activities towards this, shall be spread over the next 6-7 years as given in **Table 70.**

Table 69: Towards Property Tax Reforms

PROPERTY TAX REFORMS									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultaiton)**
	First 2 years		**Rest of Phase I**						
	2006- 07	*2007 08*	*2008 -09*	*2009 -10*	*2010 -11*	*2011-12*			
Satellite Imagery	10	-	-	-	-	-	-	**10**	**High**
Topographical Survey	12	36	32	-	-	-	-	**80**	
Cadastral Survey	20	-	-	-	-	-	-	**20**	**High**
Hardware & Software costs	20	60	20	-	-	-	-	**100**	
Data Coding & GIS	20	20	-	-	-	-	-	**40**	**High**
Web Base Development	10	10	-	-	-	-	-	**20**	**High**
Data updation (every year)	-	5	5	10	10	-	-	**30**	**High**
Total cost	**92**	**131**	**57**	**10**	**10**	**0**	**0**	**300**	
Fund requirement for First 2 years	**223**								
Fund requirement for Rest of Phase I			**77**						
Say 3.00 Crores									

Table 70: Activities for Effective Water Supply Management

WATER SUPPLY MANAGEMENT									
Projects	**Phase I**						**Phase II**	**Total Cost (Lakh)**	**Priority (Stakeholder Consultation)**
	First 2 years		**Rest of Phase I**						
	2006- 07	*2007 08*	*2008 -09*	*2009 -10*	*2010 -11*	*2011-12*			
System operations for equitable water distribution and management	-	5	2	1	2	-	-	**10**	**High**
Operations relating to new connections and sale of potable water	-	5	5	-	-	-	-	**10**	**High**
Water auditing to minimize water losses and increase revenues	2	3	3	3	1	-	-	**12**	**High**
Energy audit to minimize power consumption at pumping stations	-	3	3	3	3	-	-	**12**	**High**
Total Cost	**2**	**16**	**13**	**7**	**6**	**0**	**0**	**44**	**High**
Fund requirement for First 2 years	**18**								
Fund requirement for Rest of Phase I			**26**						
Say 0.44 crores									

32 Financial Strategy and Capital Investment Plan (CIP)

32.1 Analysis of Existing Situation

The current financial situation of MCV has been analyzed in terms of revenue and expenditure trends observed in the previous five years. The total financial profile of MCV is presented in the table. The table in the last year shows a sufficient surplus at the end of each year. The reason behind this surplus is not that the MCV is able to provide services sufficiently to citizens; it is essentially due to the government grants received at the yearend by the MCV. From 2001-02 to 2004-05 mainly operating deficit is revealed in these years, which means that the expenses incurred are more than the total receipts of the financial year (***Table 71***). There is no increase perceived in the last five years in the revenue receipts except in the previous financial year.

Table 71: Summary of Financial Profile of MCV 2001-02 to 2005-06

Particulars	2001-02	2002-03	2003-04	2004-05	2005-06	Average	% Contribution
Revenue Receipts	3,857.54	3,877.22	4,151.18	3,859.55	5,587.45	4,266.59	93.85
Capital Receipts	0.68	73.25	239.00	135.55	100.32	-	-
Deposits, Loans & Advances	31.40	21.56	32.39	31.00	48.87	33.04	0.73
Government Loans	130.00	133.00	30.00	182.50	207.90	136.68	3.01
Total Receipts	**4,019.62**	**4,105.03**	**4,452.57**	**4,208.60**	**5,944.54**	4,546.07	**100.00**
Salary Expenditure	2,794.74	2,405.65	3,063.10	2,832.19	2,992.02	2,817.54	**63.92**
Non Salary Expenditure	1,477.66	1,378.15	1,543.56	1,519.42	1,574.79	1,498.72	**34.00**
Repayment of Loans	-	-	-	-	-	-	**-**
Capital Expenditure	87.62	48.08	66.54	90.27	60.12	70.53	**1.60**
Deposits, Loans & Advances	21.65	12.69	26.77	22.54	23.05	21.34	**0.48**
Total Expenditure	**4,381.67**	**3,844.57**	**4,699.97**	**4,464.42**	**4,649.98**	**4,408.12**	**100.00**
Surplus/Deficit	**(362.05)**	**260.46**	**(247.40)**	**(255.82)**	**1,294.56**	**137.95**	

The revenues of MCV comprise of revenues from own resources in the form of tax and non-tax revenues, and the government grants. Tax revenues contribute almost 15% of the total revenues of the MCV. This share has decreased during the last five years. MCV is mainly dependent on the government grants as almost 69% of the revenues come from the State Government (**Table 72**).

Table 72: Summary of Revenues of MCV by Source

Particulars	2001-02	2002-03	2003-04	2004-05	2005-06	Average	%
Own Resources-Tax Revenues	567.58	609.67	692.16	672.09	690.81	646.46	15.15
Own Resources-Assigned Revenues	124.31	309.61	0.01	274.17	966.67	334.95	7.85
Own Resources- Non Tax Revenues	396.51	429.00	395.27	-111.46	533.22	328.51	7.70
Government Grants	2769.14	2528.94	3063.74	3024.75	3396.75	2,956.66	69.30
Total Revenue Receipts	3857.54	3877.22	4151.18	3859.55	5587.45	4266.59	100.00

32.2 Financial Performance Indicators

All financial performance indicators exhibiting the performance and efficiency of the MCV are calculated for the last five financial years. The revenue balance is negative in the initial four years but becomes positive in the last year. This is also due to non-utilization of funds received at the year-end. Capital account balance is positive due to non-segregation of expenditure into revenue and capital.

The operating ratio which is the ratio of revenue expenditure over revenue income is greater than one in the initial four years of information and 0.81 in the last year showing that the MCV is able to meet out its revenue obligations from its revenue resources.

MCV's revenue growth and expenditure management has not been very good in the last five years. Moreover the share of establishment costs to the total revenue expenditure is very high i.e almost 64% of the total revenue expenditure. Share of House Tax to the total income of MCV is also very low as compared to the other cities of India.

Debt Service Ratio is nil in MCV. Currently MCV takes non-interest bearing loan from the state government. Due to weak financial position of MCV, they are not able to repay any installments in the last financial years **(Table 73).**

Table 73: Financial Health Indicators of MCV

Particulars	2001-02	2002-03	2003-04	2004-05	2005-06
Share of own resources to the total income	0.15	0.16	0.17	0.17	0.12
Growth in Revenue Income	-	0.01	0.07	(0.07)	0.45
Growth of own sources in the revenue income	-	0.07	0.06	0.04	(0.29)
Share of non taxes to the total income	0.10	0.11	0.10	(0.03)	0.10
Share of House Tax in the revenue income	0.12	0.13	0.14	0.15	0.11
Expenditure Management					
Share of Establishment costs in the revenue expenditure	0.64	0.63	0.65	0.63	0.64
Percentage of salary costs to the total revenue income	0.72	0.62	0.74	0.73	0.54
Performance Assessment					
Revenue Account Balance	(405.11)	102.29	(449.86)	(483.60)	1,046.46
Capital Account Balance	43.06	158.17	202.46	227.78	248.10
Operating Ratio	1.10	0.97	1.11	1.12	0.81
Establishment Costs/Revenue Receipts	0.72	0.62	0.74	0.73	0.54

32.2.1 Municipal Corporation Varanasi-Critical finance Issues

The current financial position of MCV is quite unhappy situation. Performance of this organization has to go under continuous revival by first implementation all urban governance reforms. Currently there is lack of accountability and transparency in the operations of MCV. Double Entry Accrual system of accounting has to be introduced. Continuous training to the staff is required to given to ensure the sustainability in operations. The Tax collection efficiency has to be improved by adoption of modernized techniques. There are no powers with the MCV for improving the finance and taxation rates. The Surprising fact is that the revenue rates of MCV have not been

revised from the year 1978. The other main problem lies in inadequate information and database related to its existing revenues and expenditure

32.2.2 Review of Financials of VDA

VDA maintains its accounts on double entry accrual based system of accounting. Finances of VDA have been analyzed from the Income and Expenditure Accounts and Balance Sheets of last three financial years. Income of VDA comprises interest income on fixed deposits and the interest on installments received from allotees and the receipts received on sanction of maps of properties of Varanasi. Expenditure consists of revenue expenditure in terms of establishment costs and administrative costs and Capital Expenditure in terms of addition to fixed assets of the VDA in each financial year. Revenue Expenditure includes the financial expenses in the form heavy interest costs accrued to VDA on the loans taken by the agency. Loans from the World Bank has been taken by VDA through state Government, which is not efficiently repaid by this organization. The net loss as per financial performance of VDA has been decreasing in the last three years, but there is insignificant increase in the revenues of VDA. Revenue collection efficiency have to improved in VDA as there is big amount of outstanding receivables standing in the balance sheet of VDA as at the end of each financial year.

32.3 Financial Operating plan

The investment strategy for various projects identified for coverage under the JNNURM has been prepared by way of Financial Operating Plan (FOP) which mainly focuses on capital investments in infrastructure over the next 7 years with a vision of benefits realized by the turn of the horizon year, 2031, and particularly during the course of implementation of these projects. The CIP presented herein represents the investments made with effect from financial year 2006-07 to financial year 2011-12.

The FOP makes projection of the revenue and expenditure of the MCV in the next 25 years, i.e. the horizon year. It predicts the ability of MCV to pay and provide for the services with the given set of policies and assumptions put forward in the CDP in line with the guidelines for so doing under the Mission.

The FOP is designed taking into account the sustainability of new identified projects under Mission. It also gives the idea about the alternate source of financing along with the investment pattern in the next six years. The Existing financial information of MCV has been taken into account and future planning of resources and expenditure made accordingly.

32.3.1 Scenario Building

Two alternate scenarios have been considered while preparing the FOP, as follows:

1. Base Line Investment Scenario – where the forecasts of finances have been prepared without considering new investments and the static growth in revenue and expenditure of MCV is projected for the next 7 years; and

2. Sustainable Investment Scenario – where growth in revenue and reduction in expenditure is considered to reach to the ultimate goal of achieving financial sustainability after consideration of total investments projected in CIP.

The main assumption in forecasting the revenue and expenditure of MCV has been the average growth trend for the previous five years, historic financial data before working on the projections in both scenarios.

32.4 Forecast of Revenues

The revenues of MCV comprise of revenues from own resources in the form of tax and non-tax revenues and the grants from the Government. The main source of revenue for the MCV happens to be the property taxation. Some financing improvement initiatives have been put forward as part of Urban Governance reforms (Section 32: Institutional Reforms). The likely impacts of these reforms have been taken into account under the sustainable investment scenario and proposed in the foregoing section.

32.4.1 Property Tax Assessments

There is high probability of increase in property tax considering the fact that the number of cases for property tax assessment will increase tremendously consequent upon introduction and implementation of GIS system in the city.

The total number of properties currently under assessment in Varanasi is around 125,000 and the total property tax collected from these in 2005-06 financial year has been Rs. 598.26 lakh. Assuming the present population of the city as 15.53 lakh, and there are 5 persons per property, the total number of properties should be around 310,000. It could otherwise be assumed that currently 50% of properties are under tax net; assuming a target of 90% coverage of properties with introduction of GIS, the estimated number of properties shall be around 225,000. Sufficient growth rate in property tax can be assumed once these reforms are in place. Currently MCV is conducting the door to door physical survey of properties through the employees of the corporation. Self assessment unit area method is in place from April 2003 and these forms are filled up at each door step of the property. Tax calculations are based on the area value of the property instead of rental value. Due to this in the current year the property tax collections will be more than double of the previous year. After this annual increase of 30% is presumed in the property taxes each year.

32.4.2 Property Tax Demand

The annual demand against property taxes for the financial year 2005-06 is expected to grow at the rate of 10% annually.

32.4.3 Tax Collection Efficiency

Tax collection efficiency is also projected to increase from 62% to 85% of the total demand of properties as predicted in the reform agenda of the JNNURM. Advertisement tax will be more streamlined to identify the new avenues of advertisement with the establishment of LVC in the city. It is presumed to grow at the rate of 15% per annum over the next seven years.

Inconsistent trend is observed in the growth of assigned revenues and compensations. Based on the analysis of growth mainly over the last two years, it is expected to grow at the rate of 20% per annum.

Octroi is abolished in the state in the last years. State Government is supposed to provide the Government grant in lieu of octroi to Urban local bodies of U.P. This grant should have an annual increment of 10 percent each year, which is not currently done. Future projections are made taking into account the annual increase of 10% to that government contribution.

The non-tax revenues are also based on the average growth trend of all non-tax revenues as one source. Rent on buildings can be increased sufficiently by revision in rent agreements made by MCV and by computerization of the properties on rent. Registration fees from death and birth certificates will be expected to grow with the establishment of CSCs/ LVCs at 12% per annum.

Varanasi is religious tourism city. MCV is involved in the construction of roads, making street lighting arrangements and sanitary services in the city, These factors are taken into consideration while planning for financial projections of the MCV.

A proper survey needs be carried out towards identifying the regular license holders and the potential license holders. Revenue from license fees can double up the average growth trend of the historic data after the implementation of the improved measures. Also where the user of the services of MCV is directly linked with the provision of services by MCV. It can levy the appropriate user fees for the usage of services by the payee.

Water charges have not been increased in varansi by VJS from last 5 years inspite of State Govrnment orders. That may be due to pressure of elected members to the body. There is sufficient scope of increase in water tax and water charges revenues after that increase is affected and water supply management reforms by VJS

Government grants are currently received on the basis of 1991 CoI population data. It is assumed that the grants in 2006-07 shall be received on the basis of 2001 CoI, and 2012-2013 onwards, these shall be based on 2011 CoI.

32.4.4 Forecast of Revenue Expenditure

Under the baseline scenario discussed above, all the expenditure is expected to go up by a static growth. But as a result of growth in infrastructure, the O&M costs of capital investments towards these, will further add on the current growth of revenue expenditure in a sustainable investment scenario.

32.5 Capital Investment Plan

Toolkit 1 of JNNURM explains the funding pattern, sanction and disbursement to funds to ULBs. Having a population of 12.02 lakh, Varanasi stands in Category C for funding[17].

[17] JNNURM Toolkit 1, *op cit*, pp 8-9.

Table 74 below gives costs of all projects identified for coverage under the Mission with sectoral break-ups and classified as per the two sub-missions. The total estimated cost for Sub Mission I (Urban Infrastructure and Governance) is around 2556 Crore and for Sub Mission II (Basic Services for Urban Poor) is 516 Crore. Costs for Urban Renewal account for nearly 99% (Rs. 2541.43 lakh) of the cost of Sub Mission I with costs for Urban Governance Reforms accounts for 1% approximately (Rs. 14.69 Crores). In case of Sub Mission II, nearly 58% of the funds (Rs. 299.36 Crore) would go towards In-situ development of slums and remaining 42% (Rs. 217.11 Crore) would be utilized for Ex-situ development of slums.

Figures 33 illustrate break-up of costs under the various sectors of infrastructure. *Figure 34* is about the costs to be incurred with regards institutional and financial reforms. *Figure 35* shows costs of infrastructure etc towards *in-situ* development of slums. *Figure 36 outlines* costs for integrated development of slums for ex-situ development.

Table 74: Total Costs of Projects for JNNURM

TOTAL COSTS OF PROJECTS IDENTIFIED FOR CDP-VARANASI UNDER JNURM MISSION		
S.NO.	ACTIVITIES	TOTAL COSTS (Lacs)
A.	URBAN INFRASTRUCTURE AND GOVERNANCE	
a)	*Urban Renewal & Infrastructure*	
1	Urban Renewal	6271
2	Heritage	3391
2	Water Supply	38135
3	Sewerage & Sanitation	86440
4	Storm Water Drainage	30515
5	Solid Waste Management	4308.075
6	Urban Transport	83861
7	Environmental Aspects	1222
	Total (a)	254143.075
b)	*Urban Governance Reforms*	
1	E-Governance	1050
3	Property Tax Reforms	300
4	Water Supply Management Reforms	44
5	Public Awareness Program	75
	Total (b)	1469
	Total A	255612.075
S.NO.	ACTIVITIES	TOTAL COSTS (Lacs)
B.	BASIC SERVICES FOR THE URBAN POOR	
1	*In-situ Development of Slums*	
	Housing	23103
	Provision of roads/lanes	1450
	Water Supply	1261
	Sewerage	800
	Drainage	725
	Street lighting	435
	Construction of Community Centres	210
	Augmentation of existing Community Centres (21)	32
	Provision of CTCs in Slums	1900
	Provision of collection bins	20

	Solid waste Management	0
	Total cost	29,936.00
2	***Ex-situ development of slums***	
	Identification and prioritization of slums for relocation	50
	Housing	18318
	Transportation Network	1150
	Water Supply	540
	Sewerage	500
	Drainage	690
	Street lighting	345
	Parks	20
	Construction of Community Centres	90
	Provision of collection bins	8
	Solid Waste Management	0
	Total Cost	21711
	Total cost of slum development (Insitu+Exsitu) = B	51,647.00
	Total Cost of Investment (A+B)	307,259.08

Figure 33: Breakdown of Costs of Various Infrastructure Projects

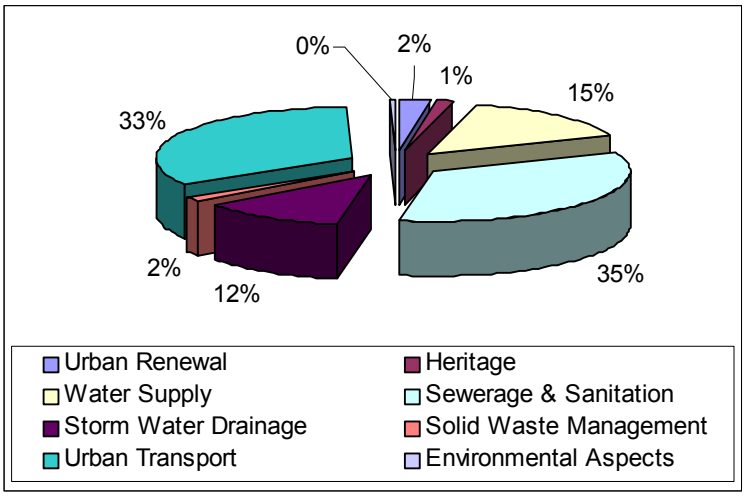


Figure 34: Costs for Institutional and Financial Reforms

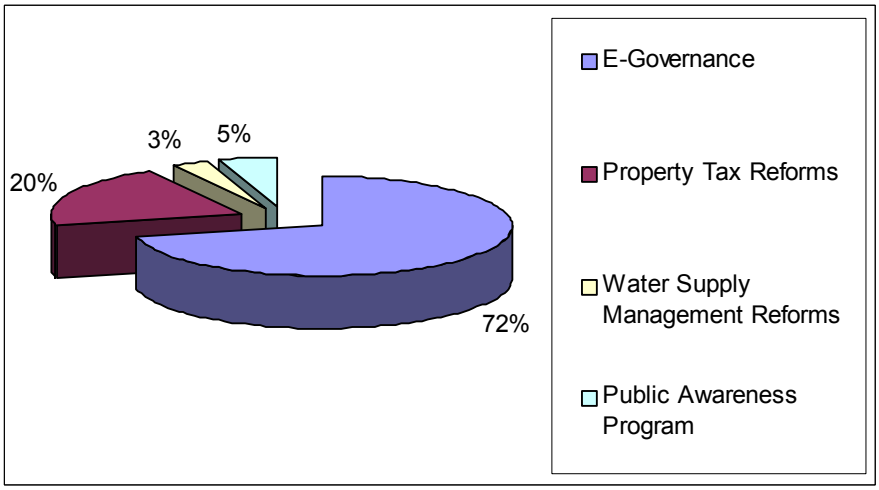


Figure 35: Costs for In-situ Development of Slums

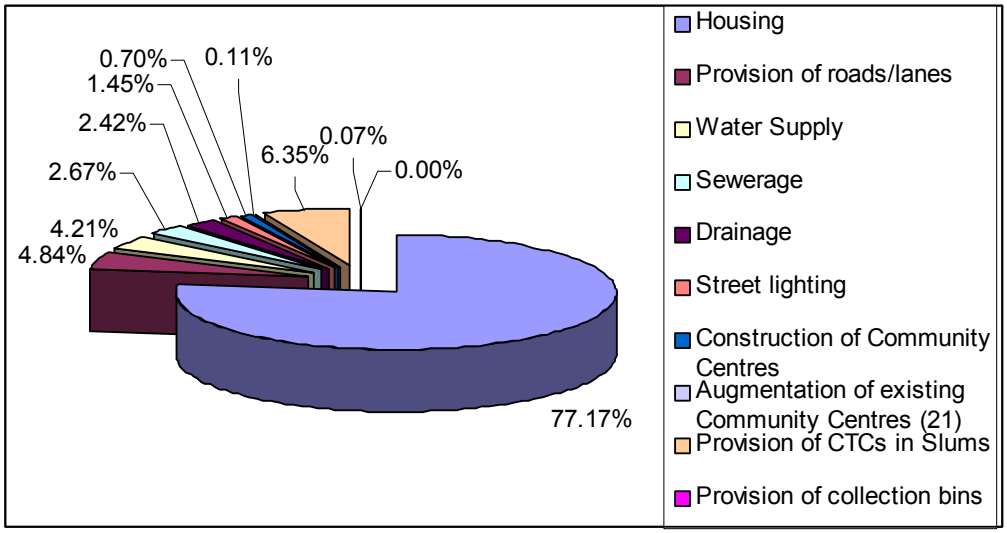
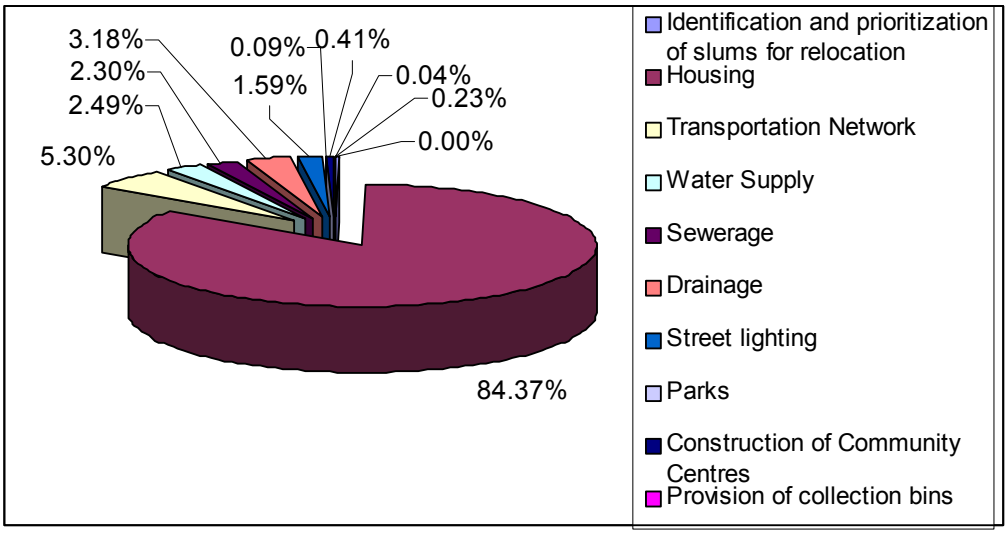


Figure 36: Costs for Ex-situ Development of Slums



32.6 Funding of Priority Projects

Costs of all priority projects to be taken up during Phase I of JNNURM have been grouped into two parts: costs for the first two years (2006-07 and 2007-08), and costs for the remaining part of Phase I (2008-09 up to 2010-11). *Table 75* puts together all costs as per this grouping. Of the total fund requirement for infrastructure development, urban governance and slum development under the Mission (Rs. 307259lakh), the requirement during the first two years is estimated at Rs. 877.22 Crore while it is Rs. 2195.37 Crore for rest of Phase I.

Table 75: Costs of Priority Projects

S.no.	Sector	Release of Funds (Lakhs)				Total Cost
		Phase I		Total phase I	Phase II	
		First 2 years	Rest of Phase I			
1	Urban Renewal	666.5	5604.5	6271	-	6271
2	Heritage	1762	1629	3391	-	3391
3	Water Supply	11775	26360	38135	-	38135
4	Sewerage and Sanitation	27535	58905	86440	-	86440
5	Storm Water Drainage	7254	23261	30515	-	30515
6	Solid Waste Management	1276	3032	4308	-	4308
7	Urban Transport	17739	66122	83861	-	83861
8	Environment	348	874	1222	-	1222
9	Basic Services to Urban Poor	18460.5	33186.7	51647.2	-	51647
10	Institutional Reforms	625	425	1050	-	1050
11	Property Tax Reforms	223	77	300	-	300
12	Water Supply Management Reforms	18	26	44	-	44
13	Public Awareness Programmes	40	35	75	-	75
Total Release of Funds		87722	219537.2		-	307259.2

Figure37: Release of funds for projects for First 2 years

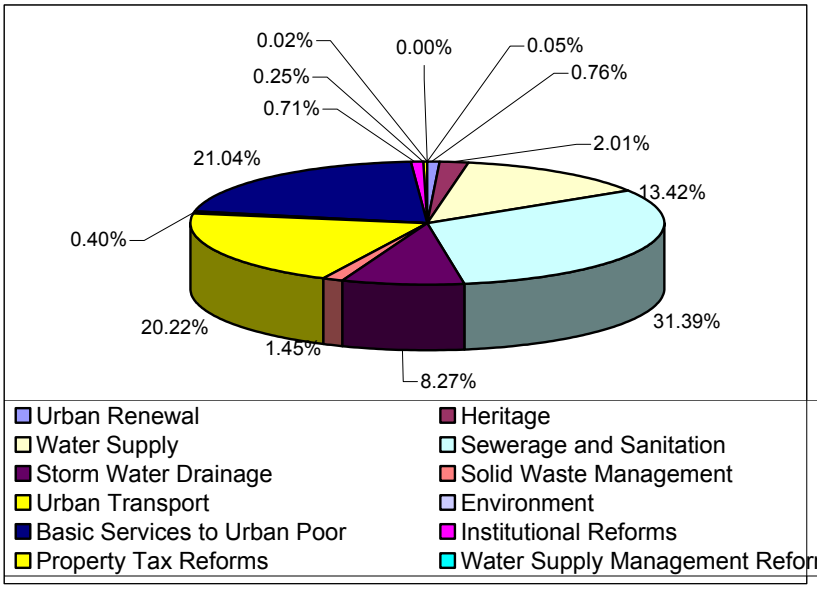
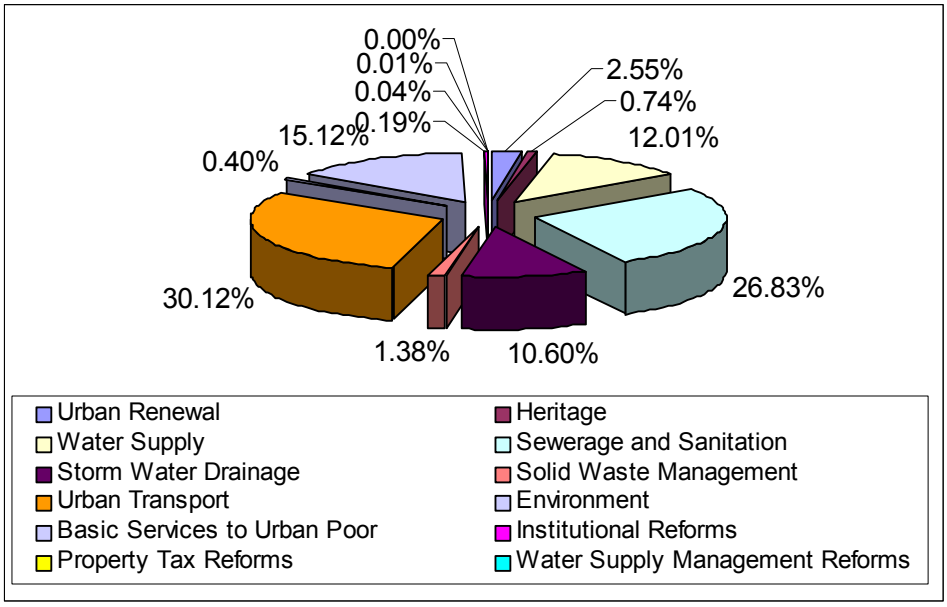


Figure 38: Release of funds for projects for rest of Phase I



Following is the break-down of fund requirement of priority projects relating to Urban Infrastructure and Governance:

i. Requirement of funds for Urban Renewal of the old city for the first two years shall be Rs. 666.5 lakh (Rs. 6.65 crore) whereas costs for the rest of Phase I shall be Rs. 56045 lakh (Rs. 560.45 crore);
ii. Heritage projects shall cost Rs. 1762 lakh (Rs. 17.62 crore) and Rs. 1629 Lakh (Rs.16.29 crore) respectively;
iii. Total cost of Water Supply projects for the first two years is estimated at Rs. 11775 lakh (Rs. 117.75 crore). The cost for the rest of Phase I shall be Rs. 26360 Lakh (Rs. 263.60 crore);
iv. Sewerage and Sanitation projects shall, in the first two years cost Rs. 27535 lakh (Rs. 275.35 crore), and Rs. 58905 lakh (Rs. 589.05 crore) for the rest of Phase I;
v. Cost of Storm Water Drainage projects for initial two years shall be Rs. 7254 lakh (Rs. 72.54 crore), while for the rest of Phase I, it shall be Rs. 23261 (Rs. 232.61 crore);
vi. SWM projects shall for the two stages cost Rs. 1276 lakh (Rs. 12.76 crore), and Rs. 3032 Lakh (Rs. 30.32 crore) respectively;
vii. Urban Transportation shall involve Rs. 17739 lakh (Rs. 177.39 crore) in the initial 2 years, and Rs. 66122 lakh (Rs. 661.22 crore) over the next 3 years in Phase I;
viii. A total of Rs. 348.00 lakh (Rs. 3.48 crore) and Rs. 874.00 (Rs. 8.74 crore) has been identified for Environmental Aspects over the 2 stages of Phase I;
ix. E-Governance Reforms are estimated to cost Rs. 625.00 lakh (Rs. 6.25 crore) and Rs. 425 Lakh (Rs. 4.25 crore) for the two stages respectively;
x. Costs of Property Tax Reform projects shall be Rs. 223 lakh (Rs. 2.23 crore) and and Rs. 77 (Rs. 0.77 crore); and
xi. Water Supply Management Reforms shall cost Rs. 18.00 lakh (Rs. 0.18 crore) in the initial 2 years, and Rs. 26.00 (Rs. 0.26 crore) in the rest of Phase I.

Following is the break-down of fund requirement of priority projects relating to Provision of Basic Services to Urban Poor:

i. Total costs of projects under *In-situ* slum development over the first two years is kept at Rs. 9810 lakh (Rs. 98.1 crore). The cost for the rest of Phase I shall be Rs. 17540 lakh (Rs. 175.4 crore); and
ii. Costs of projects for *Ex-situ* slum development shall be Rs. 7026.5 lakh (Rs. 70.26 crore) over the first two years and 12511 lakh or 125.11 crore for the rest of Phase I.

32.7 Financing Strategies

The funding share of ULBs in the city has to be decided on the basis of functions performed by the respective agency, e.g. JN for all water supply and sewerage related works. Projects relating to roads and transportation are decided on the basis of jurisdiction of the ULB (MCV/ VDA) where these would fall **(Tables 76-77).**

Based on expected distribution of funds its drawn that MCV is mainly responsible for requirements from Urban renewal components of the city development along with the Department of Irrigation and Bandi Parkhand. MCV is responsible for storm water drainage, solid waste management with PPP.

For the total sewerage and Drainage works in the City MCV and VJS and JICA are agencies for execution of the project. Since partly sewerage is funded by the external aid and that can be managed as ULB's share for sewerage and drainage work in the city.

Other parastatal like P.W.D.,UPRCTC, Uttar Pardesh Jal Nigam, Railways will be responsible for the balance project works. VDA will be mainly responsible construction of intersections of roads and flyovers aand for development of multilevel parking sites for the city.

A detailed exercise, *Table 76,* towards contribution of government at different levels – centre, state and local – has been carried out to determine the fund requirement for each sector/ project. Further, the shares for Phase I have been split into two: (i) First 2 years, and (ii) Rest of Phase I. From the total share required from ULB/parastatal agencies the share of MCV, VJS, VDA and other parastatals will be as follows: -

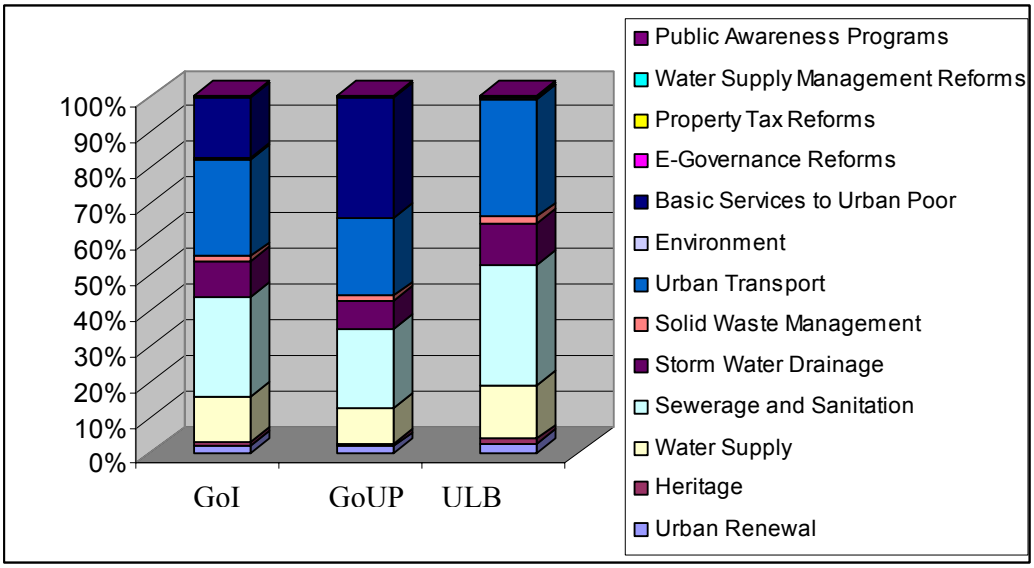
Table 76: Requirement of funds for Priority Projects

S. No.	Sector	Phase I										Total phase I	Phase II	Total Cost (Lakhs)
		First 2 years								Rest of Phase I	Priority II			
		2006-07				2007-08								
		GOI	GoUP	ULB/PS	Sub Total	GOI	GoUP	ULB/PS	Sub Total		Rest 4 years			
I	**URBAN INFRASTRUCTURE & GOVERNANCE**													
1	Urban Renewal	81.5	32.6	48.9	163	251.75	100.7	151.05	503.5	666.5	5604.5	6271	-	**6271**
2	Heritage	572.5	229	343.5	1145	308.5	123.4	185.1	617	1762	1629	3391	-	**3391**
3	Water Supply	2377.5	951	1426.5	4755	3510	1404	2106	7020	11775	26360	38135	-	**38135**
4	Sewerage and Sanitation	3675	1470	2205	7350	10092.5	4037	6055.5	20185	27535	58905	86440	-	**86440**
5	Storm Water Drainage	826	330.4	495.6	1652	2801	1120.4	1680.6	5602	7254	23261	30515	-	**30515**
6	Solid Waste Management	115.3125	46.125	69.1875	230.63	522.75	209.1	313.65	1045.5	1276.125	3031.95	4,308.08	-	**4308.075**
7	Urban Transport	1697.5	679	1018.5	3395	7172	2868.8	4303.2	14344	17739	66122	83861	-	**83861**
8	Environment	79	31.6	47.4	158	95	38	57	190	348	874	1222	-	**1222**
10	E-Governance Reforms	100	40	60	200	212.5	85	127.5	425	625	425	1050	-	**1,050**
12	Property Tax Reforms	46	18.4	27.6	92	65.5	26.2	39.3	131	223	77	300	-	**300**
13	Water Supply Management Reforms	1	0.4	0.6	2	8	3.2	4.8	16	18	26	44	-	**32**
14	Public Awareness Programs	12.5	5	7.5	25	12.5	5	7.5	25	50	25	75	-	**75**
		GOI	GoUP/ ULB/ PS		Sub Total	GOI	GoUP/ ULB/ PS		Sub Total	Total Priority I	Priority II	Total phase I	Phase II	**Total Cost (Lakhs)**
II	**BASIC SERVICES FOR THE URBAN POOR**													
9	Basic Services to Urban Poor	2884	2884		5768	6346.25	6346.25		12692.5	18460.5	33186.2	51646.7	-	**51,647**
Total Fund Requirement		**9,583.81**	**3,833.53**	**5,750.29**	**19,167.63**	**25,052.00**	**10,020.80**	**15,031.20**	**50,104.00**	**69,271.63**	**186,340.45**	**307258.8**	-	**307,247**

Table 77: Sectoral Funding Pattern

S. No.	Sector	Total Costs Phase I (Rs Lakh)	Funding Pattern		
			GOI	*GOUP*	*ULB/PS*
1	Urban Renewal	6271	3135.5	1254.2	1881.3
2	Heritage	3391	1695.5	678.2	1017.3
3	Water Supply	38135	19067.5	7627	11440.5
4	Sewerage and Sanitation	86440	43220	17288	25932
5	Storm Water Drainage	30515	15257.5	6103	9154.5
6	Solid Waste Management	4308.075	2154.0375	861.615	1292.4225
7	Urban Transport	83861	41930.5	16772.2	25158.3
8	Environment	1222	611	244.4	366.6
9	E-Governance Reforms	1050	525	210	315
10	Property Tax Reforms	300	150	60	90
11	Water Supply Management Reforms	44	22	8.8	13.2
12	Public Awareness Programs	75	37.5	15	22.5
13	**Basic Services to Urban Poor**	51646.7	25823.35	25823.35	
Total Requirement of Funds		**307258.775**	***153629.388***	***76945.765***	***76683.6225***

Figure 39: Funding Pattern



Share of ULB/PS in each of financial Year for Phase I of the Projects under JNURM is given in *Annex XIII*

32.8 Stakeholder Identification for implementation of sectoral projects

On the basis of discussions held with various stakeholders including central and state authorities, stakeholders have been identified for the implementation of sectoral projects (Table 78)

Table 78: Sector wise identification of stakeholder for implementation of projects

A	URBAN RENEWAL	Total Costs of Project	Stakeholder		
1	Improvement of access to Dashashvamedh Ghat	50	MCV	DEPT. OF TOURISM	-
2	Provision of Foot over Bridge	500	MCV	PWD	-
3	Widening of carriage way of roads leading to	76	MCV	-	-
4	Illumination and Street lighting along Ghats	116	MCV	D/o Irrigation (Bandhi Prakhand)	-
5	Strengthening of Existing fruit mandi & relocation of wholesale mandi	3131	MCV	Mandi Samiti	-
6	Provision of designed/ synchronized signages	50	MCV	Private party	-
7	Gaushalas to avoid cattle from entering the core city	50	MCV	-	-
8	Traffic Management plan for old city	100	MCV	Traffic police	-
9	Strengthening of Ghat steps	272	MCV	D/o Irrigation (Bandhi Prakhand)	-
10	Provision of Jetty on the Ghats	1500	MCV	D/o Irrigation (Bandhi Prakhand)	-
11	Provision of 6 Slaughter Houses	250	MCV	-	-
12	Development of Small Industries Complex	176	MCV	UPSIDC	-
		6271			
B	**Heritage & Tourism**	**Total Costs of Project**	**Stakeholder**		
2	Provision of Tourist Information Center at Cantt Rly Stn, Sarnath & Bisheshwamesh ghat	21	D/o Tourism	-	-
3	Upgradation of Kunds and Wetlands	450	D/o Tourism	-	-
4	Improvement of gali leading to ghats	400	Private party	-	-
5	Pre paid stands for boat rides	14	D/o Tourism	Traffic police	-
7	Renovation & beautification of ghat	840	D/o Tourism	-	-
8	Provision of public conveniences	300	D/o Tourism	D/o Irrigation (Bandhi Prakhand)	
9	Provision of public address System (Sound)	6	D/o Tourism	MCV	-
10	Provision of light and sound Shows	700	D/o Tourism	Traffic police	-
11	Development of Panch Kosi Route	450	D/o Tourism	PWD	-
12	Establishment of Tourism Village	150	D/o Tourism	Private party	-
13	Signages	60	D/o Tourism	Private party	-
		3391			

C	Water Supply	Total Costs of Project	Stakeholder		
	Existing Raw water pumping plants reorganization and strengthening of intake works, repairing, replacement of old pumps and installation of new pumps to enhance the pumping capacity up to 350 mld (App) including E/M items, complete in all respect	500	UPJN	VJS	-
	Replacement of old pumps and motor at Bhadeni Intake works	100	UPJN	VJS	-
	Water treatment plant (Settling tanks/, clariflocculators etc.) Rapid gravity filter of existing plant, this includes repairing of system and the replacement of filter media	500	UPJN	VJS	-
1250	Storage Reservoirs	150	UPJN	VJS	-
	Conversion of old slow sand filters of size 60m x 30m x 2m into clear water reservoir to enhance storage capacity of Bhelupur water works by 36 mld, 10 nos	750	UPJN	VJS	-
	Distribution System in 11 zones, replacement of old, damaged and in adequate pipes by new one. Good conditioned, old pipe to be provided at the required places including civil works.	3800	UPJN	VJS	-
	Rising mains, replacement of old, damaged and in adequate pipes by new one	150	UPJN	VJS	-
	Tube Wells	800	UPJN	VJS	-
	Booster pumps, pipes and accessories for clear water as per design requirement.	200	UPJN	VJS	-
	O&M of Existing water works	2400	UPJN	VJS	-
		9350			
	Construction of Intake well near Garhwa Ghat of 115 mld capacities with all required E/M works including power sub station as per design	1200	UPJN	VJS	-
	Construction of 100.00 mld water treatment plant at as per the detailed design.	1400	UPJN	VJS	-
	Construction of 200MLD water treatment plant including intake works, treatment units, rising main and distribution systems, etc. as per detailed design	8000	UPJN	VJS	-
	Rising main, for raw water and clear water as per the detailed design	650	UPJN	VJS	-
	Rising mains to pump raw water from intake works to treatment plant and treated clear water to OHTs at different locations in the city as per the detailed design	3500	UPJN	VJS	-
	Distribution system including all the accessories, Public Connections and water meters, etc.	6000	UPJN	VJS	-
	Replacement of old pumps and other mechanical equipments of water supply system	150	UPJN	VJS	-
	Installation of Booster Pumps as per the requirements and detailed design including electro-mechanical items, complete in all respect	250	UPJN	VJS	-
	Storage reservoirs and pump houses as per the detailed design.	3000	UPJN	VJS	-
		24150			
61550	Rain water harvesting arrangement (L.S.)	1500	UPJN	VJS	-
	Power Connection Charges	1000	UPJN	VJS	-
	Inventory of the existing scheme @ Rs. 2000.00 per km	1200	UPJN	VJS	-
	Layout planning, designing, and preparation of DPR (Lump Sum).	35	UPJN	VJS	-
	Generator set to provide supply during the no supply Hours of the electricity	300	UPJN	VJS	-
	Unforeseen items	100	UPJN	VJS	-
	Construction super vision	200	UPJN	VJS	-

D	Sewerage & Sanitation	Total Costs of Project	Stakeholder		
	Branch sewers and laterals	5000	UPJN	VJS	-
	Trunk sewers, Pumping stations, treatment plants, Rising mains, E/M works etc. that has not been taken in JICA.(Cost is based on the preliminary calculations)	1500	UPJN	VJS	-
	Existing sanitation facilities like community latrines, and bathrooms, etc.	50	UPJN	VJS	MCA
	Branch sewers and laterals	27000	UPJN	VJS	-
	Trunk sewers, Pumping stations, treatment plants, Rising mains, E/M works etc. that has not been taken in JICA.(Cost is based on the preliminary calculations)	1000	UPJN	VJS	-
	Existing sanitation facilities like community latrines, and bathrooms, etc.	43540	UPJN	VJS	MCA
	Mechanical equipment needed for the	400	UPJN	VJS	MCA
	Staff quarters @ 3%of total works.	40	UPJN	VJS	MCA
	Construction of 200MLD STP Rising Mains and trunk Sewers proposed under JBIC	560	JICA	UPJN	VJS
	Misc. items, contingencies, T&P, OH &CP @ 20% complete in all.	7350	VJS	MCA	UPJN
		86440			
E	**Storm Water Drainage**	**Total Costs of Project**	**Stakeholder**		
	Total cost of complete drainage network including rehabilitation, renovation of existing drainage, construction of new drains, pumping system etc (complete in all respect)	30000	MCV	UPJN	-
	Mechanical equipment needed for the cleaning of Drains (L.S.)	100	MCV	UPJN	-
	Inventory of the existing drains, Layout planning, designing, And preparation of DPR (Lump Sum)	50	MCV	UPJN	-
	Construction super vision @ 1.00%	315	MCV	UPJN	-
	Training & Capacity building, asset creation (L.S.)	50	MCV	UPJN	-
		30515			

F	Solid Waste Management	Total Costs of Project	Stakeholder		
	Dumper Placer Containers of 4.5 cubic meter capacity each	200	MCV	Private party	-
	Incinerator for hospital waste, complete with chimney and civil works etc. (100kg/hr. capacity)	100	MCV	Private party	-
	Development of landfill sites	200	MCV	Private party	-
	Compost plant with all accessories	700			-
	Mechanical Equipments like	1000	MCV	Private party	-
	➢ Dumper Placer with handle	0	MCV	Private party	-
	➢ Tractors	0	MCV	Private party	-
	➢ Hydraulic tractor tipping trolley	0	MCV	Private party	-
	➢ Platforms and ramping for tipping trolleys	0	MCV	Private party	-
	➢ Skip Lifter for construction debris	0	MCV	Private party	-
	➢ Skips of 7 cubic meter capacity	0	MCV	Private party	-
	➢ Hand Carts, JCV, Tipper, Hopper, Loaders	0	MCV	Private party	-
	➢ Medical waste collection vehicle with fully equipped. etc	0	MCV	Private party	-
	Depot for the vehicle	75	MCV	Private party	-
	Misc. and unforeseen items	28	MCV	Private party	-
	Peletisation	1900	MCV	Private party	-
	Capacity building and awareness programs, @2.50%	105.075			
		4308.075			

G	Urban Transport	Total Costs of Project	Stakeholder		
	Construction of Ring Road	10000	PWD	NHAI	-
	Widening and improvement of the roads (MCV& PWD)	6000	MCV	PWD	-
	Construction of 7 Flyovers at 3 intersections and 4 Railway Crossings	15000	VDA	PWD&BRIDGE CORPORATION	RAILWAY
	Construction of sub-way between Cantt Rly Stn and Cantt Bus terminal	400	MCV	PWD	UPSRTC
	Provision of 11 multilevel parking with integrated Parking for Rickshaws and Mini buses	16500	VDA	Private Party	-
	Traffic Management Plan for Old City area.	25	PWD	Traffic Police	MCV
	Geometric improvement of 48 identified intersection	800	MCV	PWD	-
	Signalization of 6 intersections	36	VDA	PWD	-
	Capacity augmentation of the existing Cantt Bus Terminal, Two New bus terminal	2500	UPSRTC	PWD	-
	Capacity augmentation of Pahadia Truck terminal & Provision of 3 new Truck terminal.	3500	MCV	PWD	Private Party
	Bus terminals for public transport to be provided at 4 locations.	3400	MCV	PWD	Private Party
	Provision for street Lightning	2000	MCV	VDA	-
	30.Mts wide Road (Extension of Panchkoshi Road including bridge on Ganga)	15000	MCV	PWD	-
	Two Bridges on Ganga at Samne Ghat & Balua Ghat	8700	MCV	PWD	Dept. of Irrigation
		83861			
H	**Environment & Beautification**	**Total Costs of Project**	**Stakeholder**		
	Environmental Improvement of Varuna	777	MCV	VDA	UPPCB
	Environmental Improvement of Asi	118	MCV	VDA	UPPCB
	Tree Plantations/ noise buffers	150	MCV	VDA	UPPCB
	Water harvesting pits at major water logging points	46	MCV	VDA	UPPCB
	Beautification and Upgradation of existing parks	100	MCV	VDA	UPPCB
	Awareness programs @ 2.5%	31	MCV	VDA	UPPCB
		1222			

32.9 Projects identified for Public Private Partnership (PPP)

A PPP is a partnership between the public and complementary sector for the purpose of delivering a project or service , which was traditionally provided by the public sector. The response of stakeholders in the City to PPP initiatives has shown that the MCV can now choose between various cost effective models involving PPP to upgrade the quality of basic services and other urban amenities in the City of Varanasi. PPP is a strategic alternative following the principles of Best Sourcing. On the basis of discussions held with the stakeholders, including the State and Local Authorities, the following projects have been identified for PPP:

Table 79: Projects identified for PPP

Projects identified for PPP		
S.No.	**Sector**	**Projects**
1	**Urban Renewal**	Illumination and Street lighting along Ghats
		Prepaid boat stands
		Provision of designed/ synchronized signages
		Development of Small Industries Complex
2	**Heritage**	Night Lighting / Illumination of Ghat area
		Sound and light show
		Conservation and renovation of Heritage sites (PPP with Mathas / owners of structures)
		Provision of Tourist Information Center at Ghats and old city
		Provision of public utilities
3	**Water Supply**	-
4	**Sanitation and Sewerage**	-
5	**Storm water drainage**	-
6	**Solid waste management**	Solid Waste management of the city
		Street cleaning and sweeping
7	**Urban Transport**	Provision of Multi level parking
		Truck Terminals
		Ring road and bridges
8	**Environment**	Beautification and Upgradation of existing parks
		Water harvesting pits at major water logging points
9	**Basic Services to urban poor**	CTCs in slums
		Insitu redevelopment of houses
10	**Institutional Reforms**	E Governance
11	**Finance and Accounting Reforms**	-
12	**Property Tax Reforms**	-
13	**Water Supply Management reforms**	-
14	**Public Awareness Programmes**	Awareness Programmes

32.10 Impact of FOP under Sustainable Investment Scenario

The FOP has been prepared on the assumption that the inflation rate will be 0% per year over the next seven years of investment. The 12th Finance Commission has also reflected in the report that the State should help the ULBs achieve financial sustainability. Assumptions made towards preparation of FOP under sustainable

investment scenario, in addition to those already discussed above, are stated in *Table 80*.

Tables 81-82 give elaborate analysis with regard to the two financial scenarios discussed in the beginning of this section.