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INTRODUCTION

1.1 URBAN SECTOR IN INDIA AND ORISSA - AN OVERVIEW

A century of industrialization and technical advancement has brought forth rapid urbanization in India. The statistics of the census of 2001 reveals that about 285 million or 27.8 percent of the total population of 1.02 billion of India live in urban areas. According to the 2001 census, the urban population in India is distributed across 4,378 towns and cities across the country. With the increase in urban population, many metro cities (population of more than one million) are emerging in the country. According to the 2001 census, 35 metro cities with a population of approximately 28 million make up about 37.8 percent of urban India. Presently, there are seven mega cities with populations of more than 4.50 million. The urbanization pattern of the country is skewed with the larger cities growing at a much faster rate, accounting for over two-thirds of the total population and the inhabitants of 35 metropolitan cities (cities having population of over a million) comprise of 37.8 percent of total urban population of India.

Urban areas are 'engines of economic growth' in terms of their contribution to the national economy and income. The contribution of the urban sector to the national gross domestic product (GDP) was estimated at only 29 percent during 1950-51, whereas at present, it is estimated at about 50-55 percent. Apart from their contribution to the GDP of the country, cities in India are also centre-point of innovations and hub of many activities. The time-series data from Indian states also show positive correlation between urbanization and growth in economic activity as measured through the state domestic product (SDP). Urbanized states show faster growth of SDP, while lesser urbanized states exhibit lesser economic productivity. The Economic Census of 1998 shows significant shifts in the urban economic structure with retail trade becoming the most important driver of employment growth during 1990-98 along with noticeable gains in areas of construction, transport and communication sectors. Manufacturing sector has slowed considerably during this period. The urban unemployment rate (with that of women in particular) has declined steadily. However, an increase of per capita income by about 20 percent in real terms over the same period was also registered thereby contributing to more than 90 percent of government revenues¹. This has indicated the tremendous potential of the Indian urban sector as a dynamic engine of economic and social development as center of innovation and entrepreneurship and as a source of generating wealth.

At the same time, most cities and towns appear to be severely stressed in terms of infrastructure and service availability. In 2001, 50.3 percent of urban households have not been provided with piped water supply within the premises, and 44 percent of those households were devoid of sanitation facilities. Even with a relatively high economic growth registered during the 1990s, 23.6 percent of the country's urban population continued to be below the poverty line. According to the 2001 Census, 14.12 percent of urban population lived in slums, without access to even the most basic services. The inner areas of cities face widespread dereliction and decadence, with significant negative economic consequences.

Orissa is one of the least urbanized states in India. As per the urbanization trends of 2001 census, Orissa State is the 24th most urbanized and 5th least urbanized state in India with about 14.97 percent of urban population. The urbanization trend in the state is much lower in comparison to the national average of 27.82 percent as per the 2001 census. However, the urban decadal growth during the last decade (1991-2001) has been enormous with a growth

¹ Report on Urban Indicators (2001) and Annual Report 2001-2002; Ministry of Urban Development and Poverty Alleviation, Government of India.

rate of about 30.28 percent, almost matching that of the country, which had an urban decadal growth rate of 32.60 percent. It is noteworthy that the State's population during the last decade has grown by about 14 percent while that of the urban population has grown at almost at double this rate.

The State has a relatively high proportion (24 percent) of population belonging to scheduled castes and tribes. The literacy rate is about 51 percent, which is low compared to the national average of 66 percent. The State's urban population of 5,517,238 (as per of 2001 census) is spread across 138 towns/cities in the State. The urban sector of the State comprises 103 urban local bodies (ULBs) comprising two municipal corporations and 101 municipalities.

1.2 JAWAHARLAL NEHRU NATIONAL URBAN RENEWAL MISSION

Urban Local Bodies (ULBs) and other urban institutions responsible for service provision are facing acute shortage of capacity and resources, notwithstanding the 74th Constitution Amendment Act (CAA), 1992, on ULBs. Most ULBs are starved of resources on account of their inability to effectively use their revenue raising powers, in particular, relating to property. Inter-government fiscal relations have changed, but at best, marginally, to make any noticeable impact on their finances. Existing municipal accounting systems do not permit accurate assessment of the financial position of ULBs, nor is it possible to ascertain the levels of spending on different services and recoveries from them. Continuation of many laws and systems which came into being in different contexts such as the Urban Land (Ceiling & Regulation) Act, 1976, have caused avoidable but serious distortions in the land and housing markets.

Considering that this state of cities is incompatible with the country's socio-economic objectives and India's growing role in the world economy, the Government of India (GoI) has decided to launch, in the past fiscal year, the Jawaharlal Nehru National Urban Renewal Mission (JNNURM). Aimed at creating economically productive, efficient, equitable and responsive cities, the JNNURM focuses on (i) improving and augmenting the economic and social infrastructure of cities; (ii) ensuring basic services to the urban poor including security of tenure at affordable prices; (iii) initiating wide-ranging urban sector reforms whose primary aim is to eliminate legal, institutional and financial constraints that have impeded investment in urban infrastructure and services; and (iv) strengthening municipal governments and their functioning in accordance with the provisions of the 74th CAA, 1992. It provides for public disclosure of local spending decisions together with earmarking of budgetary allocations for basic services to the poor. The Mission rests on the postulate that in order to make cities work and meaningfully contribute to India's economic growth and poverty reduction objectives, it is essential to create incentives and support for urban reforms both at the state and city levels; develop appropriate enabling frameworks; enhance the creditworthiness of ULBs; and integrate the poor with service delivery systems.

The JNNURM recognizes that a general lack of accountability of ULBs and other urban institutions in the quality of service delivery is hampering economic growth and increased prosperity of urban citizens. In today's rapidly globalizing economy, Indian ULBs, especially the 63 strategically important ones now targeted by the JNNURM, ought to facilitate their current and future local businesses to thrive. In addition, these ULBs should endeavor to meet for the challenges set by GoI in reducing poverty, by improving livelihood for all its citizens. The JNNURM aims at encouraging reforms and fast track planned development of identified cities with focus on efficiency in urban infrastructure and service delivery mechanisms, community participation and accountability of ULBs/parastatal agencies towards citizens. As per the guidelines issued by the JNNURM, preparation of a City Development Plan (CDP) is a prerequisite for accessing funds from the JNNURM.

The Government of Orissa (GoO) and the USAID agreed to pursue a multi-track program of technical assistance to improve delivery and management of urban services and enhance the financial management and financial sustainability of the State's ULBs at the launch of Indo-US FIRE (D-III) Project for Orissa on the June 24, 2005 at Bhubaneswar. Based on discussions

with the GoO and the officials of the ULBs, various areas of support at state and city levels were identified. One such support areas at the city level was preparation of City Development Plan for Bhubaneswar City. Community Consulting India Private Limited (hereinafter referred to as Consultants) has been retained by the US FIRE (D-III) Project to provide technical assistance to the Bhubaneswar Municipal Corporation (BMC) in this regard.

1.3 CITY DEVELOPMENT PLAN

A City Development Plan (CDP) is the ULB's corporate strategy that presents both a vision of a desired future perspective for the city and the ULB's organization, and mission statements on how the ULB, together with other stakeholders, intends to work towards achieving their long-term vision in the next five years. A CDP translates mission into actions and actions into outcomes. When a CDP is developed in close consultation with, and endorsed by all relevant local stakeholders, a ULB and others who commit themselves to action can be held accountable for their mission statements, actions and expected outcomes. The CDP will make economic development and improved quality of life as the long-term objective for all of the actions defined in the plan. The full set of proposed regulations, tax policies, infrastructure and other local government program expenditures will be framed with long-term economic development and improved quality of life, especially for the poor, firmly in mind.

A CDP clearly defines how a ULB will a) serve its customers (businesses and citizens), e.g. how it intends to guarantee basic level of urban services to all citizens, make urban planning responsive to emerging needs, become responsive to the needs of, and improve its services, to local businesses; b) run its business, e.g. how it intends to manage public finance in a modern and transparent way, execute urban planning and governance in line with an established framework, become more responsive, cost and time efficient through integrating technology in their governance and service delivery processes; and c) manage its resources, e.g. how it intends to increase revenues and expand its tax base to allow for self-sustaining urban service delivery, improve its creditworthiness, but also how it intends to recruit and retain a skilled workforce.

City Development Plan

A CDP helps a city take stock of its opportunities and endowments, gauge its place in relation to its hopes for the future, and to link these objectives to choices for improving its competitive position, for instance in producing tradable, identifying critical investments, mobilizing private sector partnerships, and to reduce poverty. A CDP is visualized as a document that would provide a perspective and a vision for the future development of a city. It should present the current status of city's development; set out the directions of change; identify the thrust areas; and suggest alternative routes, strategies and interventions for bringing about the change. It should establish a logical and consistent framework for evaluation of investment decisions. A CDP will specifically comprise of the following:

- Situation analysis, with regard to context i.e., demographic and economic trends, city governance, service provision & delivery including systems & structures, financial status of the city government and agencies concerned with service provision including an analysis of their creditworthiness; and effectiveness and efficiency of the institutional frameworks;
- Perspective and a vision for the city;
- Strategy identifying key strategic issues, risks and opportunities facing the city, with focus on reform and reform priorities; and
- City Investment Plan, referring to order of investment needed to implement the perspective and alternative financing strategies.

Context of a City Development Plan

Past efforts to produce this kind of broad, integrated approach have been fraught with coordination problems and multiple implementation agencies, which have lead to confusion and wasted resources. Moreover, past planning, like city master plans, have been excessively technical and unresponsive to citizen input and demand. The CDP is different from master planning as cities are now more open to outside influences in a globalized economy, and more able to act on opportunities for growth. At the same time, decentralization is giving cities more scope for action, and democratization is opening the planning and political process to much greater participation and accountability. A CDP is geared to respond to these new circumstances.

1.4 APPROACH AND METHODOLOGY

The CDP preparation process can be divided into three phases.

- Phase 1 - Define Vision and Mission Statements: In the first phase, after initial reconnaissance, the Consultants and the BMC (both elected and appointed members)

enumerated the city's strengths and weaknesses in facilitating economic growth and improved quality of life for all of its citizens. A one-day workshop was organized to outline an initial vision and a set of mission statements. The Consultants conducted the first round of consultations after the workshop with key stakeholders to verify and confirm the mission statements of the BMC with the demands and expectations of a representative sample of local businesses, and civil society. This was followed by a second workshop, wherein both the BMC and the interviewed stakeholder's participated, potential differences in expectations or additional service requirements were discussed and an initial vision and mission statements are agreed upon.

- | Activities |
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| <ul style="list-style-type: none"> ▪ Reconnaissance. ▪ Kick-off workshop with BMC. ▪ First round consultations with stakeholders. ▪ Second workshop to define vision/mission statements. |

- Phase 2 - Diagnostics for Identifying Priority Actions to Achieve Missions: In the second phase, the Consultants initiated a second round of consultations with relevant stakeholders for each mission statement. These consultations focused on identifying and defining actions needed to achieve a particular mission statement. In the mean time, the Consultants started collecting and analyzing the data required to rapidly assess the validity and relevance of the proposed actions (e.g. demography of the affected areas, business information, level and quality of services). The Consultants also conducted a shadow credit rating to determine the creditworthiness and to identify the financial reforms required for the BMC. The Consultants also initiated a performance and demand survey of the available services to get feedback on current service demands based on service coverage and perceived performance in service delivery. The combined findings of the above three activities resulted in a listing of priority actions that were presented and discussed in a third workshop involving the BMC and relevant stakeholders.
- | Activities |
|---|
| <ul style="list-style-type: none"> ▪ Consultations with Mission Stakeholders to identify actions. ▪ Data collection and (scenario) analysis. ▪ Service performance and demand survey. ▪ Third workshop to determine priority actions. |
- Phase 3 - Feasibility Assessments and Investment Scheduling: The Consultants started the third and final phase with consultation among stakeholders on the feasibility of the proposed actions. Feasibility was determined in terms of the most appropriate (technical and economic) solution, willingness of the partners to contribute, and the possible adverse social and environmental impacts. Special attention was given to identify opportunities for public-private partnerships and community contracting. The Consultants were required to determine the cost and financing terms (e.g. private sector contribution, amount of viability gap financing) for such of those actions that were identified as feasible, scheduling of these actions were also provided by the consultants as CDP is a multi-year plan. Since the CDP is a multi-year plan, feasible actions then need to be scheduled. The resultant City Investment Plan (CIP) was presented by the BMC with all relevant stakeholders.
- | Activities |
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| <ul style="list-style-type: none"> ▪ Consultations with Action Stakeholders. ▪ Project costing & determination of funding sources. ▪ Scheduling priority actions and developing city investment plan. ▪ Fourth workshop on priority action and investment plan. ▪ Final CDP document. |

Consequent to the fourth and final workshop, the Consultants finalized the CDP document incorporating the feedback from the workshop. This document was submitted to the BMC, and the BMC submitted it to the GoO and to the Gol under the JNNURM. The Consultants also provided the BMC with a summary of the CDP for publication and wider dissemination to the participating stakeholders.

- | Deliverables |
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| <ul style="list-style-type: none"> ▪ Vision & Mission Statements (end of Phase 1). ▪ Reports on Demand Survey Results, Data Analysis Results, including Results from Credit Rating Exercise, and Report on Priority Actions (end of Phase 2). ▪ City Development Plan, Capital Investment Plan and Documentation on Findings of Stakeholder Consultations (end of Phase 3). |

Detailed Scope of Work for the assignment is given in Annexure - 1.

1.5 SPATIAL COVERAGE OF THE BHUBANESWAR CITY DEVELOPMENT PLAN

The spatial coverage of the proposed Bhubaneswar CDP was determined based on the following:

- Mapping of the present urban agglomeration and its comparison with respect to the municipal area (135 sq. km), development area (233 sq. km), and beyond the development area, if any;
- City reconnaissance to understand the growth potential, growth directions and extent of growth on the periphery/city outskirts beyond the municipal area and development area;
- Consultations with pertinent stakeholders on the city's future growth potential and directions of growth vis-a-vis the proposed coverage of the Bhubaneswar CDP; and
- Concept Paper prepared by the IIT Kharagpur on the proposed Perspective Plan - Vision 2030 and Comprehensive Development Plan for Bhubaneswar-Cuttack Urban Complex.

A review of the above indicated that most of the pockets/areas, which have been registering rapid growth in the recent past, have been included within the administrative jurisdiction of the BMC. Approximately 10-12 percent of the total population is estimated to reside outside the present municipal area. At present, the spatial growth is limited to 8-10 percent beyond the administrative jurisdiction of the BMC and is well within the development area. The Team has also reviewed the Concept Paper on the proposed Bhubaneswar-Cuttack Urban Complex, prepared by IIT Kharagpur. This proposal envisages an area of 720 sq. km, which is yet to be discussed, approved and notified by the GoO.

Based on the above, the proposed Bhubaneswar CDP is envisaged to cover the development area of 233 sq. km. Further, there are no other urban local bodies within this development area except the BMC. Moreover, the development area is a notified area, and has a legal Comprehensive Development Plan, which would facilitate smooth implementation of the strategies, priority actions and proposals envisaged under the proposed CDP. In addition, this CDP would serve as a critical input for the larger Comprehensive Development Plan (Bhubaneswar-Cuttack Urban Complex), which is under preparation.

CITY PROFILE AND ECONOMY

2.1 LOCATION AND LINKAGES

Bhubaneswar is the capital of the State of Orissa and located at a distance of about 64 km from Puri, the abode of Lord Jagannath forming the apex of the 'Golden Triangle' with Konark and Puri as the other two points. The city is well connected by a road and railway network to the urban centers in the state and neighboring states. NH-5 (Kolkata-Chennai) and NH-203 (Bhubaneswar-Puri) traverse the city.

Regular buses ply between Bhubaneswar and Berhampur, Chilka, Cuttack, Konark, Paradip, Puri Rourkela, Sambalpur and other places in the State. Interstate bus services operate daily to Kolkata (West Bengal) Raipur (Chattishgarh) and Tatanagar (Jharkhand). Bhubaneswar is directly connected by rail with Kolkata, Puri, Chennai, Delhi, Mumbai, Bangalore, Guwahati, Hyderabad, Tirupati Thiruvanthapuram, and Tiruchirapalli. The city is also connected by air with all the four (4) major metropolitan cities apart from other cities like Vishkhapatnam, Hyderabad and Raipur through regular flights. Biju Patnaik Airport in the city is a modern airport with night landing facility. The city is administered by the BMC and the administrative jurisdiction of BMC extends over an area of 135 sq. km. The table above provides salient features of Bhubaneswar City.

Table 2.1.1: Salient Features of Bhubaneswar City

City	Bhubaneswar
District	Khorda
Area	135 sq. km (Municipal Area) 233 sq. km (Development Area)
Geographic Location	85° 44' to 85° 55' E Longitude and 20° 12' to 20° 25' N Latitude. Elevation: 45 m above the mean sea level.
Connectivity	Air: City has modern airport with regular flights to New Delhi, Mumbai, Kolkata, Chennai, Vishkhapatnam, Hyderabad and Raipur. Road: City is well connected by a road network with the urban centres of the State and neighboring States. Rail: City is well connected by a rail network and the Bhubaneswar railhead lies on the Chennai-Kolkata Railway Line.
Climate	Tropical Climate with maximum temperature of 43° C and minimum temperature of 12° C; Average Annual Rainfall of 1498 mm.
City Administrator	Bhubaneswar Municipal Corporation.

2.2 REGIONAL SETTING

By virtue of its strategic and central location, linkages, salubrious climate and propulsive effects of a growing city, its regional setting can be best illustrated in respect of the three characteristics, viz. Orissa State; Capital Sub-Region; and Golden Triangle of Tourism. Bhubaneswar City being the Capital City of the State has been functioning as an administrative city and hub for tertiary economic activities like services, trade and commerce. In addition, recent development indicates that the city is fast emerging as a preferred destination of health and education for the State. The future city economy is likely to be driven by the core sub-sectors like tourism related activities, knowledge based industries, small-scale and household service industries and services, trade & commerce. The capital sub-region can be said to extend from Khorda, Jhatni in the south and up to Choudwar in the north, while the Chandaka Forest is situated in the west and Daya Canal in the east. The city region however extends as far as Bhadrak & Talcher in the north, Berhampur in the south and Puri in the east. As stated earlier, the city is located at a distance of about 64 km from Puri, and forms the apex of the 'Golden Triangle' with Konark and Puri as the other two points. Map indicating regional setting and radial connectivity to the city is given as Plate - 1.

Plate - 1: Regional Setting and Radial Connectivity to the Bhubaneswar City

PLEASE INCLUDE AUTO CAD MAP AS TEMPLATE PLOTTED IN A-3 SIZE

The city is bounded on the north by revenue villages of Daruthenga, Raghunathpur, Kalarahanga, Injena, Rokata, Krushna Saranapur, Barimunda, Kacharamala; on the eastern side by revenue villages of Janmejyapur, Bhimpur, Jaganathpur, Saleswar, Andilo, Kuakhairiver, Koradakanta, Kesura, Bankual, Basuaghai, Raghunathpur; on the southern side by Daya River and revenue villages of Kukudaghai, Mohanpur, Dihapur, Balabhadrapur, Erabanga, Kochilaput, Bahadalpur, Sarankantar, Raysinghpur, Papada, Sankarpur, Kaikarapur; and on the western side by revenue villages of Nuagan, Malipada, Andharua, Jaganathprasada, Sundarpur, Patharagadia.

2.3 PHYSICAL CHARACTERISTICS

2.3.1 GEOGRAPHY

Bhubaneswar is located in Khorda District of Coastal Orissa, about 40 km west of north Bay of Bengal between Latitude 20° 12' to 20° 25' North and Longitude 85° 44' to 85° 55' East on the western fringe of the costal plain across the main axis of the Eastern Ghats. The city lies on the Mahanadi Delta. It lies on the west bank of River Kuakhai, which is a tributary of River Mahanadi, 30 km southeast of Cuttack. The River Daya branches off at Kathajodi and flows along the south eastern part of the city.

2.3.2 TOPOGRAPHY AND DRAINAGE CHANNELS

Bhubaneswar lies on the western fringe of the mid-coastal plain of Orissa with an average elevation of 45 metres above mean sea-level. It is located on a low laterite plateau and continuous erosion has shaped the topography into valleys and ridges. The Rivers Kuakhai, Bhargavi and Daya flow on the southeastern fringe of the city. Enormous hillock and forests are spread across the northern, western and southern parts. Topographically, the city can be divided into two major parts namely western upland and eastern lowland with the South-Eastern Railway forming the main divide between these two broad units. With the ground sloping from west to east, the city has a natural advantage for drainage. On the whole, 10 drainage channels are identified in the development area of the Bhubaneswar City.

2.3.3 CLIMATE

Bhubaneswar enjoys a salubrious and moderately humid tropical climate. Average annual rainfall is about 1498 mm falling from June to September (76 percent) and from October to December (13 percent). Temperature and humidity are high throughout the year. The mean maximum temperature ranges from 31° to 43° C and the mean minimum from 12° C to 24° C. The mean maximum humidity ranges from 71 percent to 83 percent and the mean minimum from 41 percent to 81 percent. The prevailing wind direction is southwest while the monsoon wind blows from south and southwest.

2.3.4 GEOLOGY

The western part is high land with hard soil and permits growth of forests while the eastern part is low with alluvial soil and can be considered suitable for agricultural purposes. The general soil condition is hard. Laterite stones are visible at some places on the surface.

2.4 HISTORICAL IMPORTANCE AND GROWTH

The historical reference of the city dates back to the 6th Century BC. The area was ruled by several dynasties such as the Guptas, Mauryas and Suryas. The edicts of Dhauli date the history of the land to 261 BC. Over a span of time, the city has been known by different names such as Kalinga Nagar, Tribhubaneswar, Temple City, Ekamra Kshetra and finally as Bhubaneswar. In 1936, Orissa became a separate province with Cuttack as its capital.

Later, during 1948, Bhubaneswar was selected to be the capital owing to location advantages offered by the city such as the altitude, communication linkages, vast plateau, climate and related factors. It is said that there were about seven thousand temples in this place, which earned it the coveted title 'The Temple City of India'. Even today from the hundreds of temples that still stand majestically as mute witnesses to its glorious past, one can study the chronological development of temple architecture starting from the 7th Century AD to the culmination in 13th Century AD. Bhubaneswar is a centre of art, crafts and is well known for its rich heritage and cultural background. Numerous temples, caves, religious ponds, etc. propagating faiths of Hinduism, Buddhism, Vaishnavism, Jainism speak not only of the wealth and prosperity of the people of the past but also of their skills architecture profound in stone.



Lord Lingaraj Temple

Bhubaneswar, at present, stands at the confluence of the past and the present and proudly manifests the soaring spire of the Lord Lingaraj, the Rajarani Temple, the Dhauli Pagoda, popularly known as the white dome of peace, the Jain Temples and the caves of Khandagiri and Udayagiri. Once the flourishing capital of ancient Kalinga, the city is today the largest in Orissa and a tourist destination of national and international importance. The modern city of Bhubaneswar came into existence in 1948 as the new capital of Orissa, designed by the German Architect Dr. Otto H. Koeingsberger. The city was designed for a population of 40,000 based on the 'neighborhood principles'. After the completion of the Secretariat building during 1956, government departments were shifted from Cuttack to Bhubaneswar. Gradually a stream of offices, institutions and other establishments flourished in the city. All these activities led to residential development in the private sector to a considerable extent followed by commercial activities in the city. All this contributed to a rapidly increasing trend of migration of people from the hinterland, which to some extent covers the entire state. The adjacent table provides an insight into the chronology of development and growth of Bhubaneswar since its notification as capital of Orissa.

Table 2.4.1: Chronology of Development and Growth of Bhubaneswar City

Bhubaneswar Notified Area Committee	Bhubaneswar was established with a population numbering less than 20,000 during the year 1948 (01.02.1948) as per the Bihar Orissa Municipal Act - 1922, comprising four revenue villages, viz. Old Town, Kapileswar, Kapilaprasad & Samantarapur.
Bhubaneswar Notified Area Council	Notified Area Committee became Notified Area Council during 01.10.1952 as per the Orissa Municipal Act - 1950 and the area of the little town was expanded to other Revenue Villages adjacent to Bhubaneswar such as Nayapali, Baramunda, Laxmisagar, Baragada, Jharapada, etc.
Bhubaneswar Municipality	During the year 1979, it was observed that the town grew beyond expectation and the population of the town became one lakh. Some of the major development initiatives like National Highway-5, South East Railway, etc. have taken major role for expansion of Bhubaneswar City and the population of the city was more than two lakhs at that time. Thus, the then Municipal Development Department vide their Letter No. 1078/11366 dated. 29.03.1979 declared the Bhubaneswar Notified Area Council as a Municipality.
Bhubaneswar Municipal Corporation	Subsequently, the population increased to more than 4 lakhs and new revenue villages were included in the city. Being the State Capital, Bhubaneswar Municipality was upgraded to a Municipal Corporation vide Notification No. 24148 dated. 28.07.1994, issued by the Housing & Urban Development Department, GoO.

Bhubaneswar is a combination of old world charms and new world comforts. The city has several places of importance both from the old and new era. Some of them include ancient temples (Lord Lingaraja, Vaital, Rajarani, Ananta Basudev, Mukteswar, Kapileswar, Parshurameswar, Megheswar, Brahmeshwar, Kedar Gouri, Bhaskareswar, Sikharchandi, Sri Ram, ISKCON, Satsang, Sri Shirdi Sai), Khandagiri and Udayagiri Caves, Sisupala Garh, Dhauli, Orissa State Museum, Tribal Museum, BDA-Nicco Park, Regional Science Centre (Science Park), Regional Plant Research Centre (Ekamra Kanan), Indira Gandhi Park, Biju Patnaik Park, Pathani Samant Planetarium, and Wild Life Zoo (Nandan Kanan).

2.5 HERITAGE AND CULTURE

Bhubaneswar City has a rich cultural background. It is famous for the Lord Siva temple complex that contains magnificent sculptural and architectural features depicting various social, cultural and religious heritage of Orissa at various time periods. It dates back to 300 BC. The entire temple complex is located in the old city of Bhubaneswar. Historically, this old city is regarded as the Ekamraskshetra. The old city features a conglomeration of temples, monuments, mandaps, heritage ponds, etc.

These fine architectural and sculptural elements are slowly being dominated by modern development and the same are gradually reducing its importance due to the pressure of development. In many cases, the visibility of temples is lost due to modern construction. Due to rapid urban growth, there is also environmental degradation. Initially, the old city had 1000 temples and at present, the total temples are limited to 320. As per INTACH report, majority of the existing temples are deteriorating rapidly and the precious stone carvings are also getting damaged. In order to address the above problems, the Bhubaneswar Development Authority (BDA) has delineated a specific zone for heritage area covering primarily the old city with its temple complexes while preparing the Comprehensive Development Plan for Bhubaneswar. A map indicating the 'Heritage Zone' is given as Plate - 2.

The heritage area is spread over an area of 510 hectares and consists of 4 villages namely Kapilprasad, Bhubaneswar, Goutama Nagar and Rajarani. The present population of this area is around 50,000 and net population density is 98 persons per hectare. In addition to these temples, there are several heritage lakes in the city. The details about these are dealt with separately under Section 5.4. The temple town has registered a high growth rate during last decade and this has led to problems in sanitation, traffic and transportation pollution of religious tanks, construction near temples, loss of visibility of important monuments and skyline, environmental problems, etc. are other problem areas and the same are detailed in the adjacent box.

Key Issues and Observations pertaining to Heritage Area

- Severe traffic congestion in almost all roads of the old city due to inadequate road network system.
- Inadequate parking space for vehicles in the old city is also adding to the traffic congestion in old area.
- The water of the religious tanks is getting polluted due to the inflow of sewage and waste water owing to lack of drainage and sewerage system in the area. Solid waste generation and its poor management in the area is also posing environmental problem.
- Massive construction activities in the vicinity in the recent past have been causing loss of visibility and skyline of this temple city.
- Most of the temples are in the process of deterioration.
- Availability of tourist facilities is also poor. The area needs high standard sanitation for the tourist and the people visiting the temple complexes.

2.6 AREA AND POPULATION

The administrative jurisdiction of the BMC spreads over an extent of 135 sq. km. The entire municipal area is divided into 47 administrative divisions called 'wards'. Map showing the area with the administrative jurisdiction of the BMC along with the ward boundaries is given as Plate - 3.

The city had a population of 648,032 in 2001, with a growth rate of 57.46 percent during the period 1991-2001. The growth rate of the city is higher than that of the State (urban), which stood at 30.28 percent for the period 1991-2001. It was observed that the city always had a population growth rate higher than that of the State.

Table 2.6.1: Population Details and Growth Trends in Population of Bhubaneswar City

Census Year	Population	Decadal Growth (%)	Area (sq. km)	Density per sq. km
1951	16512	--	25.90	638
1961	38211	131.41	50.25	760
1971	105491	176.07	65.03	1622
1981	219211	107.80	92.91	2359
1991	411542	87.74	124.74	3299
2001	648032	57.46	135.00	4800

Source: Various Census Reports of Government of India; 1951 - 2001 and Newsletter of Bhubaneswar Municipal Corporation (Aahwan); 2005

Plate - 2: 'Heritage Zone' earmarked in the Comprehensive Development Plan for the Bhubaneswar City

PLEASE INCLUDE AUTO CAD MAP AS TEMPLATE PLOTTED IN A-3 SIZE

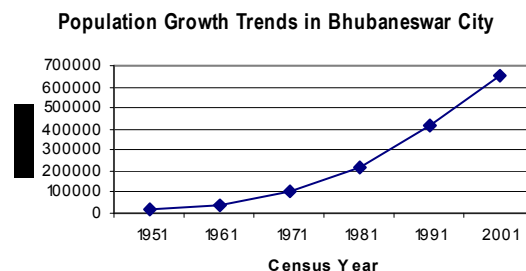
Plate - 3: Map Showing the Municipal Boundaries along with Ward Boundaries

PLEASE INCLUDE AUTO CAD MAP AS TEMPLATE PLOTTED IN A-3 SIZE

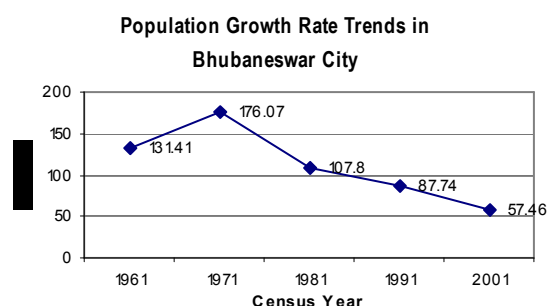
Plate - 4: Map Showing the Ward Density Pattern

PLEASE INCLUDE AUTO CAD MAP AS TEMPLATE PLOTTED IN A-3 SIZE

The city registered the highest increase of about 131 percent during the decade 1951-1961 owing to the shifting of the Capital City of the State from Cuttack to Bhubaneswar during the year 1954. The city continued to grow and registered a growth of 176.07 percent during the decade 1961-71. This was one of the highest growth rates experienced by any other capital city in the country and was also higher than any of the cities in Orissa during that decade. The city continued to grow both due to natural increase as well as migration. However, the component-wise break-up of the population growth² is not available. As per the available statistics of 1991 census, about 26 percent of the growth was due to natural increase, while the rest 74 percent was the result of migration during the decade 1981-1991.



Such remarkable growth during the last five decades can be ascribed to various reasons, which include increases due to natural growth, concentration of administrative activities in the city, corresponding growth in tertiary economic activities like trade & commerce, services and commercial activities, and large in-migration to the city from the surrounding areas because of better avenues of employment opportunities, better urban amenities together with low per capita income in the agricultural sector. Accession of new adjoining areas into the ambit of the municipal government also spurred development to a great extent as the city has undergone horizontal expansion several times during the last 50 years from 25.90 sq. km during 1951 to 135 sq. km as on date.



The population density of the city works out to about 4,800 persons per sq. km inside the municipal area of 135 sq. km as per the 2001 census. The table above (Table 2.4.1) also presents the trends in density. It may be noted that the gross density has been increasing from 638 persons per sq. km in 1951 to 4,800 persons per sq. km in 2001 as per the respective census figures. Present population of the city within the municipal limits is expected to be about 7.50 lakhs approximately (2005/06) and accordingly, density works out to 5555 persons per sq. km. Based on the ward-wise distribution of population, the BMC area is divided into five zones based on density. Present ward-wise distribution of the population³ and density pattern is given in Annexure - 2. Map showing ward-wise population density pattern is given as Plate - 4.

Issues and Observations	
▪	Ward 8, 15, 28, Unit 28, bit -7, Unit-14 areas are having high population density, in the range of 20,000-25,000 persons per sq. km.
▪	Ward 5, 9, 11, 23, Unit-2, Unit-3, Unit-9, Unit-11, Unit-30 are moderately dense areas (Population density 10,000-15,000 persons per sq. km).
▪	Central part of the city has a population density ranging from 15,000-20,000 persons per sq. km.

2.7 SOCIO-ECONOMIC CHARACTERISTICS

The city's significance in the State, in the Capital-Sub-Region and in the Golden Triangle of Tourism in Orissa has made this city an important hub of commercial, political, administrative and socio-cultural activities in the region. The table below presents the key socio-economic features of the Bhubaneswar City and their comparison with that of the urban Orissa. It may be observed that the city had better workers participation rate (33.30 percent) than that of the urban Orissa. Similarly, proportion of the main workers to total workers is better in the city than the urban Orissa. However, literacy rate and sex ratio in the urban Orissa is better than that of the city.

² Component-wise break-up of population growth, viz. natural growth, in-migration and jurisdictional change, as per Table 2 of the JNNURM Toolkit.

³ Projected based on the 2001 Census figure as ward boundaries have changed during the year 2003.

As stated earlier, the Bhubaneswar City has been functioning as an administrative city with sustained growth in tertiary economic activities. Major economic activities of the city are trade & commerce, tourism related activities and to some extent, industrial activities.

Table 2.7.1: Key Socio-Economic Features

Particulars	Orissa	City
Urban Sex Ratio (Female per 1000 Male)	895	796
Literacy Rate (Percent)	81.00	78.02
Workers Participation Rate - Urban (Percent)	30.62	33.30
Proportion of Main Workers to Total Workers (Percent)	89.80	94.76

Source: Census of India; 2001

The worker participation rate of the city was about 33.34 percent of the total population as per the 2001 census, comprising 204,702 main workers and 11,331 marginal workers, totaling 216,033 workers. It was observed that the tertiary sector including commercial activities, trade and commerce and related activities were predominant in nature with about 95.67 percent of the workers engaged in the sector. The primary sector including agriculture and its related activities constituted only 2.15 percent, while the secondary sector including industrial activities was the next major constituent sector of the city's economy, as given in the table. However, information pertaining to registered manufacturing and services⁴ like employment, quantum of business, value addition, etc. is not available.

Table 2.7.2: Socio-Economic Characteristics of Bhubaneswar City

Sector	No. of Workers	Percentage to Total Workers	Percentage to Total Population
Primary - Cultivators and Agricultural Labors	4,651	2.15	0.72
Secondary - Household Industries, Manufacturing, Services and Repair	4,715	2.18	0.73
Tertiary - Trade and Commerce, Transport and Service Sector	206,667	95.67	31.89
Total	216,033	100.00	33.34

Source: Census of India; 2001

2.7.1 TRADE AND COMMERCE

Bhubaneswar is an important center for trade and commerce in the state. Handicrafts occupy an important place in the economy of the city and contribute to foreign exchange earning. The crafts include silver filigree works, colorful applique works, stone images, wood carvings, patta paintings, brassware, horn works, bamboo etc. The trade and commerce activities in the city can be divided into two broad categories namely the organized and the unorganized markets. Presently there are 6 sectoral market complexes and 8 local markets functioning in the city. Also, street shopping has developed along some of the major roads, such as Janpath, Cuttack-Puri Road, Ekamra Marg and also at Bapuji Nagar. Other than the organized sector, there are a number of unorganized markets in the city.

Major Commercial Activities

- Central business activities located near Rajmahal and Bapuji Nagar, Unit - II market and I.
- Retail shopping activities located in the market complexes developed in different residential areas (Surya Kiran market, Municipal market, Saheed Nagar Market and Market at Station square, etc.).
- Wholesale commercial activities located in various market complexes of the city.
- Local shops (known as Weekly Hats) in newly developed colonies.

There has been a rapid growth in the commercial sector during the recent past. Hotel and construction industry has indicated a significant growth. In addition, meat shops (tin boxes), food & grocery items and clothes are the other organized commercial sector showing an

⁴ Information on economic base, registered manufacturing and services as per Table 5 of the JNNURM Toolkit.

increase. Unit 1 Market and the markets at Cuttack-Puri Road have maximum number of shops. Vegetables, fish and other green groceries predominate at the Unit 1 market whereas hardware, especially auto spare parts, are the predominant goods at the shops at Cuttack-Puri Road. Several of the commercial activities such as wholesale markets are located close to the monuments. These activities are not related to tourism but attract a number of vehicles for transportation of goods/materials thereby adding to the congestion and traffic problems. The land occupied by these activities has higher potential in view of its proximity to the monuments and hence land use conversions can be considered to maximize the benefits from the tourism sector.

Other than the organized sector, there are large numbers of unorganized markets in the city. According to a survey conducted by the BDA, about 4,500 temporary shops are presently functioning at about 45 locations. A certain degree of concentration has been observed in the location of these unorganized markets and this may pave the way for planned construction for market complexes/shopping centers/kiosks in the developed parts of the city within the framework of Development Plan. Findings from the survey of informal shopping are given in the right hand side box for ready reference.

Key Findings of the Survey on Informal Shopping

- About 78 percent of the shops were on Government land parcels while about 16 percent were located on the right-of-way of roads. Only about 6 percent of the surveyed shops were functioning on the private land. This survey also helped in locating suitable Government land for building organized markets in a planned way.
- About half (48 percent) of the shops were cabins and one-fourth (25 percent) functioned in open without permanent establishment. Also about 5 percent of the shops were mobile, 19 percent of the shops had thatched roof and only 3 percent of the shops had pucca structure. About half (49 percent) of the surveyed shops were occupying areas less than 50 sq. ft.
- The informal shopping activities engaged a total of 6600 persons. About 80 percent of whom being migrants from smaller towns and villages within the district of Puri.

2.7.2 TOURISM RELATED ACTIVITIES

Bhubaneswar City forms the apex of the world famous 'Golden Triangle' of Orissa with Konark and Puri. The city epitomizes the rise and ascendancy of Hinduism, Buddhism and Jainism. The city has magnificent monuments, architectural wonders and some of the best sites for nature lovers. The proximity to Nandankanan Zoo and the Chilka Lake makes the city a preferred destination for both domestic and foreign tourists. The city has a number of tourist spots and a list of such places of tourist interest is given in Annexure - 3. It is estimated that around 17.2 lakhs tourists visited the temple city of Bhubaneswar including both local and international during the year 2001. However, the areas within and outside the tourist spots need improvement and integration with the socio-economic, environmental and land use of the city. Though the city has vast potential for tourism development, lack of infrastructure facilities is found to be a major hurdle for inflow of tourists to Bhubaneswar.

Issues and Observations

- Bhubaneswar has high potential to attract both domestic and foreign tourists with tourist inflow increasing every year.
- Areas within and outside tourist spots need improvement and appropriate socio-economic, environment and landuse integration with the city functions.
- There is a need improve the quality of environment and other infrastructure for improving sanitary conditions, living conditions of the people, access, etc. to promote tourism activities in the city.
- In order to bring more resources to the city, there is a need to make the city attractive for tourists with higher income levels and for longer stays.
- Any plans for increasing tourists and their stay in the city should be undertaken with due analysis on type of tourists, their income levels and needs and to provide suitable accommodation to them.
- There is a need to improve the city traffic and augment local conveyance facilities. There is a potential for organizing eateries with Indian and continental cuisine but in a hygienic way, in and around tourist spots.
- Spaces for selling handicrafts and locally made goods (both from the city and the State) need to be organized and properly integrate these with the tourist spots.

The current tourist inflow is estimated to be about 4,000 to 6,000 per day. Tourists visiting Bhubaneswar City comprise about 30 percent of international visitors while the remaining 70 percent are domestic tourists. Foreign tourists generally visit the city between October and March, with some visit from September to April. The countries of origin of international tourists, among others, include United Kingdom, United States, Germany, France, Italy, China

and Japan. The visit of Indian tourists is observed to be heavy during May and June (when schools are on vacation) and in August and September (during festival periods). The local people visit monuments and other places during holidays and festive occasions. The number of international visitors from affluent groups stays only for a limited period in Bhubaneswar, as there are other tourist places in Orissa. Budget tourist groups however stay longer in Bhubaneswar. It is therefore necessary to make the city attractive for tourists with higher income levels.

Tourists generally visit the city by air, train or bus. However, there is a need to augment connectivity to the city especially by rail and road. The tourists generally use cars, taxis and safari as local conveyance. Generally the duration of the stay at Bhubaneswar is 2 to 3 days. Duration of stay of the tourists is a crucial factor for income generation from tourism. However, due to lack of infrastructure facilities, the tourists generally restrict their stay to a few days. Thus, tourism development in the city needs to be integrated with urban development and planning to provide the facilities and infrastructure (roads, water supply, sewerage, power) to support the existing and the proposed tourist population.

Bhubaneswar City has about 24 high-end hotels and 53 moderate hotels⁵. Besides the high-end and moderate hotels, there are several low budget hotels. However, most of them are not approved. Most of these hotels are concentrated in the Ashok Nagar, Bapuji Nagar, Kharvel Nagar and the Kalpana Square as these are the major commercial areas and the main traffic corridors of the city. New hotels are now coming up in the northern part of the NH-5 along the road leading to the Nandan Kanan. Any plans for an increase in tourists and their stay in the city would require analysis of the type of the tourist, their income levels and needs and provision of suitable accommodation to them.

Though there are several restaurants in the city most of these restaurants are located in areas with poor sanitary conditions. A few large and small shops are located near the tourist places and monumental sites. Though there is a high potential for marketing the local handicraft items, lack of space and other infrastructure facilities hamper such marketing. This potential needs to be integrated with the tourist spots and can be utilized as a resource base.

Information and orientation help the visitors to become aware about the opportunities, services, timing, cost of activities, safety precautions, regulations and resource protection considerations before and during their visits. Interpretation is the process of translating the historic, cultural and natural values of the resource into terms that the visitors can understand. It educates, promotes appreciation and provokes further interest in the subject at hand. Information would therefore play a very important role for a major thrust area for socio-economic development. These services are quite effective within the State and the City.

Agencies providing Information and Interpretive Services in Bhubaneswar

- State Tourism Department;
- Orissa Tourism Development Corporation;
- State Archaeological Department; and
- Archaeological Survey of India.

2.7.3 INDUSTRIAL ACTIVITIES

Bhubaneswar enjoys the status of being an important place in India in the production of various handicraft items like zari work, stone inlay, marble craft and carpet craft. The stone inlay and applique work of the city are famous for their uniqueness not only in India but also at abroad. Apart from cottage industries, there are 4 Industrial Estates in Bhubaneswar (within the Development Area but outside the

Table 2.7.3: Types of Industries Operating in Bhubaneswar City

Name of Industrial Estate	Total No. of Industries under Operation			
	Large	Medium	Small	Total
Rasulgarh	1	1	4	6
Mancheswar		22	23	45
Chandaka	2	5	3	10
Bhagabanpur		1	8	9
Others (other than Industrial Estates)		5	13	18
Total	3	34	51	88

Source: Department of Industries, Government of Orissa; 2006

⁵ Source: Tourism Department, Government of Orissa; 2006.

Municipal Area), namely Rasulgarh, Mancheswar, Chandaka Nuclear Industrial Complex (CNIC) and Bhagabanpur. Since the Comprehensive Development Plan area of the BDA has been declared as an 'Air Pollution Control Area', there is strict restriction on the use of fossil fuel. These industries are now facing threat of closure owing to critical problems such as old technology and high production cost. Moreover, these industrial areas do not have proper infrastructure including green belts, drainage/sewerage system, waste disposal facilities, proper roads for transportation of materials/goods, etc. The location of industries vis-a-vis other landuses and especially the tourism activity of the city and the likely impacts on the monuments are also to be critically viewed.

However, declaration of Bhubaneswar as an 'Electronic City' has attracted a few industries in the electronics sector, which are not polluting. Some of the large corporate houses that have set up their business in the city include Tata Consultancy Services, Satyam Computers and Infosys. On the whole, about 88 industries are operating in Bhubaneswar area comprising 3 large-scale industrial units, 34 medium-scale industrial units, and 51 small-scale industrial units.

Observations

- There are not much large scale Industries operating in the city. Most of the industries are operating inside the 4 Industrial Estates.
- The location of industries vis-a-vis the other landuses and especially the tourism activity of the city and the likely impacts on the monuments are to be critically viewed.
- Most of the small-scale industries are operating inside the city. These are specially the small-scale industries that do not have requisite pollution control measures and have pollution impact potential of 2 to 5 km.
- Mixed landuses can be seen in the areas adjoining the industrial estate. The problem becomes more chronic as the city is densely populated.

2.7.4 PROFILE OF URBAN POOR VIS-A-VIS SLUM POPULATION

Several agencies have carried out slum surveys in Bhubaneswar City to identify and quantify the number of slums and the population residing in these slums. Available statistics on the slums vary largely due to the fact that different agencies used different definitions and parameters for their surveys, and carried them out for varied purposes on different dates/years. Following is a broad summary on the available statistics on slums in Bhubaneswar City:

- The BMC carried out a slum survey during the year 2000 (post super-cyclone in 1999) to ascertain prevalent physical features after the devastating super-cyclone for undertaking improvement measures. This survey indicated about 146 slums spread across the city.
- On a later date (2001-02), the BMC carried out another survey to list all slums within the BMC limits. This survey listed 59 notified slums and 131 non-notified slums. This is also the official information/data followed/ maintained by the BMC as on date.
- During the year 1999, the BDA also carried out a survey, which identified about 30 percent (2,00,097 slum dwellers) of the population residing in slums.
- Census of India followed different parameters to identify slums and slum population. As per the 2001 census, there were 71,403 slum dwellers (18,048 slum families) in the city, constituting about 11.02 percent of the city's population.

Observations based on the Survey was conducted by the Bhubaneswar Development Authority during the year 1999

- About one-third of the city's population is estimated to be living in slums and the slum pockets are distributed throughout the city.
- There was a tremendous growth (about 78 percent) in slum population during the last decade (1991-2001) This is mainly due to the vast devastation caused in the city by the super cyclone (year 1999), which has led to huge migration from the rural hinterland, and other parts of the state as well as outside state in search of employment particularly in construction sector.
- Most of the slums of the city are located an unutilized land parcels owned by the GoO/ Railways as these land parcels remained temporarily vacant for a longer duration and thus the migrants felt convenient to settle there.
- Slums in the city were devoid of services, prone to all types of natural hazards, have poor living conditions and hence can pose severe environmental problems, including health risks. Housing conditions in all slum settlements were poor. Overall socio-economic aspects of the slum dwellers were extremely poor along with low-level income and productivity.
- The increasing trend in slum population from 1991 to 2001 leads to deteriorate living condition due to the absence of planned economic activity and physical infrastructure. In the absence of appropriate economic activity, the ongoing urbanization can lead to economically weaker sections of the migrant population settling in slums, thereby further increasing the existing slum population.

- Discussions with various stakeholders (incl. BMC officials) revealed that there are presently about 250 slums within BMC limits.

The slum settlements in the city can be classified into slum colonies belonging to industrial workers, common slums and population squatting on Government land. Lack of civic services, unhygienic living conditions coupled with increase in housing stock deficit have resulted in increase in slum population. An In-depth analysis of the existing slum situation, ongoing slum improvement programmes and other key issues are addressed in Chapter 6 titled, 'Urban Poverty and Social Development'.

A study by the BMC during the year 2000 (post super-cyclone in 1999) revealed that there were about 99 unauthorized slum pockets and 47 authorized slum pockets within the BMC limits. Following are some of the key findings of this survey:

- About 56 percent of the total slum population belonged to scheduled caste & scheduled tribes and the sex ratio was 821, which indicated selective migration in all the slum settlements. More than half (53 percent) of the slum dwellers were found to be illiterate.
- About 40 percent of the slum households were residing in their own houses built on their own land parcels. A majority of 52.33 percent had built their tenements encroaching on Government lands while the rest were living in rented houses.
- More than three-fourths (78 percent) of the slum families lived in kutcha houses while the rest 22 percent had houses built of permanent materials. These houses had an average area of about 90 sq. ft.
- Slum pockets were characterized by their unhygienic living conditions devoid of any basic services and amenities. Further, most of the household activities were observed to take place in the community space due to lack of space in the individual dwellings.
- About 21 percent of the slum households could afford electricity facility.
- Wells, public taps and tube-wells were the source of drinking water in the slum areas. The survey indicated that out of 23 slum pockets covered, 20 pockets had no access to public water supply thus inviting waterborne gastrointestinal diseases. Further a majority of hand-pumps were out of order for many days in a year causing acute shortage of drinking water.

2.8 CITY MANAGEMENT AND GOVERNANCE

City administration is vested with the BMC. With the enactment of Orissa Municipal Corporation Act, 2003, a full-fledged Municipal Corporation has come into being on October 01, 2003 with an elected Mayor and Corporators. The BMC has an executive body comprising various administrative wings headed by the Municipal Commissioner to act upon the decisions of the General Body and day-to-day functioning of the Corporation. The BMC discharges various obligatory and discretionary functions as per the provisions of the Orissa Municipal Corporation Act, 2003, and provides various specified civic services/ infrastructure facilities to the citizens of the city. Apart from the BMC, the city has various Government Departments and their Directorates with development related responsibilities and functions. An in-depth analysis of the city management and governance is addressed separately in Chapter 8 titled, 'Urban Management and Governance'.

City Administration and Development Agencies

- Bhubaneswar Municipal Corporation
- Bhubaneswar Development Authority
- Public Health Engineering Organization (GoO)
- Works Department - R&B Division (GoO)
- Orissa Water Supply and Sewerage Board (GoO)
- Water Resources Department (GoO)
- General Administration Department (GoO)
- State Pollution Control Board, Orissa
- Directorate of Town Planning (GoO)
- Industries: Industries Department (GoO) and Industrial Infrastructure Development Corporation of Orissa (IIDCO)
- Tourism: Orissa Tourism Development Corporation and State Tourism Department (GoO)
- Urban Forest: Forest (City Afforestation) and Social Forestry
- Heritage and Monuments: Archaeological Survey of India (GoI) and State Archaeological Department (GoO)

URBAN PLANNING AND GROWTH MANAGEMENT

3.1 DEVELOPMENT PLANNING

3.1.1 HISTORICAL PERSPECTIVE

As stated earlier, the historical reference of the city dates back to the 6th Century BC. The area was ruled by several dynasties such as the Guptas, Mauryas and Suryas. Over a span of time, the city has been known by different names such as Kalinga Nagar, Tribhubaneswar, Temple City, Ekamra Kshetra and finally as Bhubaneswar. In 1936, Orissa was a separate province with Cuttack as its capital. Later, during 1948, Bhubaneswar was selected to be the capital owing to location as advantages offered by the city such as the altitude, communication linkages, vast plateau, climate and related factors.

It has been reported that there were about seven thousand temples in this area, which has earned it the coveted title 'The Temple City of India'. Even today from the hundreds of temples that still stand majestically as mute witness to its glorious past, one can study the chronological development of temple architecture from the start of the 7th Century AD to its culmination in 13th Century AD. It was a sleepy little town confined to the temple town and to the developments on the southeast of the railway line, before any planning and development initiative took place for the capital city. Railway link to the town was through the Bhubaneswar Station Road, the station being connected to the temple town through a minor road which was upgraded to the status of National Highway No. 5 at a later date. The road link from Cuttack was through Old Jagannath Road which led to the temple area through the present Tankapani Road. Only the airfield was constructed for use during the Second World War and there were several barracks for accommodation of defense personnel. Subsequently, the NH-5 crossing Rasulgarh area passed through the Old Station area and following the alignment of Rajpath passed through Jagamara to meet its existing alignment at the Khandagiri junction.

Key Issues and Observations pertaining to Temple Town

- The temple town of Bhubaneswar presents a mixed land use pattern with a congregation of residential, commercial, industrial and institutional uses in a single locality.
- Ribbon-type development along major roads is prevalent with complete lack of planning.
- The open spaces are vacant and very often inaccessible. The interstices which were vacant till recently and could have been planned for landscaping around the temple / monuments are fast getting encroached / occupied with the time.
- As a result of development pressure, the finest architectural and sculptural elements are slowly dominated by modern development and the same is gradually reducing its importance. In many cases the visibility of temples lost due to modern construction.
- Inadequate road network system, results in traffic congestion in almost all roads of the old city. Moreover, inadequate parking space for vehicles also adds to the above problem. The roads are very often narrow with little possibility of widening as building have been constructed on either side leaving vast open lands behind.
- Due to lack of drainage and sewerage system, the water of the religious tanks getting polluted with inflow of sewage and waste water. Solid waste generated in the area are also posing environmental problem.
- Construction activities are being undertaken close to the temples and have caused loss of visibility and skyline of this temple city.
- Most of the temples are in the process of deterioration.
- Availability of tourist facilities is also poor. The area needs high standard sanitation for the tourist and the people visiting the temple complexes

The old temple town had been the seat of culture for about 2,500 years. Today, it covers an area of 510 hectares and comprises 4 villages, viz. Kapil Prasad, Bhubaneswar, Goutam Nagar and Rajarani. The old city features a conglomeration of temples, monuments, mandaps, heritage ponds, etc. Initially, the old city had 1000 temples and at present, temples are limited to 320. Majority of the existing temples are deteriorating rapidly and the precious stone carvings are also in damaged condition.

3.1.2 PAST PLANNING EFFORTS

Consequent to the decision to shift the capital from Cuttack to Bhubaneswar, the original plan of the capital city was drawn up in 1948. The modern city of Bhubaneswar was designed by the German Architect Otto H. Koenigsberger. The city was designed for a population of 40,000 based on 'neighborhood principles' with administration being designated as the primary function. Accordingly, six units were developed with Unit-V for the location of the administrative complex and other units planned on neighborhood principles. The town centre consisted of the market building, weekly market, daily market and bus station with a central vista leading up to Raj Bhawan and a commercial zone along Janpath and Bapuji Nagar up to Railway Station. Subsequently, bypass of National Highway was provided to segregate the local traffic from the region. Later on several residential units were added to accommodate the growing population of the city.

During the 50 years since its planning in 1948, the city has undergone various stages of transformation. Broadly, these transformations can be categorized under the following stages:

- Old temple town (till year 1956);
- New capital city (year 1956-1976);
- Major city transformations (year 1976 onwards); and
- Present Bhubaneswar City (year 2006)

Each of the aforementioned stages of growth has left a distinct mark on the city's profile. Though the planning efforts were initiated during the year 1948 with the laying of foundation stone by the then Prime Minister of India, Pandit Jawaharlal Nehru, the city actually started functioning as Capital City after the completion of Secretariat building during 1956. Thus in reality, Bhubaneswar started functioning as the new Capital City only from 1956. Development activities during the above stages and problems in each stage of development are discussed below.

Chronology of Past Planning Efforts

- **1948:** Otto H. Koenigsberger has prepared the Master Plan for the Bhubaneswar City as the new Capital City of Orissa. Late Pandit Jawaharlal Nehru, the then Prime Minister of India, laid foundation stone.
- **1968:** The GoO has created a special Planning Authority for the Bhubaneswar City. The Directorate of Town Planning of the GoO has prepared a draft Master Plan for the city (known as First Master Plan).
- **1976:** Bhubaneswar Regional Improvement Trust was formed.
- **1977:** First Master Plan for the Bhubaneswar City was submitted to the GoO for approval.
- **1983:** Bhubaneswar Development Authority was constituted under the provision of Orissa Development Authorities Act, 1982.
- **1983:** The GoO approved the First Master Plan for the Bhubaneswar City and the same Master Plan was treated as an interim development plan for Bhubaneswar.
- **1994:** The BDA has prepared the Comprehensive Development Plan for and was approved by the GoO
- **1995:** The Comprehensive Development Plan for Bhubaneswar came into operation.

3.1.2.1 NEW CAPITAL CITY

The foundation stone for the new Capital City of Bhubaneswar was laid on April 13, 1948 by the then Prime Minister of India, Pandit Jawaharlal Nehru. The planning for the new city began in close proximity to the old temple town. As stated earlier, the Master Plan was prepared by the famous architect Dr. Otto H. Koenigsberger in 1954 on the basis of the concept of neighborhood unit planning. It comprised 6 units, viz. Unit-I to Unit-VI. Unit-V has been earmarked for administrative functions while other units were planned as residential neighborhoods with emphasis on horizontal rather than vertical growth. The capital city was planned in 1948 and was built between 1948 and 1961 at a respectful distance from the temple town and no conscious steps were taken to preserve the individual identities of the temples. The city grew fast and the intervening areas were filled up quickly. Today, the 'New Capital' presents a sharp contrast with distinct areas earmarked for residential, commercial, institutional and such other uses.

Key Issues and Observations pertaining to New Capital City

- There is a total absence of provision of areas for a number of urban activities such as industrial, institutional etc. which were not envisaged then.
- With an absence of economy in allotting land for different uses, the development spread over large areas, with even residential quarters allotted in much larger areas than was necessary.
- Such a sparse development pattern resulted in much lower density of population, then was desirable and involved higher unit cost of infrastructure development.

After the completion of the Secretariat building during 1956, government departments were shifted from Cuttack to Bhubaneswar. Gradually a stream of offices, institutions and other establishments flourished in the city during the period 1956-76. The salubrious climate and availability of suitable land attracted a number of state level and regional institutions such as Vanivihar, Sainik School, the Regional Research Laboratory, the Orissa University of Agriculture and Technology, the Government Press, the Institute of Physics and several industrial units like CR Factory, OMFED Chilling Plant. The Industrial Estate at Bomikhal and Pandara were also established. The need for developing residential areas both in private and organized sectors led to developments of Sahid Nagar (Unit-II), Satya Nagar (Unit-X), Surya Nagar (Unit-VII), Acharya Vihar and Lewis Road Housing Colony (Jayadev Nagar). But in locating these institutions, the perspective growth of some of the major functions of the city, and the inter-relationship among the different city functions, do not seem to have been considered. Much larger areas have been allotted to some of the institutions than was necessary.

3.1.2.2 MAJOR CITY TRANSFORMATIONS

The city has undergone major transformations, led by the developments in organized sector since 1976. Constitution of the Bhubaneswar Regional Improvement Trust (BRIT) in 1976 and subsequently the BDA in 1983 and the role of institutional finance for mass housing in the organized sector appear to be landmark developments in this phase of the city's growth. Some of the major schemes and multistoried buildings that were executed during this period are listed in the adjacent box. Economy of space and cost had influenced the structure as well as their immediate environment. Shortage of Government land and economy of scale contributed to the construction of multistoried flats at Chandrasekharpur and buildings like IDCO tower, Housing Board Building, IPICOL Building, etc. This phase has also witnessed construction of a number of market complexes like BRIT Market at Laxmisagar, BDA's Suryakiran Market, Municipal Market and Housing Board Markets at Saheed Nagar, Ashoka Market at Station Square, Ruchika Market Complex at Baramunda, and Municipal Market at Old Town. In all such constructions, the availability of institutional finance and demand for office/commercial space has played a key role towards striking a balance of space, economy and design.

List of Major Schemes and Multi-Storied Buildings Implemented during the City Transformation

- Housing Board Colony, VSS Nagar
- BRIT Colony, Laxmisagar
- BRIT Colony, Nayapalli
- BRIT Colony, Baragarh
- Chandrasekharpur Improvement Scheme
- GGP Housing Colony
- Palaspalli Duplex Complex
- Housing Board Colony at Kapilprasad
- Housing Board Colony at Baramunda
- Housing Board Building
- IDCO Tower
- CRP Market

Although articulate and organized, these developments in the organized sector have followed the availability of government land. Though they have induced the pace of growth in the nearby areas in private holdings, the execution of housing schemes in the private holding areas has not succeeded in articulating the development in such areas in a desired manner. Many of the housing schemes in the organized sector are subsidized in terms of cost of roads, open space and infrastructure. In the nearby private areas though cost of infrastructure is charged to the individual development, the disparity in quality of environment results in inadequacy of roads, open spaces and other infrastructure.

3.1.2.3 BHUBANESWAR CITY TODAY

The city which was planned originally for 40,000 people with an area of 1684 hectares is now accommodating about 7.50 lakhs population in an area of about 135 sq. km. The present city is rectangular in form, and illustrates signs of development of the city on a vast unutilized undulating plateau. The city has extended in seven different directions during the last few decades by engulfing the fringe villages. This extension has varied length and dimensions from the core of the original temple town, which was supposed to lie at the area having Lingaraj Temple.

The extent of growth of the city in different directions from the original temple town is given in the adjacent box. Availability of government land in the north and the west has aided development of the city. The extension towards the south is totally restricted by the presence of the unplanned old city and the low-lying flood plain of the River Daya, the tributary of River Kuakhai. The Comprehensive Development Plan also promotes development in the north rather than the south. The urban sprawl and spatial growth pattern of the city along with transformation is presented in Plate - 5.

- Extent of Growth and Directions from the Temple Town**
- North: 22.5 km towards village Patia, extended up to the Chandershekharpur
 - North-West: 14.5 km
 - West: 11 km, expended well beyond the Khandagiri Junction
 - South-West: 8 km
 - South: 6.5 km, extended beyond Daya West Canal
 - East: 9.5 km and the development is confined to the Daya West Canal
 - South-East: No growth due to the location of the flood plains of Kuakhai and Daya River
 - North-East: Along the NH-5, beyond BDA limits, towards Cuttack

The growth of Bhubaneswar is restricted by the presence of the reserve forests in the northwestern part and the flood plains in the eastern part. The growth trends are most towards the southwestern direction. The present Bhubaneswar City sprawls over 233 sq. km (Development Area) comprising a total of 101 revenue villages. Out of which, 38 revenue villages form part of the BMC area, while the remaining 63 are located outside the BMC area. The jurisdiction of the Bhubaneswar Urban Area (Development Area) is under the BDA, while the city is administered by the BMC. There are several departments/agencies that have direct responsibility for urban development in Bhubaneswar. Specific roles and responsibilities of these departments/agencies are addressed separately in Chapter 8 titled, 'Urban Management and Governance'.

3.2 MASTER PLAN / LANDUSE PLAN

3.2.1 FIRST MASTER PLAN

The First Master Plan for the Bhubaneswar City was prepared and notified during the year 1968 with a plan period of 20 years (1968-1988). The draft Master Plan prepared in 1968 had landuse classification under 16 categories and the planning area was spread across 13,209 hectares of land. As per the draft Master Plan, the landuse under agriculture and forest together constituted almost half of the (53.43 percent) proposed landuse. While reviewing the draft Master Plan, the Town Planning Organization of Orissa suggested seven functional landuse zones for Bhubaneswar with specific landuses, viz. residential, commercial, industrial, public & semi-public, open spaces, green belt and transportation. The landuse distribution suggested in the Master Plan of 1968 is given in the adjacent table. It may be observed that the area earmarked (13,209 hectares) as development area in the draft Master Plan has been reduced to 9621 hectares in the final Master Plan. This landuse distribution was originally suggested by the famous German Architect, Dr. Otto H. Koenigsberger.

Table 3.2.1: Proposed Landuse Pattern of the Master Plan 1968-1988

Zone / Landuse	Area in Hectares	Percentage to Total Area
Residential	2206	22.93
Commercial	262	2.72
Industrial	481	5.00
Public & Semi-Public	1274	13.24
Open Space	1392	14.47
Green Belt	1880	19.54
Transport	1482	15.40
Others	645	6.70
Total	9621	100.00

Source: Master Plan 1968; Bhubaneswar Development Authority

Plate - 5: Urban Sprawl and Spatial Growth Pattern

PLEASE INCLUDE AUTO CAD MAP AS TEMPLATE PLOTTED IN A-3 SIZE

Plate - 6: Proposed Landuse Pattern in the Comprehensive Development Plan for Bhubaneswar City (1988-2001)

PLEASE INCLUDE AUTO CAD MAP AS TEMPLATE PLOTTED IN A-3 SIZE

3.2.2 CURRENT COMPREHENSIVE DEVELOPMENT PLAN

The Comprehensive Development Plan was prepared by the BDA during June 1993, after the completion of the plan period of the First Master Plan (year 1988). This Plan covers an area of 230.47 sq. km comprising 93 revenue villages with a population of 2,57,352 in 1981. This Comprehensive Development Plan for Bhubaneswar was prepared with the horizon year of 2001. The Comprehensive Development Plan specifies various landuse zones with a set of zoning regulations for regulating development. Orderly physical and economic development and enforcement are the basic objectives of the Comprehensive Development Plan. Specific objectives of the Comprehensive Development Plan are as follows:

- To develop an urban environment capable of sustaining a population of 10 lakhs with the required facilities and services by 2001;
- To promote a more dynamic growth of the economy with increased production of goods and services, with increased employment opportunities and to enable the capital city to play its role effectively as the centre of administration, without diminishing the traditional value of the temple city;
- To enable the development authority to sustain development planning and effective plan implementation; and
- To ensure effective coordination amongst various agencies like BDA, BMC, semi-government/private agencies and citizens, in the process of development of the capital city through effective mobilization of resources and leadership.

The proposed landuse pattern in the Comprehensive Development Plan is given in the adjacent table. The proposed landuse map of the Comprehensive Development Plan is given in Plate - 6.

Table 3.2.2: Proposed Landuse Pattern of the Comprehensive Development Plan 1988-2001

Landuse	Area in sq. km	Percentage to Total Area
Residential	75.40	32.72
Commercial	4.94	2.14
Industrial	5.86	2.54
Institutional & Utilities	7.12	3.09
Administrative	2.90	1.26
Open Space	13.77	5.98
Transport & Communication	18.91	8.21
Water Bodies	33.82	14.67
Drainage Channel	2.59	1.12
Green Belt Including Protected Forest and Reserve Forest	65.16	28.27
Total	230.47	100.00

Source: Comprehensive Development Plan, 1988-2001; Bhubaneswar Development Authority

3.2.3 PROPOSED REVISION

The existing Comprehensive Development Plan has been prepared for the horizon year of 2001, and hence there is an urgent need to undertake necessary revision. In order to support the BDA in its planning efforts, the GoO under the Orissa Technology Mission, initiated a proposal towards preparing a Development Plan for the Capital Region. The Department of Architecture and Regional Planning of Indian Institute of Technology (IIT), Kharagpur, has been assigned the task of preparing the Perspective Plan - Vision 2030 and the Comprehensive Development Plan for Bhubaneswar-Cuttack Urban Complex, with the objective to plan for the integrated development of the region.

The Concept Note prepared by the IIT Kharagpur on the proposed Perspective Plan - Vision 2030 and Comprehensive Development Plan for Bhubaneswar-Cuttack Urban Complex, identifies the planning region to comprise of two major urban centers, viz. Bhubaneswar (present State Capital City) and Cuttack (erstwhile State Capital City). Cuttack is a traditional Indian town that has

Core Idea behind the Vision for the Proposed Bhubaneswar-Cuttack Urban Complex

- Cuttack and Bhubaneswar as twin cities in complementary role.
- Transformation of the Bhubaneswar-Cuttack Urban Complex to a world class urban centre as an important gateway for national and international investments.
- Promotion of cultural, built and natural heritage in a sustainable manner.

organically developed over time, while Bhubaneswar is a modern city based on the neighborhood planning concept. A few Class II and Class III towns have flourished in and around Cuttack-Bhubaneswar that have strategic importance, namely Khorda, Jhatni and Choudwar. The total planning area is envisaged as 720 sq. km with a total population of 1.58 million (Census 2001).

The Concept Note envisages the proposed Bhubaneswar-Cuttack Urban Complex around three core ideas as highlighted in the adjacent box. The following thrust areas have been identified to achieve the defined vision:

- To generate higher service facilities for attracting various developmental activities, investors and industrial houses.
- To generate facilities and activities to support small investors, informal sectors and slum inhabitants and rural migrants.
- To improve the Transport Network system for faster communication and high standard linkages between the growth centers and their rural hinterlands.
- To provide decent housing for all sections of people living in the region.
- To transform the whole region to a pollution free zone with conservation of bio-diversity and environment.
- To manage the natural and human resources for sustainable development.
- To frame land policies and development proposals for eradicating bottlenecks for future development.
- To formulate Disaster Management Policies to tackle natural hazards.
- To provide high levels of physical and social infrastructure ensuring safe drinking water, improved sanitation, well distributed education, health, recreation and cultural facilities.
- To convert the region to a learning and cultural centre for the state as well as nation.
- To transform the region to a hub of tourism through preserving and promoting the rich cultural heritage, with high standard facilities and convenience.
- To design an effective development control mechanism with a high value of public serviceability.
- To reenergize the institutional and administrative system to manage future urban development in the region.

The Concept Note on the proposed Perspective Plan - Vision 2030 and Comprehensive Development Plan for Bhubaneswar-Cuttack Urban Complex is given as Annexure - 4.

3.3 SPATIAL GROWTH PATTERN

3.3.1 CURRENT LANDUSE

Available information with the BDA on current landuse dates to the year 1994 and is presented in the adjacent table. Field surveys were undertaken to assess the current landuse in comparison with the landuse pattern proposed in the Comprehensive Development Plan. It has been generally observed that development is duly guided by the proposed Comprehensive Development Plan. In general, mixed landuses are seen in most parts of the city. The functions such as trade commerce, open spaces, recreational areas, industries excluding household employment centres, community facilities utilities and services have encroached upon the existing areas meant for residential and other such purposes. It is also observed that the wholesale markets are located in close proximity to tourist attraction areas. The older parts of the city are characterized as mixed landuses. These changes have led to the spiraling

Table 3.3.1: Current Landuse Pattern (Year 1994)

Landuse	Percentage to Total Area
Residential	8.01
Commercial	0.55
Industrial	1.68
Institutional & Utilities	2.23
Administrative	0.87
Open Space	3.02
Transport & Communication	4.31
Water Bodies	2.42
Agriculture	28.06
Vacant Land/Forest Area	48.85
Total	100.00

Source: Bhubaneswar Development Authority; 2006

of land values and have increased the density of the already congested areas, especially in the old town area in Bhubaneswar. Several instances of incompatible landuses have been observed within the city, which are not in conformity with the existing Comprehensive Development Plan. Thus, there is a need to evolve an appropriate strategy and legal action to relocate such non-confirming activities. The identified non-compatible landuses are given in the adjacent box for ready reference.

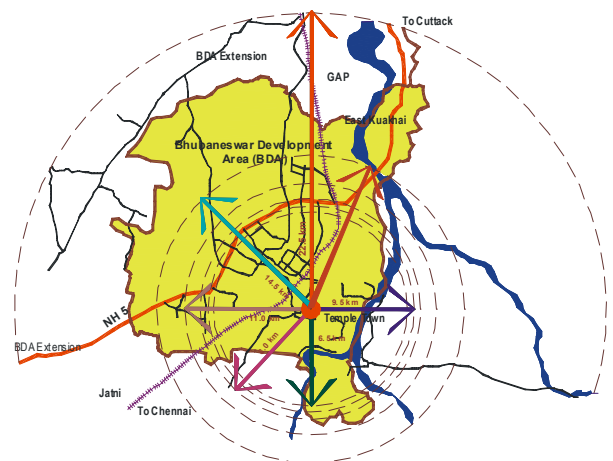
Land development is envisaged to be guided by the Comprehensive Development Plan, and at present all development activities are being permitted on the basis of the landuse plan. The development area is divided into 14 zones for micro-level planning. Zonal development plans are being prepared for each of the zones covering each plot in the development area. There is no specific and/or clear planning mechanism in place except the above two planning instruments. The BDA has also adopted a Geographical Information System (GIS) as an important tool to improve the planning process, monitor development, and facilitate decision-making for various planning activities. However, a full-fledged planning system is yet to be operationalized.

- Incompatible Landuses in the Bhubaneswar City**
- Wholesale vegetable godowns at Ashoknagar Unit-II contributing to the problem of traffic congestion and unhygienic conditions in this residential area.
 - Wholesale warehousing activities are presently continuing at Unit-I and Unit-III, Station Road and at Rasulgarh area.
 - The burial ground at Satyanagar.
 - The trenching ground located near Khandagiri. The disposal of garbage is also being carried out on the same ground with the proposal for development of a residential colony at Aiginia.
 - The location of the slaughterhouse near Kalpana Cinema in Badagada is still operational. Also, the new slaughterhouse at Gadaa Gopinath Prasad needs to be upgraded and proper solid waste management and drainage facility needs to be provided.
 - There are a number of poultry farms. The more important among them are Central Poultry Farm of Veterinary College, Siripur, Adivasipadia in Unit-I and at Laxmisagar.
 - Due to the OMFED Milk Plant, a number of a number of milk-men are functioning on the available vacant space leading to unhealthy and in sanitary conditions. It would be desirable to shift these milk-men to some identified location at the outskirts of the city and organized them through OMFED to ensure preservation and marketing of milk.

3.3.2 CURRENT RADIAL GROWTH PATTERN

The spatial growth of Bhubaneswar was initially confined to 'Old Temple Town', which was spread over an area of 510 hectares. The city got a boost in spatial development with the decision of the GoO to shift the Capital City from Cuttack to Bhubaneswar. The 'New Capital City' was planned during 1958 to accommodate 40,000 people in an area of 1684 hectares of land. Since then, the city has undergone massive transformation both in terms of population and spatial spread.

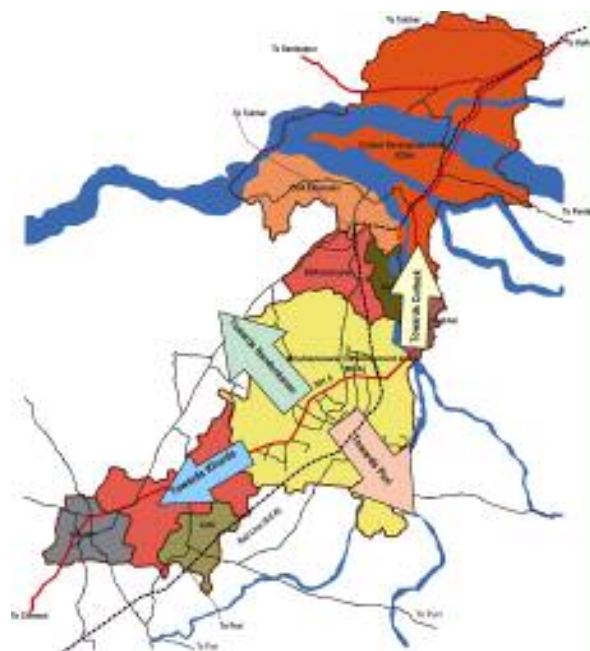
The city which was planned originally for 40,000 people with an area of 1684 hectares is now accommodating about 7.50 lakhs population in an area of about 135 sq. km. The present city is rectangular in form, and illustrates signs of development of the city on a vast unutilized undulating plateau. The city has extended in seven different directions during the last few decades by engulfing the fringe villages. This extension has varied length and dimensions from the core of the original temple town, which was supposed to lie at the area having Lingaraj Temple. Availability of government land in the north and the west has aided development of the city. The extension towards the south is totally restricted by the presence of unplanned old city and the low-lying flood plain of the River Daya, the tributary of River Kuakhai. The Comprehensive Development Plan also promotes development in the north rather than the south. The urban sprawl and spatial growth pattern of the city along with transformation is presented in Plate- 5.



Current Growth Directions of the City & Extent of City Growth

3.3.3 FUTURE GROWTH DIRECTION

The transport corridors and their proximity to existing services are the guiding factors influencing the spatial growth of the city. Current growth trends indicate that the city is fast growing along the NH-5 towards Cuttack in the northeastern direction. Similar growth trends are also observed in the other direction (southwest) along the NH-5, towards Jhatni and Khorda. The availability of vast unutilized land of the GoO has influenced growth in the west. The scope for extension towards south is limited due to the presence of the Old City. However, the region as a whole is expected to grow towards Pipli and Puri along the transport corridor NH-203. The proposed Perspective Plan - Vision 2030 also envisages the Planning Region to grow in the above directions. The map provides potential growth directions of the city in future.



Future Potential Growth Directions of the City

3.3.4 INSTITUTIONAL ARRANGEMENTS

The Bhubaneswar Development Authority (BDA) is the agency responsible for the preparation and implementation of the Comprehensive Development Plan. BDA was constituted under the Orissa Development Authorities Act, 1982, and is responsible for the development of Bhubaneswar Urban Development Area. In addition, the BDA is also responsible for the following:

- Preparation of interim, comprehensive and zonal development plans;
- Enforcement of the provisions of the development plan, zoning regulations and planning and building standards by way of issuing permissions for construction of buildings;
- Preparation of development schemes and its implementation; and
- All city planning functions, development controls and building permits.

The other principal objectives of the BDA also include creation of housing stock, creation of commercial complexes, improvement of city level infrastructure, environmental improvement, development of parks and plantations in colonies, blocks, institutions and avenue plantation.

The role of the BMC is limited to membership in various Committees set up for the preparation and implementation of the plan. It is not involved in actual preparation and implementation of the plan. The BMC is not empowered to issue building permissions, enforce development controls and approve conversions of landuse based on the guidelines of the Comprehensive Development Plan, within its jurisdiction.

The role of the Comprehensive Development Plan is to safeguard the sensitive and designated uses and implement the proposals in consultation with other stakeholders. However, the implementation of the Comprehensive Development Plan has not provided the desired results due to the following reasons:

- Lack of coordination between the BDA, BMC and other line agencies such as PHEO, R&B Works Department, etc.;
- Lack of technical expertise and manpower with the BMC; and
- Lack of financial resources to implement the plan proposals.

3.4 KEY ISSUES

Some of the key issues and observations pertaining to planned development are highlighted below:

- The development of the city is based on the Master Plan prepared in 1968. The Master Plan approach lacks key inputs to suit its functions as a tourist city and as a centre for trade & commerce.
- There are many areas with prominent monuments such as Lingaraj, Rajarani, Mukteswar and Dhauli having high tourism potential that have been neglected. The areas surrounding these monuments are in a very bad condition. All these monuments are located mostly in Old Town Area. There is a possibility of developing them into a tourism or heritage corridor.
- The city is rich with craftsmen with skills in stone-inlay, applique work, wood carving, brassware, horn work, bamboo articles, silver filigree works, textiles, painting, etc. These activities are not organized and emphasized in the Plan. These activities have tremendous tourism potential and provide employment opportunity to the local people if properly organized.
- Several slums have come up in the recent past and, based on a rough estimate, about one-third of city's population resides in slums.
- Mixed landuses are seen in most parts of the city. The functions such as commerce, open spaces, recreational areas, industries excluding household employment centres, community facilities, utilities and services have encroached upon the existing areas meant for residential and other such purposes. It is also observed that the tourism areas have wholesale markets in close proximity. The older parts of the city have more such mixed landuses. These changes have led to spiraling of land values and increased density in already congested areas, especially in the Old Town Area of Bhubaneswar.
- The land requirement for provision of new roads and other infrastructure in new areas within the development area has been identified and earmarked in the Comprehensive Development Plan. Further, it was also noted that such land parcels are either owned by the GA Department of the GoO or the BDA. Transfer of land parcels owned by the GA Department for the development purpose requires appropriate institutional arrangement.
- The road network and further developmental activities are not properly planned. Open spaces, parks, and recreational areas are inadequate and not properly organized in the city.
- Commercial areas in the city are characterized by problems relating to limitation of space, storage, on-street loading/unloading, heterogeneous traffic predominated by slow mode vehicles and idle parking, etc.
- A number of incompatible landuses are found within the city. There is a need to evolve an appropriate strategy and legal action to relocate them.
- The traffic and transportation system is inadequate and requires significant strengthening and improvement.

4

URBAN INFRASTRUCTURE - STATUS

4.1 OVERVIEW

An effective and optimally utilized set of urban infrastructure services serves as the 'prime mover' for a city that is focused on accelerating economic development and, in the process, ensuring a sustainable and comfortable standard of life for its inhabitants. The present status of urban infrastructure in Bhubaneswar and related issues identified through this assignment clearly defines the requirement that development activities need to be seamlessly integrated with existing performance levels and required augmentation/improvement. The present situation in Bhubaneswar is the equivalent of a Pandora's box posing a complex situation to city managers directly responsible for the following:

- Provision of utilities in accordance with normative standards/regulations;
- Identification of issues; and
- Subsequent system development and augmentation.

This section outlines the prevailing status of urban infrastructure, service levels and key issues that require to be addressed during the mission period (2006-2013). The situation assessment performed provides for cognitive navigation through the analysis and recommendations in various phases in the preparation of the City Development Plan for the city. The sectors covered in this chapter are given in the adjacent box.

Rationale and Methodology Adopted for Situation Analysis

Details on the existing system, service levels and issues have been assimilated and documented in this section based on the following factors:

- Preliminary discussions held with principal stakeholders;
- Review of available information provided by the departments/entities involved in O&M of the existing system;
- Suggestions and issues put-forth by the participating stakeholders during the Phase - I Consultative Workshops 1 & 2;
- Field visits and specific detailed discussions with the entities responsible for system implementation, operation and maintenance (e.g., PHEO, R&B, WRD etc.); and
- Preliminary discussions held with a comprehensive group of secondary stakeholders (e.g., Citizens' Associations, CII, Chamber of Commerce, etc.).

Based on the aforementioned factors, the resultant priority actions and proposals have been arrived at / formulated based on the following factors:

- Internal analysis of system parameters and issues identified in Phase 1 of the study;
- Mission Area specific Focus Group Discussions based on analytical framework and identification and coherent interlinking of system Strengths, Weaknesses, Opportunities and Threats (SWOT);
- Modification of the parameters based on feedback and comments from the stakeholders (secondary) at the Focus Group Discussions; and
- Phase - II Workshop to finalize the priority actions and proposals for each sector in the identified Mission Areas based on the above-mentioned activities
- The sector-wise estimated capital investment and investment components required to achieve stated objectives within the mission period (2006-2013) is given in Chapter 11 titled, 'Urban Infrastructure - Development'. Details of the capital investment phasing plan and pertinent financial information based on the above and further discussions with Action Stakeholders are furnished in Chapter 14 titled, 'Financial Operating Plan'.

Sectors covered under Urban Infrastructure

- Water Supply;
- Underground Sewerage Scheme (incl. Sanitation);
- Storm Water Drains;
- Roads, Traffic and Transportation; and
- Street Lighting

4.2 WATER SUPPLY

4.2.1 SOURCE - AVAILABILITY AND ADEQUACY

The total potable water supply quantum to Bhubaneswar City is met from a combination of surface and ground water sources in the region. Mahanadi, Daya and Kuakhai Rivers supply

over three-quarters (75 percent) of the total daily per capita requirement of potable water, while the balance is obtained from groundwater sources such as open-wells and tube-wells. It is imperative to briefly examine the availability and sustainability of the water sources that quench the city's thirst:

- The present supply is reportedly 206 MLD (surface: 166 MLD + groundwater: 40 MLD) based on the interim projected population of Bhubaneswar at nearly 7.50 lakhs for the year 2005.
- Surface water is available to a significant extent with Mahanadi being a perennial river. The availability, albeit being perennial, entails significant costs in transmission owing to its location which is approximately 30 km north of the city.
- The water treatment and transmission systems presently installed for tapping the Mahanadi source are reportedly utilized at 33 percent of the full-load rated capacity, which indicates the availability of water supply infrastructure to meet the increasing water demand over the short-term period.
- Daya and Kuakhai Rivers run along the eastern and southeastern boundary limits of the city providing for low-cost raw water transmission. However, these rivers are not perennial and utilization during summer months is significantly lower necessitating supplementation from Mahanadi or groundwater sources. Further, the treatment facilities are reportedly overloaded necessitating imminent rehabilitation and augmentation of existing treatment and clear water transmission infrastructure at the Kuakhai and Daya source points.
- Groundwater is tapped from local sources that yield satisfactory quality of water to an extent of nearly 40 million liters per day (MLD), which is an advantage when viewed from the standpoint of cost of water treatment.
- However, the cost/benefit from readily available potable water (groundwater with only disinfection required) may not be sustained in the long run and is bound to "evaporate" as the groundwater levels are reportedly depleting, coupled with over exploitation, lowered rates of aquifer replenishment and scanty seasonal rainfall.
- The optimal utilization ratio of surface: groundwater at 3:1 is expected to diminish in the forthcoming seasons where in the City is certain to face an uphill task in ensuring groundwater conservation, measured utilization and eliminating overexploitation.
- The aforementioned diminishing balance/ratio may not only require full utilization of surface water sources, but also may result in higher annual O&M costs due to increased treatment requirement.
- The present rate of supply is reportedly 275 lpcd (approx.) considering the total supplied quantum of 206 MLD.



A view of the barrage at Naraj on the Mahanadi River



Intake pipes on Kuakhai River - Picture showing channel dug on riverbed to divert main flow

Plate - 7: Details of Water Supply Coverage

PLEASE INCLUDE AUTO CAD MAP AS TEMPLATE PLOTTED IN A-3 SIZE

- The 'Manual on Water Supply and Treatment' published by the Central Public Health and Environmental Engineering Organization (CPHEEO) recommends a supply level of 150 lpcd (excluding 15 percent for system losses/UFW) for cities comparable to Bhubaneswar. Therefore, the present level of supply can be termed as a case of 'over-supply'.
- The present installed distribution system covers 17 of the total 47 wards in the city to a complete extent. About 26 wards are covered partially and 4 wards do not have piped water supply. Details of water supply coverage are shown in Plate - 7.

4.2.2 RAW WATER TRANSMISSION & WATER TREATMENT

Raw water is obtained from the aforementioned surface water sources through respective intake systems (intake channels and pipelines) and pumped to the inlet chamber of the localized water treatment plants at Mundali (Mahanadi), Palasuni (Kuakhai) and Bhuasuni (Daya). Details of the intake system at the Mahanadi system are furnished in the adjacent table.

Conventional treatment comprising flocculation, chlorination, flash mixing, clarification, rapid sand filtration and post-filter disinfection in accordance with applicable potable water quality standards is adopted at the aforementioned treatment facilities. As specified in Section 4.2.1, the WTP at Mundali is utilized only at approximately 36.00 MLD with an installed capacity of 115.00 MLD. Details of the treatment plants in the existing water supply system are furnished in the adjacent table.

The quality of water obtained from localized bore-wells and open-wells is reportedly satisfactory and compliant with potable water quality standards. However, during discussions, stakeholders highlighted the increasing apparent presence of iron as a major contaminant and the need to evaluate the utilization of groundwater.

4.2.3 CLEAR WATER TRANSMISSION

Surface water from the Mundali WTP (Mahanadi), pursuant to requisite disinfection, is conveyed through a clear water transmission main (force main) to the Master Balancing Reservoir (MBR) at Ghatikia. Treated water from the Bhuasuni

Table 4.2.1: Raw Water Intake & Transmission System at Naraj

Description	Details
Intake Well (m)	12.6 x 6.14 x 16.50
Floor Level (m)	33.58
Bottom Level (m)	17.00
Min. water level in river (m)	21.00
Raw Water Pumps (2 nos.)	Vert. Turbine
Discharge (m ³ /hr) / TDH (m)	2,520 / 22
Motor Rating (HP)	360
Raw water force main (MS)	1200 mm dia.
Length of raw water main	930 m

Source: PHEO (Urban), Bhubaneswar, 2006

Table 4.2.2: Water Treatment Plants and Capacities

Description / Year	Capacity MLD / MGD
Treatment Plants on Kuakhai Source	
HL Tank at Palasuni (1954)	6.80 / 1.50
Palasuni Water Works (1960)	13.60 / 3.00
Palasuni WTP (1974)	27.24 / 6.00
Palasuni Water Works (1987)	41.00 / 9.00
Treatment Plants on Daya Source	
Bhuasuni WTP (1968)	6.80 / 1.50
Bhuasuni WTP (1975)	6.80 / 1.50
Treatment Plant on Mahanadi Source	
Mundali WTP (1996)	115.00 / 25.00
Total Installed Treatment Capacity of All Surface Water Sources	217.24 / 47.50

Source: PHEO (Urban), Bhubaneswar, 2006

Table 4.2.3: Clear Water Mains & MBR - Mahanadi System

Description / Year	Details
Dia. (mm) / Material / Length (km)	1,200 / MS / 11.84 1,200 / PSC / 7.80
MBR at Ghatikia (ML)	21.60
Clear Water Pumps (Type & Nos.)	HSC / 6 (4 + 2)
Discharge (m ³ /hr) / TDH (m)	1,199 / 85.50
Motor Details (Sq. Cage Induction)	3.30 KV

Source: PHEO (Urban), Bhubaneswar, 2006

(Daya) and Palasuni (Kuakhai) WTPs is conveyed to Elevated/Ground Level Service Reservoirs in the existing distribution network. Details of the clear water transmission system are furnished in the table above.

4.2.4 SERVICE RESERVOIRS

The storage network of the existing water supply system comprises ground level service reservoirs (87 nos.) with a total storage capacity of 32.00 ML and elevated service reservoirs (46 nos.) with a total storage capacity of 8.40 ML as per the nominal requirement for continuous supply system as specified by the CPHEEO guidelines, the total storage capacity should equal one-third of the total water demand. It can be estimated that the present storage capacity considering the combined storage volume of 40.40 ML is sufficient to meet the water demand at present and would require augmentation to match the future demand.

4.2.5 DISTRIBUTION SYSTEM

The Public Health Engineering Organization (Urban) operates and maintains the existing system of water supply and distribution in Bhubaneswar. The present distribution network comprising distribution mains and lateral supply lines extends for a total length of 911 km and it covers about 55 percent of the total road length of 1600 km. cast iron and PVC pipes are utilized extensively in the pipelines.

4.2.6 SYSTEM COVERAGE

As specified earlier, the present supply at 280 lpcd exceeds the normative standard of 150 lpcd as specified in CPHEEO guidelines. However, the present installed distribution system covers only 17 of the total 47 wards in the city. About 26 wards are covered partially and 4 wards do not have piped water supply. It is felt that the low coverage level of only 52,000 connections, as against the prevailing property tax assessments of nearly 150,000, is due to the availability and use of groundwater sources, which are not monitored and do not involve payment of connection fee and monthly user charges. A significant section of the city's residents appear to utilize groundwater despite the fact that potable water is available in sufficient quantity from a perennial source. It is, therefore, imperative to examine alternatives to curb the exploitation of groundwater and ensure optimum utilization. Additionally, coverage of the distribution system should be increased and equitable distribution provided to ensure full cost recovery. It can also be inferred that one of the principal reasons for low O&M cost recovery is the low level of coverage of the existing water supply system.

Specific details on the provision of water supply in urban poor areas (slums) and associated details on coverage, such as the length of the local point distribution network, public stand posts, hand pumps and related are not available. A detailed infrastructure assessment in slums needs to be conducted to ascertain the level of civic service provision and delivery, deficiencies in coverage and related issues, and to augment provision in accordance with prescribed standards.

Similarly, a detailed assessment of water supply provision and delivery should be performed in peripheral areas to identify issues of incompatible extension of the existing distribution network (from main areas to the periphery), location of tail-end areas/weak spots where distribution is inequitable, service connections that may be illegal/unaccounted for and related issues. The aforementioned assessments will, to a significant extent, assist in provision of an equitable system of water supply at improved efficiencies and full cost recovery.

4.2.7 PERFORMANCE INDICATORS AND DEMAND-GAP ASSESSMENT

PERFORMANCE INDICATORS

An index of performance of the existing water supply system parameters benchmarked against the normative/standard requirements or service levels as prescribed by reference

guidelines/standards such as CPHEEO guidelines, pertinent manuals/publication and nominally prevalent level of services in similar cities with functional (good) urban infrastructure is furnished in the table below. It is imperative to mention that the nominal standard/benchmark is the requisite level of provision/delivery that is to be achieved over the existing and proposed urban agglomeration area in Bhubaneswar.

Table 4.2.4: Water Supply System - Performance Indicators

No.	Parameter / Component	Service Level	Benchmark	Comment / Remarks
1.	Water Supply / Source	280 lpcd	150 lpcd (+15% losses)	Very high
2.	Treatment Capacity	100% surface water utilized	100 percent	Adequate
3.	Storage (based on ultimate stage water demand)	20% of daily water demand	33 percent	Low. Requires augmentation
4.	Distribution System Coverage (% of PTAs)	57 percent	100 percent	Low
5.	Non-Revenue Water / UFW	33 percent	15 percent	High. Uneconomical

Source: Analysis / PHEO (Urban), Bhubaneswar; 2006

DEMAND-GAP ASSESSMENT

An assessment of the existing gap in service levels in the water supply sector in relation to the estimated future demand based on projected growth in population (presented in Section 10.2) and prescribed guidelines/normative standards has been performed for the following components of the existing system:

- Source/supply;
- Water treatment;
- Storage capacity; and
- Distribution system (coverage).

The demand-gap assessment has been performed for the short-term period, i.e. intermediate stage (15 years) and for the long-term, i.e. ultimate stage (30 years), and is presented in the table below.

Table 4.2.5: Water Supply System - Demand-Gap Assessment

Sl. No.	Component	Normative Standard		Short-Term Demand-Gap Assessment (2009-2024)			Long-Term Demand-Gap Assessment (2009-2039)		
		Unit	Quantity	Demand	Existing	Gap	Demand	Existing	Gap
1.	Source - Surface and Ground Water (MLD)	Lpcd	181	242	217	25	315	217	98
2.	Water Treatment Plant - Installed/Capacity w.r.t. Supply (MLD)	%	100	242	217	25	315	217	98
3.	Storage Capacity w.r.t. Supply (ML)	%	33	Designed for long term demand as per CPHEEO guidelines			104	40	64
4.	Distribution System Coverage w.r.t. Road Length (% of PTAs)	%	100	Designed for long term demand as per CPHEEO guidelines			100	57	43

Source: Analysis / PHEO (Urban), Bhubaneswar; 2006

From the above table, it is evident that the short-term requirements are essentially moderate augmentation of the source and water treatment components to ensure equitable supply of city water from the identified sources. An assessment of the long-term demand of the water supply system reveals the extent of gap present and the scale of improvement that will be required to ensure that Bhubaneswar is equipped with a comprehensive water supply scheme. Specifically, although the source is reliable and treatment and storage facilities can

be provided for, the most important part or priority item is the coverage of the distribution system and its efficiency (low NRW/UFW). It is imperative that the present coverage of 57 percent be improved to the minimum prescribed coverage of 85 percent of the population to ensure equitable distribution. The balance 15 percent are usually provided access to water supply through a system of public stand posts, hand pumps and localized sources (bore-wells with pump and point-source distribution network).

Additionally, as identified in the 'performance indicators' section, it is also critical to perform a detailed field level study on the efficiency of the existing distribution system through a systematic leak detection program to reduce the prevalent high incidence of NRW (33-50 percent).

4.2.8 INSTITUTIONAL AND FINANCIAL ASPECTS

INSTITUTIONAL ASPECTS

The Public Health Engineering Organization (PHEO) is responsible for construction and maintenance of city water supply and sanitary sewerage installation owned by the GoO. In addition, the PHEO is also responsible for planning, designing, construction, operation and maintenance of the water supply system and management of wastewater schemes including their transportation and distribution. Apart from the above, the PHEO is also responsible for construction and maintenance of the external and internal water supply and sanitary and sewerage installation for State Government buildings (both residential and non-residential) in the city.

Since the PHEO is a state level organization, the office of the Chief Engineer (PH-Urban) coordinates all activities of this department. The Chief Engineer is assisted by Superintending Engineers and other technical & administrative staff. For ease of administration, the entire State is divided into four Circles, viz. Bhubaneswar, Cuttack, Sambalpur and Berhampur. These PH Circles are headed by Superintending Engineers, who report to the Chief Engineer. In addition, the Chief Engineer is assisted by two Superintending Engineers, who are individually responsible for Projects & Management and Design. The Superintending Engineers are assisted by Executive Engineers and other technical and administrative staff.

Bhubaneswar PH Circle is further divided into three Divisions, viz. Division I, Division II and Division III. Each Division is headed by an Executive Engineer, who reports to the Superintending Engineer. As many of the functions and responsibilities are centralized with PHEO, city-specific institutional information is not available with BMC officials. Thus, city-specific institutional analysis for water supply and sewerage is not carried out.

Design and project management for provision of water supply system components is jointly undertaken by the PHEO and the Orissa Water Supply and Sewerage Board (OWSSB) of the GoO. However, responsibility of the OWSSB is limited to design and construction of water supply and sanitary sewerage schemes on behalf of PHEO and local bodies at their cost and on payment of centage charges. There has been good coordination between the PHEO and the OWSSB as there is a clear delineation of functional responsibilities. Specific roles, responsibilities and functions of the PHEO and the OWSSB are also discussed in Table 8.2.1 and Table 8.2.2.

FINANCIAL ASPECTS

The PHEO levies connection fees and user charges for services as the cost recovery mechanism towards sustaining service provision and delivery. The quantum of one-time fees/deposits for water service connections is dependent on the use (residential, commercial, institutional, etc.). The water tariff structure varies with the type of connection, viz. metered and non-metered. Metered connections are levied user charges based on the actual consumption, while non-metered connections are levied on a flat rate basis depending on the number of taps. The tariff also varies with the type of use. Details of service connection

charges and user charges for both water supply and sewerage, along with the relevant Gazette Notifications, are given as Annexure - 5.

Financial support for the functioning of the PHEO is provided through GoO budgetary allocation. The PHEO does not maintain a separate dedicated account for water supply and sewerage. In fact, all receipts/income from water supply and sewerage operations are sent back to the GoO exchequer and all expenditures are met by the GoO through budgetary allocation. Thus, it is not possible to undertake a detailed analysis of the financial performance of the PHEO. However, based on available data, Section 7.3 presents a brief analysis to provide insight into the financial performance of the water supply and sewerage sector. Following are some of the key issues highlighted and observations made based on the assessment of finances of the PHEO Unit of Bhubaneswar:

- Revenue receipts indicate a CAGR of 10.01 percent, while that of revenue expenditure is 4.39 percent. However, the operating ratio is not satisfactory and is always greater than unity (3 times higher), indicating the need to balance the gap between income and expenditure.
- The cost of production of a kilolitre of water is estimated as Rs. 3.33, while cost recovery is only about 30 percent. In addition, only about one-third (36.30 percent) of the O&M cost was recovered during the assessment period. This indicates a huge gap in the cost of production and recovery, requiring revision in user charges to achieve full O&M cost recovery. There is an immediate need to give a commercial orientation to the water supply and sewerage sector in order to bridge the existing mismatch.
- Collection performance is also poor. It is about 60-65 percent on total demand, which also requires immediate attention.

4.2.9 KEY ISSUES

The below listed key issues in the water supply sector have been identified through discussions with concerned authorities, field visits, review of available information/data and consultations:

- A master plan for water supply is currently not available in Bhubaneswar, which has been identified as a key prerequisite in future planning for system augmentation and improvement. The master plan should be prepared on a long-term basis considering the different strata of beneficiaries such as urban population, urban poor, peripheral areas and areas planned for or undergoing rapid development (i.e., special economic zones, etc., if applicable). The master plan shall also be updated on a periodic basis.
- Low level of service coverage in terms of ratio of House Service Connections (HSC) to Property Tax Assessments (PTA). The present coverage is approximately 45 - 50 percent whereas a fully developed water supply system for a major city such as Bhubaneswar is highly recommended to have a minimum coverage of 85 percent of PTAs.
- Significant volume of Non-Revenue Water (NRW) has been identified as a serious threat to the sustained viability of the water supply system. NRW in the city's water supply system is due, but not necessarily limited, to the following factors:
 - Illegal service connections;
 - System leakage from faulty interconnections, pipe joints, damaged pipelines and appurtenances;
 - Low collection efficiency in the case of monthly charges; and
 - Incorrect billing (non-metered consumption or faulty/damaged water meters).
- The present revenue in the water supply sector from connections and monthly charges is sufficient to meet only one-third of the total cost of O&M, which is also a serious inadequacy and poses a significant threat to sustainability of the scheme.
- Although the apparent present water supply level when considering the total population is 280 lpcd, the actual supply level is significantly higher (greater than 500 lpcd) when the actual number of water supply house service connections (individual HSC's) is considered. Combined with the fact that metering is present only for a third (approx.) of connections and that the installed meters are non-functional to a substantial extent, the revenue loss due to incorrect estimation of water consumption and resultant levy of charges is a serious issue to be immediately resolved.

- Illegal tapping in distribution mains resulting in low residual pressure at tail-end areas.
- Inequitable distribution of water - extension of existing pipelines to serve higher number of connections without adequate hydraulic assessment.
- Deteriorating downstream water quality through discharge of untreated sewage.

Based on the assessment of the existing situation, projected demand, the prevalent gap and key issues/problems in the existing water supply system, Chapter 11 outlines the sector-specific SWOT analysis, priority actions, proposals for improvement, estimated capital investment and the strategy for implementation along with suggestive timelines.

4.3 UNDERGROUND SEWERAGE SCHEME

4.3.1 EXISTING SEWERAGE SYSTEM AND COVERAGE

Bhubaneswar is partially covered with an underground sewage collection and conveyance system comprising trunk sewers, branch sewer lines and appurtenances (manholes). The material of construction of the sewer lines comprises salt-glazed stoneware and reinforced cement concrete pipes. Sewage collected at the Intermediate Pumping Stations (IPS) is pumped with the help of primary sewage pumps to the influent distribution chamber of the sewage treatment facility for onward treatment and disposal. The existing sewage collection system has a reported coverage of approximately 35 percent considering the ratio of individual house sewer connections to the property tax assessments. Details of coverage of existing underground sewerage scheme are furnished in Plate - 8. Areas presently not covered by the sewerage scheme are equipped with septic tank and soak pit systems of sewage disposal.

Specific details on the provision of sanitation in the urban poor areas (slums) at the household level are not available. Community toilets (30 nos.) are available at different locations and are reportedly maintained by a private sector entity. However, a detailed infrastructure assessment on the present system of sanitation and sewerage in slums needs to be conducted to ascertain the level of service provision and delivery, present functionality, deficiencies in coverage and related issues, and to augment provision in accordance with prescribed standards.

A master plan for sewerage should be prepared and the focus areas shall include, but not necessarily be limited to, the following:

- Overall plan for collection, conveyance, treatment and disposal/re-use of generated sewage in the development area.
- Present coverage and condition of sewerage in urban and peripheral areas.
- A definite plan for increasing coverage over a specific period to recommended levels, which will ensure that beneficiaries are migrated away from the present system of sanitation, which is not acceptable for a major city such as Bhubaneswar.
- Condition of the existing sewage collection system and potential for rehabilitation.
- Present coverage and condition of sewerage in slums and other urban poor areas.
- Provision of sanitation through low-cost units/community facilities in slums and integration of sanitation facilities with the main sewerage scheme.
- Condition of existing sewage treatment facilities and capacity for augmentation in terms of system capability and land availability.
- Availability of additional land for proposed sewage treatment facilities and related procurement and socio-environmental issues.
- Potential for re-use of treated wastewater (i.e. flushing of sewers and others).

The aforementioned assessments will, to a significant extent, assist in provision of an efficient system of sewerage, adequate coverage, treatment and disposal in accordance with applicable discharge standards and full cost recovery. The master plan shall also focus on provision of sewerage and sanitation facilities in the newly planned layouts and peripheral areas to ensure coordinated development.

Plate - 8: Details of Existing Underground Sewerage Scheme Coverage

PLEASE INCLUDE AUTO CAD MAP AS TEMPLATE PLOTTED IN A-3 SIZE

4.3.2 EXISTING SYSTEM OF SEWAGE TREATMENT AND DISPOSAL

Sewage collected from individual house sewer connections is conveyed through the aforementioned collection system to the sewage treatment plants (oxidation ponds and aerated lagoons) at different locations. Treated wastewater is discharged through outfalls to the Gangua Nallah and finally to the Daya River.

A discussion of proposed alternatives for sewage treatment and disposal, and related land availability/requirement issues, is presented in Chapter 11 of this report.

4.3.3 PERFORMANCE INDICATORS AND DEMAND-GAP ASSESSMENT

PERFORMANCE INDICATORS

An index of performance of the existing underground sewerage scheme parameters benchmarked against the normative/standard requirements as prescribed by reference guidelines/standards such as CPHEEO guidelines, pertinent manuals/publication and nominally prevalent level of services in similar cities with functional (good) urban infrastructure is furnished in the table below. It is imperative to mention that the nominal standard/benchmark is the requisite level of provision/delivery that is to be achieved over the existing and proposed urban agglomeration area in Bhubaneswar.

Table 4.3.1: Underground Sewerage System - Performance Indicators

No.	Parameter / Component	Service Level	Benchmark	Comment / Remarks
1.	Sewage Collection System Coverage	35 percent	85 percent	Very low
2.	Sewage Treatment Plants & Function characteristic of State Capitals	Oxidation Pond - 3 Nos. Aerated Lagoon - 3 No.	Activated Sludge Process	Inadequate and Conventional
3.	Revenue / O&M cost ratio	33 percent	> 95 percent	Low. Uneconomical

Source: Analysis / Orissa Water Supply and Sewerage Board, Bhubaneswar, 2006

DEMAND-GAP ASSESSMENT

An assessment of the existing gap in service levels in the city's sewerage sector in relation to the estimated future generation of sewage based on projected growth in population (presented in Section 10.3) and prescribed guidelines/normative standards has been performed for the following components of the existing system:

- Sewage generation and sewage collection system;
- Sewage treatment and disposal; and
- Requirement of land for sewage treatment facilities.

The demand-gap assessment has been performed for the short-term period, i.e. intermediate stage (15 years) and for the long-term, i.e. ultimate stage (30 years), and is presented in the table below:

Table 4.3.2: Underground Sewerage System - Demand-Gap Assessment

Sl. No.	Component	Normative Standard		Short-Term Demand-Gap Assessment (2009-2024)			Long-Term Demand-Gap Assessment (2009-2039)		
		Unit	Quantity	Generation / Demand	Existing	Gap	Generation / Demand	Existing	Gap
1.	Sewage Generation (MLD)	Lpcd	126	169	82	87	219	82	137
2.	Treatment Capacity/Potential w.r.t.	%	100	169	Nil	169	219	Nil	219

Sl. No.	Component	Normative Standard		Short-Term Demand-Gap Assessment (2009-2024)			Long-Term Demand-Gap Assessment (2009-2039)		
		Unit	Quantity	Generation / Demand	Existing	Gap	Generation / Demand	Existing	Gap
	Generation (MLD)								
3.	Sewage Collection System Coverage w.r.t. PTAs (Percent)	%	85	85	35	50	85	35	50
4.	Sewage Collection System Coverage w.r.t. Road Length (km)	%	85-100	1360	345	1015	1600	345	1255
Estimate of Requirement of Land for Sewage Treatment Alternatives									
1.	Waste Stabilization Pond (Acres)	Acres/MLD	4.00	674	--	674	876	--	876
2.	Activated Sludge Process (Acres)	Acres/MLD	0.25	42	--	42	55	--	55

Source: Analysis / PHEO (Urban), Bhubaneswar; 2006

Note: Requirement of land has been estimated based on available information on sewage treatment plants of similar scale, process of treatment, scalability and related issues. The nominal footprint/area required for a specific plant is known to vary based on the degree of treatment required, configuration of the land available, detailed design of treatment facilities and related factors. Decentralized sewage treatment facilities may result in a net higher requirement of land. The land requirement indicated in this report is provided only for comparison/reference purposes. Actual land requirement for the proposed STP(s) in Bhubaneswar and related procurement/acquisition/estimation should be arrived at pursuant to relevant surveys, investigation and detailed engineering design of the proposed facility.

From the above table, it is evident that the present coverage and installed (functional) sewage treatment capacity is seriously inadequate and poses a potential threat to overall health and hygiene. Therefore, it is evident that the sewerage system needs to be rehabilitated and augmented to a significant extent to ensure full coverage and sustainability. It is also apparent from the demand-gap assessment that a significant quantity of land will be required for installation of sewage treatment facilities. The following section (Key Issues) identifies the specific problems with the existing system and proposed development issues.

4.3.4 INSTITUTIONAL AND FINANCIAL ASPECTS

INSTITUTIONAL ASPECTS

The institutional arrangement for the sewerage sector is same as the water supply sector. The PHEO is responsible for construction and maintenance of city sewerage systems. A detailed review of the institutional structure of the PHEO has already been discussed under the water supply sector in Section 4.2.8.

The design and project management for provision of sewerage system components is jointly undertaken by the PHEO and the Orissa Water Supply and Sewerage Board (OWSSB) of the GoO. However, the responsibility of the OWSSB is limited to design and construction of water supply and sewerage schemes on behalf of PHEO and local bodies at their cost and on payment of centage charges. There is good coordination between the PHEO and the OWSSB as there is a clear delineation of functional responsibilities. Specific roles, responsibilities and functions of the PHEO and the OWSSB are also discussed in Table 8.2.1 and Table 8.2.2.

FINANCIAL ASPECTS

Similar to the water supply sector, the PHEO levies connection fees and user charges for sewerage and sanitation services as the cost recovery mechanism towards sustaining service provision and delivery. The quantum of one-time fees/deposits for sewer connection charges is dependent on both use and size of the sewer. The sewage tariff is levied based on the size of the sewer for domestic use, while it is based on number of closets for non-domestic use. Details of service connection charges and user charges for both water supply and sewerage,

along with the relevant Gazette Notifications, are given in Annexure - 5. It is important to mention that the PHEO is reportedly not collecting sewerage charges at present, as the sewerage system is non-functional in the city.

As stated earlier, financial support for the functioning of the PHEO is provided through GoO budgetary allocation. The PHEO does not maintain a separate dedicated account for water supply and sewerage. In fact, all receipts/income from water supply and sewerage operations are sent back to the GoO exchequer and all expenditures are met by the GoO through budgetary allocation. Thus, it is not possible to undertake a detailed analysis of the financial performance of the PHEO. However, based on the available data, Section 7.3 presents a brief analysis to provide insight into the financial performance of the water supply and sewerage sector.

4.3.5 KEY ISSUES

The present system of sewerage and sanitation was assessed through data available with the concerned departments such as the PHEO and Orissa Water Supply and Sewerage Board (OWSSB), field visits and discussions with principal stakeholders and other concerned officials. The key issues that surround the present system are outlined below:

- As specified earlier, a master plan for sewerage and sanitation in Bhubaneswar has not been prepared, which has been identified as a critical deficiency. The aspects/focus areas that the master plan needs to cover at a minimum have been highlighted earlier.
- Low level of coverage of existing system in terms of ratio of House Sewer Connections to PTAs. The present coverage is approximately 35 percent, whereas a sewerage scheme for a city is highly recommended to maintain a minimum coverage of 70 percent of the PTAs.



Discharge of raw sewage to open drains

- The aforementioned low coverage of the city's sewerage system can be attributed to the following reasons:
 - Poor or almost non-functional system of sewage collection and treatment;
 - Presence of conventional system of septic tank-based sanitation; and
 - Inadequate efforts on the part of the concerned agencies in ensuring increased coverage and proper conveyance and treatment/disposal of sewage.
- The low coverage of sewerage results in discharge of untreated sewage at several locations (not covered by the present scheme) through open drains to surface water bodies and open lands resulting in groundwater and surface water contamination.
- The existing antiquated trunk and lateral sewers (> 30 years) are not capable of handling the present sewage load and this inadequacy is manifested through choking, manhole overflow and sewage ex-filtration from damaged underground sewer lines.
- Further, since the existing trunk sewers have been laid along conservancy lanes, accessing the manholes/sewer lines is a principal obstacle due to dumping of solid waste and building material in these areas.
- The existing sewage treatment facilities, namely oxidation ponds and aerated lagoons, are almost non-functional and merely function only as flow-through systems.
- Since the system is substantially non-functional, sewer charges are reportedly not collected and additional connections not provided for. This is another critical area of revenue loss.

Based on the assessment of the existing situation, the prevalent gap and key issues/problems in the existing system, Chapter 11 outlines the sector-specific SWOT analysis, priority actions, proposals for improvement and augmentation of the sanitation and underground sewerage system and related issues, estimated capital investment and the strategy for implementation along with suggestive timelines.

4.4 STORM WATER DRAINS

4.4.1 EXISTING SITUATION

The general elevation of Bhubaneswar is approximately 45 m above mean sea level and the overall topography slopes from the western highlands to the eastern plains. Further, the city slopes from the north towards the south. A significant portion of the paved and unpaved area of the city is drained by a network of major (primary) and minor drains (secondary and tertiary).



MAJOR DRAINS

Choked storm water drain with solid waste

Bhubaneswar has a network of ten (10) major drains that are aligned from west to east and are situated in an arrayed layout (north to south) perpendicular to the Gangua Nallah as shown in Plate - 9. The ten major drains and canals are maintained by the Water Resources Department (WRD). The major drains are primarily catchment drains that receive (from minor drains) and convey storm water from residential and other habitation areas to Gangua Nallah and onward to the Daya River. Details of the existing major drains showing the length, location and catchment area are furnished in the table below.

Table 4.4.1: Major Drains in Bhubaneswar

Drain No.	Length (km)	Drainage Area (sq. km.)	Origin	Outfall	Design Discharge m ³ /sec
1	4.316	16.93	Forest Lake, Chandrasekharpur	Daya West Canal crossing near Kalrahaya	47.07
2	1.127	1.44	Sainik School Road Culvert	Railway bridge near VSS Nagar (confluence with Drain No. 3)	4
3	2.422	3.31	Field near Sainik School	Railway bridge near VSS Nagar (confluence with Drain No. 2)	9.2
4 (i)	4.283	13.67	Culvert near reserve forest at Bharatpur	DWBC crossing near Mancheswar	38
5	3.133	3.66	Culvert near Janpath Road	Gangua Nallah	10.17
6	2.615	2.89	Railway bridge of Ashok Nagar	Gangua Nallah	8.03
7	4.336	9.46	Culvert in Airport Road at Forest Park area	Gangua Nallah	26.3
8	4.33	12.55	Jokalandi Road culvert near Jagannath Prasad	Confluence with Drain No. 9	34.9
9	4.24	28.8	Culvert on NH-5 near Aiginia	Pokhariput Railway bridge	80.06
10	5.482	10.28	Lake near CRP Colony	Gangua Nallah	28.58

Source: Water Resources Department (WRD), Bhubaneswar; 2006.

MINOR DRAINS

The 'minor drains' that comprise secondary and tertiary drains (surface and catchment) are maintained by the BMC. The total length of storm water drains is reported to be approximately 1,450 km. Bhubaneswar has an annual average precipitation of 1,498 mm as compared to the State in average of 1,700 mm. The secondary and tertiary drains within BMC limits basically convey storm water runoff from the road surface, household roof drains and from the catchment area in undeveloped or partially developed portions of the city to the major drains. These secondary drains are constructed with laterite masonry or with cast-in-site concrete lining.

4.4.2 PROBLEMS IN EXISTING SYSTEM OF STORM WATER DRAINS

Based on discussions with the concerned authorities and consultations, this section presents problems in the existing system of storm water drains in Bhubaneswar. The principal problems identified are inundation (flooding), encroachment removal along drains, and land availability/acquisition issues for reconstruction and augmentation activities.

INUNDATION PRONE AREAS

The WRD is responsible for provision, delivery and maintenance activities of the ten (10) major drains in Bhubaneswar and overall storm water management in the region. Based on discussions with the WRD, inundation prone areas have been identified through surveys and are discussed below. Although the aforementioned problems are present in a number of areas within Bhubaneswar along the ten (10) major drains, the severity is acute along major drains nos. 4, 5, 7 and 10 and is outlined below:

- Nayapalli, Acharya Vihar, Jayadev Vihar & Shastri Nagar: Inundation during the monsoon period is significant in localities along major drain no. 4 in the aforementioned areas. Encroachment of sections of drain has resulted in reduction of the effective area available for storm water flow. Efforts to clear the congestion and ensure smooth flow in drain no. 4 is reportedly pending due to administrative/legal issues.
- Laxmisagar Area: Inundation in the aforementioned area along major drain no. 5 is recurrent due to obstruction of the drain area, specifically at Laxmisagar Chhakk and at DWBC crossing. Such obstructions, which are also in the form of construction of a masonry wall downstream of the drainage siphon, are bound to result in flooding during monsoon periods.
- Old Town Area, Gouri Nagar & Garrage Chhak: The aforementioned inundation prone areas are located along major drain no. 7. Obstruction of drains in the Old Town area is significant with issues such as non-availability of freehold land and non-acquisition of available private land being the primary issues that hinder drain reconstruction and widening. Sections of the drains have been encroached along the Bhubaneswar-Puri Road in the aforementioned localities, which results in flooding due to non-passage of storm water and subsequent drain overflow.
- Jharapada, Bomikhal, Govinda Prasada & Shanthi Nagar Area (drain no. 10): Similarly, areas along major drain no.10 in the aforementioned localities experience regular flooding during monsoon. The problem is acute along the stretch of the major drain aligned parallel to the Daya West Branch Canal. Due to significant encroachment of this stretch, torrential rains in the past have resulted in breaching of the drain section and spillover of storm water to the locality posing severe health and safety hazards.

LAND REQUIREMENT/ACQUISITION ISSUES

Concerned Government authorities have taken the decision to prepare consolidated land requirement plans and a proposal for land acquisition along the major drains for reconstruction and augmentation of the major drains to eliminate flooding and related problems in the storm water drainage system. Accordingly, a land acquisition proposal was prepared by the WRD and submitted for the four major drains in the core area of Bhubaneswar and is outlined below:

Plate - 9: Network of Major Drains in Bhubaneswar

PLEASE INCLUDE AUTO CAD MAP AS TEMPLATE PLOTTED IN A-3 SIZE

Table 4.4.2: Land Requirement/Acquisition Proposal for Reconstruction & Augmentation of Major Drains in Core Area of Bhubaneswar City

Drain No.	Area / Locality	Origin	Outfall Point	Proposal for Land Acquisition/Procurement (Acres)		
				Privately Owned	Govt. Owned	Total Land Extent
5.	Laxmisagar	Culvert near Janpath Road	Gangua Nallah	2.747	3.466	6.213
6.	Baragada	Railway bridge of Ashok Nagar	Gangua Nallah	2.172	2.401	4.573
7.	Kedargouri	Culvert in Airport Road at Forest Park area	Gangua Nallah	3.197	6.363	9.560
10.	Nicco Park	Lake near CRP Colony	Gangua Nallah	3.340	5.625	8.965
Total				11.456	17.855	29.311

Source: Water Resources Department (WRD), Bhubaneswar; 2006.

Notwithstanding land acquisition, renovation of the listed major drains in the core area was performed through construction of masonry drain sections in 1996-97. These sections are presently damaged to a significant extent owing to the past “super-cyclone” in 1999 and subsequent torrential rains and, therefore, are in need of significant reconstruction. Additionally, other sections of these drains are silted with debris and hampered by vegetation growth. The aforementioned land proposal covering the four listed major drains has reportedly been submitted and is pending resolution. It can be observed that land to an extent of nearly 30 acres is to be acquired and allotted for improvement to the listed major storm water drains, which is a significant requirement. Considering the land requirement for the other major drains (6 nos.), the overall requirement is bound to be higher. Therefore, detailed surveys need to be performed by the concerned authorities to prepare a similar updated proposal for all the major drains and perimeter areas to ensure an efficient system for the city’s drainage.

OTHER PROBLEMS

Other incidental problems in the existing storm water drainage system that were identified based on discussions with concerned stakeholders are listed below:

- Lack of periodic maintenance of masonry and other drains;
- Encroachment of drains and absence of a periodic inspection and encroachment removal mechanism to deter further encroachment of drains;
- Delays during the construction stage in the case of major drains resulting in stability problems; and
- Paucity of funds for encroachment removal, drain reconstruction and maintenance activities.

4.4.3 PERFORMANCE INDICATORS AND DEMAND-GAP ASSESSMENT

PERFORMANCE INDICATORS

An index of performance of the existing storm water drainage system parameters benchmarked against the normative/standard requirements or service levels as prescribed by reference guidelines/standards such as PWD/CPHEEO guidelines, pertinent manuals/publication and nominally prevalent level of services in similar cities with functional (good) urban infrastructure is furnished in the table below. It is imperative to mention that the nominal standard/benchmark is the requisite level of provision/delivery that is to be achieved over the existing and proposed urban agglomeration area in Bhubaneswar.

Table 4.4.3: Storm Water Drainage - Performance Indicators

No.	Parameter / Component	Service Level	Benchmark	Comment / Remarks
1.	Major Drains - Catchment Area	75 percent	100 percent	Inadequate
2.	Minor Surface/Area Drains - Coverage (Drain Length / Road Length Ratio)	90 percent	130 percent	Adequate
3.	Hydraulic Conveying Capacity of major drains	Analysis not made available	100-year return flood, 2-hrs precipitation, 4 hrs flow	Inundation prone areas. Master plan required

Source: Analysis / Water Resources Department (WRD), Bhubaneswar, 2006

DEMAND-GAP ASSESSMENT

The existing length of storm water drains has been reported at approximately 1450 km. Considering the total road length of 1,600 km in Bhubaneswar, the demand for optimum coverage at approximately 1.30 times the road length (i.e. about one-third of the total roads would have drains on both sides). Based on this normative standard, it can be observed that a gap of nearly 630 km of drains may need to be provided to ensure efficient storm water management.

A detailed study/master plan needs to be prepared focusing on the overall catchment area, storm water runoff, updated rainfall data, and the hydraulic (conveying) capacity of the drains to ensure coherent development of the storm water drain system.

4.4.4 INSTITUTIONAL AND FINANCIAL ASPECTS

INSTITUTIONAL ASPECTS

The Water Resources Department (WRD) and Works Department of the GoO are jointly responsible for planning & design, construction and operation & maintenance of all major drains located within the city and in the region. Since both the WRD and Works Department are state level organizations, the office of the Chief Engineer coordinates all activities of these departments. The Chief Engineer is assisted by Superintending Engineers and other technical & administrative staff. As functions and responsibilities are centralized, city-specific institutional information is not available, and thus a city-specific institutional analysis is not carried out.

The BMC is responsible for planning & design, construction and operation & maintenance of all minor (secondary & tertiary) drains located within the municipal limits. The office of the Municipal Engineer coordinates all activities pertaining to the provision and operation & maintenance of the storm water drainage system. There has been good coordination between the WRD/Works Department and the BMC, as there is a clear delineation of functional responsibilities. However, there is a need for strengthening coordination amongst WRD, Works Department and the BMC for concentrated efforts and effective results. Specific roles, responsibilities and functions of the WRD, Works Department and the BMC in storm water drainage are also discussed in Table 8.2.1 and Table 8.2.2.

FINANCIAL ASPECTS

Financial support for the functioning of the WRD and Works Department is provided through the GoO budgetary allocation. There are no user charges and/or revenue except the budgetary allocation. These departments do not maintain a separate dedicated account for city-wise storm water drainage. Similarly, the BMC also does not have a separate account head for storm water drainage and thus the expenses are booked under public works, along with other components like roads, buildings, etc. (detailed analysis of finances of the BMC is presented in Section 7.2). Thus, it is not possible to undertake a detailed analysis of the financial performance of the sector.

4.4.5 KEY ISSUES

Key issues and concerns identified through pertinent situation analysis, discussions with pertinent stakeholders and field visits are outlined below:

- Storm water drains in the city function as a conveyance channel for untreated sewage from the partially laid/incomplete interceptor sewer network.
- Drains located within the BMC limits are choked due to indiscriminate dumping of solid waste, building materials and related refuse.
- Drains are also significantly silted and collapsed in some sections reducing the effective cross-section and resulting in inundation problems during monsoon periods. The stakeholders opined that this situation was not prevalent during earlier times owing to the prevalent natural gradient and nature of sub-soil (laterite).
- Major drains (10 nos.) are not equipped with perimeter protection (i.e. fencing), which is a critical safety hazard, specifically during the monsoon season when high discharge/flow rates are encountered.
- A master plan for storm water drains has not been prepared. Development of drains appears to be performed as a joint activity with development/reconstruction of roads and not as an individual sector. This is specific to drains along major and minor roads. This is a critical deficiency, since the existing network along major and minor roads serves as the primary conduit for area and road drains to convey storm water from the point of origin to the ten (10) major channels/drains.
- A well designed and developed master plan for storm water drainage should be developed focusing on areas such as projected growth of population and incidental development of road network, updated rainfall details, low-lying areas, rainwater harvesting requirements and other relevant parameters.
- It is also imperative to conduct awareness programs at the city level to cover all classes of residents to highlight the function of storm water drains, prevention of encroachment of storm water drain areas, prevention of dumping of solid waste and discharge of sewage/sullage from households and other related issues.



A view of an open drain running across one of the roads located in the CBD

Based on the assessment of the existing situation, the prevalent gap and key issues/problems in the existing system, Chapter 11 outlines the sector-specific SWOT analysis, priority actions, proposals for improvement and augmentation of the storm water drainage and related issues, estimated capital investment and the strategy for implementation along with suggestive timelines.

4.5 ROADS, TRAFFIC AND TRANSPORTATION

4.5.1 EXISTING SITUATION

ROADS

Bhubaneswar City has an extensive road network for a length of approximately 1,600 km within municipal limits. This figure includes national highways, state highways, corporation roads (interior) and other roads. A summary of the roads sector is outlined below:

- The road network within the BMC limits is maintained by both the BMC and the Works Department (R&B).
- The Works Department (R&B) maintains approximately 700 km of main and arterial roads

while the BMC maintains approximately 900 km of interior and minor roads. Roads within the industrial areas are maintained by the Orissa Industrial Infrastructure Development Corporation (IIDCO).

- The per capita road length based on the aforementioned total road length and the interim projected population (2005) of 7.50 lakhs is approximately 2.13 km.
- The average road density for the BMC area is approximately 11.82 km per sq. km. Details of the type of paved surface and the corresponding length maintained by BMC are furnished in the adjacent table. From the table, it can be observed that nearly 60 percent of the BMC maintained roads are black topped while rigid cement concrete pavement and unpaved (earthen) roads are at six percent each.

Table 4.5.1: Details of Roads Maintained by BMC

Type of Roads	Road Length (km)	Percentage
Black Topped	548.88	60.99
Metalled	181.21	20.14
Cement Concrete	50.31	5.59
Un-metalled	67.66	7.52
Earthen	51.86	5.76
Total	899.92	100.00

Source: Bhubaneswar Municipal Corporation; 2006

- Bhubaneswar has basic air connectivity to the major metros and important cities in the country. Rail connectivity to the city is significant as the Bhubaneswar railhead lies along the Chennai-Kolkata Railway Line.
- The road network pattern in the central areas of the city represents a rectangular grid form, flanked by the major National Highways.
- The major corridors along the north-south alignment are Bidyut Marg, Nehru Marg and Janpath. Saheed Laxman Nayak Marg, Gandhi Marg, Gopabandhu Marg, Madhusudan Marg, Rajpath and Ekamra Marg for the major east-west corridors.
- In case of surface transport (roads), regular buses ply between Bhubaneswar and the regional cities of Behrampur, Chilka, Cuttack, Konarak, Paradeep, Puri, Rourkela, Sambalpur and other places in the State. Interstate bus services also operate on a daily basis to Kolkata (West Bengal), Raipur (Chattisgarh) and Tata Nagar (Jharkhand).



Manual traffic control at intersections and high density of incidental traffic leading to congestion

- The present system of traffic management and control at intersections is not fully developed and are mostly manual.
- It has been observed that the land requirement for provision of new roads and other infrastructure in newly developed areas within the development area has been identified and earmarked in the Comprehensive Development Plan. However, proper development of the road network and further developmental activities has to be ensured through coordinated planning and identification of system deficiencies through detailed surveys.

TRAFFIC & TRANSPORTATION

An evaluation of the present situation of traffic and transportation in Bhubaneswar is presented in this section based on discussions with concerned authorities, earlier studies conducted specific to this sector, and information obtained from stakeholder agencies such as the R&B Department, Department of Motor Vehicles, State Pollution Control Board and others. A study was also conducted in 2004-2005 to evaluate the feasibility of a mass transit system for Bhubaneswar-Cuttack region and specific details available from the survey are also discussed in this section.

- Traffic in Bhubaneswar can be termed as heterogeneous with two-wheelers forming a substantial portion (77 percent) of the traffic, while evaluating the modal mix of transport modes available. Details of the modal mix of transport in Bhubaneswar are furnished in the adjacent table.
- The total vehicle population is approximately 3,07,000 with a nominal specific vehicle size (per household) of 2.13. Details of annual vehicular registration in Bhubaneswar for the past five years are furnished in the table below:

Table 4.5.2: Modal Mix of Transport

Mode	Share (%)
Two-Wheelers	77
LMV (cars, taxi, jeeps, etc.)	11
Heavy Vehicles	10
Public Transport Carriers (buses)	2
Total	100

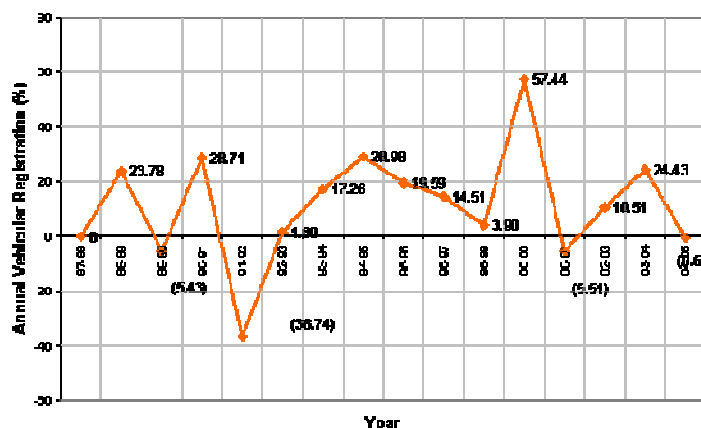
Source: RITES Study; 2004-2005

Table 4.5.3: Annual Vehicular Registration (2000 - 2005)

Year	Type (Percentage)		Total Vehicles Registered	Annual Increase (Percent)
	Commercial	Non-Commercial		
2000 - 2001	87	13	25,544	60.99
2001 - 2002	87	13	26,242	3
2002 - 2003	88	12	29,000	11
2003 - 2004	83	17	36,085	24
2004 - 2005	85	15	35,871	- 0.59

Source: Regional Transport Office, Bhubaneswar; 2006

- The average annual vehicular traffic increment in Bhubaneswar is approximately 7.50 percent for the past 5 years. Variation of annual vehicular registration for the past 18 years (1987 - 2005) is also shown in the adjacent chart. It can also be observed from Table 4.5.3 that the commercial vehicle to non-commercial vehicular ratio has been almost constant with minimal variation.



Annual Vehicular Registration Increase (1987 - 2005)
Source: Regional Transport Office, Bhubaneswar & Bhubaneswar & Environmental Management Plan, OPCB, Bhubaneswar

- The Bhubaneswar-Cuttack National Highway (NH-5) has been identified as one of the most accident prone areas with the aforementioned stretch/region contributing to nearly 22 percent of the total accidents and 20 percent of the total fatalities in the state.
- The primary reasons for the high incidence of accidents in this region are the following:
 - Significant mix of fast-moving and slower traffic (intra- vs. Inter-city traffic);
 - Lack of efficient traffic management measures; and
 - Encroachments that reduce the effective right-of-way.
- The public transport system is inadequate in Bhubaneswar since the common bus service does not serve all areas. A substantial volume of approximately 8,400 three-wheeler autos runs along parallel bus routes and traffic generating routes. Although this mode is quite popular, this sector is disorganized and requires proper regulation.

Details of recent survey of traffic and travel analysis in Bhubaneswar are listed below, which essentially appraise the existing situation on traffic and transport characteristics of commuter travel. Survey parameters observed/used are indicated in the table below.

Table 4.5.4: Traffic & Transportation Survey Parameters

Sl. No.	Survey Type	Coverage	Length/ Locations/ Sample Size
1.	Road Network Inventory	Along primary, secondary and influence area road network	292-km
2.	Speed and Delay Surveys	Along primary, secondary and influence area road network private (car) mode bi-directional peak (morning & evening) and off-peak hours	292-km
3.	Traffic Volume Counts and Passenger Occupancy <ul style="list-style-type: none"> ▪ Outer Cordons ▪ Mid-Blocks ▪ Screen Lines ▪ Intersections 	Classified, mode-wise <ul style="list-style-type: none"> ▪ 24 hours 15- minute interval ▪ 16 hours (06:00-22:00) 15- minute interval ▪ 16 hours (06:00-22:00) 15- minute interval ▪ 16 hours (06:00-22:00) 15- minute interval 	7 16 6 26
4.	Origin Destination Surveys	24 hours 15-minute interval	7
5.	Parking Surveys	8-hours, morning & evening peak	9
6.	Pedestrian Volume Counts	8-hours, morning & evening peak	11
7.	Rail Passenger Surveys (boarding/alighting)	16 hours (6:00-22:00) 15-minute interval	9
8.	Bus Stop Surveys (boarding/alighting)	16 hours (6:00-22:00) 15-minute interval	32
9.	Household Travel Surveys	1 percent sample size; stratified sampling process	3000 households

Source: RITES Survey, Oct – Nov'04

- **Road Network Characteristics:** Roads in Bhubaneswar are of fair quality with nearly 67 percent comprising paved WBM roads. Although, more than half the road length passes through residential and mixed use areas, almost 20 percent of the length also passes through areas where development is scanty and distances between developed sections of the region are significant. This results in a net increase in time of commute.
- **Travel Speed and Delays:** Analysis of surveys performed on a selected road length in Bhubaneswar revealed an average commute speed of nearly 40 km/hr. Considering delays and stops during commute, the net speed is pegged at 24 km/hr. Delays to the extent of 50 seconds (average) are primarily caused by median breaks that permit unwarranted/frequent turns and impedes streamlined flow of traffic.
- **Traffic Volume Counts:**
 - **Outer Corridors:** The national highways running through Bhubaneswar account for maximum traffic volume intensity with traffic volume counts ranging between 26,000 to 36,000 PCUs. Peak hour traffic occurs between 9:30 to 10:30 am and 5:30 to 6:30 pm. The composition of traffic is primarily the fast-moving category accounting for nearly 60 percent, with other modes of transport such as bus, load carriers, etc. making up for the remainder. Occupancy levels have been found to be optimum in the standard bus, two- and three-wheeler categories, whereas the occupancy level among cars is under utilized with an occupancy level of 3.
 - **City Areas:** Average traffic volumes within the city range from 4,500 to 32,000 PCUs with relatively high volumes (nearly 33,000 PCUs) being observed along the NH-203 (Bhubaneswar-Puri Highway), which runs through core areas of the city. Peak hour traffic is slotted between 10:00 to 11:00 am and from 7:00 to 9:00 pm with the ratio varying between 7 to 19 percent. Composition of traffic in these areas is also primarily fast moving accounting for 77 percent, with the remaining being composed of slow moving vehicles.
 - **Screen Lines/Physical Barriers:** Traffic volume studies conducted at natural/man-made barriers such as rivers, canals, railway lines, level crossings and related revealed volume counts between 2,000 to 10,000 PCUs.

Specifically, Shaheed Nagar level crossing and flyover sections were identified as the maximum traffic volume points with intensities of nearly 10,200 PCUs. Composition of traffic at these locations was found to be similar to that observed in city areas.

- **Intersections:** Junctions on the national highways (NH-5 and 203) account for maximum traffic volume with studies at Rajmahal Square and Jaydev Vihar observing volumes of 85,000 and 71,000 PCUs, respectively. Peak hour traffic slots have been observed between 9:30 to 10:30 am and from 5:30 to 6:30 pm at these locations with fast moving modal transport accounting for nearly 71 percent of the total traffic volume.
- **Parking Facilities:** Maximum 'on/off-street' parking is observed from AG Square to Kalpana Square (11,000 vehicles) followed by 'off-street' parking at the Railway Station area (9000vehicles). Predominant parking characteristics and respective areas are outlined in the adjacent table. These details indicate the type of parking facilities that will be required at the named locations. However, detailed engineering studies will need to be performed to ascertain specific requirements. 'On-street' parking constitutes 31percent and the mixed type of parking is 55 percent. Approximately 90 percent of parked cars and an equal percentage of two-wheelers were observed to be short-term, 'on-street' in nature.
- **Pedestrian Volume Count:** Survey of pedestrian movement was performed at important locations like Vani Vihar. It was observed that the 'along' movement constituted 61 percent of the total pedestrian movement with maximum movement observed at the above named location (12,300). Similarly, maximum 'across' movement was observed at Rajmahal Square (12,500). Lack of appropriate pedestrian facility infrastructure is an issue of concern. Peak hour pedestrian traffic was found to occur between 10:00 to 11:00 am while reverse flow was observed from 6:00 to 7:00 pm.
- **Bus Stop Survey (Boarding Alighting):** Daily boarding/alighting was found to be in the order of 35,000 passengers with approximately 63 percent of passengers boarding from designated bus stops, albeit 43 percent of buses were found to skip certain stops, which causes a highly disorganized public transport system. Bus stops located on the NH-5 can be termed as the most important with maximum daily passenger volumes observed at Master Canteen (4,100), Vani Vihar Chhakk (4,000) & Acharya Vihar Square (2,200). Peak hours were found to fall between 9:00-10:00 am and 5:00-6:00 pm with the share ranging from 7 percent to 19 percent.

Table 4.5.5: Parking Characteristics

Predominant Category	Area
Cars	Sri Ram Temple to Shishu Bhawan
Two-Wheelers (Park & Ride)	Railway Station
Three-Wheelers, Truck & MAV	Rasulgarh to Ravi Talkies
Busses	Baramunda Bus Stand
Slow Moving Vehicles	AG Square to Kalpana Square

Source: RITES Study; 2004-2005

4.5.2 PERFORMANCE INDICATORS AND DEMAND-GAP ASSESSMENT

PERFORMANCE INDICATORS

An index of performance of roads sector parameters benchmarked against the normative/standard requirements or service levels as prescribed by reference guidelines/standards such as MoRTH/PWD guidelines, pertinent manuals/publication and nominally prevalent level of services in similar cities with functional (good) urban infrastructure is furnished in the table below. It is imperative to mention that the nominal standard/benchmark is the requisite level of provision/delivery that is to be achieved over the existing and proposed urban agglomeration area in Bhubaneswar.

Table 4.5.6: Roads, Traffic and Transportation - Performance Indicators

No.	Parameter / Component	Service Level	Benchmark	Comment / Remarks
1.	Fully Paved (Flexible & Rigid) Road Length - BMC roads	84 percent	95 percent	Satisfactory. Can upgrade based on development requirement/potential

No.	Parameter / Component	Service Level	Benchmark	Comment / Remarks
2.	Average Road Density	11.82 km/sq. km	10 - 15 km/sq. km.	Adequate
3.	Per Capita Road Length	2.13 m	1.5 - 2.0 m	Adequate
4.	Vehicular Increase per Year	7.50 percent	5 percent	Moderate

Source: Analysis / Works Department (R&B) and Bhubaneswar Municipal Corporation, Bhubaneswar; 2006

DEMAND-GAP ASSESSMENT

A demand-gap analysis has been performed for this sector to provide insight into the type and extent of problems in various areas, corridors and intersections. The demand-gap assessment will also serve to identify principal requirements of infrastructure and improvements that may be required to existing infrastructure. The following parameters have been evaluated based on information from earlier traffic surveys conducted in Bhubaneswar and discussion with concerned authorities:

- Road capacity utilization (volume/capacity ratio);
- Degree of congestion;
- Junction capacity analysis;
- Pedestrian-vehicle conflict;
- Parking parameters; and
- Level crossing analysis.

A detailed description on the above is given below:

- Road Capacity Utilization (Volume/Capacity Ratio): Road capacities at Bidyut Marg (1.44), Ekamra Marg (1.14) & NH-203 (1.07) were observed to be constrained when compared to the normative value of 1.00 and will require service upgradation and widening. It may also be feasible to enhance road capacities by fully utilizing the available carriageway space/road reserve if the prevalent 'on-street' parking system is shifted to well-planned and organized 'off-street' parking lots adjacent to important locations such as business clusters, shopping centers and related. Road capacity utilization has been computed for 2009 for a 'business as usual' scenario. As specified earlier, 'on-street' parking and encroachments are to be removed at the first instance. Additionally, other important roads may require alternative interventions such as uni-directional traffic system, ban on certain modes (e.g. heavy vehicles, inter-state/city buses, etc.) and road closures for thoroughfares at specific times.
- Degree of Congestion: High degree of congestion was also observed at Lingaraj Temple Road (193), Bindusagar (136), Ekamra Marg (99) and NH-203 (96). Alternative traffic management measures/options such as one-way traffic, pedestrian ways, etc. need to be evaluated on a detailed basis for efficient traffic management.
- Junction Capacity Analysis (Y-Value): Significantly high values were observed at Ravi Talkies (2.19), Jaydev Vihar (2.09) & Acharya Vihar (2.04). Approach volumes exceeding 10,000 vehicles are also observed at Rajmahal Square, AG Square, Kalpana Square and Jaydev Vihar Chhakk. Since the values exceed normative standards (10,000), grade-separation may be warranted to ensure long-term improvement.
- Pedestrian-Vehicle Conflict (PV2): It was observed that nearly all major junctions warrant pedestrian grade-separation since the surveyed values exceed permissible standards per the IRC (2 x 108). Improvements can be in the form of a pedestrian subway or a foot over-bridge. Maximum values were observed at Rajmahal Square (57 x 108), Kalpana Square (36 x 108) and Vani Vihar Square (13 x 108).
- Parking Parameters: 'On & off-street' parking facilities have been assessed based on parameters, viz. parking accumulation, index, duration, turnover and space hours. 73.32 percent of the vehicles are parked 'on-street'. Parking is highly disorganized and unpaid. Haphazard parking leads to inefficient utilization of parking space. Parking turnover (accumulation/supply) is relatively high at 3.09. Areas with high parking accumulation and parking index call for parking demand management measures with provision of additional facilities. Commercial areas, which witness high parking turnover and low parking duration, may require paid parking facilities. Areas with acute parking congestion and

space constraints on provision of additional facilities would call for banning or restricting travel time on certain classes of vehicles. Parking demand is basically of short-term nature.

- **Level Crossing Analysis (TVU Value):** Total traffic vehicle units exceed the norm of 50,000 TVUs warranting provision of a grade-separated facility. There are a total of 12 level crossings between Bhubaneswar and Cuttack. 5 lie within the urban limits of Bhubaneswar and 2 within Cuttack. All warrant a grade-separation facility within urban areas due to increases in road/rail traffic. Level crossings after Cuttack Main (4.47 lakhs) and Punama Gate (4.19 lakhs) in Bhubaneswar have the maximum TVUs followed by VSS Nagar (3.67 lakhs), Vani Vihar (3.25 lakhs), HMI (Postal Colony) (3.22 lakhs), and the crossing before Lingaraj PH (2.44 lakhs). In the intervening areas, level crossings at Barang (1.93 lakhs) are nearly saturated and need appropriate attention.

4.5.3 INSTITUTIONAL AND FINANCIAL ASPECTS

INSTITUTIONAL ASPECTS

The Works Department (R&B Division) of the GoO is responsible for planning & design, construction and operation & maintenance of all major roads including flyovers and other road infrastructure located within the city and in the region. Since the Works Department is a state level organization, the office of the Chief Engineer coordinates all activities of this department. The Chief Engineer is assisted by Superintending Engineers and other technical & administrative staff. As functions and responsibilities are centralized, city-specific institutional information is not available, and thus a city-specific institutional analysis is not carried out.

The BMC is responsible for planning & design, construction and operation & maintenance of all municipal roads (minor/internal) including flyovers and other road infrastructure located within the municipal limits. The office of the Municipal Engineer coordinates all activities pertaining to the provision and operation & maintenance of municipal roads. There has been good coordination between the Works Department and the BMC, as there is a clear delineation of functional responsibilities. However, there is a need for strengthening coordination for concentrated efforts and effective results. Specific roles, responsibilities and functions of the Works Department and the BMC in road sector are also discussed in Table 8.2.1 and Table 8.2.2.

FINANCIAL ASPECTS

The financial support for the functioning of the Works Department is provided through GoO budgetary allocation. There are no user charges and/or revenue except for the budgetary allocation. These departments do not maintain a separate dedicated account for the city-wise road network. Similarly, the BMC also does not have a separate account head for municipal roads and thus the expenses are booked under public works along with other components like storm water drains, buildings, etc. (detailed analysis of finances of the BMC is presented in Section 7.2). Thus, it is not possible to undertake a detailed analysis of the financial performance of the sector.

4.5.4 KEY ISSUES

Key issues and concerns in the roads, traffic and transportation sector in Bhubaneswar as identified through analysis, discussions with concerned authorities, field visits and consultations with relevant stakeholders are outlined:

- Roads in the city are characterized by poor surface conditions and insufficient carriage-way width to accommodate constantly increasing traffic volume.
- Main/arterial roads are usually plagued by high density traffic resulting in traffic snarls, unregulated flow and accidents.
- Circular access/by-pass roads that normally serve to restrict and divert inter-city traffic ensuring segregation of inter-city and intra-city traffic are not present.
- Inadequate and disorganized road furniture - signage, streetlights, signals, medians etc.

- Improper design of pavement camber results in accumulation of rain water along large stretches of major roads which is further compounded by an inadequately surface drain system.
- Intersections on major roads are not equipped with an adequate number of Road Over Bridges (ROB) for smooth traffic flow at intersections and Foot Over Bridges (FOB)/ Subways for controlling pedestrian movement.
- Inadequate greenery/landscaping along roads with topsoil being exposed, thereby worsening ambient air quality and road conditions.
- As a significant portion of the registered vehicles are two-wheelers, absence of service lanes poses a serious problem during peak hours substantially hampering through traffic movement.
- A typical example of traffic management issues in an arterial road is best observed along the Cuttack-Puri Road. The formation width varies to a significant extent along the alignment, specifically from Rasulgarh Junction up to Samantrapur. This road is characterized by significant commercial land use reducing the effective right-of-way (ROW), high parking demand and a significant high volume of mixed traffic.
- Parking has been identified as a major problem in Bhubaneswar. Commercial establishments in the city have been designed to accommodate only incidental parking. In several locations, dedicated parking facilities are entirely absent. This situation has spawned significant proliferation of on-street parking, which in turn has resulted in the existing right-of-way being encroached upon and obstructing smooth flow of traffic.
- Improved management and provision of sufficient parking lots are not available resulting in haphazard parking and congestion of main roads.
- Bhubaneswar is not equipped with an intra-city public transport system (bus/rail) and the present system of public transport is disorganized with share autos and mini buses plying without proper regulation.
- The absence of an intra-city transport system results in a high traffic index of two-and/or three-wheeled vehicles which can be controlled if an effective surface transport system is made available for public transport.

Based on the assessment of the existing situation, the prevalent gap and key issues/problems in the existing system, Chapter 11 outlines the sector-specific SWOT analysis, priority actions, proposals for improvement and augmentation of the roads, traffic and transportation sector including estimated capital investment and the strategy for implementation along with suggestive timelines.

4.6 STREET LIGHTING

4.6.1 SYSTEM DESCRIPTION

BMC is responsible for provision and maintenance of street lights within corporation limits. BMC handles material procurement, installation and maintenance through qualified and approved contractors. Details of street lighting within the BMC limits are outlined below:

- Provision of street lights in Bhubaneswar comprises sodium vapor lamps (approx. 6,000 nos.) and tube lights (approximately 12,000 nos.).
- Other general lighting service fitments includes high-mast and semi high-mast cluster lights at major intersections and roundabouts.



Day-Time Glowing of Streetlights - Poor Energy Management

- Private sector participation in maintenance of street lighting is being introduced in a phased manner where initially 12 out of the total 47 wards have been divided into 4 zones and privatized through turnkey contracts.

4.6.2 PERFORMANCE INDICATORS

An index of performance of the street light sector parameters benchmarked against the normative/standard requirements or service levels is furnished in the table below:

Table 4.6.1: Street Lighting - Performance Indicators

No.	Parameter / Component	Service Level	Benchmark	Comment / Remarks
1.	Spacing between Lamp Posts (Pitch)	88 m	< 30 m	Very high spacing
2.	Proportion of Fluorescent Tube Lights	66.67 percent	70-80 percent	Almost adequate
3.	Proportion of Sodium Vapor Lamps	33.33 percent	20-30 percent	Adequate

Source: Analysis / Bhubaneswar Municipal Corporation, Bhubaneswar; 2006

4.6.3 INSTITUTIONAL AND FINANCIAL ASPECTS

The BMC is responsible for planning & design, construction and operation & maintenance of all street lights located within the municipal limits. In addition, the installation of street lights is also coordinated through CESCO, a private electricity supplier to the city. This apart, the BMC has also privatized street light management in the city. As per this initiative, the BMC has hired the services of private contractors to procure materials and maintain conventional streetlights in all respects. About 24 wards have been handed over to the private contractor. This initiative has helped the BMC to maintain street lights more efficiently.

The office of the Municipal Engineer coordinates all activities pertaining to the provision and operation & maintenance of street lights. There has been good coordination between the BMC, CESCO and the private operators as a result of coordinated efforts of the BMC. However, there is a need for strengthening coordination for concentrated efforts and effective results. Specific roles, responsibilities and functions of the BMC in street lighting are also discussed in Table 8.2.1 and Table 8.2.2. Sector-specific financial information is not available. However, financial performance of the BMC is presented in Section 7.2.

4.6.4 KEY ISSUES

Key issues identified through discussions with officials of the BMC and field visits are outlined below:

- High inter-spacing of streetlights at approximately 90 m indicates that significant portion of the road network remains uncovered.
- Inadequate management of power consumption by streetlights.
- Significant electricity consumption expenditure due to absence of power consumption measurement and energy saving equipment such as trip sensors, solar-coupled lights.

Based on the assessment of the existing situation, the prevalent gap and key issues/problems in the existing system, Chapter 11 outlines the sector-specific SWOT analysis, priority actions, proposals for improvement and augmentation of the street lighting sector including estimated capital investment and the strategy for implementation along with suggestive timelines.

URBAN ENVIRONMENT - SYSTEM

5.1 OVERVIEW

Urban development and expansion of any city pose a constant threat to the surrounding environment. There is an increasing awareness that the socio-economic benefits of an urban development initiative should not be negated by external factors, specifically those that can be attributed to environmental consequences of the project during implementation and operation stages. Although urban development projects such as urban expansion, housing, upgrading utilities, widening roads and related works are generally expected to bring in positive impacts on the economy of the project area, such activities are bound to induce negative impacts which can range from short-term to irreversible if requisite caution is not exercised.

Rationale and Methodology Adopted for Situation Analysis

Details on the existing system, service levels and issues have been assimilated and documented in this section based on the following factors:

- Preliminary discussions held with principal stakeholders;
- Review of available information provided by the departments/entities involved in O&M of the existing system;
- Suggestions and issues put-forth by the participating stakeholders during the Phase - I Consultative Workshops 1 & 2;
- Field visits and specific detailed discussions with the entities responsible for system implementation, operation and maintenance (e.g., PHEO, R&B, WRD etc.); and
- Preliminary discussions held with a comprehensive group of secondary stakeholders (e.g., Citizens' Associations, CII, Chamber of Commerce, etc.).

Based on the aforementioned factors, the resultant priority actions and proposals have been arrived at / formulated based on the following factors:

- Internal analysis of system parameters and issues identified in Phase 1 of the study;
- Mission Area specific Focus Group Discussions based on analytical framework and identification and coherent interlinking of system Strengths, Weaknesses, Opportunities and Threats (SWOT);
- Modification of the parameters based on feedback and comments from the stakeholders (secondary) at the Focus Group Discussions; and
- Phase - II Workshop to finalize the priority actions and proposals for each sector in the identified Mission Areas based on the above-mentioned activities
- The sector-wise estimated capital investment and investment components required to achieve stated objectives within the mission period (2006-2013) is given in Chapter 11 titled, 'Urban Infrastructure - Development'. Details of the capital investment phasing plan and pertinent financial information based on the above and further discussions with Action Stakeholders are furnished in Chapter 14 titled, 'Financial Operating Plan'.

5.2 ENVIRONMENTAL PROFILE

Bhubaneswar City is situated along the eastern seaboard and at the junction of two National Highways, viz. Chennai-Kolkata (NH-5) and Puri-Bhubaneswar (NH-203). The city is characterized by a temperate climate and is vested with several environmental resources as listed below:

- Reserve forests;
- Plantations;
- Parks/open spaces;
- Monuments of historical importance;
- Agricultural lands;
- Daya and Kuakhai Rivers; and
- Lakes & ponds (wetlands).

Table 5.2.1: Salient Environmental Features of Bhubaneswar

Features	Details
Geographic Location	Latitude: 20° 12' to 20° 25' N Longitude: 85° 44' to 85° 55' E
Temperature	Maximum: 43° C Minimum: 12° C
Precipitation (Jul, Aug & Sept)	1498 mm
Wind Direction	From Southwest (prevailing) From South and Southwest (monsoon wind)

Source: Various; 2006

Salient features of Bhubaneswar are furnished in the adjacent box. A brief evaluation of the predominant environmental characteristics is presented in the following sections of this report.

5.3 URBAN ENVIRONMENTAL CHARACTERISTICS

5.3.1 AIR QUALITY

Ambient air quality as defined by the National Ambient Air Quality Standards has been monitored through earlier studies at strategic locations within the city. The following major parameters/contaminants have been monitored:

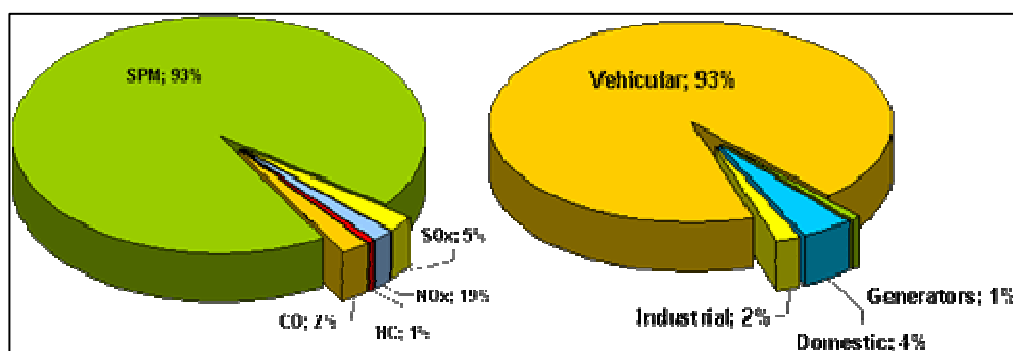
- Suspended Particulate Matter (SPM);
- Respirable Particulate Matter (RPM);
- Sulfides (SO_x); and
- Nitrates (NO_x).

The identified sources of pollutants in the city are as follows:

- Domestic Emissions : Fossil fuels, Refrigerants etc.;
- Industrial Emissions: Fossil fuels (power), stack emissions etc.;
- Vehicular Emissions;
- Combustion by-products from power generating equipment (Generator sets); and
- Brick kilns and stone crushers.

Pursuant to monitoring through installation of monitoring stations at strategic locations in compliance with applicable norms and regulations, detailed analysis has been performed as part of development of the Environmental Management Plan for Bhubaneswar by the Orissa Pollution Control Board. Details of the observations made and inferences drawn are outlined below:

- The total air pollution load from the domestic, industrial, vehicular and generator equipment in Bhubaneswar is approximately 45.60 tons per day. Sector and contaminant specific break-up of the total pollution load is illustrated below:



Source: Environmental Management Plan, OPCB - BBSR

- It can be observed that vehicular pollution is the highest contributing factor (93%) to the total incidental pollution load.
- Emissions from brick kilns and stone crushing units have elevated SPM to alarming levels forming nearly 93 percent of the total pollution load.
- On an overall assessment from the National Ambient Air Quality Monitoring Network established in Bhubaneswar and monitoring performed by the Orissa Pollution Control Board as part of the Environmental Management Plan, the following issues have been identified:
 - SO_x emissions in most locations within the city can be characterized as “low” and well within limits
 - NO_x emissions at most locations can be attributed as ranging between “moderate to high”
 - The primary contributor to the aforementioned parameters is vehicular traffic
 - SPM generated, on the other hand, ranges from “high to critical” at most locations due to natural dust and stone crushing units in the city limits.

5.3.2 WATER QUALITY

5.3.2.1 GENERAL

Assessment of water quality is critical in ensuring hygiene, health and eliminating the possibility of breakout of water-borne diseases and related health hazards. The primary identified sources of water for drinking and bathing purposes within the city limits are:

- Kuakhai and Daya Rivers;
- Gangua Nallah and major drains (10 nos.) that convey treated wastewater and raw sewage to the Daya River;
- Lakes that double as groundwater recharge points and surface sources; and
- Groundwater sources providing water for potable purposes - open & tube wells.

The designated quality of water at the aforementioned sources has been monitored duly considering the impact of discharge of treated wastewater and raw sewage from areas not covered with sewerage systems, industrial areas and economically weaker sections located near the sources of surface water.

5.3.2.2 WATER QUALITY ASSESSMENT OF SURFACE SOURCES

- Surface water quality of Kuakhai and Daya Rivers has been monitored for a significant period, collected samples tested in accordance with prescribed standards by the Central Pollution Control Board and evaluated for compliance with water quality criteria to identify the 'designated-best-use' classification.
- An evaluation of the important parameters to assess the quality of surface water for use for potable and bathing purposes is listed in the table below:

Table 5.3.1: Surface Water Quality (Average/Range) - Kuakhai and Daya Rivers

No.	Parameter	Water Quality		Water Quality Criteria	
		Kuakhai	Daya	Benchmark	Designated-Best-Use / Compliance
1.	pH	7.5 - 7.9	7.5 - 7.9	6.0 – 9.0	C/ Nominal
2.	Biochemical Oxygen Demand - BOD (mg/lit)	2.3 - 3.8	3.9 - 5.0	< 3.0 mg/l	C / Exceeds
3.	Dissolved Oxygen - DO (mg/lit)	6.9 - 11	5.8 - 10.3	> 4.0 mg/l	C / Nominal
4.	Total Coliform - TC (MPN/100 ml)	288 - 6,669	451 - 11,000	< 5,000	C / High

Source: Environmental Management Plan, State Pollution Control Board, Orissa

- It can be inferred that the water quality of both Kuakhai and Daya Rivers for 'designated-best-use' prescribed by the CPCB criteria for water quality only satisfies the requirements partially and is classified as Class "C", which refers to "Drinking Water Source with Conventional Treatment and Disinfection".
- The Total Coliform (TC) count in both rivers is higher than the permissible level and in the case of Daya River is seen to exceed the benchmark by a significant measure posing a serious health hazard.
- The situation in Daya River can be attributed to the impact of sewage and wastewater discharge from Gangua Nallah.
- Gangua Nallah is a natural stream that originates from Gadakhan Village, flows along the eastern boundary of Bhubaneswar and west of Daya River. This nallah serves as the discharge sink for major drains (10 nos.) that convey sewage, sullage and storm water from secondary and tertiary drains from different parts of the city. Gangua Nallah ultimately joins the Daya River southeast of Bhubaneswar near Kanti Village.
- Monitoring along the stretch of Gangua Nallah and the ten (10) major drains indicates that the discharge quality is far from satisfactory.
- However, the aforementioned threat may cause a significant impact only during the

summer months when minimal or no storm water flow occurs. On the other hand, during the monsoon period, sufficient flow in the drains and Gangua Nallah assist in lowering the contaminant concentration through natural dilution.

- Therefore, it is imperative to maintain a high degree of treatment and disinfection of raw water extracted from these sources and ensure compliance with quality requirements as outlined in Class - A “Drinking Water Source without Conventional Treatment and Disinfection”.

5.3.2.3 WATER QUALITY ASSESSMENT OF LAKES/PONDS

- Bhubaneswar, being a temple town, is dotted with a number of water bodies that serve not only as groundwater recharge basins, but also as water sources for religious rituals by the city’s inhabitants.
- Water quality monitoring was performed in seven (7) major water bodies to gauge the overall quality of surface water and the impact of human intervention.
- Surface water from the following major lakes/ponds was monitored and tested for quality assessment purposes:
 - Vani Vihar Lake;
 - Baramunda Bus Stand;
 - Unit - IV Lake;
 - Brameshwar Temple Pond;
 - Mausima Temple Pond;
 - Bindu Sagar; and
 - Kedar Gouri Tank.

An evaluation of the important parameters to assess the quality of surface water in the major water bodies is listed in the table below:

Table 5.3.2: Surface Water Quality (Range) - Major Lakes/Ponds

No.	Parameter	Water Quality	Water Quality Criteria	
			Benchmark	Designated-Best-Use / Compliance
1.	pH	6.5 - 7.5	6.0 - 8.5	B / Nominal
2.	Biochemical Oxygen Demand - BOD (mg/lit)	2.0 - 24.0	< 3.0 mg/l	B/ High
3.	Dissolved Oxygen - DO (mg/lit)	4.2 - 7.1	> 5.0 mg/l	B/ Moderate
4.	Total Coliform - TC (MPN/100 ml)	290 - 9,000	< 500	B/ High

Source: Environmental Management Plan, State Pollution Control Board, Orissa

- It can be seen that the overall water quality of all the monitored water bodies does not meet the water quality criteria for designated-best-use under ‘Class B’. Therefore, these sources are not suitable for bathing purposes or religious rituals.
- Further, since these water bodies are being used for religious rituals, it is highly imperative that adequate measures be taken to ensure that incidental water quality at least meets the minimum criteria for ‘Class B’.

5.3.2.4 WATER QUALITY ASSESSMENT IN DISTRIBUTION SYSTEM

The quality of water supplied through the existing distribution system, i.e. at the user end, becomes the critical factor for assessment. Piped water supply at the following locations has been monitored for compliance with, ‘Class A’ water quality criteria - ‘Drinking Water Source without Conventional Treatment and Disinfection’.

An evaluation of the important parameters to assess the quality of surface water for potable purposes at the point of supply is listed in the table below:

Table 5.3.3: Surface Water Quality (Range) - Distribution System

No.	Parameter	Water Quality	Water Quality Criteria	
			Benchmark	Designated-Best-Use / Compliance
1.	pH	6.5 - 7.5	6.0 - 8.5	A / Nominal
2.	Dissolved Oxygen - DO (mg/lit)	2.0 - 24.0	> 6.0 mg/l	A / Nominal
3.	Total Coliform - TC (MPN/100 ml)	4.2 - 7.1	< 50	A / Nominal

Source: Environmental Management Plan, State Pollution Control Board, Orissa

- It can be seen that the overall water quality in the distribution system meets the water quality criteria for designated-best-use under 'Class A' with only minimal variation in some locations which can be attributed to localized contamination and is not indicative of a recurrent threat to drinking water quality in the existing piped water supply system of Bhubaneswar. This noted variation can be eliminated through better O&M practices including guarding of cross-connections of water supply/distribution mains at locations where cross-drainage works or sewer pipes are laid adjacent to the water supply pipelines.

5.3.2.5 GROUNDWATER QUALITY ASSESSMENT

- As specified in Chapter 4 of this report, groundwater is extracted to an extent of 40.00 MLD through the use of open-wells and tube-wells in several locations within the city to supplement the supplied quantum to the existing system to meet daily water demand.
- It can be assumed that additional groundwater extraction through localized sources is also in practice to meet increasing water demand from high-rise residential dwellings, commercial entities and related and consumers in areas not covered by the existing water supply system.
- Groundwater quality has been tested through obtaining samples from both open-wells and tube-wells at strategic locations.
- The collected samples have been tested in accordance with the prescribed standards by the Central Pollution Control Board and evaluated for compliance with the water quality criteria to identify the "designated-best-use" and treatment/disinfection requirements, if applicable.
- Groundwater quality has been assessed through testing samples obtained from the following locations:
 - Open-Wells
 - Palasuni Village, Sainik School, Baramunda Bus Stand, Khandagiri Chhak, Niladri Vihar, Satya Nagar, Sunderpada, Baragarh Village and Vani Vihar
 - Tube-Wells
 - Baramunda Market Complex, Khandagiri Chhak, Ram Mandir, Capital Hospital, Sunderpada, Kalpana Area, Baragarh Brit Colony, Unit-IV Market, Vivekananda Marg and Satya Nagar
- An evaluation of the important parameters to assess the quality of groundwater extracted from open-wells and tube-wells at the aforementioned locations is listed in the table below:

Table 5.3.4: Groundwater Quality (Range) - Open Wells & Tube-Wells

No.	Parameter	Water Quality		Water Quality Criteria	
		Open Well	Tube Well	Benchmark	Designated-Best-Use / Compliance
1.	pH	6.2 - 7.9	5.2 - 7.4	6.5 - 8.5	A / Moderate
2.	Total Coliform - TC (MPN/100 ml)	7 - 55	< = 6	< 50	A / Moderate
3.	Fecal Coliform - FC (MPN/100 ml)	2 - 32	< = 2	< 50	A / Nominal

Source: Environmental Management Plan, State Pollution Control Board, Orissa

- It can be inferred that the water quality from both sources, i.e. open wells and tube wells comply to a significant extent with “designated-best-use” prescribed by the CPCB criteria for water quality under ‘Class A’, which refers to “Drinking Water Source without Conventional Treatment and Disinfection”.
- However, the Total Coliform (TC) count in the case of open-wells was found to exceed the normative level (< 50) at two out of the nine locations tested, i.e. Khandagiri Chhak and Sunderpada.
- In the case of tube-wells, the pH was found to be low and iron was the principal contaminant (typical in most deep aquifers) on the tested samples which is undesirable. Presence of high quantity of Iron renders potable water difficult to consume and stains clothes in case of water used for washing purpose. However, the TC and FC counts were well within prescribed limits.
- Therefore, it can be inferred that groundwater can be utilized for drinking water purposes with supplemental localized treatment at the household level which may be involve boiling or UV based disinfection.
- Iron removal filtration units can also be used at the household level.
- The above suggested measures essentially form the secondary level of defense in ensuring hygiene and health.

5.4 SOLID WASTE MANAGEMENT

5.4.1 SYSTEM DESCRIPTION

The BMC presently handles the solid waste collection, transportation and disposal system within city (municipal) limits, which is headed by the Health Officer & supported by sanitary supervisors, sweepers/ loaders. Based on the discussions with the concerned stakeholders such as the officials of the BMC and the OWSSB, a summary of the existing system of solid waste management is outlined below:

5.4.1.1 MUNICIPAL SOLID WASTE GENERATION AND STORAGE

- Bhubaneswar City generates approximately 300 MT of municipal solid waste every day comprising both the biodegradable and non biodegradable components.
- The total present generation of waste works out to a daily per capita of 400 grams, which is significantly higher than the normative standards of 250 grams per capita day⁶ for cities of similar scale.
- The major sources of municipal solid waste are domestic, fruits & vegetable markets, hotels & restaurants, fish/ meat shops & markets, street sweepings, hospitals, office/institutions, etc.
- Source-wise reconciliation of solid waste generation is furnished in the adjacent table.

Table 5.4.1: General Composition of Municipal Solid Waste Generated in Bhubaneswar

Source	Source-wise Break-up of Waste Generation			Percentage
	Biodegradable	Non-Biodegradable	Total	
Domestic	181.23	36.25	217.47	72.96
Hotels and Restaurants	16.80	2.23	19.03	6.38
Commercial	12.04	14.58	26.62	8.93
Institutions	9.94	11.15	21.09	7.07
Temples	5.07	0.25	5.32	1.79
Marriage Halls	7.29	1.26	8.55	2.87
Total	232.36	65.72	298.07	100.00

Source: Detailed Project Report on Scheme for Integrated Sewerage and Solid Waste Management for Abatement of Pollution of River Kuakhai & Daya at Bhubaneswar, OWSSB

⁶ Manual on Municipal Solid Waste Management; Ministry of Urban Development & Poverty Alleviation, GoI (2000).

The table given below provides details on physical characteristics and concentration of heavy metals in the waste generated in Bhubaneswar City. A scientific and well-developed process of source segregation and storage of waste at source was observed to be generally absent resulting in a disorganized and ad-hoc primary collection system. There are possibilities of introducing source segregation initially in a few areas particularly in commercial areas and high-class well developed residential areas of the city. It was observed during the reconnaissance surveys that there were no bins for storage of domestic, trade and institutional wastes at source. Very few households/ establishments had such a practice in place and, in such cases, wastes were stored in a) buckets; b) plastic bins; c) plastic bags; and d) metal bins with/without lids. In many cases, it was observed that such wastes were either thrown on streets/drains or on public/private open spaces resulting in large-scale pollution of soil, water, air in particular and the general environment.

It has been observed that the ULB has been encouraging private sector participation for solid waste management. The BMC has taken initiatives to direct households and establishments to store waste at source and not to throw them on the streets and/or drains and deposit the same in the designated community storage bins. In addition, there is an immediate need to develop and issue guidelines relating to the kind of storage receptacles, segregation of wastes, etc. In the absence of such strict guidelines for penalizing offenders, the practice of imposing penalty/compensation has not been brought into force. No segregation of non-biodegradable/recyclable wastes was done either at the source or at the street-level. This potentially hampers aerobic composting when dumped along with biodegradable waste.

It was also observed that a major part of the above waste is collected & transported from each ward by the contingents of BMC managed & privatized "Safai Karmacharies" through outsourcing (14 out of 47 wards). Such partly segregated solid waste is presently transported to the nearest temporary solid waste disposal site within the city.

Table 5.4.2: Physical Composition of Municipal Solid Waste Generated in Bhubaneswar

Components	Physical Composition of Waste Generation (Grams)		Percentage Composition	
	Dry Season	Wet Season	Dry Season	Wet Season
Fermentable	346	234	34.67	23.28
Paper	65	94	6.51	9.35
Textile	72	87	7.21	8.66
Plastics	64	103	6.41	10.25
Combustible	211	121	21.14	12.04
Glass	38	103	3.81	10.25
Metals	33	97	3.31	9.65
Incombustible	113	129	11.32	12.84
Miscellaneous	56	37	5.61	3.68
Total	998	1005	100.00	100.00

Source: Detailed Project Report on Scheme for Integrated Sewerage and Solid Waste Management for Abatement of Pollution of River Kuakhai & Daya at Bhubaneswar, OWSSB

5.4.1.2 PRIMARY COLLECTION OF SOLID WASTE

Presently, a systematic and scientific system of primary collection of waste⁷ is practically non-existent and is yet to be developed. Primary collection of waste is effected through depositing of wastes by the producers and by BMC sanitary workers into community waste bins. However, most citizens were observed to merely dump the wastes around the community bins adding to the volume of street sweepings.

The sanitary workers do not appear to observe safety precautions during collection and subsequent transfer into the community bins. The sanitary workers restricted themselves to

⁷ Ideally, the ULB should provide the services of door-to-door collection of waste through its sanitary workers with appropriate tools and equipment, following systematic handling of wastes. This also includes door-to-door and/or doorstep collection by NGOs/CBOs/private operators.

street sweeping and the most desirable system of door-to-door and/or doorstep collection was not in place. It was found that the residents were depositing the wastes into storage bins and sanitary workers were clearing them from the storage bins and from the streets resulting in double handling. Further no provision is made for depositing recyclable and hazardous wastes.

Therefore, there is an imminent requirement to mobilize community participation, design and develop an appropriate system of primary collection of waste, and synchronize the same with storage at source as well as waste storage depot facilities, ensuring that the waste once collected reaches the processing or disposal site through an effective transportation system without multiple handling.

5.4.1.3 STREET CLEANSING

BMC has a health wing led by a City Medical Officer and supported by a team of sanitary inspectors (12 nos.), filarial staff, assistant unit officer, food inspector and a battery of sweeping staff. Street cleaning operation is carried out with a sanitary work force of 1,227 sweepers for collection of waste from bins and street sweeping. There are also 175 loaders engaged to load waste on trucks or tractors. Major sources of street waste in Bhubaneswar are given in the adjacent box.

Major Sources of Street Wastes

- Natural wastes comprising dust blown from unpaved areas.
- Decaying vegetation like fallen leaves, blossoms and seeds originated from trees and plants.
- Road traffic wastes like oil, rubber, accidental spillage of load of vehicles in addition to the construction wastes and animal droppings of related vehicles.
- Behavioral wastes include litter thrown by pedestrians, households, establishments and tourists along with human spittle and excrement of domestic pets.

Natural waste and road & traffic wastes are unavoidable and require to be cleared by street sweeping process. However, behavioral wastes are to a significant extent avoidable, provided an efficient refuse collection service is in operation and litterbins are provided for use of pedestrians. The process of street sweeping was still primitive in the city. The sanitary workers were found sweeping the streets using brooms to make small heaps of solid waste. These heaps of solid waste are then taken to the nearest temporary waste storage point in wheelbarrows/baskets. In addition, due to improper and inadequate spacing of the temporary storage points, carrying the solid waste up to the temporary solid waste collection point is a troublesome task compelling sanitary workers to create a heap in undesignated open yards in the route of the solid waste transportation vehicle. The major constituents of the road sweeping are silt, dry leaves, small branches, tree-felling, paper, plastics and animal droppings.

It was also observed that all roads and streets were not being swept on a daily basis. In practice, certain important roads and markets are swept daily, some were swept on alternate days or twice a week, some are swept occasionally or not at all. The road length to be swept by a sanitary worker's also not standardized. There is no definite yardstick prescribed for each sanitary worker. As stated earlier, the system of door-to-door and/or doorstep collection is unscientific and it was observed that the sanitary workers were restricting themselves only to the sweeping of the streets and cleaning of the drains. The desirable practice in this regard would be to ensure that



Ill-designed temporary waste storage point with inadequate capacity

the sanitary workers of the BMC should collect the wastes from the doorstep during street sweeping process on a daily basis. Due to the absence of such a system, solid waste in the city is often subjected to double handling leading to wastage of both manpower and financial resources of the BMC.

5.4.1.4 TEMPORARY WASTE STORAGE POINTS

The BMC has provided 381 cylindrical bottomless concrete bins and these are located in the 47 wards. Out of 381 waste bins with a collective volumetric capacity of 90 cu. m, 230 were observed to be damaged which signifies a 60 percent de-rating of the collection infrastructure. These temporary storage points were not only facilitating proper deposition of waste but also enabled sanitary workers to carry and deposit the wastes swept by them in an effective manner. Collection bins were placed along the roadside at an average spacing of about 4.21 km, which is far higher than the normative standards of 300-500 m.

It may be noted that the existing containers can hold up to 75 MT of waste (assuming the density of waste as 0.5 MT per cu. m). Thus, the total storage capacity of the temporary storage points is grossly inadequate to meet the requirement of waste generated in the city, which is about 300 MT.

5.4.1.5 TRANSPORTATION OF WASTE

The primary objective of transportation is to clear waste from the city and ensure safe and proper disposal. It is the responsibility of the ULB to ensure that waste is transported from the various temporary storage points to the treatment location/landfill site with the help of the transportation fleet. The movement of wastes from the households, street sweepings, etc. to the temporary storage collection points is the collective responsibility of the sanitary workers and the citizens of the city. Generally, transportation of waste involves activities like a) movement of vehicles to the various temporary storage points; b) manual loading of wastes using baskets and other lifting tools; c) lifting of wastes from the open yards on the way to the disposal site; and d) transportation to the disposal site. It is very essential to synchronize the whole operation of collection of waste with the transportation for effective management of the waste for achieving cost efficiency in the process.

As in the case of several major cities, the BMC has adopted open transport of wastes from temporary storage points to the disposal site. Waste is collected from the collection bins and loaded on to the tippers/tractor-trailers manually. Manual loading was found to be time consuming and to reduce the productivity of vehicles and manpower deployed. Additionally, manual loading and handling of wastes poses a serious threat to the health of sanitary workers. The BMC presently clears the waste using the existing transportation fleet. The details regarding transportation of waste are furnished in the adjacent table.

Table 5.4.3: Available Vehicular Fleet in Bhubaneswar for Municipal Solid Waste Transportation

Type of Vehicles	No. of Vehicles		Total
	BMC	Private Operator	
Trucks	4	--	4
Mini Trucks	4	--	4
Tractors	5	48	53
Excavators & Back Hoe	4	--	4
Robots	1	--	1
Total	18	48	66

Source: Bhubaneswar Municipal Corporation, Bhubaneswar; 2006

It is reported by the BMC that each vehicle makes 2-3 trips per day between the assigned wards and the dumping ground. The existing transportation fleet of the BMC has a rated capacity of 3 MT per vehicle per day. However, it was observed that the vehicles were not filled to maximum capacity to complete scheduled number of trips. Further, the operational efficiency of the fleet on road was only about 70-75 percent every day. From field observations, it was found that the vehicles are loaded only up to 75 to 80 percent of full carrying capacity due to lack of stringent monitoring system. Further, the waste was

transported in open condition emanating foul smell and causing public nuisance. The BMC does not have a workshop facility. From the discussions held with the officials of the BMC, it was observed that the repairs and maintenance of the vehicles were undertaken in select private workshops. The expenses in this regard were met through the provisions under contingencies.

5.4.1.6 TREATMENT AND DISPOSAL OF WASTES

Presently, BMC has adopted only dumping as a method of waste disposal. Presently the BMC has 8 temporary designated open dumping sites for disposal of municipal solid waste, covering an area of about 18.5 acres of land within city limits. BMC has reportedly procured land (25 acres) outside the city limits for treatment and disposal of municipal solid waste as per the Municipal Solid Waste (Management & Handling) Rules, 2000. The evaluation of the available technologies for solid waste treatment and disposal have been carried out for the following parameters:

- Available project experience information or proven technology (domestic/international);
- Suitability of process for region specific field condition;
- Scale of operation;
- Technical feasibility;
- Feasibility of capacity upgrade;
- Economy of operation - capital and annual O&M cost;
- Requirement of land, water and power;
- Manpower & level of skill requirement;
- Capability of the BMC to manage the facility;
- Environmental impact of such technology;
- Process aesthetics; and
- Overall life cycle cost.



View of temporary dumping yard located at BRIT Colony (within BMC limits)

5.4.2 PERFORMANCE INDICATORS

An index of performance of solid waste management sector parameters benchmarked against the normative/standard requirements or service levels as prescribed by reference guidelines/standards such as CPHEEO guidelines, Municipal Solid Waste (Management & Handling) Rules, 2000, pertinent manuals/publication and nominally prevalent level of services in similar cities with functional (good) urban infrastructure is furnished in the table below. It is imperative to mention that the nominal standard/benchmark is the requisite level of provision/delivery that is to be achieved over the existing and proposed urban agglomeration area in Bhubaneswar.

Table 5.4.4: Solid Waste Management - Performance Indicators

No.	Parameter / Component	Service Level	Benchmark	Comment / Remarks
1.	Per-Capita Generation	400 grams	250 grams	Very high
2.	Collection Performance	70 percent	100 percent	Needs improvement
3.	Spacing of Collection Bins	4,200 metres	500 metres	Inadequate
4.	No. of Sanitary Workers per 1,000 Population	1.93	1.80	Almost adequate
5.	Sanitary Workers per Supervisor	120	25	Grossly inadequate

Source: Analysis / Bhubaneswar Municipal Corporation, Bhubaneswar; 2006

5.4.3 INSTITUTIONAL AND FINANCIAL ASPECTS

The BMC is responsible for planning & design, construction and operation & maintenance of municipal solid waste management within the municipal limits. In order to make collection and transportation system more effective, the BMC has already privatized cleaning and sanitation work in 14 wards with effect from May 2005. In addition, the transportation activity of solid waste management is also partly privatized, and at present the private operators have provided 48 tractors for the service. In addition, the BMC is also exploring private sector participation in treatment and disposal of waste in near future.

The BMC's Health Department coordinates all activities of municipal solid waste management. Specific roles, responsibilities and functions of the BMC in solid waste management are also discussed in Table 8.2.1 and Table 8.2.2. Sector-specific financial information is not available. However, financial performance of the BMC is presented in Section 7.2.

5.4.4 KEY ISSUES

Solid waste management is a key sector which plays a significant role in not only the hygiene of city, but also in the ambient appearance of the city through developed aesthetics and therefore requires careful evaluation for identification of important issues and requisite improvement plans. Key issues and concerns are outlined below:

- Significant portion of collection infrastructure is reportedly damaged as verified through site visits and available data.
- Waste is also indiscriminately dumped along major drains and water bodies posing a severe health hazard and rendering the city un-aesthetic.
- Door-to-door collection and source segregation of waste is abjectly neglected.
- Containerization of collection and transportation of municipal solid waste is also a critical factor to avoid double and manual handling of wastes.
- Treatment of solid waste through a techno-economically feasible process is absent resulting in a high requirement of landfill space, unsanitary conditions and loss of a valuable source of fertilizer grade compost.
- Specific treatment of bio-hazardous waste generated from slaughterhouses, hospitals and other institutions is absent resulting in a high risk to public safety and environmental health.

Based on the assessment of the existing situation, the prevalent gap and key issues/problems in the existing system, Chapter 11 outlines the sector-specific SWOT analysis, priority actions, proposals for improvement and augmentation of the solid waste management sector including estimated capital investment and the strategy for implementation along with suggestive timelines.

5.5 CONSERVATION OF WATER BODIES

5.5.1 EXISTING SYSTEM

Bhubaneswar is an important city from the standpoint of regional tourism development and it is part of the Golden Triangle of tourism comprising the cities of Konarak and Puri. The existing condition of water bodies, its functionality and local environmental development through preservation activities is discussed in this section a number of ponds and lakes are situated within the BMC limits. A significant portion of these water bodies is usually in the vicinity or within the compound of temples of profound importance, where rituals are regularly performed. A principal water body within the BMC limits is the Bindu Sagar Lake. Details of other heritage lakes (natural and man-made) in Bhubaneswar are furnished in Annexure - 6.

5.5.2 KEY ISSUES

Key issues and concerns identified through discussions with stakeholders and field visits are outlined below:

- The existing water bodies are in a deteriorated condition with no proper facility for inlet and outlet of storm water from adjacent catchment areas.
- Additionally, solid waste, specifically plastic material, is dumped into these lakes compounding the problem.
- The existing water bodies are reportedly heavily silted due to non-maintenance and require strengthening of embankments.
- Proper fencing and access control to prevent misuse is absent.
- The collected water is not treated or re-circulated resulting in the development of anaerobic conditions.



Poor maintenance and unhygienic conditions at Bindu Sagar Lake

Based on the assessment of the existing situation, the prevalent gap and key issues/problems in the existing system, Chapter 11 outlines the sector-specific SWOT analysis, priority actions, proposals for improvement and augmentation of this sector including estimated capital investment and the strategy for implementation along with suggestive timelines.

6

URBAN POVERTY AND SOCIAL DEVELOPMENT

6.1 EXISTING SITUATION

6.1.1 OVERVIEW

Bhubaneswar City is no exception to the proliferation of slum development. In fact, slum proliferation and informal sector has been growing at a geometric rate. The growth of informal sector in slums and squatters is more than the formal growth due to huge migration from the rural hinterland and other parts of the State as well as outside the state in search of employment particularly in the construction sector. The slum settlements in the city can be classified into slum colonies belonging to industrial workers, common slums, population squatting on the land belonging to Indian railways and other government agencies. The growth of slums, squatters and informal settlements has become more acute after the super cyclone, which has aggravated the problem. Most of the slums of the city are located on unutilized government land/railway land. The availability of government land has provided opportunities to the lower economic groups specially belonging to the labor classes that have migrated to the city in quest of new opportunities and employment.

As stated earlier in Section 2.7.4, several agencies have carried out slum surveys to identify and quantify the number of slums and the population residing in these slums. Available statistics on slums vary largely due to the fact that different agencies used different definitions and parameters for the surveys, and carried them out for varied purposes on different dates/years. Following is a broad summary on available statistics on slums in Bhubaneswar City:

- The BMC carried out a slum survey during the year 2000 (post super-cyclone in 1999) to ascertain prevalent physical features after the devastating super-cyclone for undertaking improvement measures. This survey indicated about 146 slums spread across the city.
- On a later date (2001-02), the BMC carried out another survey to list all slums within the BMC limits. This survey listed 59 notified slums and 131 non-notified slums. This is also the official information/data followed/maintained by the BMC as on date.
- During the year 1999, the BDA also carried out a survey, which identified about 30 percent (2,00,097 slum dwellers) of the population residing in slums.
- Census of India followed different parameters to identify slums and slum population. As per the 2001 census, there were 71,403 slum dwellers (18,048 slum families) in the city, constituting about 11.02 percent of the city's population.
- Discussions with various stakeholders (incl. BMC officials) revealed that there are presently about 250 slums within BMC limits.



Unhygienic Environment within the Slums

Plate - 10: Map Showing the Spatial Distribution of Slums

PLEASE INCLUDE AUTO CAD MAP AS TEMPLATE PLOTTED IN A-3 SIZE

A significant portion of the slum dwellers in Bhubaneswar are migrants in search of employment, primarily in the unorganized sector. After the devastating cyclone of 1999, an effort was made to identify the existing slums and their population in order to provide relief material and undertake upgrading/improvement works. A total of 190 slums were identified within the BMC limits, comprising 59 notified slums (located on private/own land) and 131 non-notified slums (located on government land). Basic characteristics of these slums are dilapidated housing structures with poor ventilation, overcrowding, inadequate lighting, lack of potable water, absence of sanitation facilities, faulty alignment of streets/ lanes, inundation during monsoon season, lack of access for fire-fighting and control measures and other basic physical and social services.

6.1.2 GROWTH TRENDS IN SLUMS

The city presents a range of activities in the industrial and commercial sectors. Growth in such activities, possibilities of absorption in industrial, allied as well as service sectors, scope of employment in trade & business activities, hawking, retailing, carting, etc. have attracted the rural poor to the city. A total of 190 slums were identified within the BMC limits, comprising 59 notified slums (located on private/own land) and 131 non-notified slums (located on government land).

It is noteworthy that the proportion of slum population as per 1991 census was about 5.92 percent, which has increased to 11.02 percent during the year 2001. It is worth mentioning the fact that the city population is increasing at a rate of 5.75 percent per annum while that of the slum population is increasing at 19.30 percent. However, it may be noted that the demographic features (number of households and population) provided by the Census vary with that of the database provided by the BMC owing to difference in the definition of the slums followed by Census and BMC. A map showing the location of all notified slums within the BMC area is given as Plate - 10. A list containing the administrative reference name, number of households and population of all notified and non-notified slums is available with the BMC.

Table 6.1.1: Growth Trend in Slums

Particulars	1991	2001
Total City Population	411542	648032
Annual Growth Rate (Percent)	8.77	5.75
Total Slum Population	24372	71403
Annual Growth Rate (Percent)	NA	19.30
Slum Population as Percentage of Total Population	5.92	11.02

Source: Census of India, 1991 & 2001

6.1.3 SOCIO-ECONOMIC CHARACTERISTICS

As stated earlier, the demographic features (number of households and population) provided by the Census vary with that of the database provided by the BMC owing to difference in the definition of the slums followed by Census and BMC. However, for the socio-economic characteristics have been analyzed based on the 2001 Census. Some of the key socio-economic features of the slum population as per the Census 2001 are given in the adjacent table. It may be observed that the average household size in slums was 3.96, which was lower than that of the city (4.49). The sex ratio of slum population (865) was higher than that of the city (796). Slums in Bhubaneswar had about 23.88 percent of population belonging to SC/ST category. However, the literacy rate of the slum dwellers (56.34 percent) was lower than that of the city population (78.02 percent). The worker participation rate was

Table 6.1.2: Key Socio-Economic Features

Particulars	City	Slums
Population (Nos.)	648032	71403
Annual Growth Rate (Percent)	5.75	19.30
Average Household Size (Nos. per HH)	4.49	3.96
Sex Ratio (Female per 1000 Male)	796	865
Proportion of SC/ST Population in Slums (Percent)	12.43	23.88
Literacy Rate (Percent)	78.02	56.34
Workers Participation Rate (Percent)	33.30	36.87
Proportion of Main Workers to Total Workers (Percent)	94.76	91.29

Source: Census of India, 2001

also higher than that of the city, which was 33.30 percent as per 2001 Census. About 91.29 percent of the total slum workers were main workers. The prevailing socio-economic characteristics of slum population indicate immense potential for bringing them into the social and economic main stream of the city. A detailed ward-wise break-up of above socio-economic features is given in Annexure - 7.

6.1.4 CURRENT STATUS OF SERVICES IN SLUMS

The BMC has provided certain key data pertaining to status of services in all notified slums (59 nos.) in the city. These slums are spread over an area of about 1.41 sq. km (349.50 acres). About 58,485 persons forming part of about 11,697 households are living in these slums. Factual information on the type and number of dwelling units was not available. However, based on discussions, it is estimated that there are about 10,000 dwelling units in the notified slums, out of which only about 10-12 percent may be pucca in nature. About 15-20 percent may be semi-pucca structures and the remaining 68-75 percent may be kutcha in nature, indicating huge capital investment for upgradation of existing dwelling units. The water supply requirements in these slums are met with 155 tube wells, 365 public stand posts and 92 wells altogether. Few of the slum dwellers in the notified slums are having access to individual latrine while others rely on community latrines or open defecation. There are about 2271 houses with individual latrines recorded in these notified slums.



Absence of sanitation and paved road surface

Some of the notified slums are provided with temporary waste storage points/dustbins for the storage/collection of the solid waste. Only 13 slums are provided with these dustbins and the BMC has been providing collection and transportation services. About 7.84 running km of drains are existent in these slums and the road length is about 40.43 running km. Most of the notified slums are provided with streetlights and there were about 587 streetlight fixtures. There are about 42 community centres in the notified slums. The BMC has provided training to the slum dwellers of the notified slums in various areas under different employment generation schemes. About 66 beneficiaries have been provided with training in computer operation while about 216 beneficiaries were trained in tailoring. About 44 slum dwellers were provided with training in coir product finishing and about 961 slum dwellers were trained exposure in other areas. In total, about 128 self-help

Table 6.1.3: Key Service Indicators in Notified Slums and Comparison with Normative Standards

Service indicators	Unit	Current Status	Normative Standards*
Typology of Dwelling Units			
- Pucca	Percent	10-12	80
- Semi-Pucca	Percent	15-20	20
- Kutcha	Percent	68-75	
Household per Dwelling Unit	Nos.	1.17	1.00
Public Water Tanks/Taps	Persons	96	50
Public Toilet Seat	Persons	Nil	30
Public Urinal	Persons	Nil	50
Proportion of Roads having Drains	Percent	19.39	100
Spacing of Streetlights	Metres	69	30

* Evolved based on various consultancy/research studies in India and based on prevalent normative standards in other similar cities/State Capitals in India
Source: Analysis/Bhubaneswar Municipal Corporation; 2006

groups (SHGs) are functioning in the notified slums. The table above provides performance the of select service indicators along with the comparison with normative standards.

6.1.5 TREND ANALYSIS

As stated earlier, the super-cyclone of 1999 changed the socio-economic map of Bhubaneswar City, which in turn led to the large-scale proliferation of slums in the city. The change was so severe that many authorities have undertaken separate surveys to quantify the real situation as presented in Section 6.1.1 above. Given this difficult situation, trend analysis on the urban poor, growth of slums, increase in number of slum dwellers, access to services, etc. cannot be undertaken in the context of Bhubaneswar. However, the Team has attempted to present available data/information as per the tables illustrated in JNNURM Toolkit-2, which are presented on the right-hand side and below:

Table 6.1.4: Social Composition of Population

Year	Number of Urban Poor*
1993/94	Not enumerated
1999/00	22,413
2004/05 (Estimated)	Survey of the urban poor is being undertaken by BMC. Results/ findings of the survey would be available by end of the year 2006

* Below Poverty Line

Source: Analysis/Bhubaneswar Municipal Corporation; 2006

Table 6.1.5: Access of Slum Dwellers to Basic Services

Year	Number of Slum Dwellers	Percentage of Slum Dwellers having Access to Services		
		Water Supply	Drainage System	Waste Service Collection
1991	24,372	NA	NA	0
2001	71,403	NA	NA	0
2005 (Estimated)	NA	56	2	0

NA: Not Available

Source: Bhubaneswar Municipal Corporation/OSCARD/WATER-AID, India; 2006

Lack of a comprehensive database on number of slums, slum dwellers, socio-economic and physical features, including information on access to services, is a major deterrent to formulate slum upgrading and improvement measures. Moreover, neither the GoO nor the BMC has a 'slum upgrading policy' to identify, notify and categorize slums for possible upgrading initiatives. Thus, it is critical to evolve a comprehensive 'slum upgrading policy' along with an upgrading database on the slums and slum dwellers, including socio-economic and physical features.

6.2 SLUM IMPROVEMENT PROGRAMMES

This section reviews past and current programs including ongoing schemes that address service delivery to the poor in Bhubaneswar. Given the complexity of the social, economic and physical environment in which a growing number of urban poor eke out their livelihoods, it is clear that the formulation of anti-poverty measures and the design of slum improvement programs is a difficult issue. A review of slum improvement programmes indicates that by improving basic infrastructure and access to municipal services, there is a significant impact on the quality of life of slum residents, both poor and non-poor. To alleviate the problems of slum dwellers and to reduce urban poverty, a number of programs have been initiated and are being implemented by the BMC with assistance from the GoO and the Gol. Some of the major slum improvement programs being implemented in Bhubaneswar are in the adjacent box while the components of these schemes, beneficiaries, and other details are given below.

- | Slum Improvement Programs in Bhubaneswar |
|--|
| <ul style="list-style-type: none"> ▪ National Slum Development Programme (NSDP) ▪ Valmiki Ambedkar Awas Yojna (VAMBAY) ▪ Swarna Jayanti Shehri Rojgar Yojna (SJSRY) ▪ Development of Women and Children in Urban Areas (DWCUA) ▪ Other Programmes |

6.2.1 NATIONAL SLUM DEVELOPMENT PROGRAMME (NSDP)

This scheme provides for construction of, roads, drains, street lighting, community toilet/bath in the slum areas. The allotment under the scheme involves 70 percent as loan and 30 percent as grant. The loan portion carries a grace period of 5 years for repayment with 10 percent interest per annum, with 15 (fifteen) equal installments per annum and with a penal interest of 2.75 percent if not paid in time. Special Priority is given to the following:

- Improvement of drinking water supply system;
- Laying/relaying of roads;
- Provision of street lights;
- Drainage facilities;
- Improvement and new public conveniences with water supply;
- Welfare (education, etc.); and
- Shelter upgradation (individual water connections).

The BMC availed financial assistance from the Gol during 1996-97 and has constructed/provided drains, roads, streetlights, community latrines/baths, and community centres. Till date, about, 36.76 km of road length, 5.78 km of drains, 42 tube wells, 10 public stand posts, one primary education center, one culvert and five community centers in different slums have been constructed under this scheme.

6.2.2 VALMIKI AMBEDKAR AWAS YOJANA (VAMBAY)

Valmiki Ambedkar Awas Yojana (VAMBAY) was introduced in the year 2001. The primary objective of this scheme is to provide shelter or upgrade the existing shelter of people living below the poverty line in urban slums. The upper financial limit for construction of VAMBAY units under normal circumstances would be maximum of Rs. 40,000/- including provision for sanitary latrine for an area of not less than 15 (fifteen) sq. m with a subsidy of 50 percent, i.e. Rs. 20,000/- by HUDCO.

Under this program, the BMC has identified 250 beneficiaries and 110 dwelling units are nearing completion. The remaining are under various stages of construction. The unit cost of each dwelling unit was Rs 40,000/-. The BMC has transferred the entire subsidy of Rs. 20,000/- received from the Gol to the beneficiaries and has also provided loan assistance to the beneficiaries to an extent of Rs. 20,000/- per dwelling unit to meet the gap.

Apart from the above, the BMC has upgraded 271 dwelling units in Bharatpur Slum area under the NRY (Scheme for Housing & Shelter Upgradation). The shelter upgradation cost was between Rs. 4,000-Rs. 11,000. Under the LIGH Scheme, 425 slum houses have been constructed with a cost of Rs. 14,500 to Rs. 19,500 per unit in the BMC area.

6.2.3 SWARNA JAYANTI SHEHRI ROJGAR YOJNA (SJSRY)

Swarna Jayanti Shehri Rojgar Yojna (SJSRY) consists of two special schemes, viz. Urban Self Employment Programme (USEP) and Urban Wage Employment Programme (UWEP). It is funded in a ratio of 75:25 between the Centre and the State. Under UWEP of SJSRY, socially and economically useful public assets, i.e. roads, drains, culverts, community centers, community latrines are constructed in slum areas, providing wage employment to the urban poor.

Under the USEP, the BMC has provided loan and subsidy for income generation activities to about 346 beneficiaries. 2650 beneficiaries have been trained on health, sanitation, child care, leprosy, AIDS, different social welfare schemes, etc. Under UWEP activities, roads, drains, culverts, community centers, community latrines, etc. have been constructed in many slum areas. In addition, 123 Angadwadi are functioning under ICDS Programme and 7 Balwadis are functioning under the SJSRY Scheme. 289 children within the age group of 3-6 years are studying in these Balwadis.

6.2.4 DEVELOPMENT OF WOMEN AND CHILDREN IN URBAN AREAS (DWCUA)

This scheme is distinguished by the special incentive extended to urban poor women who decide to set up self employment ventures as a group as opposed to individually. Groups of poor women shall take up an economic activity suited to their skill, training, aptitude and local conditions. Besides generating income, these groups also strive to empower urban poor women by making them independent by facilitating self-employment.

The DWCUA group has been setup as a Thrift and Credit Society, in addition to its other entrepreneurial activity. The group is entitled to a lump-sum grant of Rs. 25,000/- as revolving fund at a maximum rate of Rs. 1000/- per individual. 11 Thrift and Credit Society (self-help groups) with women members assist in the revolving fund. They are engaged in income generation activities, i.e. manufacture of household articles, food items, etc.

6.2.5 OTHER PROGRAMMES

Following are some of the improvement programmes initiated/completed by the BMC in its effort to upgrade quality of life of slum dwellers in the city:

- Training: About 167 beneficiaries have been provided with training in computers, tailoring, coir product making, etc. for self employment.
- Tube-Well: 165 tube-wells and 120 public stand posts have been constructed to provide water to slum dwellers under SJSRY, UBSP and BMC funds.
- Balika Samrudhi Yojana (BSY): 517 families have been provided with financial assistance of Rs. 500/- under the scheme.
- Old Age/Widow Pension and Orissa Disability Pension: 5143 beneficiaries are being provided with old age/widow pension and 338 beneficiaries have been assisted under the Orissa Disability Pension. The beneficiaries are getting pension on the 15th day of every month @ Rs. 100 each.
- Health Facilities: Primary health centers are functioning in most slums providing health care to slum dwellers. Health camps are being organized in slums throughout year. Also, first-aid training is imparted for slum dwellers.
- BPL/Antodaya Arna Yojana: About 22,413 families have been covered under BPL programme. 4035 beneficiary families have been covered under AAY and Expanded AAY provides 35 kg rice per month @ Rs. 3.00 per kg.
- Arnapurna Yojana: 744 families are provided with 10 kg rice per month free of cost under the Arnapurna Yojana.

Many more development activities are contemplated to improve the slum conditions in BMC area during 2005-2006. It has been planned to spend Rs. 1.56 crores under NSDP for provision of water supply, streetlights, roads, community toilets, drains and community centers in all the slums of the 47 wards of the BMC. 50 Anganwadi Centers are to be constructed with a unit cost of Rs 1.25 lakhs each for education of slum children. It is proposed that 75 percent of the cost would be borne by the GoO while the remaining 25 percent would be borne by the BMC.

A budget estimate of Rs. 50 lakhs has been made under SJSRY to benefit slum entrepreneurs to avail bank loans under urban self employment programme to train unemployed youth in several vocational activities to make them self-reliant, assist Thrift and Credit Societies with revolving funds and organize health camps, awareness camps, etc. A budget provision of Rs. 18 lakhs has been made out of the BMC funds to take up a slum survey as per the Orissa Municipal Corporation Act, 2003, and also to organize various social, cultural and sports activities among the women and children of slum areas. BMC is also contemplating to organize the urban poor into several SHGs to improve their economic condition by availing the benefits of various schemes of different ministries of GoI/GoO.

6.3 KEY ISSUES

Following are some of the key issues identified based on the above assessment:

- Community participation is the key in successful implementation of Slum Improvement Programs. In most of the cases, community is not fully involved resulting in poor performance of the programs and their sustainability even when the number of slums are on the lower side.
- Lack of need-based fund allocation in Slum Development Programmes and the need to establish sustainable, continuous and non-lapsable fund flow for slum improvement programs.
- The GoO/BMC does not have a 'Slum Upgrading Policy' to guide slum improvement/upgrading programmes. Thus, it is necessary to develop a comprehensive 'Slum Upgrading Policy' to identify, notify and upgrade the slums with clear assignment of responsibilities.
- There is a need for fresh notification of tenable/non-tenable slums and mapping within BMC area. Also, there is a need to develop a database on socio-economic characteristics of slum dwellers and physical characteristics of slums (housing and services).
- There is an immediate need for identification of land parcels for resettlement of slum dwellers and involve NGOs/CBOs in the process. Also, appropriate institutional arrangements for transfer of land from General Administration Department of the GoO to BMC for undertaking slum improvement schemes and housing for urban poor need to be evolved.
- The poorest of poor households do not have the means to afford individual toilets. Similarly, slum households that live on rented properties are unwilling to invest in individual toilets. The issue is to devise strategies to ensure adequate access to toilets by all households in the city.
- Other issues include ensuring tenure security and sustainability and improving living conditions in the slums.

7

URBAN FINANCES

7.1 GENERAL

The Bhubaneswar City is administered by the Bhubaneswar Municipal Corporation (BMC), while there are various Government departments and their directorates with development related responsibilities and functions as described in Section 2.7. Among all service providers, only the BMC and Public Health Engineering Organization (PHEO) have their own sources of revenue, collected in the form of taxes and/or user charges though most of their revenue/income is in the form of assigned revenue and/or budgetary revenue grant. Barring the BMC and PHEO, all other service providing agencies are providing the services through Government budgetary support. Accordingly, this urban financial assessment covers the financial assessment of BMC and the PHEO.

7.2 MUNICIPAL FINANCES

The BMC follows the single entry (cash-based) accounting system for maintaining municipal accounts. For the purposes of analysis, all the account items are broadly categorized under the following major heads:

- **Revenue Account:** All recurring items of income and expenditure are included under this head. These include taxes, charges, salaries, maintenance expenses, debt servicing, etc.
- **Capital Account:** Income and expenditure items under this account are primarily non-recurring in nature. Income items include loans, contributions by GoO, other agencies and capital grants under various State and Central Government programmes and income from sale of assets. Expenditure items include expenses booked under developmental works and purchase of capital assets.
- **Advances, Investments and Deposits:** Under the municipal accounting system, certain items are compiled under advances, investments and deposits. These items are temporary in nature and are essentially adjustments for the purpose of recoveries and payments. Items under this head include income tax deductions, investments/realization, pension payments, provident fund, payment and recoveries of advances to employees and contractors, etc.

Table 7.2.1: Summary of Finances of the Bhubaneswar Municipal Corporation

All figures in Rs. Crores

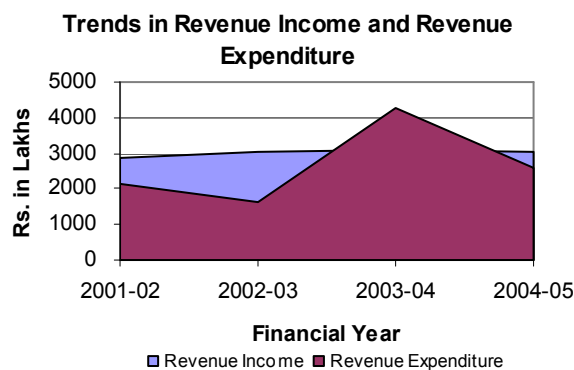
Particulars	2001-02	2002-03	2003-04	2004-05
Revenue Account				
Income	28.81	30.58	30.76	30.17
Expenditure	21.53	16.30	42.52	25.79
Status (Surplus/Deficit)	7.28	14.28	(11.76)	4.38
Capital Account				
Income	--	0.56	0.55	0.90
Expenditure	1.34	0.77	0.82	6.35
Status (Surplus/Deficit)	(1.34)	(0.22)	(0.27)	(5.45)
Advances, Investments and Deposits				
Income	0.14	0.26	0.38	1.45
Expenditure	1.28	0.88	3.70	3.72
Status (Surplus/Deficit)	(1.13)	(0.62)	(3.32)	(2.27)
Overall Status	4.80	13.44	(15.35)	(3.34)

Source: Bhubaneswar Municipal Corporation; 2006

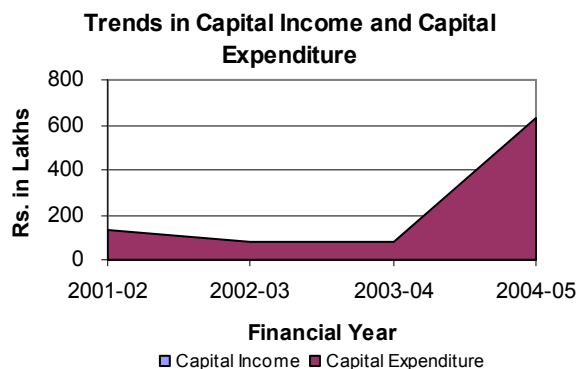
7.2.1 FINANCIAL STATUS

Financial assessment of the BMC has been carried out based on the financial information collected for four financial years, i.e. FY 2001-02 to FY 2004-05. In addition, the budget

estimate of the BMC for FY 2005-06 was also taken up for analysis. Revenue income of the BMC has grown to a level of Rs. 30.17 crores in FY 2004-05 from Rs. 28.81 crores in FY 2001-02, at a compounded annual growth rate (CAGR) of 1.58 percent. However, the revenue expenditure has shown a CAGR of 11.61 percent during this period. The BMC has maintained revenue surplus during all years except during FY 2003-04 owing to settlement of salary arrears. However, the BMC has maintained an overall surplus consistently over the assessment period. The figures on the municipal finances along with the charts are given for reference.



Capital income comprises loans, grants and contributions in the form of sale proceeds of assets, and contributions and deposits received. A major share on capital income is in the form of deposits received on account of capital work assignment. The capital account has witnessed a deficit-implying utilization of revenue surpluses to fund capital works. During the assessment period, the BMC has not received any mayor capital income except in the form of earnest money deposits from contractors for undertaking civil works. Income and expenditure statements of the BMC for the assessment period are given in Annexure - 8.



The following sections present a detailed review of revenue and capital accounts, primarily aimed at assessing the municipal fiscal status and provide a base for determining the ability of the BMC to sustain the planned investments.

7.2.2 REVENUE ACCOUNT

The revenue account comprises two components, revenue income and revenue expenditure. Revenue income comprises internal resources in the form of tax and non-tax items. External resources are in the form of assigned revenues and revenue grants from the GoO. Revenue expenditure comprises expenditure incurred on salaries, operation & maintenance, administrative expenses and debt servicing.

7.2.2.1 REVENUE INCOME

The revenue sources of the BMC can be broadly categorized as own sources (includes both tax and non-tax revenues), assigned revenues and grants. The source-wise income generated during the review period is presented in the table below. The base and basis of each income source has been further elaborated in the following section.

OWN SOURCES

Own sources of income of the BMC include income from resource mobilization activities in the form of taxes, fees, user charges, rent received from municipal properties, etc. Own revenue sources are further classified as tax revenue and non-tax sources that are generated by various sections of the BMC.

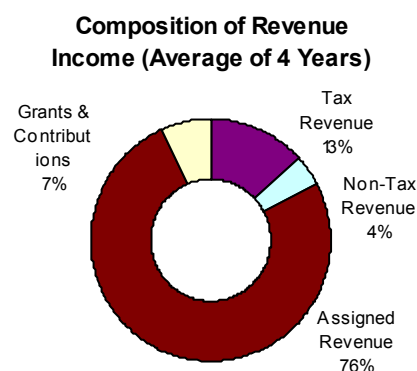
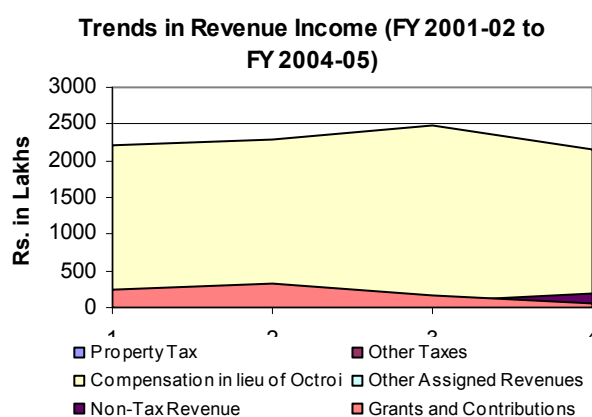
Property tax is the major source of tax revenue while other taxes include tax on carriages & carts, advertisement tax and tax on animals. Non-tax sources included all non-tax revenues such as fees and charges levied as per the Municipal Corporation Act. Such revenue sources include rent from municipal properties, fees & user charges, sale & hire charges and others.

Major source of revenue income is in the form of assigned revenue, which contributes to about three-fourth of the revenue income on average. This source mainly includes compensation in lieu of Octroi. 17 percent of the total revenue income is generated through own sources during the assessment period. There has been a swift rise in own sources during FY 2004-05 due to consolidation of both tax and non-tax revenues. There has been a declining trend in terms of dependence on assigned revenues and grants, which is a healthy scenario for the self-sustenance of the BMC. As a whole, revenue income has registered an annual growth of about 1.61 percent on average during the assessment period. Income through own-source heads that contribute substantially towards revenue income include the following:

Table 7.2.2: Source-wise Revenue Income

Particulars	2001-02	2002-03	2003-04	2004-05	Average
Income / Receipts (Rs. in Crores)					
Own Sources	3.88	4.22	4.50	7.95	5.14
Assigned Revenue	22.48	22.96	24.70	21.66	22.95
Grants & Contributions	2.44	3.39	1.56	0.56	1.99
Total	28.81	30.58	30.76	30.17	30.08
Sectoral Contribution to Total Revenue Income (in Percentage)					
Own Sources	13.48	13.82	14.63	26.35	17.09
Assigned Revenue	78.03	75.10	80.29	71.80	76.30
Grants & Contributions	8.49	11.09	5.08	1.85	6.61
Growth Trends (in Percentage)					
Own Sources	--	8.76	6.50	76.70	30.65
Assigned Revenue	--	2.16	7.54	(12.28)	(0.86)
Grants & Contributions	--	38.69	(53.92)	(64.24)	(26.49)
Total	--	6.15	0.58	(1.90)	1.61

Source: Bhubaneswar Municipal Corporation; 2006



Property Tax: The most important category in the own sources of income is the property tax⁸ (erstwhile holding tax). This tax is imposed on land and buildings depending on their nature of use. Property tax component comprises holding tax, latrine / drainage tax and lighting tax. The present property tax assessment is being done as per the provisions of the Orissa Municipality Act⁹, 1950.

⁸ Property tax belongs to the class of general benefit taxes, primarily indirect user charges for municipal services whose benefits are collective and not confined to any particular individual / community.

⁹ Though the BMC was upgraded from Municipality to Municipal Corporation status way back in year 1994, the BMC was functioning under the Orissa Municipality Act, 1950. The Orissa Municipal Corporation Act came into existence during the year 2003 while the

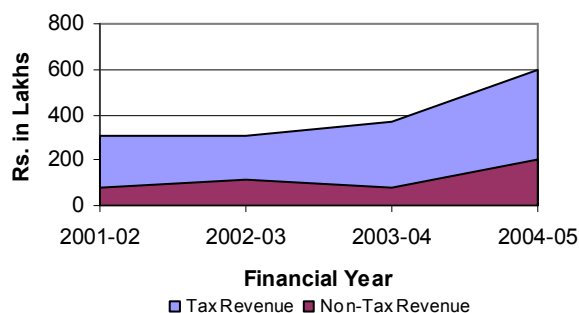
Property tax is based on the Annual Rental Value (ARV) of property and is the single largest and most elastic source of revenue. The ARV of the property varies with the nature of use, viz. a) residential use - owner occupied, b) residential use - rental and c) commercial use. The ARV is calculated based on the plinth area, building and land cost. Detailed procedure for assessing the property tax is given in Annexure - 9. The present tax rate is 17.50 percent of the ARV, which comprises 10 percent of ARV on holding tax, 2.5 percent on latrine/drainage tax and remaining 5 percent on lighting tax. The BMC is empowered to revise the property tax at least once in five years (quinquennial revision).

Table 7.2.3: Revenue Income from Own Sources (Tax & Non-Tax)

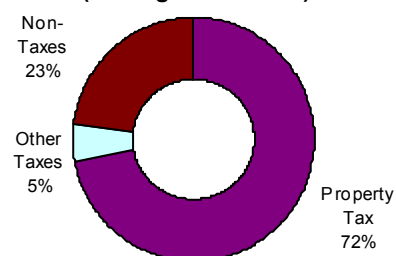
Particulars	2001-02	2002-03	2003-04	2004-05	Average
Income / Receipts (Rs. in Crores)					
Taxes					
Property Tax	2.61	3.05	3.22	5.93	3.70
Other Taxes	0.45	0.01	0.51	0.02	0.25
Non-Taxes					
Rent from Municipal Properties	0.58	0.63	0.50	0.78	0.62
Fees & User Charges	0.12	0.19	0.20	0.24	0.19
Sale & Hire Charges	0.12	0.11	0.06	0.55	0.21
Other Income	0.00	0.22	0.02	0.43	0.17
Total	3.88	4.22	4.50	7.95	5.14
Sectoral Contribution (in Percentage)	13.48	13.82	14.63	26.35	17.09
Growth Trends (in Percentage)	--	8.76	6.50	76.70	30.65

Source: Bhubaneswar Municipal Corporation; 2006

Trends in Own Sources of Revenue Income



Composition of Revenue Income from Own Sources (Average of 4 Years)



The property tax collection of the BMC has almost doubled from Rs. 3.06 crores in FY 2001-02 to Rs. 5.95 in FY 2004-05. This significant increase has been due to the proactive efforts of the BMC to bring in more assessments into the tax net and improve collection performance as there were no tax revision earlier during this period and the number of assessments has increased at an average rate of 6.88 percent per annum. Rapid increase in property tax collection is observed during FY 2004-05, which was 85 percent more than the previous financial year. Current trends indicate that property tax is expected to register a higher growth during the FY 2005-06. As a whole, the property tax component has registered an average annual growth rate of 36 percent during the assessment period. The swift rise in current demand during FYs 2003-04 and 2004-05 is primarily attributed to the proactive efforts of the BMC.

Available estimates indicate that there are about 1,20,000 holdings/properties within the BMC limits. Assuming current average property tax per property of Rs. 638.36, the overall property tax demand for all the holdings/properties within the BMC limits works out to Rs. 7.66 crores, which is about 1.8 times the current property tax demand for FY 2004-05.

rules and bye-laws are yet to be formulated and adopted. In the absence of these, the property tax administration is being done as per the Orissa Municipality Act, 1950.

Property tax demand-collection-balance (DCB) statement analysis indicates a rapid increase in number of property tax assessments during the last two financial years with an average increase of over 8.50 percent per annum. Average property tax per property works out to Rs. 638.36 while average ARV of the property works out to Rs. 3647.77 during the assessment period. About 14 percent of the total assessments are commercial properties, and this has registered an average increase of 8.81 percent per annum which is higher than that of the residential properties, which has grown at about 6.58 percent per annum. As a whole, the number of assessments has increased at an average rate of 6.88 percent per annum.

Table 7.2.4: Demand-Collection-Balance (DCB) Statement for Property Tax

Particulars	2001-02	2002-03	2003-04	2004-05	Average
No. of Assessments	53892	55775	59994	65734	
Growth in Assessments (Percent)	--	3.49	7.56	9.57	6.88
Demand (Rs. in Crores)					
Current	3.24	3.70	3.86	4.24	3.76
Arrear	2.35	2.82	4.97	3.25	3.35
Total	5.59	6.52	8.83	7.49	7.11
Collection (Rs. in Crores)					
Current	1.96	1.40	2.96	3.04	2.34
Arrear	0.81	1.86	2.62	1.17	1.62
Total	2.77	3.26	5.58	4.21	3.96
Collection Performance (Percentage)					
Current	60.53	65.73	76.57	71.52	62.19
Arrear	34.40	37.93	52.82	36.12	48.25
Total	49.54	49.97	63.20	56.18	55.63

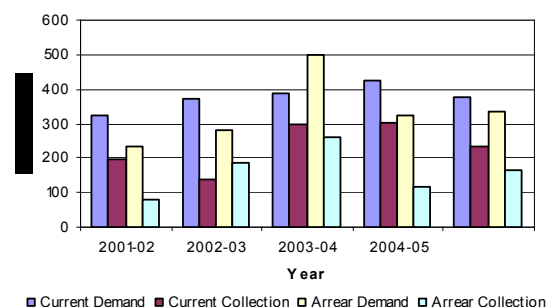
Source: Bhubaneswar Municipal Corporation; 2006

Similar growth trends are also observed in current property tax demand, which has increased from Rs. 3.24 crores in FY 2001-02 to Rs. 4.24 crores in FY 2004-05. This indicates an average increase of about 9.50 percent per annum. During the same assessment period, the arrear demand has also increased from Rs. 2.35 crores in FY 2001-02 to Rs. 3.25 crores in FY 2004-05. On average, about 47 percent of the total demand constitutes the arrears, and this figure is very high when compared to the other similar ULBs in the country. During FY

2004-05, total arrear demand was about 43 percent of the total demand, which was lower than the average during the assessment period. Based on the average ARV/tax rate and estimated number of assessments, the BMC has property tax potential of Rs. 7.66 crores, which is about 1.8 times the property tax demand of FY 2004-05. The collection performance also shows improvement during the assessment period. The overall collection performance was about 50 percent during FY 2001-02, which has increased to 63 percent during FY 2003-04 but decreased to 56 percent during FY 2004-05. Similarly, collection performance of current tax has also increased from 61 percent (in FY 2001-02) to 72 percent (in FY 2004-05) and that of the arrear collection has improved from 34 percent to 36 percent during the assessment period.

Other Taxes: Other tax revenues are in the form of taxes levied on carriage & carts, animals, advertisement and others. The most important category in own sources of income is the property tax. Advertisement tax is the other most important tax and it contributes about 7 percent of the total tax revenue. The other taxes contributed about 5 percent of the total own sources on average during the assessment period.

Property Tax Collection Performance



Non-Tax Revenue / Remunerative Enterprise: Income from remunerative enterprises is categorized as non-tax income received in the form of rentals from assets like shopping complexes, market fees, parking fees and income from other real assets owned by the BMC. Rent from the municipal properties is the major contributor among non-tax revenue items, which contributes about 57.40 percent on average, about Rs. 62 lakhs per annum on average during the assessment period. The municipal properties of the BMC are generally auctioned and thus the revenue realization in terms of rentals generally reflects the market value. The BMC is also very proactive in mobilizing additional resources by utilizing the available land parcels owned by the BMC. The total non-tax income generated through remunerative enterprises on average is about 23 percent of the total revenue income from own sources while it is about 3.94 percent of the total revenue income on average.

ASSIGNED REVENUES

Assigned revenues include revenues transferred to the BMC by the GoO under specific acts. This source of revenue income comprises duty on transfer of properties, entertainment tax / public resort, compensation in lieu of Octroi and other assigned revenues. Income through assigned revenue contributes to about three-fourth (76.31 percent) of revenue income, the growth of which however has been inconsistent. Apart from the drastic reduction in compensation in lieu of Octroi during the FY 2004-05, there has been an inconsistency in terms of the amount transferred to the BMC. Other sources of assigned revenue include duty on transfer of properties, entertainment tax/public resort, and others and these sources have not contributed during the last three financial years of the assessment period as indicated in the table above. As a whole, the assigned revenue has shown negative growth rate of 0.86 percent on average during the assessment period.

REVENUE GRANTS, CONTRIBUTIONS & SUBSIDIES

The BMC receives revenue grants and compensations from the GoI/GoO under the various heads. Grants received from the GoO are for the following purposes:

Table 7.2.5: Revenue Income from Assigned Revenue

Particulars	2001-02	2002-03	2003-04	2004-05	Average
Income / Receipts (Rs. in Crores)					
Compensation in lieu of Octroi	22.22	22.96	24.70	21.66	22.89
Other Assigned Revenues	0.26	0.00	0.00	0.00	0.07
Total	22.48	22.96	24.70	21.66	22.95
Sectoral Contribution (in Percentage)	78.03	75.10	80.29	71.80	76.31
Growth Trends (in Percentage)	--	2.16	7.54	(12.28)	(0.86)

Source: Bhubaneswar Municipal Corporation; 2006

Table 7.2.6: Revenue Grants, Contributions and Subsidies

Particulars	2001-02	2002-03	2003-04	2004-05	Average
Income / Receipts (Rs. in Crores)					
Central Government	0.03	1.65	0.05	0.00	0.43
State Government					
Salary Grant including DA Grant	0.00	0.58	0.00	0.00	0.15
Teachers' Salary	0.09	0.07	0.56	0.00	0.18
Road Maintenance	1.03	0.71	0.01	0.49	0.56
Pension from DMA	0.16	0.27	0.50	0.06	0.25
Other GoO Grants	0.00	0.11	0.43	0.00	0.14
Other Grants, and Contributions	1.13	0.00	0.00	0.00	0.28
Total	2.44	3.39	1.56	0.56	1.99
Sectoral Contribution (in Percentage)	8.49	11.09	5.08	1.85	6.63
Growth Trends (in Percentage)	--	38.69	(53.92)	(64.24)	(26.49)

Source: Bhubaneswar Municipal Corporation; 2006

- Salary/DA grant;
- Salary of teaching staff;
- Road maintenance;
- Pension from DMA; and
- Others.

The allocation on the above regular grants is ad-hoc in nature and inconsistent. These items have contributed 6.63 percent of revenue income and have registered an average negative growth rate of 26.49 percent per annum. Fluctuations in these grants are also due to receipt of some special grants during certain years.

7.2.2.2 REVENUE EXPENDITURE

Revenue expenditure of the BMC has been analyzed based on expenditure heads broadly classified under the following departments:

- General Administration;
- Finance and Audit;
- Tax and License;
- Light Establishment;
- Market Establishment;
- Conservancy Establishment;
- Medical Establishment;
- Public Works Establishment; and
- Education Establishment.

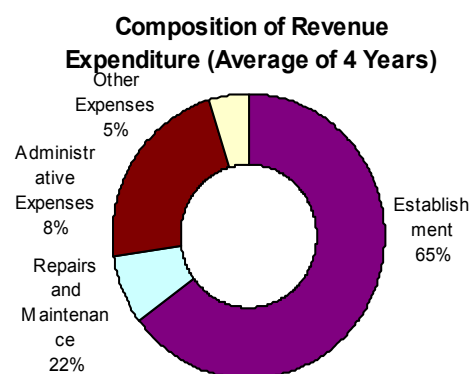
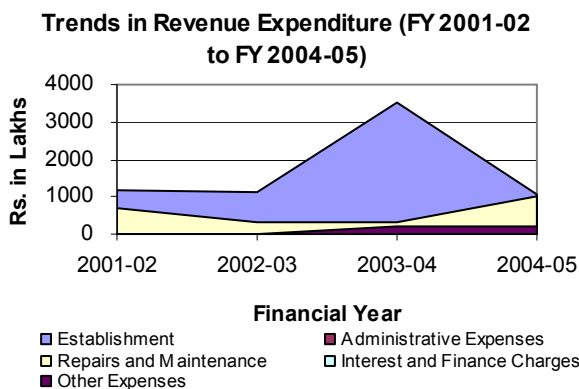
The administrative expenses and expenses on repairs & maintenance are not clearly separated across the above departments and hence these expenses are analyzed together for the BMC. However, the establishment charges, which have the highest utilization, have been analyzed for each of the above departments separately. Revenue expenditure is further classified under the following heads:

- Establishment;
- Administrative expenses;
- Repairs & maintenance;
- Interest & finance charges;
- Revenue grants, contributions and subsidies; and
- Miscellaneous / other expenses.

Table 7.2.7: Head-wise Revenue Expenditure

Particulars	2001-02	2002-03	2003-04	2004-05	Average
Revenue Expenditure (Rs. in Crores)					
Establishment	11.85	11.36	35.40	10.44	17.26
Admin. Expenses	2.41	1.39	1.69	2.78	2.06
Repairs & Maintenance	7.10	3.29	3.12	10.37	5.97
Interest & Finance Charges	0.00	0.00	0.00	0.00	0.00
Other Expenses	0.18	0.26	2.32	2.20	1.24
Total	21.53	16.30	42.52	25.79	26.54
Sectoral Utilization to Total Revenue Expenditure (in Percentage)					
Establishment	55.02	69.71	83.24	40.49	65.05
Admin. Expenses	11.18	8.53	3.96	10.77	7.78
Repairs & Maintenance	32.99	20.17	7.33	40.19	22.49
Interest & Finance Charges	0.00	0.00	0.00	0.00	0.00
Other Expenses	0.81	1.59	5.47	8.55	4.68
Growth Trends (in Percentage)					
Establishment	--	(4.07)	211.47	(70.49)	45.64
Admin. Expenses	--	(42.23)	21.23	64.87	14.62
Repairs & Maintenance	--	(53.70)	(5.25)	232.71	57.92
Interest & Finance Charges	--	--	--	--	--
Other Expenses	--	48.47	794.09	(5.15)	279.13
Total	--	(24.28)	160.82	(39.34)	32.40

Source: Bhubaneswar Municipal Corporation; 2006



Application of funds by each sector and head-wise utilization of the revenue expenditure is presented in the table and charts. It may be observed that the establishment expenditure accounts for about 65 percent of revenue expenditure on average during the assessment period. In comparison with revenue income, about 51 percent is utilized for payment of salaries. The other major sector having higher utilization is the repairs & maintenance, which accounts for about 22.49 percent of the revenue expenditure on average. The BMC had no debt serving obligations as on date (March 31, 2005).

During the assessment period, revenue expenditure has indicated an average growth of about 32.40 percent per annum while the corresponding growth in revenue income was only 1.61 percent, indicating a huge mismatch. Though this condition doesn't present a healthy picture of the fiscal surpluses, it is more relevant to FY 2003-04, which recorded high growth in revenue expenditure mainly due to the settlement of arrears to conservancy staff. Otherwise, growth of revenue expenditure has stabilized against increase in revenues.

While expenditure on establishment is declining (barring FY 2003-04 for the reasons stated above), expenditure on O&M has been steadily increasing. This indicates that the establishment cost is under control and that the BMC is investing a substantial amount for upkeep of assets and maintaining city infrastructure.

ESTABLISHMENT

As stated earlier, the establishment related expenses are analyzed with respect to nine departments of the BMC as shown in the adjacent table. The establishment charges of the conservancy staff during FY 2003-04 was about 7 times higher than normal due to the settlement of their arrears. Except for conservancy establishment other departments have either shown nominal increases or indicated a decrease in establishment expenditure in FY

Table 7.2.8: Establishment Expenditure

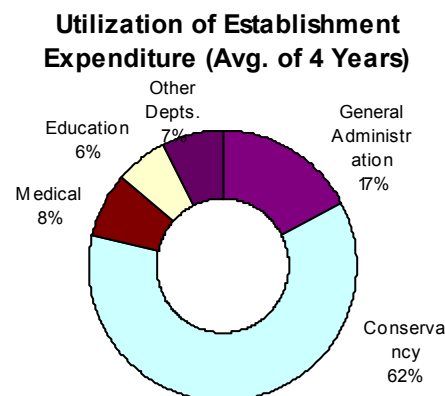
Particulars	2001-02	2002-03	2003-04	2004-05	Average
Establishment Expenditure (Rs. in Crores)					
General Admin.	3.14	3.35	2.73	2.73	2.99
Finance and Audit	0.00	0.08	0.08	0.09	0.06
Tax and License	0.60	0.57	0.42	0.37	0.49
Light	0.27	0.37	0.36	0.25	0.31
Market	0.00	0.10	0.17	0.18	0.12
Conservancy	4.84	4.33	28.94	4.21	10.58
Medical	1.44	1.30	1.33	1.38	1.36
Public Works	0.24	0.28	0.33	0.27	0.28
Education	1.33	0.99	1.03	0.96	1.07
Total	11.85	11.36	35.40	10.44	17.26
Sectoral Utilization (in Percentage)	55.02	69.71	83.24	40.49	65.05
Growth Trends (in Percentage)	--	(4.07)	211.47	(70.49)	45.64

Source: Bhubaneswar Municipal Corporation; 2006

Except for conservancy establishment other departments have either shown nominal increases or indicated a decrease in establishment expenditure in FY

2003-04. Conservancy establishment accounts for about 62 percent of the total establishment charges while general administration accounts for about 17 percent. Education and medical establishments accounts for about 6 percent, and 8 percent, respectively.

As a whole, the establishment charges constitute about 65 percent of the total revenue expenditure with an average annual growth rate of 45.64 percent during the assessment period. It is noteworthy that the BMC has been containing establishment expenditure through privatization initiatives in solid waste management, which has to a certain extent, started to give results as is reflected from the share of establishment expenses in the revenue expenditure during FY 2004-05.



ADMINISTRATIVE EXPENSES

Administrative expenses include expenses incurred on general administration like publicity, finance and legal charges, insurance, taxes and other contingency expenses pertaining to general administration. This expenditure head also includes fuel charges (including conservancy vehicles), hire charges, conservancy/solid waste management. Fuel charges are the highest consumer under administrative expenses with an average utilization of about 21 percent during the assessment period. The next highest consumption is hire charges with about 14 percent on average. Various other administrative expenses account for about half of the total administrative expenses. On the whole, the administrative expenses constitute about 7.78 percent of the total revenue expenditure on average with an average annual growth of 14.62 percent during the assessment period as indicated in the table above.

Table 7.2.9: Administrative Expenses

Particulars	2001-02	2002-03	2003-04	2004-05	Average
Administrative Expenses (Rs. in Crores)					
Fuel Charges	0.72	0.67	0.86	1.00	0.81
Hire Charges	0.45	0.49	0.21	1.05	0.55
Contingency Exp.	0.26	0.02	0.00	0.12	0.10
Conservancy	0.29	0.12	0.50	0.21	0.28
Solid Waste Management	0.42	0.00	0.00	0.00	0.10
Other Admin. Exp.	2.38	1.38	1.67	2.75	2.05
Total	4.52	2.68	3.24	5.12	3.89
Sectoral Utilization (in Percentage)	11.18	8.53	3.96	10.77	7.78
Growth Trends (in Percentage)	--	(42.23)	21.23	64.87	14.62

Source: Bhubaneswar Municipal Corporation; 2006

REPAIRS & MAINTENANCE

Repairs and maintenance expenditure of all sections together accounts for 22.49 percent of revenue expenditure and had increased at an average rate of 57.92 percent per annum. There was a huge increase in repairs and maintenance expenses during the FY 2004-05 due to massive investment of about Rs. 7.66 crores on repairs and maintenance of roads and drains. Overall expenses on repairs and maintenance during FY 2004-05 were more than 3 times that of FY 2003-04.

Repairs and maintenance of roads and energy charges on streetlights together constitute about two-thirds of total expenditure on repairs and maintenance. Roads account for about 33.65 percent while that of streetlights was about 34.00 percent on average during the assessment period. Another major sector is drainage, which accounts for about 13.74 percent while all other components account for the remaining 18.61 percent of total expenses on repairs and maintenance. Recent efforts of BMC to introduce private contractors for streetlight maintenance are expected to reduce expenses on O&M during the next few years. Initiation of energy conservation measures is also likely to reduce energy charges for the streetlights.

Table 7.2.10: Expenditure on Repairs and Maintenance

Particulars	2001-02	2002-03	2003-04	2004-05	Average
Repairs and Maintenance (Rs. in Crores)					
Roads	1.75	0.62	0.67	5.00	2.01
Streetlights (Energy Charges)	3.25	2.37	0.04	2.45	2.03
Drainage & Sewerage	0.53	0.08	0.00	2.67	0.82
Other Expenses	1.57	0.22	2.41	0.25	1.11
Total	7.10	3.29	3.12	10.37	5.97
Sectoral Utilization (in Percentage)	32.99	20.17	7.33	40.19	22.49
Growth Trends (in Percentage)	--	(53.70)	(5.25)	232.71	57.92

Source: Bhubaneswar Municipal Corporation; 2006

DEBT SERVICING

There were no loan obligations/debt liabilities for the BMC as on March 31, 2005. Considering the current property tax demand (FY 2004-05) of Rs. 4.25 crores, the BMC can leverage debt to finance its projects to an extent of Rs. 10-12 crores as this would be within the threshold range of minimum 2 and maximum 3 times the current property tax demand generally considered by financial institutions for the purposes of lending. However, based on the revenue receipts and revenue expenditure during the assessment period, the BMC would be in a position to draw loans¹⁰ to an extent of about Rs. 7-8 crores on average.

OTHER REVENUE EXPENDITURE

Other revenue expenditures of the BMC included revenue grants, contributions & subsidies and other revenue expenses, which do not form part of the above. Revenue grants, contributions & subsidies have accounted for about 1.03 percent of the total revenue expenditure while other revenue expenditure items account for about 3.08 percent.

7.2.3 CAPITAL ACCOUNT

The capital account comprises two components, viz. capital income and capital expenditure. The base and the basis of transactions in this account are elaborated below.

7.2.3.1 CAPITAL INCOME

Capital income mainly comprises income/receipts for capital works like loans/ borrowings, capital grants from the Central/State Government, and sale proceeds from assets apart from transfers from the revenue account to the three capital funds maintained by the BMC, viz. Municipal General Funds, Earmarked Funds and Reserve Funds. This account also has contributions received in the form of security deposits/EMD from suppliers, contractors, etc.

¹⁰ Based on the acceptable thumb-rule, about 25 percent of the total revenue receipts and/or about 30 percent of the total revenue expenditure, whichever is lower, can be considered as leverageable surplus.

It is noteworthy that the BMC has neither received capital grants nor taken any loans during the assessment period for capital works. Also, there were no transfers to the capital funds during this period. Only receipts/income to the capital account during the assessment period was in the form of security deposits/EMD and recovery of cost materials & adjustments. In a nutshell, the BMC has not received any specific or particular receipt for capital works during the assessment period. As a whole, total capital receipt of the BMC has increased from Rs. 0.56 crores in FY 2002-03 to Rs. 0.90 crores in FY 2004-05 with an average increase of about 31 percent per annum.

Table 7.2.11: Break-up of Capital Receipts/Income

Particulars	2001-02	2002-03	2003-04	2004-05	Average
Receipts / Income (Rs. in Crores)					
Municipal General Funds	--	--	--	--	--
Earmarked Funds	--	--	--	--	--
Reserve Funds	--	--	--	--	--
Loans	--	--	--	--	--
Deposits Received	0.00	0.56	0.55	0.89	0.50
Revenue Grants, and Contributions	--	--	--	--	--
Sales Proceeds from Assets	0.00	0.00	0.00	0.01	0.00
Total	0.00	0.56	0.55	0.90	0.50
Growth Trends (in Percentage)	--	--	(0.47)	62.11	30.82

Source: Bhubaneswar Municipal Corporation; 2006

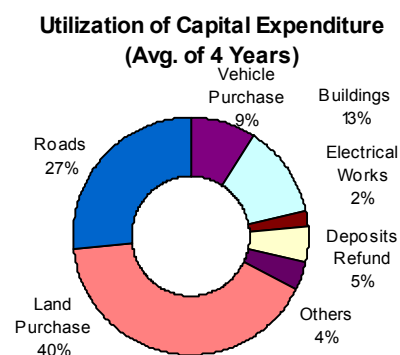
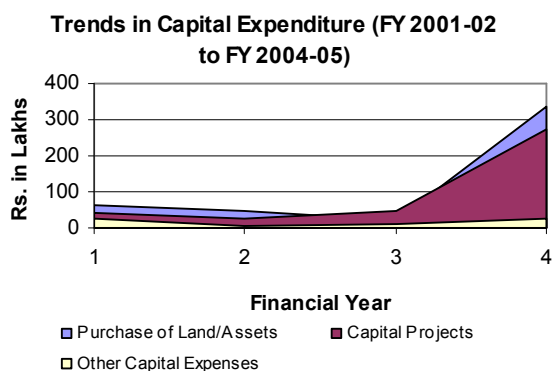
7.2.3.2 CAPITAL EXPENDITURE

Capital expenditure may be broadly categorized under three broad heads, viz. a) acquisition/ purchase of fixed assets; b) capital projects; and c) other capital expenses like refund of deposits, spending from the municipal funds, etc. The BMC has been spending almost half of total capital expenses on purchase of land during the assessment period. The BMC has spent about Rs. 3.82 crores on land purchase while the remaining was spent for the purchase of vehicles.

Table 7.2.12: Break-up of Capital Expenditure

Particulars	2001-02	2002-03	2003-04	2004-05	Average
Expenditure (Rs. in Crores)					
Purchase of Land/ Assets	0.61	0.48	0.22	3.36	1.17
Capital Projects	0.44	0.26	0.49	2.73	0.98
Other Capital Expenses	0.29	0.03	0.12	0.26	0.17
Total	1.34	0.77	0.82	6.35	2.32
Growth Trends (in Percentage)	--	(42.43)	6.44	670.99	211.67

Source: Bhubaneswar Municipal Corporation; 2006



About 42.23 percent of capital expenditure was spent for construction of new buildings, new roads and electrical fixtures. Roads had the major share under capital projects with about 63 per cent utilization while buildings had about 30 percent of utilization under capital projects. Other capital expenditure included refund of security deposits/EMD, etc. as indicated in the table and charts above.

7.2.4 KEY FINANCIAL INDICATORS

To assess the financial situation and performance of the BMC, certain key financial indicators have been generated. Following are the heads under which specific indicators of financial status and performance of the BMC have been assessed:

- Resource mobilization;
- Expenditure management; and
- Debt and liability management.

Following table provides performance of various key financial indicators of the BMC during the assessment period, along with the comparison with certain desirable benchmarks for evaluation.

Table 7.2.13: Performance of Key Financial Indicators in Bhubaneswar Municipal Corporation

Particulars	2001-02	2002-03	2003-04	2004-05	Average	Desirable Benchmark	Remarks
Operating Ratio	0.75	0.53	1.38	0.85	0.88	Less than 1.00	Satisfactory / favorable
Capital Utilization Ratio (Capital expenditure to capital income)	--	1.39	1.49	7.08	3.32	More than 1.00	Satisfactory / favorable
Debt Servicing Ratio (Debt servicing expenditure to revenue income)	--	--	--	--	--	Less than 25 percent	Satisfactory / favorable
Share of Own Source in Total Revenue Income	13.48	13.82	14.63	26.35	17.09	More than 35-40 percent	Not satisfactory/ unfavorable
Establishment Expenditure as Percentage of Total Revenue Income	41.12	37.16	115.08	34.62	57.00	Less than 35-40 percent	Not satisfactory/ unfavorable
Establishment Expenditure as Percentage of Total Revenue Expenditure	55.02	69.71	83.24	40.49	62.11	Less than 40-45 percent	Not satisfactory/ unfavorable
Outstanding Loan to Revenue Income	--	--	--	--	--	Less than 25 percent	Satisfactory / favorable
Outstanding Loan to Current Property Tax Demand	--	--	--	--	--	Between 2-3 times	Satisfactory / favorable
Current Property Tax Collection Performance	60.53	65.73	76.57	71.52	62.19	More than 85 percent	Not satisfactory/ unfavorable
Overall Property Tax Collection Performance (both Current & Arrears)	49.54	49.97	63.20	56.18	55.63	More than 75 percent	Not satisfactory/ unfavorable
Overall Property Tax Demand including Non-Assessed Properties (Rs. in Crores)					7.66		1.8 times the current property tax demand for FY 2004-05

Source: Analysis based on the Data provided by the Bhubaneswar Municipal Corporation; 2006

7.2.4.1 RESOURCE MOBILIZATION

Indicators relating to resource mobilization comprise specific financial indicators that reflect the financial status of the BMC. The other financial indicators relating to sources of finances, their contribution and growth trends have been discussed in detail in the previous sections. Annual per capita income is a quick indicator to assess the financial capacity of the BMC. The per capita income of the BMC is estimated as Rs. 416.17. It has been arrived based on the revenue receipts during the year 2004-05 and the estimated population during the year 2004/05. The per-capita capital receipt was as low as Rs. 12.37 during the same period, indicating lower resources for capital projects and asset creation for the BMC. Further, this capital receipt is through internal resources and revenue surplus utilized for capital works.

7.2.4.2 EXPENDITURE MANAGEMENT

Indicators pertaining to expenditure management comprise specific indicators that reflect the utilization pattern of BMC. Growth trends and utilization have been discussed in detail in the previous section. The other expenditure management indicators include per capita expenditure, operating ratio and debt servicing ratio, which give an indication of the financial performance/ management in the BMC.

PER CAPITA EXPENDITURE

Annual per capita expenditure has been arrived at based on revenue expenditure during the year 2004-05 and the estimated population during the year 2004/05. The per capita expenditure of the BMC has been estimated at Rs. 355.79. It may be observed that the per capital income is higher than the per capita expenditure, indicating operational efficiency of the BMC. The per capita capital expenditure was Rs. 37.34 during the same period, which is almost 3 times that of the capital receipt. This indicates utilization of revenue surplus for capital works, which is a healthy scenario.

OPERATING RATIO

Operating Ratio is the ratio of revenue expenditure to revenue income and it indicates financial position in terms of surplus or deficit. If the ratio is below one, it indicates that the ULB is in surplus. Average operating ratio of the BMC during the assessment period was 0.88. It may be noted that the BMC always had operating ratio less than unity during the assessment period except during the FY 2003-04 owing to settlement of arrears to the conservancy staff.

DEBT SERVICING RATIO

Debt Servicing Ratio (DSR) is the ratio (expressed in percentage) of debt payment (principal and interest paid out) to total revenue income. This indicator helps in assessing the implication of debt on the local body finances vis-a-vis expenditure for operation and maintenance. The BMC did not have debt obligations as on March 31, 2005 and thus, the BMC can explore loan/borrowings up to an extent of about 25 percent of DSR, which is generally the maximum threshold allowed by the financial institutions.

7.2.4.3 DEBT AND LIABILITY MANAGEMENT

Debt management is a significant issue that needs to be addressed, especially in the wake of urban local bodies having to approach the hitherto non-traditional sources of borrowings, viz. financial institutions and the open market. The urban local bodies ought to plan their borrowings on the basis of their capacity to leverage operating revenues. Moreover, the local bodies will have to ensure prompt servicing of the debt in order to retain fair levels of credit-worthiness. This is one aspect where many urban local bodies have defaulted in the past, due to various reasons. As a result, they end up accumulating significant sums of overdue principal and interest. A review of the outstanding loan statement of the BMC, as on March 31, 2005, reveals that the BMC did not have any outstanding debt liabilities.

7.2.5 SHADOW CREDIT RATING OF THE BHUBANESWAR MUNICIPAL CORPORATION

Utilizing the past financial performance of the BMC, various revenue and expenditure drivers were projected for both a short-term (2005-06 to 2009-10) and long-term (2005-06 to 2024-25) horizon period using the prevailing trends and growth patterns. These inputs were utilized for generating a Financial Operating Plan (FOP) without further capital investment consideration, but with due consideration for the impact of ongoing reform initiatives. Using this FOP, the borrowing capacity and investment capacity of the BMC have been estimated based on certain assumptions on capital structuring¹¹ and lending terms and conditions¹², with the following methodology:

- Financial forecast was made for each of the financial years for both short-term (2005-06 to 2009-10) and long-term (2005-06 to 2024-25) horizon period, to arrive at the following key financial indicators for the BMC:
 - Total revenue Receipts (TR) and total revenue Expenditure (TE) were calculated for each of the financial years;
 - Debt Servicing (DS) component was quantified as sum of both principal repayment and interest payable on loans, for each financial year;
 - The ratio of DS/TR was arrived at and presented in terms of a percentage;
 - TE/TR was also calculated in terms of a percentage; and
 - The net surplus/deficit was established for each of the financial years after providing for necessary debt servicing and committed capital contribution, if any.
- Once the above key indicators were generated, the borrowing capacity of the BMC has been assessed taking the lowest of the following three caps as the leverageable surplus for investment decision-making:
 - Cap1 - Maximum borrowing can be 25 percent of DS/TR: In order to be lower than 25 percent maximum allowable DS/TR, the borrowing can be 25 percent of the ratio of DS/TR in terms of annuity;
 - Cap 2 - The ratio of TE/TR should be less than 1.00: In order to arrive at the ratio TE/TR equal or less than 1.00, the TR should be more than or equal to TE. The difference will be the surplus available for leveraging in addition to the present loan annuity; and
 - Cap 3 - 50 percent of the primary operating surplus was estimated and deducting existing annuities thereafter, calculated for each financial year separately.
- Based on the lending terms and conditions, a 'conversion factor' was established and the product of leverageable surplus and this conversion factor depicts the borrowing capacity of the BMC (for each financial year); and
- Investment capacity was determined based on the assumptions made on capital structuring. Assuming 60 percent of the capital investment requirement to be met from borrowings, the investment capacity would be a quotient of the borrowing capacity and the proportion of capital investment requirement to be met through borrowings.

Table 7.2.14: Shadow Credit Rating: Borrowing and Investment Capacity of the Bhubaneswar Municipal Corporation

Rs. in Crores

Particulars	Short-Term (2005-06 to 2009-10)	Long-Term (2005-06 to 2024-25)
Borrowing Capacity	35.25	--
Investment Capacity	58.76	--

Note: To be read along with Table 7.2.13: Performance of Key Financial Indicators in Bhubaneswar Municipal Corporation

Source: Analysis based on the Data provided by the Bhubaneswar Municipal Corporation; 2006

¹¹ 60 percent of capital investment requirement would be met through borrowings and remaining 40 percent through grants and own contribution by the BMC in equal proportion.

¹² Loan would have a tenor of 20 years with 15 years as repayment period (5 years moratorium on principal payment), bearing interest at the rate of 8.00 percent per annum.

Based on the above, the BMC has a borrowing and investment capacity for short-term (2005-06 to 2009-10) period indicating the need for proactive short-term and long-term reform initiatives to enhance the creditworthiness of the BMC for sustaining future capital investment requirements.

7.2.6 ISSUES AND OBSERVATIONS

Following are some of the key issues highlighted and observations made based on the assessment of finances of the BMC:

- Revenue receipts indicated CAGR of 1.58 percent while that of the revenue expenditure was 6.60 percent, indicating the need to balance the gap;
- The operating ratio of the BMC has been satisfactory and is well below the desirable level of unity except during the FY 2003-04, owing to settlement of salary arrears to the conservancy staff;
- Capital utilization ratio indicates a healthy sign (more so with increasing rate) with the ratio above unity in all four years of assessment, indicating utilization of revenue surplus to fund capital works;
- Finances of the BMC are largely dependent on assigned revenue (mainly compensation in lieu of Octroi) and grants & contributions, which together accounted for about 83 percent;
- Own sources of revenue (both tax and non-tax) contributed only 17 percent per annum on average, which is far less than the desirable level of at least 35-40 percent. Thus, there is a need to augment own sources of revenue towards improving creditworthiness of the BMC and self-sustainability. However, revenue from own sources revenue has registered a growth of about 55 percent per annum during the assessment period and this is a positive indicator;
- The BMC did not have any debt obligations as on March 31, 2005. Based on desirable level of leverageable capacity, the BMC can leverage debt to finance its projects to an extent of Rs. 10-12 crores based on the current property tax demand (FY 2004-05) and about Rs. 7-8 crores on average based on the revenue receipts and revenue expenditure during the assessment period;
- Establishment expenses were to the tune of 57 percent of revenue income, which is very high compared to the threshold level of 35-40 percent; and
- The property tax collection performance presents a healthy scenario. However, there is a need to increase it further so as to reach at least 75 percent of total demand and/or 85 percent of the total current demand.
- Based on the above, there is an immediate need for initiating the following performance improvement measures:
 - Increase in own-sources of income, especially tax revenues;
 - Reduce establishment expenditure;
 - Try to match own sources of income with the establishment expenditure; and
 - Need to improve property tax collection performance.
- At present, the BMC does not have evaluation details on the asset base in terms of land holdings, movable and immovable properties. Thus, it is of paramount importance to recognize these assets and update their market value as this would facilitate the BMC to improve its overall creditworthiness.
- Based on the shadow credit rating exercise, the BMC has a borrowing and investment capacity only for short-term (2005-06 to 2009-10) funding indicating the need for proactive short-term and long-term reform initiatives to enhance the creditworthiness of the BMC for sustaining future capital investment requirements.

7.3 FINANCES OF THE PHEO

Public Health Engineering Organization (PHEO) is an agency under the Department of Housing and Urban Development, GoO. The PHEO is responsible for construction and maintenance of city water supply and sanitary sewerage installations owned by the GoO. The PHEO is also responsible for planning, designing, construction, operation and maintenance of water supply systems and management of waste water schemes including transportation and distribution. Apart from above, the PHEO is also responsible for construction and maintenance

of the external and internal water supply, sanitary and sewerage installations for State Government buildings (both residential and non-residential) in the city.

The financial support for the functioning of the PHEO is provided through the GoO budgetary allocation. The PHEO does not maintain a separate dedicated account for water supply and sewerage. In fact all receipts/income from water supply and sewerage operations are sent back to the GoO exchequer and all expenditures are met by the GoO through budgetary allocation. Thus, it is not possible to undertake a detailed analysis of the financial performance of the PHEO. However, based on the available data, a brief analysis is presented to provide insight into the financial performance of the water supply and sewerage sector. For the purposes of analysis, all account items are broadly categorized under following major heads:

- **Revenue Account:** All recurring items of income and expenditure are included under this head. These include user charges, connection fees, salaries, O&M/ maintenance expenditure, etc.
- **Capital Account:** Income and expenditure items under this account are primarily non-recurring in nature. Income items include budgetary allocation/contributions by GoO. Expenditure items include expenses booked under developmental works and purchase of capital assets.

7.3.1 FINANCIAL STATUS

Financial assessment of the PHEO Unit of Bhubaneswar has been carried out based on the financial information collected for four financial years, i.e. FY 2001-02 to FY 2004-05. Revenue income of the PHEO, Bhubaneswar, has grown to a level of Rs. 8.69 crores in FY 2004-05 from Rs. 6.69 crores in FY 2001-02, at a compounded annual growth rate (CAGR) of 10.01 percent, whereas the revenue expenditure has shown a CAGR of 4.39 percent during this period. There was a deficit in the account during all years to a tune of about 3 times. The figures on financial status along with the charts are given for reference.

Capital income comprises only budgetary allocation/contributions by the GoO. The capital receipts were mainly reimbursements towards capital expenditure. Unutilized capital funds were generally returned back to the GoO exchequer before the close of the financial year. Thus, the status of the capital account is always zero.

7.3.2 REVENUE ACCOUNT

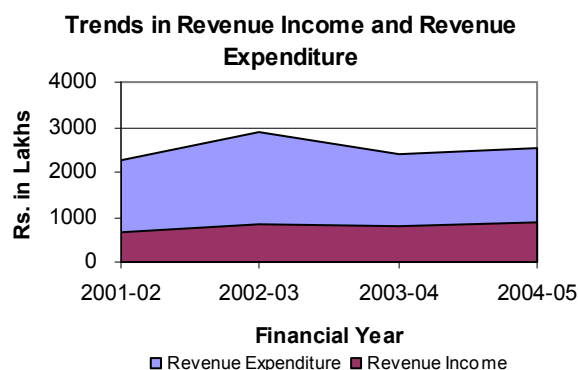
The revenue account comprises two components, revenue income and revenue expenditure. Revenue income comprises internal resources in the form of user charges for water supply and sewerage and connection charges. Revenue expenditure comprises expenditure incurred on salaries, repairs & maintenance, O&M expenses (electricity, chemicals, etc.) and others. The gap between income and expenditure is generally met through revenue grants from the GoO.

Table 7.3.1: Summary of Finances of the PHEO, Bhubaneswar

All figures in Rs. Crores

Particulars	2001-02	2002-03	2003-04	2004-05
Revenue Account				
Income	6.69	8.44	8.19	8.69
Expenditure	22.46	29.02	23.92	25.41
Status (Surplus/Deficit)	(15.77)	(20.58)	(15.73)	(16.72)
Capital Account				
Income	0.78	1.85	1.71	2.71
Expenditure	0.78	1.85	1.71	2.71
Status (Surplus/Deficit)	0.00	0.00	0.00	0.00
Overall Status	(15.77)	(20.58)	(15.73)	(16.72)

Source: Public Health Engineering Organization, Bhubaneswar; 2006



7.3.2.1 REVENUE INCOME

The revenue sources of the PHEO unit Bhubaneswar comprise user charges and connection fees & others. Revenue from user charges is the single largest source and charges are levied for the delivery of water supply and sewer charges for providing the sewer services. The connection fees, collected for providing water supply and sewerage connection, are the other major source. The source-wise income generated during the review period is presented in the adjacent table.

It may be observed that about 91.38 percent of income is through user charges on water. Only about 8.62 percent is realized through other charges including connection charges. As a whole, user charges have increased at an annual growth rate of about 51 percent during the assessment period while other charges have grown at an average rate of 16 percent during the same period. As a whole, revenue receipts have increased at a growth rate of 67 percent during the assessment period. Revenue realization per kilo-litre of water was about Rs. 0.97 against the production cost of Rs. 3.33 per kilo-litre of water.

The quantum of one-time fees/deposits for water service connections is dependent on the use (like residential, commercial, institutional, etc.) while sewer connection charges are dependent on both use and size of the sewer. The water tariff structure varies with the type of connections, viz. metered and non-metered. Metered connections are levied user charges based on the actual consumption, while non-metered connections are levied flat rate depending on the number of taps. The tariff also varies with the type of use. The sewage tariff is levied based on the size of the sewer for domestic use while it is based on number of closets for non-domestic use. Details of service connection charges and user charges for both water supply and sewerage along with the relevant Gazette Notifications are given as Annexure - 5.

Detailed demand-collection-balance (DCB) statement for water supply and sewerage was not made available. However, based on discussions, overall collection performance is in the range of 60-65 percent of the total demand (both arrears and current).

Table 7.3.2: Sources of Revenue

Particulars	2001-02	2002-03	2003-04	2004-05	Average
Receipts / Income (Rs. in Crores)					
User Charges - Water	6.19	7.74	7.56	7.72	7.30
Other Charges (incl. Connection Charges)	0.49	0.69	0.63	0.97	0.70
Total	6.69	8.44	8.19	8.69	8.00
Sectoral Contribution to Total Revenue Receipts (in Percentage)					
User Charges - Water	92.64	91.78	92.26	88.83	91.38
Other Charges (incl. Connection Charges)	7.36	8.22	7.74	11.17	8.62
Growth Trends (in Percentage)					
User Charges - Water	--	154.92	(18.31)	16.34	50.98
Other Charges (incl. Connection Charges)	--	20.09	(5.87)	33.66	15.96
Total	--	175.01	(24.18)	50.00	66.94

Source: Public Health Engineering Organization, Bhubaneswar; 2006

7.3.2.2 REVENUE EXPENDITURE

The revenue expenditure items of the PHEO unit Bhubaneswar comprise staff salaries, expenses on repairs and maintenance, O&M expenses (electricity, chemicals, etc.), other expenses and expenses on sewerage. Item-wise application of funds and head-wise utilization of revenue expenditure are presented in the table and charts. O&M expenditure has the highest utilization with about 63 percent on average during the assessment period. Salaries and works (repairs & maintenance) had almost the same utilization with about 18 percent on average. It is noteworthy that the expenses on salary and wages are decreasing, indicating effective manpower management. As a whole, the revenue expenditure has grown at an average rate of about 6 percent per annum. It may be observed that recovery of user charges is able to meet only about 29 percent of the O&M cost, requiring revision in user charges to achieve full O&M cost recovery. Thus, there is an immediate need to view the water supply & sewerage sector with commercial orientation.

Table 7.3.3: Item-wise Revenue Expenditure

Particulars	2001-02	2002-03	2003-04	2004-05	Average
Expenditure (Rs. in Crores)					
Salary and Wages	5.33	4.85	3.87	3.80	4.46
Works (Repairs and Maintenance)	2.37	4.07	5.63	5.59	4.42
O&M Expenses	14.76	20.10	14.23	14.23	15.83
Other Expenses	0.00	0.00	0.15	1.20	0.34
Sewerage	0.00	0.00	0.04	0.59	0.16
Total	22.46	29.02	23.92	25.41	25.20
Sectoral Utilization to Total Revenue Expenditure (in Percentage)					
Salary and Wages	23.72	16.70	16.20	14.96	17.71
Works (Repairs and Maintenance)	10.56	14.03	23.55	22.00	17.52
O&M Expenses	65.72	69.27	59.50	56.00	62.81
Other Expenses	0.00	0.00	0.61	4.72	1.33
Sewerage	0.00	0.00	0.15	2.33	0.62
Growth Trends (in Percentage)					
Salary and Wages	--	(9.03)	(20.04)	(1.87)	(10.31)
Works (Repairs and Maintenance)	--	71.74	38.36	(0.75)	36.45
O&M Expenses	--	36.17	(29.18)	(0.03)	2.32
Total	--	29.20	(17.55)	6.23	5.96

Source: Public Health Engineering Organization, Bhubaneswar; 2006

7.3.3 CAPITAL ACCOUNT

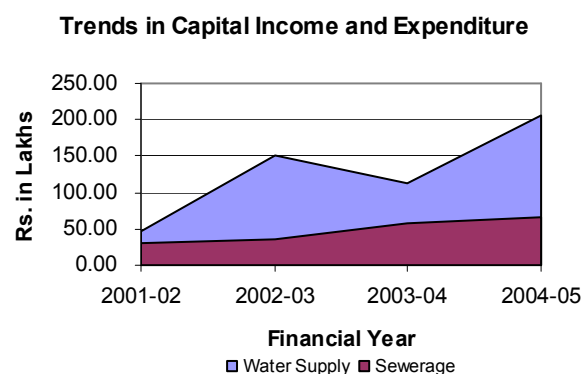
As stated earlier, capital income comprises only budgetary allocation/ contributions by GoO. Capital receipts were mainly reimbursements towards capital expenditure. Unutilized capital funds were generally returned back to the GoO exchequer before the close of the financial year. Thus, the status of the capital account is always zero. Water supply accounts for about 70.93 percent of total capital expenditure while the remaining 29.07 percent is utilized for sewerage. No specific growth trend could be established in terms of utilization of both by water

Table 7.3.4: Capital Account of Water Supply and Sewerage

Particulars	2001-02	2002-03	2003-04	2004-05	Average
Capital Receipts and Expenditure (Rs. in Crores)					
Water Supply	0.47	1.51	1.13	2.06	1.29
Sewerage	0.31	0.35	0.58	0.65	0.47
Total	0.78	1.85	1.71	2.71	1.76
Growth Trends (in Percentage)					
Water Supply	--	221.67	(25.22)	82.84	(37.36)
Sewerage	--	12.10	67.06	11.82	(27.32)
Total	--	138.36	(7.97)	58.74	(34.96)

Source: Public Health Engineering Organization, Bhubaneswar; 2006

supply and sewerage. Expenditure on both water supply and sewerage was highest during the last financial year (FY 2004-05) of the assessment period. The growth pattern during this year indicates an increase of about 59 percent over the previous year. As a whole, there was a negative growth of about 35 percent per annum, in terms of capital utilization/expenditure during the assessment period.



7.3.4 KEY FINANCIAL INDICATORS

To assess the financial situation and performance of the PHEO unit of Bhubaneswar, certain key financial indicators have been generated. Following table provides performance of various key financial indicators of the PHEO, Bhubaneswar, during the assessment period, along with comparison with certain desirable benchmarks for evaluation.

Table 7.3.5: Performance of Key Financial Indicators of PHEO, Bhubaneswar

Particulars	2001-02	2002-03	2003-04	2004-05	Average	Desirable Benchmark	Remarks
Operating Ratio	3.36	3.44	2.92	2.92	3.16	Less than 1.00	Not satisfactory/ unfavorable
Unit Cost per kilo-litres of Water Production	2.99	3.86	3.18	3.30	3.33	--	Actual cost
Percentage of Cost Realization	27.58	26.69	31.65	31.11	29.26	At least 70 percent	Not satisfactory / unfavorable
Percentage Realization of O&M Cost	36.15	32.04	38.05	38.96	36.30	100 percent	Not satisfactory/ unfavorable
Overall Collection Performance (both Current & Arrears)	NA	NA	NA	NA	60-65	More than 75 percent	Not satisfactory/ unfavorable

Source: Public Health Engineering Organization, Bhubaneswar; 2006

7.3.5 ISSUES AND OBSERVATIONS

Following are some of the key issues highlighted and observations made based on the assessment of finances of the PHEO Unit of Bhubaneswar:

- Revenue receipts indicated CAGR of 10.01 percent while that of the revenue expenditure was 4.39 percent. However, the operating ratio is not satisfactory and is always more than unity (3 times higher), indicating the need to balance the gap between income and expenditure.
- The cost of production of a kilo-litre of water is estimated as Rs. 3.33 while cost recovery is only to a tune of about 30 percent. In addition, only about one-third (36.30 percent) of the O&M cost was recovered during the assessment period. This indicates a huge gap in the cost of production and recovery, requiring revision in user charges to achieve full O&M cost recovery. There is an immediate need to give a commercial orientation to the water supply and sewerage sector in order to bridge the existing mismatch.
- The collection performance is also poor. It is to a tune of about 60-65 percent on total demand, which requires immediate attention.

URBAN MANAGEMENT AND GOVERNANCE

8.1 URBAN LOCAL BODIES - NEW CONTEXT OF LOCAL GOVERNMENT

The 74th CAA, 1992, of the GoI has imparted constitutional status on the ULBs and has assigned appropriate functions to them. A constitutional backing is given to the relationship of the ULBs with the State Government with respect to their functions and powers, ensuring timely and regular elections, arrangements for revenue sharing etc. ULBs are given additional powers including preparation of local development plans, programmes for ensuring social justice, and environmental management thereby making them more responsive to the local needs. This is facilitated by Section 243 (W) of the 74th CAA, 1992.

In conformity with the 74th CAA, various State Governments have taken initiative to amend their respective Municipal Corporation / Municipalities Act and the ULBs have been entrusted with the functions listed in the Twelfth Schedule of the constitution or Section 243 (W) of the 74th CAA, 1992. Similarly, the GoO has also taken this initiative and has recently enacted the Orissa Municipal Corporation Act, 2003, in conformity with the 74th CAA.

The urban reforms resulting from the 74th CAA lay larger responsibility on the ULBs in terms of development planning, service provision and fiscal affairs. The policy framework of the State and Central Government has provided the necessary impetus to the urban sector to play a proactive role in the development process. In the changed scenario, it is imperative for the ULBs to set their priorities and strategies right, designed to achieve a clear vision.

Twelfth Schedule (Article 243 W - 74th CAA)

- Urban Planning including town planning
- Regulation of land-use and construction of buildings
- Planning for economic and social development
- Roads and bridges
- Water supply for domestic, industrial and commercial purposes
- Public Health, sanitation conservancy and solid waste management
- Fire services
- Urban forestry, protection of the environment and promotion of ecological aspects
- Safeguarding the interests of weaker sections of society, including the handicapped and mentally retarded
- Slum improvement and up gradation
- Urban poverty alleviation
- Provision for urban amenities and facilities such as parks, gardens and playgrounds
- Promotion of cultural, educational and aesthetic aspects
- Burials and burial grounds; cremations, cremation grounds and electric crematoriums
- Cattle pounds; prevention of cruelty to animals
- Vital statistics including registration of births and deaths
- Public amenities including street lighting, parking lots, bus stops and public conveniences
- Regulation of slaughter houses and tanneries

8.2 CITY MANAGEMENT

As stated earlier, the City Administration is vested with the BMC. With the enactment of Orissa Municipal Corporation Act, 2003, a full-fledged Municipal Corporation came into being on October 01, 2003 with an elected Mayor and Corporators. The BMC has an executive body comprising various administrative wings headed by the Municipal Commissioner to act upon the decisions of the Corporation and for the day-to-day functioning of the Corporation. The BMC discharges various obligatory and discretionary functions as per the provisions of the Orissa Municipal

City Administration and Development Agencies

- Bhubaneswar Municipal Corporation
- Bhubaneswar Development Authority
- Public Health Engineering Organization (GoO)
- Works Department - R&B Division (GoO)
- Orissa Water Supply and Sewerage Board (GoO)
- Water Resources Department (GoO)
- General Administration Department (GoO)
- State Pollution Control Board, Orissa
- Directorate of Town Planning (GoO)
- Industries: Industries Department (GoO) and Industrial Infrastructure Development Corporation of Orissa (IIDCO)
- Tourism: Orissa Tourism Development Corporation and State Tourism Department (GoO)
- Urban Forest: Forest (City Afforestation) and Social Forestry
- Heritage and Monuments: Archaeological Survey of India (GoI) and State Archaeological Department (GoO)

Corporation Act, 2003, and provides for various specified civic services/infrastructure facilities to the citizens of the city. Apart from the BMC, there are other Government departments and their directorates with development related responsibilities and functions. The following table provides insight into the development related responsibilities and functions of various Government departments/institutions in Bhubaneswar City along with a brief note on the intended responsibilities & functions of these agencies:

Table 8.2.1: Development Related Responsibilities and Functions of Various Government Departments / Institutions in Bhubaneswar City

Sl. No.	Name of the Department/ Institution	Responsibilities and Functions	Remarks (Intended Roles as per the 74 th CAA)
1.	Bhubaneswar Development Authority (BDA)	<ul style="list-style-type: none"> ▪ Bhubaneswar Development Authority (BDA) was constituted under the Orissa Development Authorities Act, 1982. ▪ Responsible for development of Bhubaneswar Master Plan area. ▪ Preparation of interim, comprehensive and zonal development plans. ▪ Enforcement of the provisions of the development plan, zoning regulations and planning and building standards by way of issuing permissions for construction of buildings. ▪ Preparation of development schemes and its implementation. ▪ All city planning functions, development controls and building sanctions. ▪ Principal objectives of the authority include creation of housing stock, creation of commercial complexes, improvement of city level infrastructure, environmental improvement, parks and plantations in colonies, blocks, institutions and roadsides. 	<ul style="list-style-type: none"> ▪ All functions pertaining to Master Plan & Development Plan preparation, preparation of development schemes & its implementation, all city planning functions, development controls and building sanctions within the BMC limits, to be dealt by the BMC as per the 74th CAA. ▪ BDA should be abolished and functions other than above should be transferred to the Directorate of Town Planning.
2.	Public Health Engineering Organization (PHEO), GoO	<ul style="list-style-type: none"> ▪ Responsible for construction and maintenance of city water supply, sanitary sewerage installation owned by the GoO. ▪ Also responsible for planning, designing, construction, operation and maintenance of water supply system and management of wastewater schemes including their transportation and distribution. ▪ Apart from above, the PHEO is also responsible for construction and maintenance of the external and internal water supply, sanitary and sewerage installation for State Government Buildings (both residential and non-residential) in the city. 	<ul style="list-style-type: none"> ▪ All functions pertaining to planning, designing, construction, operation and maintenance of city water supply and management of waste water (sanitation & sewerage) schemes including their transportation and distribution within the BMC limits to be dealt by the BMC as per the 74th CAA. ▪ The PHEO can continue to deliver its assigned responsibilities and functions outside the administrative jurisdiction of the BMC.
3.	Works Department (R&B Division), GoO	<ul style="list-style-type: none"> ▪ Responsible for construction, repair and maintenance of buildings, roads, bridges and other related structures financed from the state and capital budget allocations of the GoO. ▪ All major arterial roads in the city are under the control of the WD. ▪ Also responsible for ensuring that no encroachment or structure, whether temporary or permanent is erected on the land and property under the control of WD. It is also responsible for removal of such 	<ul style="list-style-type: none"> ▪ All functions pertaining to construction, repair and maintenance of all major arterial roads, city roads, bridges and other related road infrastructure within the BMC limits to be dealt by the BMC as per the 74th CAA. ▪ The Works Department can continue to deliver its assigned responsibilities and functions outside the administrative jurisdiction of the BMC.

Sl. No.	Name of the Department/ Institution	Responsibilities and Functions	Remarks (Intended Roles as per the 74 th CAA)
		<p>encroachments as per the GoO rules.</p> <ul style="list-style-type: none"> Maintaining a register of land, buildings and properties belonging to the GoO and under the administration of WD. 	
4.	Orissa Water Supply and Sewerage Board (OWSSB), GoO	<ul style="list-style-type: none"> Responsible for construction of water supply, sanitary sewerage scheme on behalf of PHEO and local bodies at their cost and on payment of cent age charges. 	<ul style="list-style-type: none"> As per the 74th CAA, the BMC, at its own discretion, can decide to hire the services for the works within the BMC limits.
5.	Water Resources Department, GoO	<ul style="list-style-type: none"> Responsible for construction and maintenance of major storm water drains (10 nos.) within BMC limits. 	<ul style="list-style-type: none"> All functions pertaining to construction and maintenance of major storm water drains (10 nos.) within the BMC limits to be dealt by the BMC as per the 74th CAA. The Water Resources Department can continue to deliver its assigned responsibilities and functions outside the administrative jurisdiction of the BMC.
6.	General Administration Department, GoO	<ul style="list-style-type: none"> The General Administration Department (Estate Functions) is responsible for Government Land Management in Bhubaneswar. Administration of Government residential and non-residential estates and buildings located in Bhubaneswar City. Other Capital Administration issues connected with land in the city. 	<ul style="list-style-type: none"> All State Government (GA Department) owned land parcels located within the BMC limits, should be transferred to the BMC for undertaking development activities, as per the 74th CAA.
7.	State Pollution Control Board, Orissa	<ul style="list-style-type: none"> Responsible for pollution control and environmental protection Dealing with environmental monitoring and pollution control in the State Also undertakes environmental planning studies for the entire State 	<ul style="list-style-type: none"> This institution should continue to act as a monitoring agency for environmental aspects of the city
8.	Directorate of Town Planning, GoO	<ul style="list-style-type: none"> Advises the GoO on matters pertaining to urban planning. 	<ul style="list-style-type: none"> This Department should provide advisory services on matters pertaining to urban planning.
9.	<ol style="list-style-type: none"> Industries Department, GoO Industrial Infrastructure Development Corporation of Orissa (IIDCO) 	<ul style="list-style-type: none"> Responsible for planning and establishment of industries in the State. Also, responsible for development of industrial estates and industrial areas, creation of industrial infrastructure and amenities there in. 	<ul style="list-style-type: none"> These Departments/ Institutions should undertake development activities in close consultation/ cooperation with the BMC.
10.	<ol style="list-style-type: none"> Orissa Tourism Development Corporation State Tourism Department, GoO 	<ul style="list-style-type: none"> Responsible for identification and development of tourist interest site, publicity and development of infrastructure for tourism in form of lodging and boarding, transportation facilities. Arrangement of different tourism packages covering different tourist sites. 	<ul style="list-style-type: none"> These Departments/ Institutions should undertake development activities in close consultation/ cooperation with the BMC
11.	<ol style="list-style-type: none"> Forest (City Afforestation) Social Forestry 	<ul style="list-style-type: none"> Responsible for development and maintenance of greenbelts, road side plantation, development of parks and social forestry. 	<ul style="list-style-type: none"> All functions within the BMC limits to be dealt by the BMC as per the 74th CAA. These agencies can continue to deliver its assigned responsibilities and functions

Sl. No.	Name of the Department/ Institution	Responsibilities and Functions	Remarks (Intended Roles as per the 74 th CAA)
			outside the administrative jurisdiction of the BMC.
12.	1. Archaeological Survey of India (ASI), GoI 2. State Archaeological Department, GoO	<ul style="list-style-type: none"> ▪ Responsible for identification, protection and preservation of ancient monuments of national and state importance. ▪ Also responsible for excavation of new sites of archeological importance. 	<ul style="list-style-type: none"> ▪ These Departments/ Institutions should undertake development activities in close consultation/ cooperation with the BMC.

Following table provides insight into institutional responsibilities, including the roles played by the private sector for various urban infrastructure and services, as per the illustrative tables provided in the JNNURM Toolkit-2:

Table 8.2.2: Institutional Responsibility and Role of Private Sector

Urban Infrastructure	Planning and Design	Construction	Operation and Maintenance	Role of Private Sector
Water Supply	PHEO/OWSSB	PHEO/OWSSB	PHEO	No specific role as on date
Sewerage	PHEO/OWSSB	PHEO/OWSSB	PHEO	No specific role as on date
Storm Water Drainage - Major Drains	Water Resources Department and Works Department	Water Resources Department and Works Department	Water Resources Department	No specific role as on date
Storm Water Drainage - Minor Drains	BMC	BMC	BMC	No specific role as on date
Solid Waste Management	BMC	BMC	BMC with Private Sector Participation	Private sector is involved in street sweeping in 14 Wards
Roads (including Flyovers) - Major Roads	Works Department (R&B Division)	Works Department (R&B Division)	Works Department (R&B Division)	No specific role as on date
Municipal Roads (including Flyovers) - Minor/Internal Roads	BMC	BMC	BMC	No specific role as on date
Street Lighting	BMC	BMC/CESCO	BMC/Private Sector	Private sector is involved in O&M of street lights in 24 wards

Source: Various Departments and Agencies; 2006

Since city administration is vested with the BMC, the organizational structure, functional responsibilities, etc. of the BMC are analyzed in detail. Other service providing agencies are Government departments and their directorates. The office of the Chief Engineer coordinates all activities of these departments. The Chief Engineer is assisted by Superintending Engineers and other technical & administrative staff. Specific roles and responsibilities are described in the above table. There is a clear delineation of functional responsibilities between various departments. However, there is a need for proper coordination amongst the various service providing agencies for concentrated efforts and effective results.

8.3 BHUBANESWAR MUNICIPAL CORPORATION

8.3.1 ORISSA MUNICIPAL CORPORATION ACT, 2003

As stated earlier, the functions and responsibilities of the BMC are defined by the provisions of the Orissa Municipal Corporation Act, 2003. The Act came into force with effect from February 11, 2003. The Act provides for the State Election Commission to conduct and monitor election to the corporations in the State. The Act also empowers elected persons by assigning them with various functions of the corporation. The Act provides for four authorities in a corporation as indicated in the adjacent box.

Hierarchical Authorities of the Corporation as per the Orissa Municipal Corporation Act, 2003

- The Corporation;
- The Mayor;
- The Standing Committees; and
- The Commissioner

Following are some of the salient features of the Orissa Municipal Corporation Act, 2003:

- The Act empowers the State to nominate five persons from amongst the residents of the city having special knowledge or experience in municipal administration and every member of House of People and State Legislative Assembly representing the constituencies, which comprise wholly or partly the area of the city. This ensures adequate representation of the people.
- In order to bring in transparency and accountability, the Act has envisaged democratic decentralization by devolving powers and functions to the corporation on the one hand and introducing decentralized planning on the other. Extensive participation from people's representative in every phase of the process is the hallmark of the new Act. However, there is a strong need to empower the ward committee to provide for planning from below and a good and viable public accountability system.
- There is a provision for appointment of Corporation Ombudsman by the Government who shall receive complaints from any person relating to the provision of the various services of the Corporation and to consider the same or arrive at a settlement by agreement through negotiation by passing award in accordance with the provisions of the Arbitration Land Conciliation Act, 1996.
- Corporation Valuation Committee and Corporation Assessment Tribunal can be constituted under the provisions of the new Act to take up valuation and assessment work of property tax and to hear appeals thereof. Similarly, the Act provides for the appointment of a Judicial Magistrate First Class to conduct trials of offences under the Act.
- The new constitutional status of municipal corporations through this Act would provide an institutional framework for participatory democracy.

Key Features of Orissa Municipal Corporation Act, 2003

- Empowers the Corporation to levy collect and appropriate certain taxes tolls, duties, fees, user charges and also to levy fees and fines, procedure for its realization.
- Provides for determination of annual value of building and land for the purpose of property tax by introducing self-assessment system.
- Empowers to levy tax on advertisement by way of regulation, removal of poster and hoarding etc., which are of unauthorized.
- Empowers the Corporation to determine whether work shall be executed by contract and the provisions of the contract, mode of making contract etc. and defines the powers of several authorities to sanction estimate.
- Provides for urban forestry protection of environment and promotion of ecological aspects.
- Empowers the Corporation to take up water supply and building regulations as municipal function.

Key Civic Services / Infrastructure Facilities Provided and Operated by the BMC

- Conservancy services and solid waste management;
- Slaughterhouses;
- Birth and death registration;
- Prevention of food adulteration;
- Preventive health care;
- Construction, maintenance of roads, drains and markets;
- Storm water drainage;
- Parks;
- Plantation;
- Slum improvement and urban community development;
- Street lighting and removal of encroachments.

The BMC discharges various obligatory (Section 24) and discretionary functions (Section 25) as per the provisions of the Orissa Municipal Corporation Act, 2003, and provides for various specified civic services/ infrastructure facilities to the citizens of the city. The above functions are indicated in a nutshell in the right hand side box for ready reference.

Based on the above, it may be observed that the following functions as outlined in the Twelfth Schedule (Article 243 W - 74th CAA) are not included as functions of the Municipal Corporations in the Orissa Municipal Corporations Act, 2003:

- Urban planning including town planning;
- Landuse regulation and construction of buildings;
- Planning for economic and social development;
- Water supply for domestic, industrial and commercial purposes;
- Public health and sanitation; and
- Fire services.

The GoO is committed to transfer the planning related functions like urban planning, landuse regulation, building construction and planning for economic & social development to the BMC from the BDA. However, transfer of water supply and sanitation functions from the PHEO is likely to be a time-consuming process. There is no initiative/move to transfer fire services to BMC in the near future.

8.3.2 ORGANIZATION STRUCTURE

With the enactment of the Orissa Municipal Corporation Act, 2003, a full-fledged Municipal Corporation came into being on October 01, 2003 with an elected Mayor and Corporators. The election to the BMC was conducted by the State Election Commission. As per the provisions of the Orissa Municipal Corporation Act, 2003, the apex body is the General Body of the Corporation headed by the Honorable Mayor. The organizational setup of the BMC comprises a political wing and an executive wing. The political wing consisting of elected body of Corporators from different wards in the city and is headed by the Honorable Mayor. The executive wing, headed by the Municipal Commissioner looks after the day-to-day functioning of the BMC and supports the political wing in the decision-making process.

Standing Committees of the BMC

- Taxation, Finance & Accounts;
- Public Health, Electric Supply, Water Supply, and Drainage & Environment;
- Planning & Development;
- Education, Recreation & Culture;
- License & Appeals;
- Contracts;
- Corporation Establishment;
- Grievance and Social Justice; and
- Public Works.

POLITICAL WING

The Political wing of the BMC consists of 47 elected Corporators, each representing a ward¹³. The Honorable Mayor (elected from among the Corporators) heads the Municipal Corporation, which performs its duties as per the provisions of the Orissa Municipal Corporation Act, 2003. The political wing provides an overall direction to the Municipal Corporation and performs its functions through a set of Standing Committees (Section 9 and Section 10) constituted for different purposes. There are nine Standing Committees in the BMC as indicated in the adjacent box to aid and advise the Mayor. The functions and responsibilities of the above Standing Committees are outlined in the adjacent table.

For strengthening and bringing transparency into supervision and monitoring of various activities of the Corporation at the ward level, 'Ward Committees' have been constituted as per Section 21 of the Orissa Municipal Corporation Act, 2003, with the area Corporator as the Chairperson and representatives of Mayor and Municipal Commissioner as members. The table below provides powers and duties of various Standing Committees.

¹³ Section 6 of the Orissa Municipal Corporation Act, 2003, provides a framework for determining the number of Corporators in a Municipal Corporation. According to the above section, the BMC (with a population range of above 6 lakhs and up to 12 lakhs as per 2001 Census) should have minimum of 59 Corporators and for the population of 6.48 lakhs the BMC should have at least 60 Corporators as per the Act.

Table 8.3.1: Powers and Duties of Standing Committees of the Bhubaneswar Municipal Corporation

Sl. No.	Name of the Standing Committee	Powers and Duties
1.	Standing Committee for Taxation, Finance and Accounts	<ul style="list-style-type: none"> ▪ Recommend measures to be taken with regard to the Annual, Interim and Revised Budget Estimates, keeping in view the need of the city vis-a-vis the availability of funds of the Corporation without encroaching Government grants and loans.
2.	Standing Committee for Public Health, Electric Supply, Water Supply, Drainage and Environment	<ul style="list-style-type: none"> ▪ Recommend measures to be taken with regard to the following matters in order of priority as provided under Sections 24 and 25 keeping in view the need of the city vis-a-vis the availability of funds of the Corporation without encroaching Government grants and loans: <ul style="list-style-type: none"> ○ Watering, scavenging and cleaning of all public streets and places in the city and removal of all sweepings there from; ○ Collection, removal, treatment disposal of solid wastes, sewage, offensive matters and rubbish and the preparation of compost manure from such of solid wastes, sewage, offensive matters and rubbish; ○ Construction, maintenance and cleansing of drains and drainage works and of water closets, urinals and similar public conveniences; and ○ Lightening of public buildings vested in the Corporation, public streets and Corporation parks.
3.	Standing Committee for Planning and Development	<ul style="list-style-type: none"> ▪ Recommend measures to be taken with regard to the matters relating to urban planning including town planning, slum improvement, upgradation and development and development of fringe area, keeping in view the need of the city vis-a-vis the availability of funds of the Corporation without encroaching Government grants and loans.
4.	Standing Committee for Education, Recreation & Culture	<ul style="list-style-type: none"> ▪ Recommend measures to be taken with regard to the following matters keeping in view the need of the city vis-a-vis the availability of funds of the Corporation without encroaching Government grants and loans: <ul style="list-style-type: none"> ○ Promotion of cultural, educational and aesthetic aspects; and ○ Provision of urban amenities and facilities such as parks, gardens, playgrounds, etc.
5.	Standing Committee for License & Appeals	<ul style="list-style-type: none"> ▪ Aid and advice in various licensing systems. In general, e-Governance may be adopted for bringing transparency in the system and for convenience of citizens.
6.	Standing Committee for Contracts	<ul style="list-style-type: none"> ▪ Powers and functions with regard to matters to be decided in connection with execution of contracts and finalization of tenders.
7.	Standing Committee for Corporation Establishment	<ul style="list-style-type: none"> ▪ Recommend measures to be taken with regard to the following matters keeping in view the need of the city vis-a-vis the availability of Funds of the Corporation without encroaching Government grants and loans: <ul style="list-style-type: none"> ○ Creation of posts, and ○ Recruitment of the staff of the Corporation.
8.	Standing Committee for Grievance and Social Justice	<ul style="list-style-type: none"> ▪ Recommend measures to be taken with regard to the following matters keeping in view the need of the city vis-a-vis the availability of funds of the Corporation without encroaching Government grants and loans: <ul style="list-style-type: none"> ○ Planning for Economic and Social Development, and ○ Safeguarding the interests of weaker sections of society, including the handicapped and mentally retarded.
9.	Standing Committee for Public Works	<ul style="list-style-type: none"> ▪ Recommend measures to be taken with regard to the matters relating to buildings, roads and bridges, pathways, drains and sewerage, general improvement works keeping in view the need of the city vis-a-vis the availability of funds of the Corporation without encroaching Government grants and loans.

EXECUTIVE WING

The executive wing is responsible for the day-to-day operations of the BMC and is headed by the Municipal Commissioner. Various administrative wings function under the Municipal Commissioner assisted by a Deputy Commissioner, Secretary, Deputy Secretary, Establishment Officer, Recovery Officer, Slum Improvement Officer, Environment Officer, Executive Engineers, City Health Officer, Chief Medical Officer & Law Officer.

Since the Municipal Rules are yet to be finalized, the detailed organization structure of the BMC vis-a-vis individual departments have not been finalized. However, the Act defines the role and functions of the above officers. Roles, functions and responsibilities of various the departments can be finalized only after the finalization of the Rules. The staff strength of BMC as on February, 28, 2006 is given in the adjacent table.

Table 8.3.2: Staff Strength of Bhubaneswar Municipal Corporation

Classification	Grade I	Grade II	Grade III	Grade IV	Total
Deputation	20	35	24	26	96
Local Fund Service	--	2	145	--	147
Non-Local Fund Service	--	--	345	951	1296
Total	20	37	514	967	1538

Source: Bhubaneswar Municipal Corporation, Bhubaneswar; 2006

8.4 ONGOING REFORMS

The BMC has been very proactive in introducing reforms at the ULB level. All these reforms may be broadly categorized under the following:

- Computerization Initiatives;
- Property Tax Reforms;
- Privatization Initiatives;
- Accounting Reforms; and
- Resource Mobilization Initiatives

A brief description on the above reform initiatives are given below:

8.4.1 COMPUTERIZATION INITIATIVES

The BMC has initiated computerization of various activities towards providing transparent, efficient administration through e-Governance. The ultimate aim of this e-Governance initiative is to connect the citizens with the BMC and to provide the citizens a clean, transparent, efficient, effective and hassle-free administrative system. Keeping these objectives in mind, the BMC has embarked upon an ambitious programme of computerization for its service delivery system. Orissa Computer Application Center (OCAC) has been engaged as turnkey consultants for implementation of the project over a period of two years. The basic objectives of this programme are to a) achieve office automation, b) corporation activities made accessible to all citizens for greater transparency, and c) provide a management information system, that cuts down on procedural delays and grievances are quickly redressed, and decisions are taken with minimum loss of time.

In the first phase of this programme, desktop computers have been procured and provided to officers in charge of Human Resources, Finance, Slum Improvement, Revenue, Engineering, and Health & Sanitation. Application software for payroll and holding tax collection has been developed by OCAC for execution during August 2005. A server has been introduced for centralized data storage and software sharing by various sections. A website (www.orissa.gov.in/ourbmc) containing information of the BMC has been hosted on the web and updated from time to time for easy access of the public to activities of the BMC and to facilitate BMC-citizen interface. Birth and death registration & issue of certificates has been fully computerized.

In the second phase, a GIS-based system is proposed to be designed and developed to aid in development of infrastructures like roads and drains and maximize revenue collection. It can be safely concluded that computerization of the BMC would redefine the mechanism of delivery of services and products and bring about a sea change in the functioning of the BMC. The BMC is also planning to introduce e-Seva kiosk, which would provide wide range of services to the citizens.

8.4.2 PROPERTY TAX REFORMS

The BMC has already taken initiative to improve collection efficiency of property tax during the last 3-4 years. Now, the BMC is providing thrust to the following key areas as part of the property tax reforms:

- Broadening the tax base or tax-net so as to avoid the dependence on relatively high tax rates;
- Rationalizing the tax rates to ensure better tax compliance and to prevent tax evasion; and
- Involvement and bringing ownership in tax reforms by the public in general and tax payers in particular.

The BMC is contemplating to introduce the scheme of self-assessment of property tax from next year. Steps have been taken for a comprehensive survey of all the existing holdings through tax collectors in 75 tax collection units. The survey forms are being supplied to the owners of various holdings to elicit the required information. Wide publicity and tax-education programme are being launched simultaneously. Following are some of the steps being initiated in this regard:

- Comprehensive survey of properties/holdings;
- Physical verification of major categories of properties;
- Verification of properties with exemptions and concessions;
- Regular monitoring by authorities and action against erring staff;
- Computerization of holding records through GIS;
- Focus on Government properties to collect tax;
- Focusing on major defaulters;
- Computerizations of out-dated demand registers;
- System of incentives and disincentives for collection staff; and
- Incentives to tax payers on advance payments.

The Indo-USAID FIRE (D-III) Project has committed to provide necessary technical assistance to the BMC in the property tax reforms. Recently, the BMC has launched a resource mobilization initiative with focus on property tax reforms and accrual based double entry accounting system with technical assistance from the Indo-USAID FIRE (D-III) Project.

8.4.3 PRIVATIZATION INITIATIVES

The BMC has been proactive in initiating private sector participation in BMC services. BMC has already privatized the cleaning and sanitation work in 14 wards with effect from May 2005. In addition, the transportation activity of solid waste management is also partly privatized and at present, the private operators have provided 48 tractors for the service. In addition, the BMC is also exploring private sector participation in treatment and disposal of waste in near future.

The BMC has also privatized streetlight management in the city. As per this initiative, the BMC hires the services of private contractors to procure materials and maintain conventional streetlights in all respects. About 24 wards have been handed over to the private contractor. This initiative has helped the BMC to maintain streetlights more efficiently.

8.4.4 ACCOUNTING REFORMS

Currently, the BMC is keeping its accounts on cash basis. As part of accounting reforms, the BMC is contemplating to switch over to the accrual based double entry accounting system. In

this regard, Indo-USAID FIRE (D-III) Project would support the implementation of improved financial management and accounting reforms in the ULBs of the State including the BMC. The Indo-USAID FIRE (D-III) Project would assist the GoO to develop a municipal accounting manual in accordance with the Ministry of Urban Development (MOUD) National Municipal Accounts Manual (NMAM). The MoUD would also assist the GoO to organize orientation and training programs for elected representatives, municipal officials, auditors and chartered accountants related to the development of the manual. Recently, the BMC has launched a resource mobilization initiative with focus on property tax reforms and accrual based double entry accounting system with technical assistance from the Indo-USAID FIRE (D-III) Project.

8.4.5 RESOURCE MOBILIZATION INITIATIVES

The BMC has initiated various resource mobilization initiatives to achieve sustainability and reduce dependence on grants from the State Government. Following are some of the key initiatives to improve/strengthen tax and non-tax resources:

- Improving the collection efficiency of the property tax;
- Special drive to recover arrears of property tax; and
- Improvement of non-tax revenue through market improvement, property markets, rentals from commercial properties, etc.

Recently, the BMC has launched a resource mobilization initiative with focus on property tax reforms and accrual based double entry accounting system with technical assistance from the Indo-USAID FIRE (D-III) Project.

8.4.6 STATE-LEVEL ROADMAP FOR URBAN WATER SECTOR REFORM

In addition to the above reforms at the BMC level, the Indo-USAID FIRE (D-III) Project is providing technical assistance to the GoO to evolve a State-level road map for urban water sector reforms. The major objectives of this technical assistance are to develop and institute:

- Urban water and sanitation policy;
- Strategy for reform of water and sanitation services;
- Legislative reform to enable service improvements and to comply with the provisions of 74th CAA; and
- Institutional restructuring plan including enabling framework for outsourcing service delivery.

The above assignment is being carried out under the supervision of the FIRE (D-III) Project team with full support from the GoO.

8.5 KEY ISSUES

Following are some of the key issues identified under the urban reforms and governance related issues:

- There are concerned efforts at all levels to decentralize the local administration. The GoO has been expressing its commitment to undertake full decentralization in a phased manner as per the 74th CAA during the next five years.
- Building Rules and City Planning functions are proposed to be transferred to the BMC from the BDA. However, transfer of water supply and sewerage functions to the BMC may take more time though the GoO is keen to implement the decentralization measures as per the full spirit of the 74th CAA.
- In the event of transfer of functions from BDA to the BMC, there is a need to expand the administrative jurisdiction of the BMC to cover the existing Development Area (Master Plan Area) of 233 sq. km. The Concept Note on the proposed Bhubaneswar-Cuttack Urban Complex has not highlighted the role of the BMC and its probable administrative jurisdiction as transfer of functions is still at a preparatory stage.
- The BMC is observed to be keen to introduce property tax and accounting reforms.
- The BMC has successfully privatized part of solid waste management and street lighting service. Currently, these efforts are small-scale, while technical assistance may be

- required to upscale these initiatives.
- Progressive resource mobilization initiatives are observed on the part of the BMC to generate own sources of revenue through innovative partnerships with private agencies in real estate sector.
- There is a need for capacity building and training for the municipal staff to take forward the reform process in the following areas:
 - Conversion of existing cash based single entry accounting into accrual based double entry accounting system;
 - Computerization of the office activities including e-governance;
 - Models on large-scale privatization of civic services; and
 - Forging effective public-private-people-partnerships (PPPP).
- There is a need for comprehensive land reforms for transfer of land to the BMC by the GA Department of GoO for the purpose of locating utility facilities, slum upgrading measures and housing for the urban poor.
- There is a need for finalization of the Municipal Corporation Rules to facilitate speedy implementation of property tax and accounting reforms.
- Speedy decentralization of local administration as per the true spirits of the 74th CAA is an immediate requirement for full functioning and accountability of the BMC.

9

CONSULTATIONS, SURVEYS AND ANALYSIS

9.1 STAKEHOLDERS

A City Development Plan (CDP) is the corporate strategy of the ULB that presents both a vision of a desired future perspective for the city and the ULB's organization, and mission statements on how the ULB, together with other stakeholders, intends to work towards achieving their long-term vision in the next five years. Thus, a CDP preparation process is essentially a consultative process and therefore identification of stakeholders to be involved in the process is of crucial importance. A list of such identified stakeholders is given in Annexure - 10. The identified stakeholders represented both government and non-government sectors.

The identified stakeholders may be broadly categorized as under:

- Elected Representatives;
- Service Providers/GoO Offices;
- Business Houses and Associations; and
- NGOs/CBOs and Resource Persons

The above stakeholders were further categorized as Vision Stakeholders, Mission Stakeholders and Action Stakeholders, to define specific roles of for each of the participating stakeholders. Needless to say, the BMC has played an important role in identifying the above stakeholders and has involved them in a proactive manner through all stages of the consultative process.

9.2 CONSULTATION PROCESS

As stated earlier, the entire CDP preparation process was divided into three phases. The outcomes of each of the phases were based on extensive consultations and consensus emerged thereon. Phase 1 of the assignment involved extensive consultations with 'Vision Stakeholders', while Phase 2 had a wider list of stakeholders comprising representatives from various walks of life, identified as 'Mission Stakeholders'. Phase 3 of the assignment had specific consultations with 'Action Stakeholders' who were identified to participate in implementation of the CDP with specific roles and responsibilities. Each of the above phases culminated with a workshop, which endorsed the findings with specific remarks and suggestions.

Broadly, the consultation process was carried out in the following manner:

- Individual/sector specific discussions;
- Focus group discussions;
- External consultations; and
- Workshops.

Illustrative List of Stakeholders (Government) involved in the CDP Preparation Process
Elected Representatives
▪ Honorable Mayor
▪ Honorable Deputy Mayor
▪ Chairpersons of Standing Committees of BMC
▪ Corporators
Service Providers/GoO Offices
▪ Bhubaneswar Municipal Corporation
▪ Housing & Urban Devt. Department, GoO
▪ Bhubaneswar Development Authority
▪ Municipal Administration, GoO
▪ GA Department, GoO
▪ Public Health Engineering Organization (PHEO), GoO
▪ Orissa Water Supply & Sewerage Board
▪ Orissa Pollution Control Board
▪ IT Department, GoO
▪ Tourism Department, GoO
▪ Works Department, GoO
▪ Water Resources Dept., GoO
▪ Dept. of Town Planning, GoO
▪ Orissa State Housing Board
▪ State Urban Development Authority
▪ Orissa Police
▪ Dept. of Commerce and Transport
▪ Orissa Computer Application Centre
▪ Regional Transport Officer (RTO)
▪ Health & Family Welfare Dept., GoO
▪ OPEPA, GoO
▪ Dept. of Women & Child Devt., GoO
▪ Cuttack Municipal Corporation
▪ BDA- NICCO Park
▪ HUDCO
▪ East-Coast Railways
▪ National Institute of Habitat Management

Consultations were held in three stages as follows:

- First stage of consultations primarily addressed the concerns of the 'Vision Stakeholders'. This stage of consultations aimed at defining the draft Vision and Mission Statements for further discussions, streamlining and adoption;
- Second stage of consultations targeted the various identified 'Mission Stakeholders' and this stage of the consultative process streamlined the Vision and Mission Statements and has identified various priority actions and proposals to be addressed in the proposed CDP; and
- Third phase of consultations looked at the feasibility assessments and investment scheduling, which were finalized in consultation with the 'Action Stakeholders'.

9.2.1 INDIVIDUAL / SECTOR-SPECIFIC DISCUSSIONS

During the initial stages of the assignment, more specifically during Phase 1, the Consulting Team had a series of individual and sector-specific discussions with various stakeholders, having representing both government and non-government sector. Broadly, the individual consultations were held with various resource persons for discussing the city potentials, opportunities, existing constraints/weaknesses, felt needs and focus areas for the proposed CDP. The sector-specific discussions were held with service providing agencies to understand the current situation, system details, technical and administrative issues, prospects, and their preparedness to meet the emerging challenges. These discussions involved senior officials of GoO, BMC, PHEO, OWSSB, and other departments like Tourism, Roads, WRD, etc. Minutes of these discussions are enclosed as Annexure - 11. In a nutshell, these discussions focused on the city's strengths and weaknesses in facilitating economic growth and improving quality of life for all citizens. The outcome of these discussions facilitated the Consulting Team to draft a Vision Statement and identify various Mission Areas to be addressed in the CDP. Needless to say, these individual and sector-specific consultations have been continued throughout the plan preparation process.

Illustrative List of Stakeholders (Non-Government) involved in the CDP Preparation Process

Business Houses and Associations

- Confederation of Indian Industries
- Chamber of Commerce & Industry
- Hotel and Resorts Association
- Real Estate Developers Association
- IIDCO
- CESCO
- Reliance Telecom
- BSNL
- Kalinga Hospital
- Airport Authority of India
- Satyam Computer Services Ltd.
- Confederation of Citizens' Associations
- INTACH
- City Managers Association, Orissa
- City Transporters Association
- Big Bazaar
- Satyam Shivam Sundram

NGOs and Resource Persons

- Lingaraj Temple Trust
- Jagruthi
- Vikash
- Centre for Youth & Social Development (CYSD)
- Adhikar
- Prof. Mahalik (Resource Person)
- Prof. S. N. Tripathi (Resource Person)
- Prof. B. N. Sinha (Resource Person)
- Mrs. Monalisa Mohanty (Resource Person)
- Prof. Bipin Das (Resource Person)
- Prof. Manoj Kumar Rout (Resource Person)

9.2.2 FOCUS GROUP DISCUSSIONS

The focus group discussions were primarily envisaged towards in-depth Mission Area specific discussions by addressing both technical and administrative aspects. These discussions provided a platform for each of the Mission Stakeholders to express his/her view/concerns for possible redressal in the CDP. Apart from the focus group discussions this also provided the platform for interactive discussions within the group towards arriving at a consensus on various issues and priority actions. For the purposes of focus group discussions, all Mission Stakeholders were broadly grouped under the following based on the identified Mission Areas:

- Economic and Urban Development;
- Infrastructure Development;
- Environment Improvement; and
- Urban Poor and Slum Upgrading.

Issues pertaining to governance, citizen interface and reform agenda were discussed as cross-cutting features in the above discussions. In order to provide a prelude to the CDP

preparation process vis-a-vis the agenda for focus group discussions along with findings, the Consulting Team made a presentation to the participating members on the situation analysis (existing condition), SWOT analysis of the Mission Areas and key issues identified based on earlier stakeholder consultations. The discussions were guided by the Agenda Points circulated in advance along with the invitation letters.

In addition, the Consulting Team put in place an analytical framework for debate and discussion on the city's inherent strengths, latent weaknesses, opportunities available and imminent and progressive threats for each identified sector in the respective Mission Areas. Study aids such as relevant maps, SWOT analysis charts were made available to the stakeholders to enable them not only to effectively contribute, but also to specifically record their representations on the charts for subsequent incorporation into the CDP.

During the above focus group discussions, the Vision & Mission Statements and focus areas were deliberated in detail. Specific modifications addressed by the Mission Stakeholders on the Vision & Mission Statements were incorporated and approved in unison by all participants of the meeting. Proceedings of the above focus group discussions are given in Annexure - 12.

9.2.3 EXTERNAL CONSULTATIONS

External consultations were envisaged to discuss specific issues with various members belonging to a particular type of stakeholder identified for their involvement in the CDP preparation process. Several external consultations were held during the process and the following two are the major external consultations:

- Consultations with office bearers of Confederation of Citizens' Associations; and
- Consultations with the members of Utkal Chamber of Commerce & Industry.

Consultation with the office bearers of the Confederation of Citizens' Associations was held during their Annual General Body Meeting, which was attended by about 40 members/office bearers. The President extended an invitation to the Consulting Team to attend the meeting and to obtain opinion/feedback from its members as all its members were working at the grassroot level and were thus best suited to share/represent concerns and feelings of the citizens. This consultation was very fruitful and provided important inputs for addressing the key issues in infrastructure development, urban management and governance.

Another external consultation was held with the members of the Utkal Chamber of Commerce & Industry (Bhubaneswar), a professional body responsible for facilitating commercial and industrial activities in the city for its members. This meeting was attended by about 60 members and the Consulting Team presented its findings and policy directions for the urban and economic development of the city. This consultation provided good exposure on the activities of UCCI and possibilities of involving them as one of the key Action Stakeholders in implementation of the CDP. Overall, the consultation provided very important inputs on urban development and economic development along with key issues in other Mission Areas of the CDP. The UCCI also assured the team about their willingness and cooperation in the preparation and implementation process.

9.2.4 WORKSHOPS

As stated earlier, each phase of the assignment culminated with a workshop, which endorsed the findings with specific remarks and suggestions. Phase 1 had two workshops (Workshop 1 and Workshop 2), while Phase 2 and Phase 3 had one workshop each (Workshop 3 and Workshop 4). Each of these workshops had specific objectives, agenda and outcome. All these workshops were organized with a plenary session in which the Consulting Team presented the findings of the consultations, relevant data analysis and findings for discussions, clearly specifying the objective, agenda and expected outcome of the workshop. Breakout sessions were organized among the participants. These breakout sessions were envisaged to discuss and deliberate in detail on the agenda points of the workshop and arrive at a consensus on the outcome. The Consulting Team identified one participating stakeholder

as a facilitator for each of the groups with necessary team members. The facilitator was requested to present the findings and outcome of their discussions. Finally, the Team Members summarized the discussion points and prepared the proceedings for the approval of the BMC.

The First Workshop (Workshop 1) was organized on December 31, 2005 to discuss the initial findings, outcomes of stakeholder discussion and key issues across different sectors. This workshop was attended by representatives of key stakeholding departments and service providing agencies. A draft Vision Statement was proposed and the same was approved with certain modifications in this workshop. Presentation material is enclosed as Annexure - 13 and the Proceedings of the First Stakeholders' Workshop as approved by the BMC are enclosed as Annexure - 14.

After the First Workshop, the team continued further consultations with key stakeholders to confirm the Vision Statement of the BMC with the demands and expectations of a representative sample of local businesses and civil societies. Second Stakeholder Workshop was organized on January 05, 2006, involving both the BMC and the interviewed stakeholders representing both government and non-government sectors. This workshop was chaired by the Honorable Mayor of the BMC. Potential differences in expectations and additional service requirements were discussed during this workshop and initial Vision and Mission Statements were agreed upon. Presentation material of this workshop is enclosed as Annexure - 15 and the Proceedings of this Second Stakeholders' Workshop as approved by the BMC are enclosed as Annexure - 16.

The Third Stakeholders' Workshop (Workshop 3) was organized at the end of Phase 2 to detail out the priority actions and proposals to be addressed in the proposed CDP. This workshop detailed out the priority actions in terms of resources required, responsibilities and stakeholder involvement, identification of potential road blocks and suggestions to overcome these impediments, preliminary funding requirements and responsibilities, additional requirements, and pre-requisites for successfully accomplishing the priority actions. All the participants unanimously agreed with the findings and approved the priority actions (projects & reforms) for each of the Mission Statements. Presentation material of this workshop is enclosed as Annexure - 17 and the Proceedings of the Third Stakeholders' Workshop as approved by the BMC are enclosed as Annexure - 18.

The draft Bhubaneswar City Development Plan was presented to the Bhubaneswar Municipal Corporation (Workshop 4) in a Special Corporation Meeting held on April 17, 2006. This meeting was chaired by the Honorable Mayor and was attended by Corporators representing different wards of Bhubaneswar City. This meeting unanimously approved the draft Bhubaneswar City Development Plan in terms of findings, priority actions, proposals, capital investment plan and financial operating plan along with the proposed reform agenda and time frame. Presentation material is enclosed as Annexure - 19 and the Resolution passed in this regard by the BMC is enclosed as Annexure - 20.

9.3 VISION STATEMENT AND MISSION AREAS

Based on the outcome of the stakeholder consultations and key issues identified across different core sectors of city administration and management, the stakeholders adopted the below listed 'Vision Statement' for Bhubaneswar City during the above referred workshops and focus group discussions:

'Achieving holistic and sustainable development through improved urban governance, adequate levels of service provision & delivery, reform driven urban management, leading to making the city resource rich, vibrant in economy, clean, green, comfortable, safe and enjoyable place to live in...'

Based on the above 'Vision Statement', the following broad Mission Areas were identified:

- Primary Mission Areas
 - Economic & Urban Development;
 - Infrastructure Development (Provision & Delivery);
 - Environment Improvement;
 - Urban Poor and Slum Upgrading;
 - Urban Management and Sectoral Reforms; and
 - Urban Governance.

- Secondary Mission Areas
 - Public-Private-People-Partnerships;
 - Community Interface; and
 - Social Development.

9.4 MISSION AREAS AND MISSION STATEMENTS

Extensive consultations were held with various stakeholders (vision & mission) to ratify the aforementioned Mission Areas and finalize the 'Mission Statements' for each of the Mission Areas. Following table presents Mission Areas and approved 'Mission Statements' by various stakeholders.

Table 9.4.1: Mission Areas and Mission Statements

Sl.	Mission Areas	Mission Statements
1.	Economic and Urban Development	Strengthen the city economy by creating conducive environment for development in the city and the hinterland
2.	Infrastructure Development (Provision & Delivery)	Achieve adequate and equitable distribution of all services coupled with efficiency enhancement and sustainability
3.	Environment Improvement	Prevent pollution in all respects, which affects the safety of the inhabitants of the city along with protecting the existing natural resources from man-made intervention to maintain the environment balance within the city
4.	Urban Poor and Slum Upgrading	Improve overall living conditions of urban poor through improved housing, proper tenure and equitable basic services to bring them into the main stream
5.	Urban Management and Reforms	Strengthen the finances & resources through reform driven urban management initiatives
6.	Urban Governance	Bring transparency and accountability in the city administration through technology interface, human resource development and citizen orientation

9.5 DEMAND ASSESSMENT SURVEYS

The objective of the demand assessment survey is to understand the perceptions of the citizens of Bhubaneswar regarding the overall image of BMC and the services rendered by the BMC. This survey was also intended to ascertain the delivery level of the services provided by other service providers like PHE Organization, etc. This survey also sought the willingness of citizens to pay user charges for existing and improved civic services and their willingness for community participation for managing the civic/municipal services. The output of the above survey was an important input to the CDP as these were considered as perceptions of the citizens. This survey also highlighted the key concern areas of citizens and thereby helped the BMC to focus its attention on such issues. Finally, the survey also provided key reference points for pricing the utility services based on the willingness-to-pay (WTP). It may be noted that all the information captured and the inferences drawn from this section are based on perceptions of the respondents.

Broad Objectives

- Assess existing standards of service delivery
- Determine need for higher standards
- Priorities and preferences
- Assess willingness to pay for services and higher standards of service delivery
- Assess willingness to associate to self-manage certain urban services
- Bring out inequities across space and across category of respondents

9.5.1 SURVEY METHODOLOGY

The survey was conducted in areas/pockets located both inside and outside the administrative jurisdiction of the BMC. The areas outside BMC limits were limited to the peripheral urban areas where there has been significant development in the recent past. The survey covered various aspects on provision and delivery of urban/civic services, aspects related to citizen representation such as presence of citizen associations, involvement of citizens in managing urban services, etc. The survey also gathered socio-economic data relating to the respondents in order to draw suitable conclusions regarding different categories of respondents. Various aspects covered under the surveys are given in the box above.

Aspects/Sectors Covered in Demand Assessment Surveys
▪ Water supply
▪ Sewerage and drainage
▪ Solid waste management
▪ Road network and transportation
▪ Parking facilities
▪ Street lighting
▪ Social infrastructure / community facilities
▪ Complaint redressal system
▪ Property tax
▪ Public awareness
▪ Public opinion
▪ Willingness to associate
▪ Personal information

The sample size for the survey was selected based on the geographical coverage of the city and various income groups. Broadly, the samples are categorized as follows:

- Households;
- Urban Poor (Slum Dwellers);
- Small Commercial Establishments; and
- Large Commercial Establishments.

Separate questionnaires were designed for each of the above categories along with field control information. A copy of the above questionnaires is given as Annexure - 21. The methodology adopted for selection of samples and sample size for each of the categories is given in the table below:

Table 9.5.1: Sample Selection Methodology and Sample Size

Sl.	Category	Rationale	Size (Nos.)
1.	Households	<ul style="list-style-type: none"> ▪ Sampling based on electoral rolls, using systematic random sampling method; ▪ Selection of about 50 pockets with about 7 interviews per pocket; ▪ Pockets distributed across the wards. More pockets in high density wards; ▪ Pockets preferably covered areas with known inequities in service provision; ▪ Monitoring socio-economic categories in pocket interviews during fieldwork & conducting booster interviews (purposive) to achieve shortfall (if any) in a particular category to arrive at a quota of about 75 in each of the four categories; ▪ Booster interviews (purposive), covered at least one-third of women respondents; ▪ Conduct 1 household interview per every 25 buildings (skip 25 buildings for the next interview). 	377
2.	Urban Poor (Slum Dwellers)	<ul style="list-style-type: none"> ▪ Slums categorized into 4 categories by population and about 15 slums selected for ensuring geographical spread as well as coverage across slum settlements of different sizes; ▪ Number of interviews conducted per slum is proportional to the population of the slum - depending upon the size, 8-12 interviews conducted per slum; and ▪ Cluster sampling followed to conduct interviews in each slum - each slum is divided into 3-4 clusters (that ensures geographical coverage within the slum settlement) and 2-3 interviews conducted in each cluster. 	209
3.	Small Commercial Establishments	<ul style="list-style-type: none"> ▪ Purposive sampling followed; ▪ Geographical coverage is ensured while selecting establishments - interviews conducted in different areas across the city; ▪ Covered areas/establishments located outside municipal limits (but within urban agglomeration), which are functionally connected to the city (if required); and ▪ Owner / Manager of the establishment interviewed. 	114

Sl.	Category	Rationale	Size (Nos.)
4.	Large Commercial and Trading Establishments	<ul style="list-style-type: none"> ▪ Purposive sampling followed; ▪ Geographical coverage is ensured while selecting establishments - interviews conducted in different areas across the city; ▪ Covered areas/establishments located outside municipal limits (but within urban agglomeration), which are functionally connected to the city (if required); and ▪ More than one person within an establishment is interviewed for eliciting correct response to all the questions. 	63
All Categories of Representation			763

Note: In all categories, about two-third of total sample size were selected on random basis as per above suggested methodology, while remaining one-third of the sample size were covered through purposive booster interviews to achieve balance of different types of respondents within each category.

The surveyors were provided with on-field training for conducting the survey and the supervisors were made responsible for maintaining the desired level of quality of the survey. Pilot test was carried out before the commencement of the survey to ascertain: a) whether the identified/specified respondent is able to answer the questions, b) whether the questions were properly understood by the respondents and all appropriate responses were listed, and c) whether any key aspects had been left out of the questionnaire. The pilot tests were successful.

9.5.2 ANALYTICAL FRAMEWORK

The demand assessment survey analysis was carried out separately for each category viz., households, urban poor, small commercial establishments and large commercial establishments. Apart from the category-wise analysis, certain results have been analyzed across all categories of consumers to highlight the key findings for Bhubaneswar as a whole. The broad framework adopted for the analysis is given below:

- **Coverage:** Analysis of the coverage has been done separately for each customer category to ascertain category-specific issues. Finally, a cumulative analysis was carried out across all categories to have an overall picture.
- **Analysis of Existing Standards:** Empirical evidence suggests that perceptions of citizens/consumers regarding the existing standards of service delivery have a direct impact on their WTP and other responses to civic agencies. The survey therefore has captured the perceived standards for various municipal services through parameters such as hours of supply, quality and sufficiency of water, distance from hand pumps and public taps, frequency of waste collection, road sweeping, etc. Two types of value added analysis have been done using the responses, viz. access to services and quality of services.
- **Analysis of Desired Standards:** This analysis consists of the need for higher standards and the corresponding WTP for those standards. This analysis provides key inputs to infrastructure planning and development agencies such as the BMC, BDA, PHEO, etc. for future planning of infrastructure capacities and operating technologies. The analysis also provides an insight for the BMC/GoO to prioritize investments and price the services appropriately.
- **Need for Higher Standards:** The need for higher standards for municipal services has been ascertained in two ways. The adequacy of existing standards vis-a-vis the requirement for higher standards was analyzed. It has also been ascertained by asking certain direct questions such as need for 4 and 8 hours of water, need for sewer connection, etc.
- **WTP for Higher Standards:** WTP for higher standards has been assessed at different levels of service. As municipal services are mostly in the nature of networks, measurement of WTP provides inputs to infrastructure planners for determining the service options, trade-offs between options, centralized vs. decentralized systems, etc. The responses were analyzed as percentage of respondents at various price levels for a

particular standard of service or WTP for different service levels. Apart from providing certain indicators for pricing, the survey also revealed the rationale behind citizen responses and the need for consumer education on municipal services including pricing issues.

- Willingness-to-Associate (WTA): The presence of an active civil society has a direct bearing and impact on the quality of urban services. Organizations comprising citizens residents of particular localities (RWAs/CBOs) that take up civic issues can potentially play a key role in improving the quality of civic services within their locality.
- Public Opinion/Public Awareness: Two aspects relating to public opinion/awareness were analyzed as part of the survey:
 - Awareness of various aspects relating to BMC, namely knowledge of key personnel such as the Mayor, Commissioner and their respective Corporators, place for registration of complaints, local issues discussed in newspapers, etc. Levels of awareness of such information would indicate the extent to which citizens were familiar with BMC.
 - Overall rating of municipal services on a categorical scale reflecting the satisfaction level of the citizens. Citizens were also questioned about the most important service that needs to be improved. This input was required to prioritize the action plans of the BMC.
- Demographic Profile: Demographic information, such as age, occupation, education, income, etc., has been recorded as part of the survey. This was useful in analyzing the responses across age, income, education and occupation classes.
- Cross-Tabulations: Each question typically captures responses to one variable or a particular category. Cross-tabulation is a method that helps highlight findings in one variable and further analyze of the responses. In one category, cross-tabulation primarily involves tabulating responses to a dependent variable vis-a-vis an independent variable. For example, responses to questions relating to income and WTP could be cross-tabulated to check whether respondents in higher income categories indicate higher WTP.
- Conclusions: The conclusions and implications of the survey findings have been drawn at both levels, viz. for operational decisions and for strategic/policy decisions. Both have been taken into account as inputs for CDP preparation.

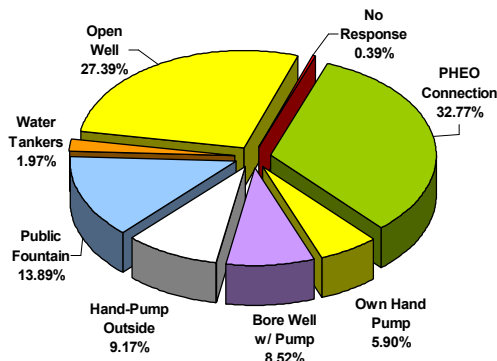
9.5.3 SURVEY RESULTS, ANALYSIS AND INFERENCES

The respondents expressed their interest in the provision of an improved level of civic services, but were reluctant to reveal their actual income since this survey was conducted along with officials of the BMC and it was felt that the study was targeted at increasing taxation levels. The survey, besides obtaining an assessment of the willingness-to-pay of the public towards improved infrastructure services, also evaluated the perception of citizens on services presently provided by the BMC and PHEO.

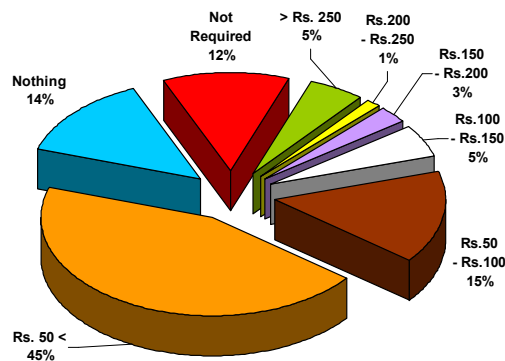
Analysis of the data collected through the demand assessment survey on several aspects of the identified Mission Areas is presented in the following sections.

WATER SUPPLY & SEWERAGE

- Sources of Water Supply:** Individual water connection (PHEO) is the major source of water supply (32.77 percent) followed by open well (27.39 percent) and public water (13.89 percent) as illustrated below.



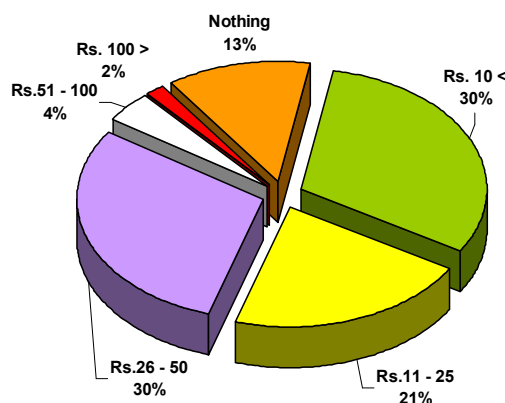
Main Source of Existing Water Supply



Monthly WS Charges - Willingness-to-Pay

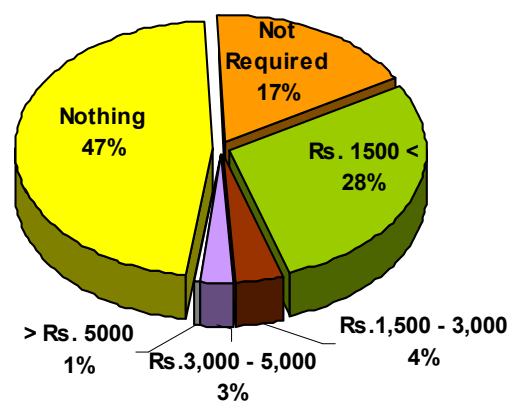
O&M of water supply and underground sewerage schemes entails a significant expense comprising tools, equipment, consumables, labor, energy charges, renewals/replacements and related heads. Collection of a monthly payment as water and sewerage charges from the beneficiaries of the proposed underground sewerage scheme needs to be implemented to ensure cash flow and meet the expenditure.

- WTP for Water Charges:** A significant proportion of respondents (45 percent) have indicated Rs. 50 or less as the preferred monthly payment for water supply charges. 15 percent have opted for the nominal range of Rs. 50-100 per month as illustrated.
- WTP for Sewage Charges:** 30 percent of the respondents have indicated Rs. 50 or less as the preferred monthly payment for sewerage charges. Only four percent have selected the nominal range of Rs.50-100 per month as illustrated.



Monthly Sewerage Charges - Willingness to Pay

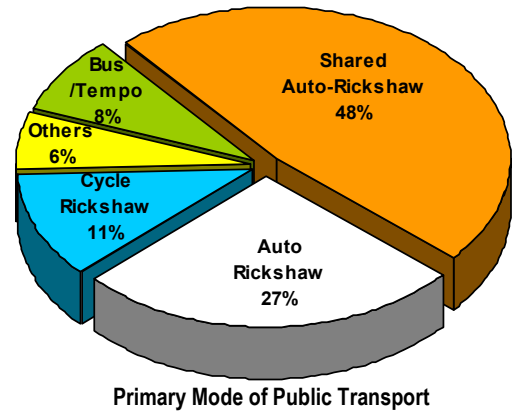
- WTP for Water Supply and Connection Charges:** About 28 percent of the respondents have opted for the lowest payment mode, i.e. one time payment of Rs.1,500. A significant percent of the respondents (47 percent) were not willing to pay for the connection. However, this is relatively better when compared with the survey results from other towns where nearly 90-95 percent of the respondents were not willing to pay any charges, both one-time and monthly for water supply and sewerage.



One-time Payment - WS & UGSS Connection

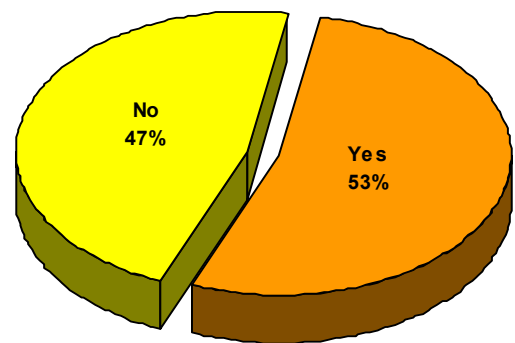
ROADS, TRAFFIC & TRANSPORTATION

- Nearly half of the respondents (48 percent) use the system of share-autos followed by individual auto-rickshaw services. The most common economical mode of travel, i.e. bus was selected by only 8 percent of the respondents.
- Nearly three-fourths of the respondents surveyed (72 percent) were found to be willing to pay for regulated and adequate parking facilities in Bhubaneswar City.



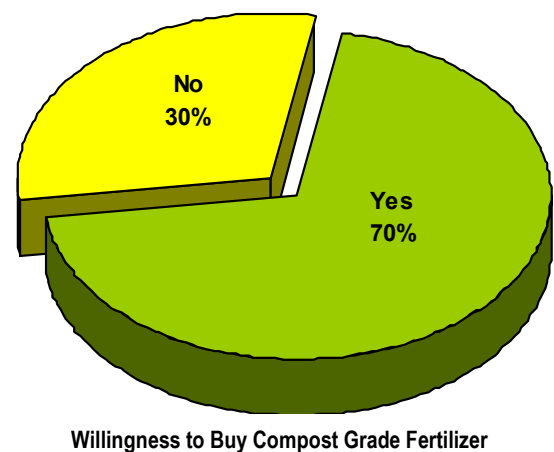
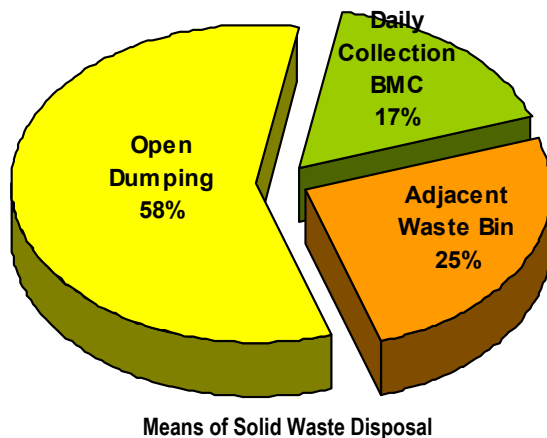
STREET LIGHTS

- 53 percent of the respondents conveyed that street lights were available. However, a significant portion of the respondents (45 percent) indicated that the installed lighting was not functional indicating that maintenance of street lighting is to be significantly improved.



SOLID WASTE MANAGEMENT

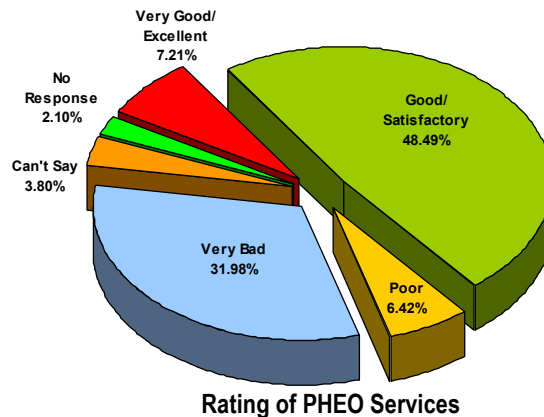
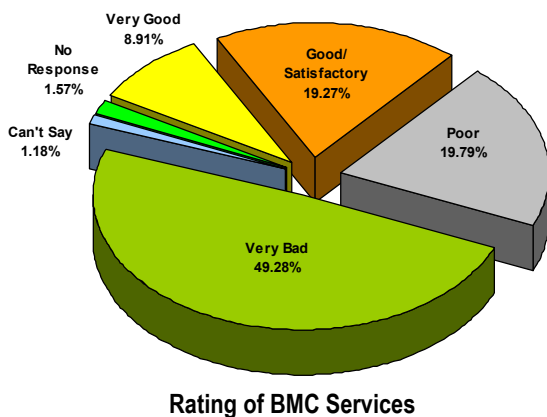
- The efficiency of solid waste collection, transportation and disposal was also evaluated through the questionnaire. It was found that nearly 60 percent of the population resorted to open dumping of solid waste in street corners and drains. Only 17 percent indicated daily collection by BMC staff.



- With regard to monthly charges payable for solid waste collection and disposal, nearly 43 percent of the respondents opted for the minimum payable charges of Rs. 10 per month. On the other hand, nearly 40 percent of the respondents were not willing to pay any charge towards solid waste collection. Only a minimum number of respondents (<10 percent) opted for higher monthly charges.
- Public opinion was sought to assess the willingness of the public to buy compost-grade fertilizer from a proposed treatment facility. Nearly 70 percent of the respondents indicated their willingness to buy composted material for soil conditioning and for utilizing it as fertilizer.

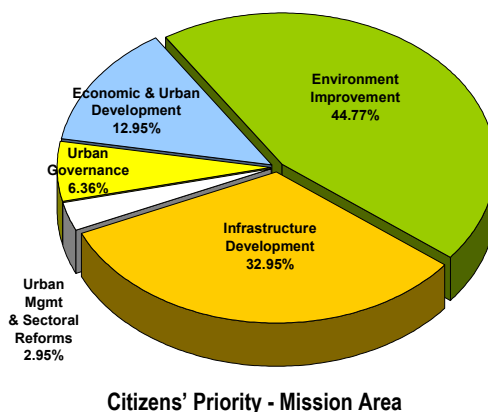
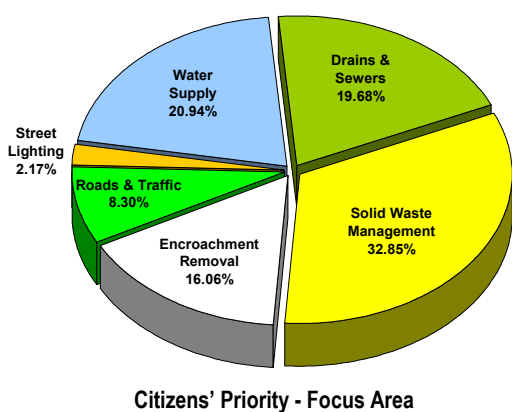
URBAN MANAGEMENT & GOVERNANCE

- It was ascertained that nearly 70 percent of the respondents pay less than Rs. 500 per month as property tax.
- An assessment of the level and performance of the services provided by the BMC and PHEO indicates that nearly half of the respondents were dissatisfied with the quality of services provided by BMC. Only 20 percent responded that the services can be rated as “good or satisfactory”. With regard to service levels by PHEO, almost 50 percent of the respondents rated PHEO services as being “good/satisfactory”.
- Although these ratings are qualitative, it is important that BMC and the PHEO adequately respond to public requirements and address grievances in a timely and effective manner.



CITIZEN'S PERCEPTION ON INVESTMENT PRIORITIES

- The overall perception of the citizens of Bhubaneswar was solicited to identify the areas requiring improvement and specific Mission Area/civic service areas, which would result in overall improvement of the quality of life in the city.
- Approximately 45 percent feel that the city environment required improvement on a priority basis followed by nearly a third (33 percent) to improve the urban infrastructure.
- A similar perception survey conducted on the “Civic Service” front has revealed that nearly 33 percent feel that solid waste management is a priority area that requires significant improvement followed by water supply, drains, sewers and removal of encroachment.



10

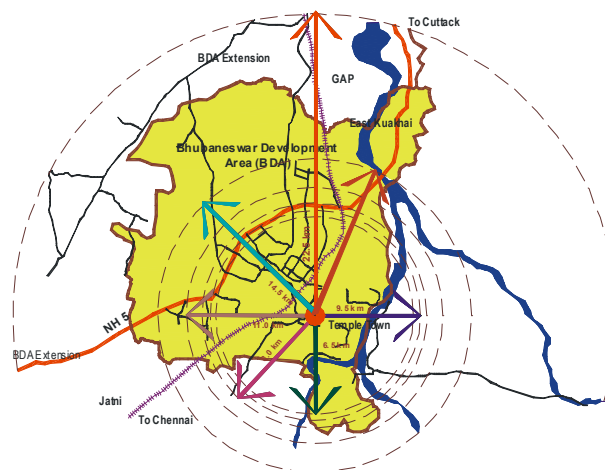
ECONOMIC AND URBAN DEVELOPMENT

10.1 DEVELOPMENT SCENARIO OVERVIEW

10.1.1 URBAN DEVELOPMENT

As stated earlier, the city, which was planned originally for 40,000 people with an area of 1684 hectares of land, is now accommodating about 7.50 lakhs of population in an area of about 135 sq. km. The present city is nearly rectangular and has extended in seven different directions during the last few decades by engulfing the fringe villages. Bhubaneswar is a fast growing city but its growth is hampered by the location of the reserve forests in the northwestern part and the flood plains in the eastern part. The structure of the city indicates growth towards the southwestern side of the city. The present Bhubaneswar City sprawls over 233 sq. km. comprising 2312 revenue villages.

The transport corridors and their proximity to existing services guide the spatial growth of the city. The city is fast growing along the NH-5 towards Cuttack in northeastern direction and along the NH-5, towards Jhatni and Khorda in the south-west. The availability of vast unutilized land of the GoO in the west also aids development. The scope for extension towards the south is limited due to the presence of the Old City. However, the region as a whole may grow towards Pipli and Puri along the transport corridor NH-203. The adjoining map illustrates the potential growth direction of the city in future. In fact, the proposed Perspective Plan - Vision 2030 also envisages the areas along the above growth directions as Planning Region.



Current Growth Directions of the City & Extent of City Growth



Future Potential Growth Directions of the City

10.1.2 ECONOMIC DEVELOPMENT

Bhubaneswar City has been functioning as an administrative city with sustained growth in tertiary economic activities. Major economic activities of the city are trade & commerce, tourism related activities and to some extent, industrial activities. Bhubaneswar is an important center for trade and commerce in the state. Handicrafts occupy an important place in the

economy of the city and contribute to foreign exchange. The crafts include silver filigree works, colorful applique works, stone images, wood carvings, patta paintings, brassware, horn works, bamboo articles and related. The trade and commerce activities in the city can be divided into two broad categories namely the organized and the unorganized markets.

There has been a rapid growth in the commercial sector during the recent past. Hotel and construction industry have witnessed significant growth. In addition, meat shops (tin boxes), food & grocery items and clothes are the other sectors indicating increased growth. Other than the organized sector, there are large numbers of unorganized markets in the city. According to a survey conducted by the BDA, about 4,500 temporary shops are presently functioning at about 45 locations. A certain degree of concentration has been observed in the location of these market complexes/shopping centers/kiosks in the developed parts of the city within the framework of the Development Plan.

The tertiary economic activities like trade & commerce, administrative functions and services are continue to dominate the city's economy.

Declaration of Bhubaneswar as an Electronic City has attracted many industries in the electronic sector, which are not polluting in nature. Some of such large corporate houses, which have already set up their business in the city, include Tata Consultancy Services, Satyam Computers and Infosys. In addition, the city is fast emerging as a preferred destination of health and education for the State. In the background of the above factors and availability of skilled manpower, the city has a great potential for knowledge based industries like ITES, health and education. Moreover, based on the discussions, the Consulting Team understands that the GoO has a policy to encourage knowledge based industries in the State Capital City.

Generally knowledge based industries, especially, ITES demands good connectivity, safety and entertainment. Bhubaneswar City, being connected by air, rail and road, offers good connectivity. Further, the city (State) has relatively good law and order. In addition, the city is also bestowed with many natural & man-made attractions, which can provide entertainment. All these factors can make the city a hub in the eastern India for knowledge based industries.

Bhubaneswar City has a rich cultural background. It is famous for the Lord Siva temple complexes built with magnificent sculptural and architectural features depicting the varied social, cultural and religious heritage of Orissa's different eras dating back to 300 BC. The entire temple complexes that are located in the old city of Bhubaneswar feature a conglomeration of temples, monuments, mandaps, heritage ponds, etc. The monuments are spread over an area of 510 hectares. Moreover, the city forms the apex of the world famous 'Golden Triangle' of Orissa with Konark and Puri. The city epitomizes the rise and ascendancy of Hinduism, Buddhism and Jainism. The city has magnificent monuments, architectural wonders and some of the best sites for nature lovers. The proximity to Nandankanan Zoo and the Chilka Lake makes the city a preferred destination for both domestic and foreign tourists. All the above aspects provide a perfect platform to look at heritage conservation and tourism as a potential area for boosting the city economy.

The city requires major investments to retain its fame as the 'Temple Town'. Heritage conservation measures and improvement in infrastructure would boost tourism related activities, which in turn can turnaround city's economy.

Based on the above, following conclusions may be made on economic development:

- Being the State Capital, the city would continue to function as an administrative hub for the State with potential for the service sector, trade & commerce and other related activities to prosper;
- Owing to the city's past glory, rich history and culture, and wealth of heritage monuments, and natural beauty, tourism related activities can continue to prosper and play a major role in city's economy;
- Recent developments, conducive environment, good connectivity and availability of skilled manpower can provide impetus for knowledge based industries; and
- Apart from the above, the city will continue to provide support for sustaining small-scale and household service industries.

City's economy is driven by the following core sub-sectors:

- Services, trade & commerce;
- Heritage/tourism related activities;
- Knowledge based services (ITES, health & education); and
- Small-scale and household service industries.

10.1.3 SWOT ANALYSIS

In order to appreciate and articulate the current situation and present the future possibilities, a SWOT analysis conducted for, 'Economic and Urban Development' which is one of the Mission Area, is furnished below:

STRENGTHS

- As stated earlier, the city is bestowed with large number of heritage monuments and is rich in culture. This historical significance and recognition by the GoI as a 'Heritage City' would provide a unique place for Bhubaneswar in the national map for heritage and tourism related activities.
- Current administrative status of Bhubaneswar as 'Capital City' would bring in many tertiary activities like services, trade and commerce, to the city. This coupled with good connectivity (air, rail & road) and relatively high urban growth would provide a perfect setting for the city to prosper economically in the region.
- The city's significance in the State, in the Capital-Sub-Region and in the Golden Triangle of Tourism in Orissa has made this city an important hub of commercial, political, administrative and socio-cultural activities in the region.
- The city has been demonstrating sound socio-economic and cultural inter-linkages with neighboring settlements like Cuttack, Puri, Khorda and Jhatni. This would provide a platform for the city to grow spatially towards these other towns/cities.
- Needless to say, the city is endowed with natural setting, rich bio-diversity and natural resources. Holistic utilization of this natural advantage in sustainable manner would pay rich dividend to the city in the long run.

WEAKNESSES

- Though the city has been accredited as one of the few planned cities in India, the authorities have significantly failed to control the non-planned and haphazard urban growth. This aspect has been affecting the overall quality of life of the citizens in general and is posing a big obstacle to the prosperity of the city's economy.
- Urban areas are engines of economic growth and sound infrastructure provision and delivery is a key to sustaining such growth. Though the city has proved its potential and importance in the region, inadequate infrastructure provision and delivery have deterred attracting entrepreneurship into the city. This has also resulted in slow economic development, which in turn has failed to bring in resources in tune with the rapid urban development.
- After the super-cyclone of 1999, the city is yet to recover from the devastation even after 8 years. This devastation had impoverished many people, while the city has witnessed vast in-migration from rural areas in search of livelihood. All these factors have caused rapid growth of slums and large incidences of urban poverty, which have created a major dent in the city's overall development.
- The city is administered by the BMC while there are many agencies and directorates of the GoO involved in the development activities. This multiplicity of service providing agencies has failed to provide integrated and holistic urban management and infrastructure development solutions to the city.

OPPORTUNITIES

- The city in particular and the sub-region in general provide flexibility of growth. The city offers potential for intrinsic development by retaining socio-cultural and heritage values. Alternatively, the city exhibits potential for development along the National Highway-5. These aspects would provide significant flexibility for the city managers in policy planning and decision making.
- Owing to the city's strategic location, connectivity, inherent potential and availability of skilled manpower, knowledge based industries like ITES, health and education can prosper to a great extent. Recent development in the city and also proactive thinking of the GoO to encourage such entrepreneurship in the city would provide perfect setting for this sector to grow in the near future.

THREATS

- Owing to rapid urban growth, the city is witnessing a vast deterioration in the overall environment and uncontrolled exploitation of natural resources. These aspects, if they remain unaddressed, can cause potential obstacles for the city's overall development and economy in the long-run.
- During the field reconnaissance, several incompatible and non-conforming landuses were noticed at different locations. Delays in addressing these developments may cause bottlenecks for future planned growth and development.

It is considered that the inherent strengths identified through evaluation can be directly converted into opportunities for further improvement. On similar lines, the latent weaknesses that have been identified are necessarily indicative of the imminent and progressive threats that are bound to occur if the present issues/problems remain unaddressed.

Therefore, the priority actions identified through discussions with stakeholders and the proposals evolved for improvement are specifically intended to achieve dual objectives, viz. optimal utilization of the available strengths of the system through requisite identification and creation of opportunities for system improvement and sustainability, and implementation of remedial measures. Weaknesses of the system/sector need to be identified to ensure that the imminent and potential (future) threats are eliminated and prevented from recurrence.

10.1.4 POLICY FRAMEWORK, PRIORITY ACTIONS AND PROPOSALS

Based on the above, following are the broad policy framework and priority actions identified under the Mission Area 'Economic and Urban Development':

- Develop Bhubaneswar as 'Heritage City' and facilitate augmentation of the attractions / facilities to promote tourism related activities:
 - Turnaround strategy for the city to become an icon for heritage development, which includes heritage conservation measures, identification of heritage/tourism packages within the city and provides a supportive environment for their sustainability.
 - Inner city development around the Lingaraj Temple, Bindu Sagar and other heritage lakes.
 - City beautification measures like organized open spaces, urban squares, recreation places, fair grounds, etc.
- Promotion of knowledge based industries like ITES, health and education with adequate facilities - connectivity, entertainment and security:
 - Development of city infrastructure and facilities to compete with Kolkata and Hyderabad in attracting ITES.
 - Acceleration of city's airport expansion plan, augmentation of flights and facilities, expansion of railway station and augmentation of number of trains towards improving the overall connectivity for fast movement.
 - Decongestion of city's traffic, improvement of public transport, improvement of security, augmentation of entertainment facilities towards encouraging tourists to extend their stay in the city.
- Creation of economic opportunities and improvement of living conditions for urban poor towards bringing them into main stream and preventing slum proliferation in future. Policies to address livelihood opportunities for the urban poor and organize the informal sector of the city's economy.
- Policy measures and proactive facilitative role of the city administrator along with other professional bodies and associations to bring in more resources to the city and accelerate overall city development:
 - Set up 'Agenda Task Force' to monitor development and implementation progress.
 - BMC to act as 'single window clearance' agency with responsibilities to provide & deliver all city services including planning and regulating urban/city development.
 - Improve community interface to facilitate active participation of citizens.

- Appropriate institutional arrangements to facilitate transfer of all GoO owned land parcels to BMC to facilitate development activities.
- Development of effective interface between BMC/GoO and professional bodies and associations (UCCI, CCA, CII, HRAO, CMAO, etc.).

The capital investment required for the above priority actions are separately dealt with in detail under Section 10.3 for Heritage Conservation and Tourism Development, Chapter 11 for Urban Infrastructure, Chapter 12 for Urban Environment and Chapter 12 for Slum Upgrading and Urban Poor.

10.2 PROJECTION OF FUTURE POPULATION

10.2.1 BASIS AND METHODS

A critical factor in estimating the requirement of the urban infrastructure for future planning, design and investment outlay is the projection of population. The basis of projection is based on the following factors:

- Past census population of the city;
- Decadal growth and growth rates of the country, state and the city;
- Population density pattern and availability of land for the future growth of the city;
- Socio-economic characteristics and economic base along with employment generating potentials of the city;
- Relative developmental characteristics of similar project areas;
- Development (Master) Plan for the city considering the contextual issues stated and growth pattern of the city in terms of landuse and land availability for growth including proposed plans and potential for significant change in landuse (within project period/ design life);
- Positioning of the city in terms of its hinterland, linkages and connectivity and importance as an economic base for the region;
- Availability of resources to facilitate provision and delivery of services and facilities;
- Implications of the ongoing and proposed projects towards improving the provision and delivery of services;
- Other external and internal growth dynamics responsible for migration; and
- Other factors - tourism, natural disasters and related.

Population Projection Methods	
Numerical Methods	
▪	Arithmetic Increase
▪	Incremental Increase
▪	Geometric Increase
Graphical Methods	
▪	Exponential Series
▪	Polynomial 2 nd Order Series
▪	Power Series
▪	Logarithmic Series
Ward-wise Density Method	

The impact of the above factors was considered while assuming the growth rate for population projection. Future population for projection is carried out based on the various methods that are generally acceptable for urban planning and development related planning. These methods are given in the above box. The base criteria adopted for the projection of future population are listed below:

- Year of Study - 2006
- Census Years - 2011, 2021, 2031, 2041, 2051, 2061
- Design Stages - 2009 (Commissioning), 2024 and onward at 15-year intervals

Per CPHEEO guidelines and general construction practices, civil works/structures are designed for a nominal service life of 30 years and mechanical/electrical equipment for 15 years. Therefore, design stages essentially reflect the period/duration for which projection is required to design the replacements, renewals and reconstruction activities. Projection of future population has been performed for the vision period exceeding 50 years (2006 - 2061).

10.2.2 METHODOLOGY AND EVALUATION

The methodology used to project growth of population in Bhubaneswar is outlined below:

- A pilot projection was performed to evaluate the past trend of decadal growth, i.e. the population of 2001 was projected by utilizing available census data from 1951 to 1991. The projected value (by numerical and graphical methods) was then compared with actual census population to identify the method that resulted in the minimum allowed variation;
- Projection of future population (2006 - 2061) was then performed by utilizing the method(s) that resulted in the minimum allowed variation (< 5 percent). In cases where the variation was found to be significant (> 5 percent), then all methods were utilized;
- An additional projection method considering the present ward density and the ward-level potential for development was also carried out and
- Finally, results from the aforementioned methods were compared, average decadal growth rates computed and recommendations were provided accordingly.

As specified above, the pilot projection of 1991 and 2001 population was projected by numerical and graphical methods considering the available census data for the period 1951 to 1981 and compared with the respective census population, as given in the table below:

Table 10.2.1: Comparison of Projected Population of 1991 and 2001

Sl. No.	Projection Method	Projected Population		Census Population		Percentage Variation	
		1991	2001	1991	2001	1991	2001
1.	Arithmetic Increase	286,777	354,344	411,542	648,032	(30.32)	(45.32)
2.	Geometric Increase	516,502	1,216,976	411,542	648,032	25.50	87.80
3.	Incremental Increase	332,788	492,375	411,542	648,032	(19.14)	(24.02)
4.	Logarithmic	203,702	228,053	411,542	648,032	(102.03)	(184.16)
5.	Exponential	553,985	1,332,000	411,542	648,032	25.71	51.35
6.	Polynomial 2 nd Order	378,718	584,284	411,542	648,032	(8.67)	(10.91)
7.	Power	279,844	392,332	411,542	648,032	(47.06)	(65.17)
8.	Linear	263,702	331,240	411,542	648,032	(56.06)	(95.64)

It can be observed that all methods yield results with a variation of more than 5 percent with the polynomial 2nd order method exhibiting the least variation on both counts (1991 and 2001). Therefore, projection of future population for the vision period was performed considering available census data from 1951 to 2001 and using all numerical methods and the polynomial 2nd order method in the case of graphical methods.

10.2.3 PROJECTION OF FUTURE POPULATION

10.2.3.1 NUMERICAL AND GRAPHICAL METHODS

Based on the aforementioned methodology and evaluation performed, population has been projected for the several identified project stages based on numerical methods and graphical methods, whose details are furnished below.

Table 10.2.2: Population Projection based on Numerical and Graphical Methods

Year / Stage	Census Population	Projected Population			
		Numerical Method			Graphical Method
		Arithmetic	Geometric	Incremental	Polynomial 2 nd Order
1951	16,512				
1961	38,211				
1971	105,491				
1981	219,211				

Year / Stage	Census Population	Projected Population			
		Numerical Method			Graphical Method
		Arithmetic	Geometric	Incremental	Polynomial 2 nd Order
1991	411,542				
2001	648,032				
2006		711,184	927,141	731,321	787,234
2009		749,075	1,149,411	787,738	878,001
2011		774,336	1,326,463	828,034	941,324
2021		900,640	2,715,148	1,061,733	1,291,670
2024		938,531	3,366,069	1,142,314	1,407,737
2031		1,026,944	5,557,661	1,349,131	1,698,236
2039		1,127,987	9,857,593	1,617,711	2,063,967
2041		1,153,248	11,376,026	1,690,226	2,161,022
2051		1,279,552	23,285,690	2,085,018	2,680,028
2056		1,342,704	33,314,889	2,302,551	2,960,614
2061		1,405,856	47,663,688	2,533,509	3,255,254

10.2.3.2 WARD-WISE DENSITY METHOD

As specified earlier, pursuant to the evaluation and projection of future population based on conventional methods (numerical and graphical), an additional population projection was performed by considering the below listed factors:

- Present population density in each ward in Bhubaneswar;
- Classification of each ward as high, medium and low-density zones (relative grading);
- Potential for future development in each ward based on proximity to city center, established road network and access to related infrastructure and transport facilities; and
- Present landuse pattern and possible significant change in landuse over the vision period (2006-2056).

The population density of each ward based on 2001 census population has been computed by obtaining ward areas from an existing Ward Map provided by the BMC. Accordingly, wards were classified into high, medium and low-density wards in a relative manner. A map showing the ward population density pattern is given in Plate - 4.

PROJECTION FOR HIGH DENSITY WARDS

Wards with a population density (2001) of 9,000 or greater were designated as high-density wards. Projection of future population in high density wards has been performed by utilizing the decadal growth rate of the city of 57.46 percent (1991-2001). This rationale was adopted as it was felt that these wards form the core area would have access to all facilities and transport nodes. Such wards were expected to continue to develop with a high rate of growth as expressed by the stakeholders during the discussions.

PROJECTION FOR MEDIUM DENSITY WARDS

Wards with a population density (2001) between 6,000 and 9,000 were designated as medium-density wards. Wards with medium-density are those where expansion may occur over a nominal pace, but at a rate lower than the core areas of the city. In simple terms, these wards are situated close to high-density areas and owing to availability of open space for future development and the relative proximity to city center, it was assumed that the population growth will follow the country decade growth rate of 21.34 percent (1991-2001).

PROJECTION FOR LOW DENSITY WARDS

Wards with a population density (2001) less than 6,000 were designated as low-density wards. The identified wards of the low-density category were found to be characterized by large tracts of open space for development, but restrained by the nature of landuse such as institutional, reserve forests, hinterland areas, industrial estates, government complexes etc. Therefore, it was felt that the development may occur at a lower pace ruling out significant changes in the landuse pattern within the project (30 years) or the vision (50 years) period. Projection for these wards was performed by adopting the Orissa State Decadal Growth Rate of 15.94 percent (1991-2001). It is imperative to outline the following points which justify the assumptions made (ward categorization) and growth rates adopted:

- Classification of wards has been performed based on field visits, stakeholder discussions and review of the ward level information assimilated and enclosed in the Integrated DPR for Sewerage and Solid Waste Management Schemes for Bhubaneswar;
- The growth rates adopted are published by the Department of Census, Gol, and are characteristic/specific to similar cities; and
- The categorization of wards and the potential for future development is assumed based on the low probability of significant change in landuse pattern.

10.2.3.3 COMPARISON

A comparison of the projection of future population of Bhubaneswar from 2006 to 2061 is furnished in the table below:

Table 10.2.3: Comparison of Projected Population

Year / Stage	Census Population	Projected Population (in Lakhs)				
		Arithmetic	Geometric	Incremental	Polynomial 2 nd Order	Ward Density
1951	0.17					
1961	0.38					
1971	1.06					
1981	2.19					
1991	4.12					
2001	6.48					
2006		7.11	9.27	7.31	7.87	8.59
2009		7.49	11.49	7.88	8.78	9.39
2011		7.74	13.26	8.28	9.41	9.92
2021		9.01	27.15	10.62	12.92	12.58
2024		9.39	33.66	11.42	14.08	13.38
2031		10.27	55.58	13.49	16.98	15.25
2039		11.28	98.58	16.18	20.64	17.38
2041		11.53	113.76	16.90	21.61	17.91
2051		12.80	232.86	20.85	26.80	20.57
2056		13.43	333.15	23.03	29.61	21.90
2061		14.06	476.64	25.34	32.55	23.23
Average Decadal Growth Rate (Percentage)		19.49	1209.19	48.49	67.05	43.09

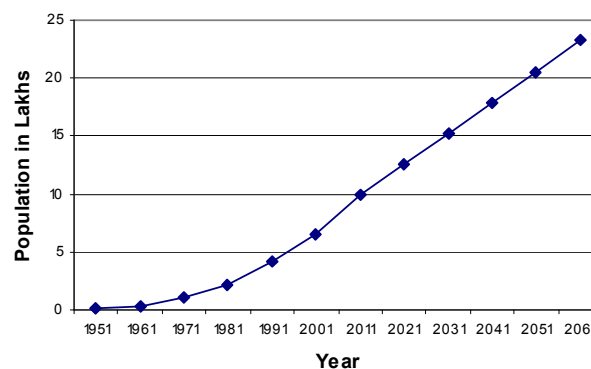
10.2.4 RECOMMENDED PROJECTED POPULATION

It can be observed that the projection of future population by 'Incremental Increase Method' and the 'Ward-wise Density Method' are the optimal projections for the purposes of planning for urban infrastructure projects. Thus, it is recommended to select the lower projected value of the aforementioned methods, i.e. 'Ward-wise Density Method' as the design population for the respective project design stages and vision period. The recommended projected population is as follows:

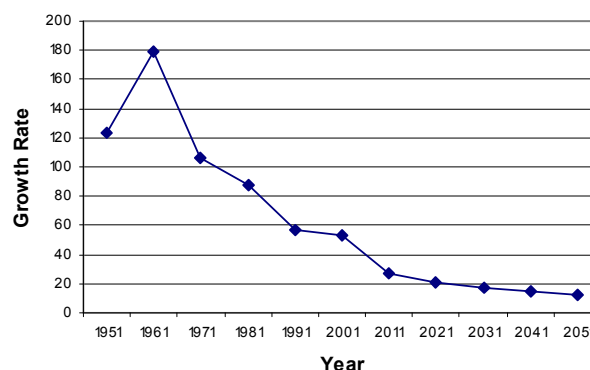
Table 10.2.4: Recommended Projected Population

Year / Stage	Census Population	Recommended Projected Population
1951	0.17	
1961	0.38	
1971	1.06	
1981	2.19	
1991	4.12	
2001	6.48	
2006		8.59
2009		9.39
2011		9.92
2021		12.58
2024		13.38
2031		15.25
2039		17.38
2041		17.91
2051		20.57
2056		21.90
2061		23.23

Population Growth Trend (1951-2061)



Population Growth Rate (1951-2061)



10.3 HERITAGE CONSERVATION AND TOURISM DEVELOPMENT

10.3.1 GENERAL

Bhubaneswar forms a golden triangle of tourism with Konark and Puri in the region. The city, till date, has remained as the gateway to the other two cities and essentially lives on secondary tourism potential despite the fact that significant heritage and culture related importance is available and can be projected in an effective manner. This potential is highly imperative to be considered and evaluated. The most important aspect to be dealt with in Bhubaneswar is the conservation of heritage monuments and adjoining areas to spur tourism and generate revenue in addition to improving the overall "image" of the city.

10.3.2 PRIORITY ACTIONS AND PROPOSALS

10.3.2.1 PRIORITY ACTIONS

Based on the discussions with stakeholders, the following priority actions have been formulated to achieve the aforementioned objective:

- Declaration of heritage zones within the city;
- Re-development of the area within heritage zones duly considering the monuments/temples and the potential impacts that arise from development;
- Development of an Environmental Management Plan specific to heritage zones and ensure proper implementation of the same during developmental activities;
- Regulating urbanization in the heritage areas and, if required, restrict/prohibit activities that may damage the structures, e.g. high-rise construction etc.;
- Installation of additional ambient air quality monitoring stations and subsequent development of an active database to continuously monitor conditions within the heritage zones;
- Planning and provision of basic infrastructure for tourists visiting the heritage zones; and
- Development of a specific traffic management plan for these zones including parking arrangements.

10.3.2.2 PROPOSALS

It is imperative to mention that heritage conservation has been considered as an important facet in the development of each sector that has been analyzed and recommended in this CDP. Sectoral improvements such as roads, solid waste management, water bodies, etc. serve to enhance conservation initiatives. The proposals listed below have been identified based on earlier studies, discussions and priority actions as required and mutually agreed upon by the stakeholders:

- Heritage Information Center;
- Traveler's accommodation;
- Community Hall;
- Amphitheater;
- Development of parks and playgrounds - green cover;
- Development of local heritage shopping centers;
- Heritage area lighting;
- Sculpture Park
- Site planning of temple areas - provision of buffer zone;
- Provision of gateways at entrance to the heritage areas;
- Conservation of heritage monuments;
- Adequate signage and information boards (multi-lingual) for tourists; and
- Other related infrastructure.

10.3.3 ESTIMATED SECTORAL INVESTMENT

Estimated capital costs for the proposed intervention are based on the following references, schedules, guidelines and assumptions:

- Costs are based on estimated costs provided in earlier studies conducted by the INTACH, Orissa Regional Chapter, OP rates, prevailing market rates and relevant information; and
- Land procurement and/or acquisition costs have not been included.

The capital costs estimated for the proposed intervention has been estimated at Rs. 5.95 crores (current rates). Appropriate provision for contingencies, cost escalation, supervision and administration charges including consultancy has been considered. Necessary clearances from concerned ministries or authorities need to be acquired at the earliest possible for timely realization of the proposed improvement.

Proposed Capital Works - Heritage Conservation

- Heritage Information Centre;
- Heritage Area Lighting;
- Gateways to Heritage Zones;
- Environmental Monitoring Stations;
- Declaration of Heritage Zones;
- Re-development of Temple Areas;
- Other Related Works.

The above capital investment components should be implemented by the BMC, in strategic cooperation/coordination with the Orissa Tourism Development Corporation and State Tourism Department (GoO).

10.4 POLICIES AND STRATEGIES FOR GROWTH MANAGEMENT

Considering the existing landuse and the potential for development, a growth management policy has been formulated. The policy is 'to allow growth of the city for a sustainable future through dispersal of economic and developmental activities'. Accordingly the following strategies have been evolved.

Growth Management Strategies

- Decongestion of Core City Area;
- Development of Potential Wards;
- Revitalising Commercial and Mixed Landuses; and
- Improvements to Public domain areas.

10.4.1 DECONGESTION OF CORE CITY AREA

Immediate steps need to be taken to decongest the core area. Following are some of the specific areas requiring attention in this regard:

- In the 'Temple Town', the finest architectural and sculptural elements are slowly dominated by modern development and the same is gradually reducing its importance. In many cases the visibility of temples is lost due to modern construction. Thus, it is imperative to prevent further construction of high-rise buildings in the old town with adequate development control measures.
- Inadequate road network system has resulted in traffic congestion in almost all roads of the old city. Moreover, inadequate parking space for vehicles also adds to the above problem. The roads are very often narrow with little possibility of widening as buildings have been constructed on either side leaving vast open lands behind. Thus, the available open space may be developed as organized parking lots to decongest the narrow roads.
- Several wholesale markets are located very close to the monuments. These attract large number of vehicles for transportation of goods/materials thereby adding to congestion and traffic problems though these activities are not related to tourism. The land occupied by these activities has higher potential due to tourism being in proximity to the monuments and hence landuse conversions can be considered.

10.4.2 DEVELOPMENT OF POTENTIAL WARDS

This strategy aims to allow future development based on current densities and constraints such as ecologically sensitive areas which shall not be disturbed. Considering the above, all wards in the city are categorized into 'saturated' wards, 'constraint' wards and 'potential' wards.

10.4.2.1 SATURATED WARDS

These wards are classified based on present and future densities. As the densities are reaching the saturation limit, newer developments, especially commercial development shall be limited or shall not be allowed. Accordingly, wards having density higher than 18,000 persons per sq. km should be classified under this category.

Saturated Wards

- Saturated due to high densities
- Population density higher than 18,000 persons per sq. km.

10.4.2.2 CONSTRAINT WARDS

These wards are classified based on constraints to development, which are environmentally sensitive, like heritage lakes, heritage monuments, etc. The development in these wards would harm the fragile eco-system and hence shall be avoided. The wards forming part of/adjoining the 'Temple Town' should be essentially included under this category. The development in these wards shall be allowed after careful consideration of the impacts and thus development in this area, if allowed, should be carefully monitored.

Constraint Wards

- Constraint for development due to presence of environmental / heritage resources.
- Wards forming part of / adjoining the 'Temple Town' should be included under this category.

10.4.2.3 POTENTIAL WARDS

These are wards that have exhibited the potential for future growth as development in these wards is catching up. These areas also do not contain any determinants in terms of growth and hence can satisfy the future growth requirements. The wards not classified under the above two categories may be included under this category. These wards are also large in area and occupy significant proportion of the total city area. Potential lands have been identified by the BMC/BDA based on private vacant lands but also on institutional ownership. Chunks of institutional lands are also available in these wards, which hence make them suitable for future development.

Potential Wards
<ul style="list-style-type: none"> ▪ Potential due to availability of vacant lands, new development proposals, etc. ▪ Potential lands have been identified by the BMC/BDA based on private vacant lands but also on institutional ownership.

10.4.3 REVITALIZING COMMERCIAL AND MIXED LANDUSES

The assessment with respect to the current landuse (based on city reconnaissance) indicates that there is still scope for commercial activity but it should be dispersed and balanced. Accordingly, landuse policy shall consider development of formal commercial structures at different places. The specific strategies include:

- Addition of commercial areas in the potential wards supplemented by formal land uses in the saturated and constraint wards to minimize demand for commercial activity in these wards.
- Encourage mixed landuse with less residential use in the core areas and discourage mixed land use activity based on minimum road widths in the inner areas.
- Improvements to public domain areas - road space and institutions.
- Improving more road open space on major arterial road to improve the traffic flow.

10.4.4 IMPROVEMENT TO PUBLIC DOMAIN AREAS

The area under the 'public domain' (incl. roads and open spaces) needs to be increased, through identification of such potential areas. There are a number of unidentified open spaces in 'Temple Town' and other parts of the city, which are owned by the GA Department of the GoO. Appropriate institutional arrangements need to be evolved to facilitate transfer of these land parcels to the BMC/BDA for developing areas of public domain. The specific strategies include:

- Appropriate guidelines to be followed in issuing building permissions to match with the road width to generate adequate open spaces at the community dwelling level.
- Conservation of environmental resources such as heritage monuments, lakes (heritage & man-made), in terms of pollution abatement and monitoring of recreational activities.
- Use of market friendly mechanisms like accommodation and reservation to generate more urban land and to further generate open space.
- Formulating a water bodies' networking programme to supply integrated open spaces to support physical and economic infrastructure.

The policies along with the strategies for growth management within the city are enumerated in the table below:

Table 10.4.1: Policies and Strategies for Growth Management

Policy	Strategy	Guidelines
Decongestive Policy	Decongesting Core City Area	<ul style="list-style-type: none"> ▪ Prevent/regulate further construction of high-rise buildings in old town with adequate development control measures. ▪ Develop available open spaces in 'Temple Town' as organized parking lots to decongest narrow roads. ▪ Shift/relocate wholesale markets located close to the monuments and develop the area for tourism related activities.

Policy	Strategy	Guidelines
Redistribution Policy	Limiting Densities and Population	<p>Population limitations on wards type basis, i.e., saturated, constraint and potential:</p> <ul style="list-style-type: none"> ▪ Average gross density for saturated wards 15,000 persons/ sq. km. ▪ Average gross density for constraint wards-9,000 persons/ sq. km. ▪ Average gross density for potential wards-12,000 persons/ sq. km.
Landuse Regulation Policy	Revitalizing Commercial and Mixed Landuses	<ul style="list-style-type: none"> ▪ Addition of commercial areas in the potential wards. ▪ Regulate mixed landuse based road widths. ▪ Improvements to public domain areas - road space and institutions. ▪ Improve more road open space on major arterial roads to improve the traffic flow.
Improvement in Public Domain Areas	Water Bodies' Networking	<ul style="list-style-type: none"> ▪ Specific guidelines for building permission to match with road width. ▪ Conservation of environmental & heritage resources. ▪ Generate more urban land through market friendly mechanisms. ▪ Formulate water bodies' networking programme to supply integrated open spaces to support physical and economic infrastructure.

URBAN INFRASTRUCTURE - DEVELOPMENT

11.1 GENERAL

This section of the Report pertains to the proposed development initiatives and specific improvements that are recommended to upgrade the existing system of Urban Infrastructure provision, delivery, operation and maintenance to normative standards and characteristics required for a State Capital.

The basis, sources and methodology adopted in assessment of the existing situation and identification of key issues specific to each selected sector has been briefed in Chapter 4.0 of this report. Similarly, sector specific analysis, assimilation of priority actions and proposed improvements have been arrived at / formulated based on the following:

- Discussions held with a wider group of secondary stakeholders (e.g., Citizens' Associations, CII, Chamber of Commerce etc.);
- Mission Area specific focus group discussions based on analytical framework and use of the SWOT analysis technique;
- Modification of the parameters (SWOT) based on feedback and comments from the stakeholders (secondary) at the focus group discussions and incorporation for future discussions; and
- Phase II workshop to finalize the priority actions and proposals for each sector in the identified Mission Areas based on the above-mentioned activities.

The overall sector-wise estimated capital investment required to achieve stated objectives within the mission period (2006-2013) has also been estimated and presented to the stakeholders in the Phase II workshop. Details of the investment components, capital investment phasing plan based on the above, and discussions with Action Stakeholders are also enclosed in subsequent sections of the report.

Sectoral investment for proposed interventions across all sectors and sub-sectors for this Mission Area has been estimated based on the following parameters:

- Information available/provided by concerned departments, detailed discussions with pertinent authorities, field/site visits, techno-economic evaluation/analysis conducted by the consulting team;
- Standard Schedule of Rates issued by PWD, PH, OWSSB and other engineering boards/organizations, OP rates, prevailing market rates, and relevant information;
- Consultant's database and experience on design of projects of similar scale/nature;
- Costs indicated are only estimated costs. Detailed cost estimation shall be performed for each item of work pursuant to detailed design engineering (during the DPR preparation);
- Land procurement and/or acquisition costs have not been included;
- Capital and annual O&M cost of the treatment facility has been estimated considering the techno-economically most feasible alternative technologies;
- Estimated costs are also based on recommendations and guidelines in "Plant Design and Economics" by Peters and Timmerhaus, "Compounding and Discounting Tables for Project Evaluation", A World Bank Publication; and
- Necessary provision for physical contingencies, cost escalation for implementation period greater than 18 months, administration/supervision and consultancy charges have been included.

11.2 WATER SUPPLY

11.2.1 WATER DEMAND

The existing water supply levels in Bhubaneswar need to be increased in terms of coverage and the volume of potable water needs to be supplied in an equitable manner to achieve an average per capita water supply as specified in CPHEEO guidelines on Water Supply and Treatment and to cater to 100 percent of the projected population. Non-Revenue Water/ Unaccounted for Water (NRW/UFW) and system losses need to be mitigated and monitored to ensure that the total losses do not exceed the allowable limits (15 percent) as specified in the CPHEEO guidelines. Further reduction of the losses through an effective and continual leak detection and water audit program is highly recommended and this would prove advantageous in the long-term.

Based on the projected population and the permissible supply levels as specified in the "Manual on Water Supply and Treatment" by CPHEEO, the total future water demand has been estimated and furnished in the table below:

Table 11.2.1: Estimated of Future Water Demand

No.	Description / Parameter	Present Stage (2009)	Intermediate Stage (2024)	Ultimate Stage (2039)
1.	Projected Population	939,000	1,338,000	1,738,000
2.	Per capita supply (lpcd)	150	150	150
3.	Allowable losses	15%	15%	15%
4.	Total per capita supply (lpcd)	172.5	172.5	172.5
5.	Bulk Flow/Industrial Supply	5%	5%	5%
6.	Total Supply (MLD)	170.08	242.35	314.80
Condition 1 - All three (3) sources are to be utilized				
7.	Installed Capacity of all sources (MLD)	217.24	217.24	217.24
8.	Augmentation required at Mahanadi Source (MLD)	-	25.11	97.56

It can be observed from the above table that the existing system does not require immediate augmentation (source only). The system is capable of meeting the increasing water demand through a combination of three sources till the year 2011 (assumed based on projected population). Pursuant to this stage, augmentation becomes necessary. At the same time, augmentation measures need to be identified considering the utilization plan for the three sources. Kuakhai and Daya River intake systems should be utilized only to the presently installed capacity and should not be overloaded because of low flow conditions in the respective rivers during the summer months (considerable part of the year). Mahanadi (perennial source) can be augmented for meeting the ultimate stage water demand conditions. It is important that capital investments in the water supply sector are planned to broadly address the following issues:

- Augmentation of installed capacity of existing facilities to meet the growing demand; and
- Rehabilitation of existing facilities to avoid higher costs of deferred and inadequate maintenance.

11.2.2 SOURCE DEVELOPMENT

The only perennial source, Mahanadi, can be tapped effectively. Additional raw water intake systems can be installed in the future. The present system of raw water intake channels to the intake well needs to be evaluated and modified, if necessary, since the MWL during summer months in the Mahanadi River may not allow adequate water to flow into the intake well.

For future augmentation of source, alternative intake systems (which can eliminate treatment requirements to a significant extent), as listed below can be evaluated for adoption:

- Ranney Collector Wells (only if sufficient sand depth to an extent of 5-m or higher is available); and
- Infiltration Wells/Galleries (a battery of wells/galleries would be required with appropriate inter-spacing as determined from summer yield tests in accordance with the established curve of interference).

As for the other sources, Kuakhai and Daya, which are non-perennial, it is important to ensure sustainability and utilize these sources accordingly. Water quality monitoring is a principal issue in these sources as the sources are susceptible to pollution due to the city's discharge of sullage and sewage through the Gangua Nallah and other outfall points.

An alternative which is practiced in drought-prone areas is recommended and requires further investigation for adoption. Summer storage tanks can be developed in the vicinity of the Kuakhai and Daya Rivers. These tanks are essentially massive earthen structures which are designed based on the probable holding capacity established through analysis of rainfall

intensity, flow during flood conditions and evaporation factors. High discharge pumps can draw water during high flow/flood conditions in the rivers and pump the same to the summer storage tanks for extraction for treatment and consumption during drought conditions. This measure will serve to conserve water and enhance groundwater storage potential.

In the face of full utilization of the surface source to meet future demand, groundwater use can be restricted and eventually phased out for daily consumption. On the other hand, the existing infrastructure for groundwater extraction can be used to meet localized distribution requirements during drought seasons when the yield from Kuakhai and Daya sources are likely to decrease.

11.2.3 ANALYTICAL FRAMEWORK - SWOT ANALYSIS

In order to appreciate and articulate the current situation and present future possibilities, the water supply sector was analyzed from all perspectives considering the strengths, weaknesses, opportunities and threats. The objective of this analysis is to essentially demarcate potentials and drawbacks of the existing system, weigh the possibilities and prepare the roadmap for an improved, effectively planned, designed, operated and maintained system:

STRENGTHS

- The presently utilized major surface water source, Mahanadi River, is a perennial source which provides for augmentation and complete utilization.
- The existing source availability and installed treatment facilities are adequate to cater to the water demand for the projected future population for the mission period (say 2011 – 2012).
- Although a high number of service reservoirs are available, this provides for the option to maintain the size of each distribution zone to a minimum (area, length of pipelines and connected units) which assists in exercising greater control in achieving equitable distribution.
- Skilled manpower is available to operate and maintain the existing system with better management practices which can ensure higher cost recovery and efficient supply.

WEAKNESSES

- A high per capita cost of capital expenditure is prevalent in the existing system as the coverage is not complete (50-55 percent).
- Due to problems such as inadequate zoning, improper extension and illegal connections, at adequate volume of water is not available at the specified minimum residual pressure throughout the system, specifically at tail end areas.
- Significant volume of Non-Revenue Water is present in the system, and this has a direct impact on the sustainability of the scheme. In other terms, the revenue from water supply charges is capable of meeting only a third of the total O&M expenditure.
- The stakeholders were of the opinion that collection centers for payment of water supply and sewerage charges were not adequate.
- User charges are presently on a flat-rate basis and not on specific consumption, which essentially creates a critical imbalance in O&M cost recovery and derails the potential for water conservation and conscious use.

OPPORTUNITIES

- System users are willing to pay nominal charges for reliable and equitable water supply.
- As the source availability is assured and appears to be reliable, continuous system of water supply can be established through proper re-distribution and rezoning of the network.
- JNNURM provides for capital investment support and capacity building.
- BMC can serve as the administrative and nodal agency for O&M of the water supply system with required technical and management support from the PHEO & OWSSB.
- Awareness programs can and should be conducted on water consumption to minimize wastage.
- O&M expenditure reforms can be adopted which will also result in direct cost savings and enhance cost recovery indirectly.

THREATS

- A significant threat to complete cost recovery is delayed decision making and implementation of water supply metering.
- The local sources (Kuakhai and Daya) require water quality monitoring for possible contamination.
- Unplanned development in the northeastern parts of the city needs to be regulated to minimize groundwater exploitation and assess the quantum of potable water from the city supply system.
- Cross-connections in previously installed distribution networks where cross-contamination can occur needs to be examined and corrected.

It can be observed that the inherent strengths identified through evaluation are directly converted as opportunities for furthering improvement. On similar lines, the latent weaknesses that have been identified are indicative of the imminent and progressive threats that are bound to occur if the present issues/problems remain unaddressed. Therefore, the priority actions identified through discussions with stakeholders and the proposals planned for the system improvement have been recommended with the intension of achieving the following objectives:

- Optimal utilization of the available strengths of the system through requisite identification and creation of opportunities for system improvement and sustainability; and
- Implementation of remedial measures based on identified weaknesses of the system/sector to ensure that imminent and potential (future) threats are eliminated and prevented from recurring.

11.2.4 PRIORITY ACTIONS AND PROPOSALS

11.2.4.1 PRIORITY ACTIONS

The following priority actions have been formulated to achieve the aforementioned objectives:

- Planning and capacity augmentation for adequate and equitable water supply and related capital investments.
- Water supply system for uncovered areas to make the coverage of 100 percent.
- Implementing the continuous system of water supply which requires lower interim storage and volumetric flow rates through the supply mains (lower head, lowered energy charges) as compared to intermittent supply.
- Improvement of operation and maintenance of the system.
- Performance monitoring - energy audit, leak detection, NRW studies, water quality, etc. These measures will reduce the unaccounted for water component and assist in cost recovery.
- Institutional strengthening and capacity building.

11.2.4.2 PROPOSALS

The improvement to the water supply system is designed to ensure that the installed water supply infrastructure meets the community's needs (water demand) for adequate and equitable supply at reasonable charges. The following proposals have been identified by the study team based on the reported evaluations, discussions and priority actions

as required and mutually agreed upon by the Mission Stakeholders:

- Redistribution/re-zoning of distribution system in existing areas;
- Rehabilitation of existing service reservoirs;
- Construction of additional service reservoirs;
- Proposed distribution system in uncovered areas;
- Rehabilitation and upgrading of operation systems in existing water treatment plants;

Proposed Capital Works - Water Supply

- Rehabilitation of storage and distribution system in existing areas;
- Source Augmentation;
- Augmentation of Transmission Mains;
- Augmentation of Storage Capacity; and
- Extension & Augmentation of Distribution Network

- Raw water supply system to meet the 30-year demand (2009-2039); and
- Augmentation of WTP and Clear Water Transmission Mains for ultimate stage demand.

The above proposals are envisaged to initially cover the entire BMC area. However, the concept of design/implementation shall be similar to that adopted for BMC, which can be implemented on a modular/zonal basis in the peripheral areas consistent with future development.

Following table presents priority actions and their implementation strategy for water supply during the mission period (2007-2012):

Table 11.2.2: Priority Actions and Implementation Strategy - Water Supply

Sl. No.	Priority Actions	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1.	Detailed assessment of NRW - implementation of comprehensive leak detection program and regularization of connections		████████████████████					
2.	Project formulation, detailed engineering, procurement and related activities		████████████████████					
3.	Rehabilitation of existing water supply and distribution system in covered areas to ensure equitable distribution		████████████████████					
4.	Augmentation of system coverage (100 percent) through proposed distribution system and house service connections for uncovered areas			████████████████████				
5.	Augmentation of raw water supply system to meet 30 year demand (2009-2039)				████████████████████			
6.	Augmentation of treatment and clear water storage and transmission systems (2009-2039)				████████████████████			
7.	Upgrade mechanical & electrical equipment, instrumentation at source, WTP and other pump stations including installation of SCADA system				█	█	█	█
8.	Site restoration, green zone development, service roads (along cross-country alignment), valve designations and other auxiliary activities					█	█	█
9.	IEC activities, awareness programs on water conservation, institutional restructuring and related capacity building measures	█	█	█	█	█	█	█
10.	Explore private sector participation in O&M activities			█	█	█	█	█

11.2.5 ESTIMATED SECTORAL INVESTMENT - CAPITAL AND ANNUAL O&M COST

Based on the parameters specified in the box given at the start of this chapter, the capital and annual operation & maintenance cost have been estimated for the proposed intervention and are listed below:

Table 11.2.3: Estimated Sectoral Investment - Water Supply

		<i>Rs. in Crores</i>
Sl. No.	Sector / Component Description	Investment
1.	Redistribution/re-zoning of distribution system in covered areas	93.36
2.	Rehabilitation of existing service reservoirs	7.79

Sl. No.	Sector / Component Description	Investment
3.	Construction of additional service reservoirs	110.32
4.	Proposed distribution system in uncovered areas	154.60
5.	Proposed raw water supply system (2009-2039)	87.92
6.	Augmentation of existing raw water supply system, water treatment plants and clear water transmission systems	146.50
7.	Provision and upgrade of operational infrastructure (e.g. SCADA), electrical works and miscellaneous such as clearing/restoration, etc.	85.76
8.	Provision of railway / NH crossings for supply/distribution mains	5.00
	Total Capital Cost (incl. contingencies, supervision, administration and consulting charges)	691.26
	Annual O&M Cost	8.29

Necessary clearances from concerned ministries or authorities need to be acquired at the earliest. The authorities/departments/agencies that are proposed to be responsible for project formulation/implementation/monitoring are listed below, but shall not be necessarily limited to the following entities:

- Nodal Agency: Bhubaneswar Municipal Corporation.
- Formulation/Implementation Agency: PHEO.
- Monitoring Agency: State Pollution Control Board, Orissa, Bhubaneswar

11.3 UNDERGROUND SEWERAGE SCHEME

11.3.1 SEWAGE GENERATION

Based on the projected population and the slated per capita water supply, approximately 80% of the supplied quantum of water is expected to be translated into sewage flow (per CPHEEO "Manual on Sewerage and Sewage Treatment"). The proposed sewerage scheme should be designed considering this generation ratio including the possible infiltration that could occur in this region based on rainfall, soil condition, geology, installed sewer length and manhole conditions.

11.3.2 DISCUSSION ON SEWAGE TREATMENT, RE-USE/DISPOSAL SYSTEMS

Treatment of collected sewage in accordance with the pollution control norms and river discharge standards is critical and poses a significant hazard to public health if not designed, implemented, operated and maintained in a proper manner. The present system of sewage treatment through oxidation ponds and/or aerated lagoons is not a feasible alternative for the entire city with a high population index. Conventional methods of treatment such as waste stabilization ponds (WSP) result in a significant land requirement, which not only results in high capital cost for land acquisition, but also provides a relatively low-degree of treatment unless the hydraulic residence time in the maturation pond is increased to the required extent. (This increases the land requirement further.)

The activated sludge process (ASP) could be a viable alternative where land requirement is kept to a minimum and a high degree of treatment is ensured. ASP is usually adopted in large cities where land availability is low and landuse is restricted. Further, a higher capacity, centralized facility can serve to lower the cost of operation and maintenance (cost of treatment per kiloliter of raw sewage).

Another issue that must be dealt with is the re-use of treated wastewater, which will directly reduce the overall demand on freshwater. The following uses are recommended for further evaluation:

- Re-use of treated water for supplementing fire-fighting demand. Although it is impractical to install a wet system of fire protection, treated wastewater can be stored at strategic locations at ground level with pumping arrangement or overhead tanks for access by the fire department. These locations will have to be clearly demarcated, accessible and equipped with watch/ward to prevent misuse or human contact with the treated wastewater. In the present scenario, this option may not be viable and is presented here only for future consideration.
- Re-use for wet sweeping of main roads - modern equipment is commercially available to sweep and clean main roads through mechanical brushing/sweeping combined with a water spray to keep suspended particulate matter to a minimum. Water for this operation can be obtained from treated wastewater.
- Flushing of head manholes/sewers - this operation is probably the best use for treated wastewater and is most beneficial to the longevity of the installed sewers. Periodic flushing of the head manholes using treated wastewater discharged from mobile flushing units is recommended to reduce silt deposition in sewers. The flushing operation can be performed on a rotational basis where each sewer line (starting/head reach within a sewerage zone) is flushed at least once in a month.

11.3.3 ANALYTICAL FRAMEWORK - SWOT ANALYSIS

The need, approach and objective of performing the SWOT analysis as explained earlier are equally pertinent to the sewerage sector. In order to appreciate and articulate the current situation and present future possibilities, the SWOT analysis was performed for 'sewerage' sector and is presented below:

STRENGTHS

- A partially installed sewage collection system for about 35 percent of the area is existent. The coverage, albeit low, is considered beneficial when compared with cities that do not have an underground sewerage scheme.
- Skilled manpower available to handle the present condition.

WEAKNESSES

- The uncovered area within the system is as high as 65 percent compared to the normative standard of 15 percent, these results in the discharge of sewage/sullage to the adjacent water bodies and rivers without any form of treatment.
- Individual septic tanks that have already been installed in uncovered areas may not be suitable for integration to the sewerage system and this necessitates relaying of the house sewers up to the property boundary/inspection manhole.
- House/lateral/trunk sewers in developed areas are both old and hydraulically inadequate. Choking of sewers due to silt deposition is a major factor in reduction of the hydraulic capacity of sewers.
- Existing treatment facilities are non-functional to a significant extent and must be upgraded/rehabilitated suitably to ensure a higher degree of sewage treatment in accordance with applicable norms.
- As with the water supply sector, the revenue from sewer connections and sewerage charges (monthly) meets only a third of the total O&M expenditure essentially rendering the system financially unviable.

OPPORTUNITIES

- Topography of Bhubaneswar slopes from the western limit towards the eastern lowlands/floodplains and is conducive to a gravity based sewage collection system which can possibly result in lower depths of sewer installation and flatter slopes keeping the self-cleansing velocity in accordance with CPHEEO requirements (0.6 m/sec at average flow).
- Well-planned and designed system can be implemented for full coverage.
- Willingness-to-pay, effective and comprehensive sewage collection, treatment and disposal system.
- Prevention of pollution of surface and ground water sources in the region.
- JNNURM provides support for capital investment and capacity building.

- BMC can serve as the administrative and nodal agency for O&M of the water supply system with required technical and management support from the PHEO & OWSSB.
- Scope for private sector involvement is available in the O&M sphere of activities involving O&M of sewage treatment plant and pump/lift stations.

THREATS

- The most critical threat is the continued presence and operation of an unorganized sewerage system which is difficult and almost impossible to be rehabilitated at a later date.
- Discharge of untreated sewage to adjacent water bodies and sources increases the possibility/risk of an outbreak of a water borne epidemic.

It can be observed that the inherent strengths identified through evaluation are directly converted as opportunities for furthering the improvement. On similar lines, the latent weaknesses that have been identified are necessarily indicative of the imminent and progressive threats that are bound to occur if the present issues/problems remain unaddressed.

Therefore, the priority actions identified through discussions with stakeholders and the proposals evolved for improvement are specifically intended to achieve dual objectives, viz. optimal utilization of the available strengths of the system through requisite identification and creation of opportunities for system improvement and sustainability, and implementation of remedial measures based on the identified weaknesses of the system/sector to ensure that the imminent and potential (future) threats are eliminated and prevented from recurrence.

11.3.4 PRIORITY ACTIONS AND PROPOSALS

11.3.4.1 PRIORITY ACTIONS

As specified earlier, priority actions identified by the stakeholders, discussed and finalized pertaining to development of the existing system of sewerage in Bhubaneswar and proposed expansions are furnished below:

- Rehabilitation of sewage collection system in sewered areas.
- Sewage collection and conveyance system for uncovered areas.
- Integration of existing and proposed LCS & community toilets to UGSS - the capital investment for proposed units is covered under the Urban Poor and Slum Upgrading component.
- Treatment of sewage - decentralized advanced systems.
- Re-use of treated wastewater.
- Performance monitoring - energy audit, quality, etc.

11.3.4.2 PROPOSALS

The below listed proposals have been identified by the study team based on reported evaluations, discussions and priority actions as required and mutually agreed upon by the Mission Stakeholders:

- Rehabilitation of existing collection system - ultimate stage peak flow (2009-2039);
- Sewage collection system to uncovered areas - sewers, manholes, pump/lift stations, etc.;
- Sewage treatment plants designed to handle ultimate stage flow with installation on a modular basis (15-year design period); and
- Wastewater pumping and out-fall systems.

Proposed Capital Works - UGSS

- Rehabilitation of existing collection system;
- Sewage collection system to uncovered areas;
- Sewage Treatment Plants; and
- Wastewater pumping and out-fall systems.

The above proposals are envisaged to initially cover the entire BMC area. However, the concept of design/implementation shall be similar to that adopted for BMC, which can be implemented on a modular/zonal basis in the peripheral areas consistent with future development.

Following table presents priority actions and their implementation strategy for underground sewerage during the mission period (2007-2012):

Table 11.3.1: Priority Actions and Implementation Strategy - Underground Sewerage Scheme

Sl. No.	Priority Actions	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1.	Project formulation, detailed engineering finalization, procurement and related activities	■						
2.	Project formulation, detailed engineering, procurement and related activities for slums	■						
3.	Finalize land requirement/availability for sewage treatment plants, land procurement/acquisition and related activities	■						
4.	Construction of sewage treatment plants and sewage pump stations			■				
5.	Rehabilitation of existing underground sewerage scheme in covered areas and interconnection to the newly constructed STP/PS			■				
6.	Augmentation of system coverage (to 85 percent of PTA's) through provision of UGSS to uncovered areas, regularization and integration of LCS units (slums) to main UGSS			■				
7.	Provision of railway/NH crossings and necessary coordination with concerned authorities/ departments			■	■	■	■	■
8.	Installation of SCADA system including water quality and discharged effluent monitoring stations/systems				■	■	■	■
9.	Site restoration, green zone development (at STP), treated effluent re-use systems and auxiliary activities						■	■
10.	IEC activities, awareness programs on health, hygiene, environmental impacts, institutional restructuring and capacity building measures	■	■	■	■	■	■	■
11.	Explore private sector participation in O&M activities			■	■	■	■	■

11.3.5 ESTIMATED SECTORAL INVESTMENT - CAPITAL AND ANNUAL O&M COST

Based on the parameters specified in the box given at the start of this chapter, the capital and annual operation & maintenance cost has been estimated for the proposed intervention and is listed below:

Table 11.3.2: Estimated Sectoral Investment - Underground Sewerage Scheme

Sl. No.	Sector / Component Description	Investment
1.	Rehabilitation of existing sewage collection system in covered areas	134.02
2.	Proposed sewage collection system to uncovered areas incl. appurtenances	198.18
3.	Proposed sewage treatment plants for ultimate stage sewage flow (ASP)	155.50
4.	Provision of railway / NH crossings for gravity trunk sewers / sewage force mains	8.60
	Total Capital Cost (incl. contingencies, supervision, administration and consulting charges)	496.29

Rs. in Crores

Sl. No.	Sector / Component Description	Investment
	Annual O&M Cost	18.33

Necessary clearances from concerned ministries or authorities need to be acquired at the earliest. The authorities/departments/agencies that are proposed to be responsible for project formulation/implementation/monitoring are listed, but shall not be necessarily limited to the following entities:

- Nodal Agency: Bhubaneswar Municipal Corporation.
- Formulation/Implementation Agency: PHEO and OWSSB.
- Monitoring Agency: State Pollution Control Board, Orissa, Bhubaneswar.

11.4 STORM WATER DRAINS

11.4.1 ANALYTICAL FRAMEWORK - SWOT ANALYSIS

The need, approach and objective of performing the SWOT analysis as explained earlier are equally pertinent to the storm water drainage sector. In order to appreciate and articulate the current situation and present future possibilities, the SWOT analysis was performed for the 'storm water drains' sector and is presented below:

STRENGTHS

- Topography of Bhubaneswar, slopes from the western limit towards the eastern lowlands/floodplains and is conducive to development of an effective storm water drain system.
- Major drains (10 nos.) are available for conveyance of storm water away from residential dwellings and low-lying areas.

WEAKNESSES

- Encroachment of major and minor drains within the network has been identified as a major problem that reduces the effective capacity of the drains.
- Solid waste dumping in drains leads to reduction of effective hydraulic capacity.
- Most drains in the city also convey sewage which is a significant health hazard.
- Multiple agencies construct & maintain the drains rendering coordination and concurrent development difficult.
- Comprehensive city level scheme for storm water drains considering updated rainfall/return flood data, available capacity, required widening and networking has not been developed.
- Ineffective maintenance of drains leading to silt deposition and clogging.
- Major drains are not fenced. These drains can significantly endanger public life in the event of major floods/storm conditions.
- Majority of other drains are not covered which is also an aesthetic issue and requires to be addressed.

OPPORTUNITIES

- Planned development of roads in coordination storm water drains can facilitate an effective drainage system.
- Drains can also be used as rainwater harvesting structures through installation of soak pits on the floor/bed of the drains to allow enhanced percolation during the monsoon months.
- Check dams along the major drains will increase groundwater potential through augmented storage of storm water.
- JNNURM provides support for capital investment and capacity building.
- Private sector participation can be envisaged in maintenance of drains and the freeboard area adjacent to the drains (i.e. development of greenways).

other departments such that development activities across each front, i.e., installation of sewer mains, water mains, street lights, storm water drains are performed in a coordinate manner together with improvement of roads.

Details of traffic volume studies conducted in the city at important junctions have been furnished and discussed in Chapter - 4 of this report.

11.5.2 ANALYTICAL FRAMEWORK - SWOT ANALYSIS

In order to appreciate and articulate the current situation and present future possibilities, the SWOT analysis was performed for the 'roads, traffic and transportation' sector and is presented below:

STRENGTHS

- An extensive network of roads providing for internal and radial connectivity is available which can be streamlined and enhanced for improved traffic management.
- Adequate carriage-way is observed to be available along major roads, which permits widening to meet the increasing (future) traffic demand.
- The two (2) National Highways that run through the city (NH-5 and 203) ensure adequate inter-city connectivity to the metropolitan and other major commercial and industrial cities in the region and across the eastern corridor.

WEAKNESSES

- Encroachment of the pavement has forced pedestrian traffic to utilize the formation width leading to reduction of carriage-way and increased congestion.
- As specified above, by-pass roads for the National Highways have not been implemented leading to high ratio of non-incident traffic to overall traffic that flows through Bhubaneswar.
- Traffic congestion and irregular movement is prevalent at important junctions due to the absence of an adequate signage and signal system with most of the intersections being controlled manually.
- Absence of a city-wide public surface transport system has in turn spurred the unregulated sector of "share-autos and tempos".
- A detailed study on parking requirements in the State Capital has not been performed, it has been discussed and agreed upon by all stakeholders that parking woes plague almost all city roads.
- Flyovers, service roads & pedestrian subways are not provided at important junctions leading to increased travel duration and delays.
- Depleting roadside green-cover.

OPPORTUNITIES

- A well-planned public transport can be implemented to ensure economic travel.
- A comprehensive traffic management plan can be developed.
- Users willing to pay reasonable charges for parking.
- JNNURM provides support for capital investment and capacity building.
- Private sector participation can be encouraged wherein major corporate entities can take up the maintenance of specific road sections limited to beautification, green cover development and overall aesthetic improvement.

THREATS

- Damage to heritage structures has been highlighted as one of the imminent and critical threats due to rapidly increasing traffic conditions and absence of traffic management measures.
- Loss of productivity is a critical non-tangible threat due to increased travel duration from congestion and delays.
- Increased air pollution at intersections is another health hazard and has the potential to develop into a severe problem which presently haunts all major cities in both the developing and developed countries.

- Increased risk of accidents due to non-separation of bicycles/two-wheelers from the light commercial vehicle traffic is a critical threat with an alarming increase in the number of registered two-wheelers.

It can be observed that the inherent strengths identified through evaluation are directly converted as opportunities for furthering the improvement. On similar lines, the latent weaknesses that have been identified are necessarily indicative of the imminent and progressive threats that are bound to occur if the present issues/problems remain unaddressed.

Therefore, the priority actions identified through discussions with stakeholders and the proposals evolved for improvement are specifically intended to achieve dual objectives, viz. optimal utilization of the available strengths of the system through requisite identification and creation of opportunities for system improvement and sustainability, and implementation of remedial measures based on the identified weaknesses of the system/sector to ensure that the imminent and potential (future) threats are eliminated and prevented from recurring.

11.5.3 PRIORITY ACTIONS AND PROPOSALS

11.5.3.1 PRIORITY ACTIONS

As specified earlier, priority actions identified by the stakeholders, discussed and finalized pertaining to development of the existing system of roads and transportation in Bhubaneswar are furnished below:

- Improvement to existing road network for present and future traffic requirements.
- By-pass roads for the National Highways.
- Flyovers and subways at major intersections for traffic improvement.

Further, it is recommended to carry out the following initiatives:

- Study of city-wide parking requirements and development of parking infrastructure.
- Feasibility study for implementation of a city-wide public surface transportation system.

11.5.3.2 PROPOSALS

The below listed proposals have been identified by the Team based on reported evaluations, discussions and priority actions as required and mutually agreed upon by the Mission Stakeholders:

- BMC maintained roads - restoration and reconstruction of existing BT and CC roads based on the existing condition and type of pavement and considering the incidental traffic volume count;
- R&B maintained roads - widening of major roads from 2 to 4 and from 4 to 6 lanes with provision for service lanes (pedestrians, two- and three-wheelers) pursuant to detailed traffic surveys and estimation of future requirements;
- Construction of by-pass roads for the National Highways (NH-5 & 203); and
- Construction of flyovers (ROB) and pedestrian subways at major intersections including widening of the embankment and ramp landing (access and main) areas.

Proposed Capital Works - Roads, Traffic and Transportation

- Pavement Improvements to BMC maintained roads widening and improvement of R&B maintained roads;
- Construction of NH by-pass roads;
- Construction of flyovers and subways; and
- Studies on parking requirements and city-wide public transportation system.

As stated earlier, based on the discussions, it was noted that the land requirement for provision of new roads and other infrastructure in newly grown areas within the development area has been identified and earmarked in the Comprehensive Development Plan. However, formation and development of such roads are not envisaged under the above proposals.

Following table presents priority actions and their implementation strategy for roads, traffic and transportation during the mission period (2007-2012):

Table 11.5.1: Priority Actions and Implementation Strategy - Roads, Traffic and Transportation

Sl. No.	Priority Actions	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1.	Project formulation, sanctions, land acquisition/procurement and related tasks	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
2.	Roads and road furniture - detailed condition assessment and surveys	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
3.	Reconstruction and restoration of existing roads (BT & CC) and new roads in unpaved areas - full coverage (100 percent)		■ ■ ■ ■ ■ ■ ■ ■ ■ ■					
4.	Upgrading road furniture including signals and direction/location signs - full coverage (100 percent)		■ ■ ■ ■ ■ ■ ■ ■ ■ ■					
5.	Project formulation, sanctions, land acquisition/procurement and related tasks	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■
6.	Detailed assessment studies and engineering design for traffic and transportation management and related improvements		■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■
7.	Proposed by-pass roads for National Highways			■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■			
8.	Proposed grade separators at major intersections along National Highways			■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■			
9.	Detailed assessment of parking requirements including land availability, traffic patterns and related activities	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
10.	Feasibility evaluation of public transport system (surface based, e.g. bus network)		■ ■ ■ ■ ■ ■ ■ ■ ■ ■					
11.	Assessment and augmentation of private sector participation in O&M of parking facilities, collection of charges, sponsoring road furniture and related areas of involvement			■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■
12.	IEC activities, awareness programs on public safety and traffic/transportation issues	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■ ■ ■ ■ ■ ■ ■

11.5.4 ESTIMATED SECTORAL INVESTMENT - CAPITAL AND ANNUAL O&M COST

Based on the parameters specified in the box given at the start of this chapter, the capital and annual operation & maintenance cost has been estimated for the proposed intervention and is listed below:

Table 11.5.2: Estimated Sectoral Investment - Roads, Traffic and Transportation

Rs. in Crores

Sl. No.	Sector / Component Description	Investment
1.	BMC maintained roads - restoration and reconstruction of existing BT and CC roads based on existing condition and type of pavement and considering the incidental traffic volume count	64.38
2.	R&B maintained roads - widening of major roads from 2 to 4 and from 4 to 6 lanes with provision for service lanes (pedestrians, two and three wheelers)	275.02
3.	Construction of by-pass roads for the National Highways (NH-5 & 203)	48.98
4.	Construction of flyovers (ROB) and pedestrian subways at major intersections including widening of the embankment and ramp landing (access and main) areas	120.00
	Total Capital Cost (incl. contingencies, supervision, administration and consulting charges)	508.37
	Annual O&M Cost	23.42

Necessary clearances from the concerned ministries or authorities need to be acquired at the earliest. The authorities/ departments/ agencies that are proposed to be responsible for project formulation/ implementation/ monitoring are listed but shall not be necessarily limited to, the following entities:

- Nodal Agency: Bhubaneswar Municipal Corporation.
- Formulation/Implementation Agency: BMC and R&B.

11.6 STREET LIGHTING

The existing situation in the street lighting sector that is handled by the BMC has been discussed in Chapter 4 of this report. The principal issue in this sector is the present level of power consumption and measures to reduce energy charges in the future that is incurred through provision of adequate street lighting for the city roads.

11.6.1 ANALYTICAL FRAMEWORK - SWOT ANALYSIS

In order to appreciate and articulate the current situation and present future possibilities, the SWOT analysis was performed for the 'street lighting' sector and is presented below:

STRENGTHS

- Adequate coverage and illumination have been provided through the fitment of high-mast cluster lights and sodium vapor lamps along the main roads.
- Private sector participation has been encouraged in installation & maintenance of street lighting including a complaint redressal system. This initiative has been carried out by the BMC to a successful extent in 12 wards. The BMC is poised to expand this initiative further to cover all the wards (47 nos.).

WEAKNESSES

- Base-level electricity consumption due to street lighting has not been assessed. The BMC is reportedly paying a flat monthly rate for electrical power without actual assessment of the incurred cost.
- Timing of operation of street-lights is not synchronized with natural light availability and many street lights are observed to be burning even during the daytime.

OPPORTUNITIES

- Power saving equipment can be installed to improve power factor conditions which can assist to a significant extent in reducing overall electricity charges.
- A general lighting plan can be developed to optimize the usage and assess the type of lighting and level of luminescence required.
- JNNURM provides support for capital investment and capacity building initiatives in the street lighting sector.
- Private sector participation in maintenance of street lighting can be enhanced and augmented.

THREATS

- Mounting electricity charges from improper operation of street lights and non-implementation of base-level metering.

It can be observed that the inherent strengths identified through evaluation are directly converted as opportunities. On similar lines, the latent weaknesses that have been identified are necessarily indicative of the imminent and progressive threats that are bound to occur if the present issues/problems remain unaddressed.

Therefore, the priority actions identified through discussions with pertinent stakeholders and the proposals evolved for improvement are specifically intended to achieve dual objectives, viz. optimal utilization of the available strengths of the system through requisite identification and creation of opportunities for system improvement and sustainability, and implementation

11.6.3 ESTIMATED SECTORAL INVESTMENT - CAPITAL AND ANNUAL O&M COST

Based on the parameters specified in the box given at the start of this chapter, the capital and annual operation & maintenance cost has been estimated for the proposed intervention and is listed below:

Table 11.6.2: Estimated Sectoral Investment - Street Lighting

		<i>Rs. in Crores</i>
Sl. No.	Sector / Component Description	Investment
1.	Installation of street lighting fixtures (FL) at uncovered areas - poles, bulk head fittings, control systems and solar panels (as applicable)	8.02
2.	Replacement of FL with SV or equivalent lamps at major intersections	19.69
3.	Provision of Energy Efficient / Saving and Metering Equipment	0.15
4.	Proposed dedicated power supply infrastructure (transformers etc.)	1.07
	Total Capital Cost (incl. contingencies, supervision, administration and consulting charges)	28.92
	Annual O&M Cost	11.57

Necessary clearances from the concerned ministries or authorities need to be acquired at the earliest. The authorities/ departments/ agencies that are proposed to be responsible for project formulation/ implementation/ monitoring are listed, but shall not be necessarily limited to, the following entities:

- Nodal Agency: Bhubaneswar Municipal Corporation.
- Formulation/Implementation Agency: BMC and R&B.

12

URBAN ENVIRONMENT IMPROVEMENT

12.1 GENERAL

This section pertains to the proposed development initiatives and specific improvements that are recommended to upgrade the existing urban environment and supporting infrastructure such as solid waste management and conservation of water bodies.

The basis, sources and methodology adopted in assessment of the existing situation and identification of key issues specific to each selected sector has been described in Chapter 5.0 of this report. Similarly, sector specific analysis, assimilation of priority actions and proposed improvements have been arrived at / formulated based on the following:

- Discussions held with wider group of secondary stakeholders (e.g., Citizens' Associations, CII, Chamber of Commerce, etc.);
- Mission Area specific focus group discussions based on analytical framework and use of the SWOT analysis technique;
- Modification of the parameters (SWOT) based on feedback and comments from the stakeholders (secondary) at the focus group discussions and incorporation for future discussions; and
- Phase II workshop to finalize the priority actions and proposals for each sector in the identified Mission Areas based on the above-mentioned activities.

The overall sector-wise estimated capital investment required to achieve stated objectives within the mission period (2006-2013) has also been estimated and presented to the stakeholders in the Phase II workshop. details of the investment components, the capital investment phasing plan based on the above and discussions with Action Stakeholders are also enclosed in subsequent sections.

Sectoral investment for the proposed intervention across all sectors and sub-sectors for this Mission Area has been estimated based on the following parameters:

- Information available/provided by concerned departments, detailed discussions with pertinent authorities, field/site visits, techno-economic evaluation/analysis conducted by the consulting team;
- Standard Schedule of Rates issued by PWD/WRD and other engineering boards/organizations, OP rates, prevailing market rates, and relevant information;
- Consultant's database and experience on design of projects of similar scale/nature;
- Costs indicated are only estimated costs. Detailed cost estimation shall be performed for each item of work pursuant to detailed design engineering (during the DPR preparation);
- Land procurement and/or acquisition costs have not been included;
- Capital and annual O&M cost of the treatment facility has been estimated considering techno-economically most feasible alternative technologies;
- Estimated costs are also based on recommendations and guidelines in "Plant Design and Economics" by Peters and Timmerhaus, "Compounding and Discounting Tables for Project Evaluation", A World Bank Publication; and
- Necessary provision for physical contingencies, cost escalation for implementation period greater than 18 months, administration/supervision and consultancy charges have been included.

12.2 INSTITUTIONAL AND REGULATORY FRAMEWORK

The environmental management of urban areas rests with a number of agencies. While the enforcement and implementation of monitoring environmental laws vests with the State Pollution Control Board, Orissa, this agency is also required to coordinate with various other agencies in its efforts of pollution prevention.

Urban Environment - Institutional Framework

- State Pollution Control Board (SPCB)
- Bhubaneswar Municipal Corporation
- Works Department (R&B)
- Water Resources Organization
- Police Department (Traffic)

12.2.1 INSTITUTIONAL FRAMEWORK

Institutional responsibility to enforce the environmental laws in Bhubaneswar is vested with State Pollution Control Board (SPCB), Orissa. Responsibility of major agencies in environmental protection in Bhubaneswar is presented in the table below:

Table 12.2.1: Institutional Framework for Environmental Protection

Agency	Responsibility
State Pollution Control Board, Orissa	<ul style="list-style-type: none"> Responsible for implementation of pollution control laws in the state including Bhubaneswar.
Bhubaneswar Municipal Corporation (BMC)	<ul style="list-style-type: none"> The agency responsible for planning and developmental initiatives within the town including environmental planning, management, prevention of pollution to water bodies, air and noise pollution. The 74th CAA has empowered the ULBs to undertake environmental protection measures within their jurisdiction. Responsible for the provision and maintenance of other roads (secondary) within Bhubaneswar. Responsible for the maintenance of major and minor water bodies in the region (in close coordination/along with WRD).
Water Resources Department (WRD)	<ul style="list-style-type: none"> Responsible for the maintenance of major and minor water bodies in the region (in close coordination/along with BMC). Responsible for maintenance of major storm water drains, channels, canals (nallah) and rivers.
Works Department (R&B)	<ul style="list-style-type: none"> Responsible for the provision and maintenance of NH & SH, by-pass, expressways, major flyovers and arterial (main) roads within Bhubaneswar limits.
Police Department (Traffic)	<ul style="list-style-type: none"> Responsible for identification and implementation of traffic operational and management initiatives.

12.2.2 REGULATORY FRAMEWORK

Three laws govern pollution prevention and control activities:

- Environmental Protection (Prevention & Control) Act.
- Water Pollution (Prevention & Control) Act.
- Air Pollution (Prevention & Control) Act.

12.2.2.1 ENVIRONMENTAL PROTECTION ACT

Formulated by the GoI, Environmental Protection Act, popularly known as EPA, is a comprehensive act that details out the pollution control regulations to be followed in the country. The act covers three major areas of environmental pollution control and includes, water pollution, air pollution and noise pollution control. Under the Act, the enforcing agencies are empowered to take legal actions and initiate necessary punishable measures against polluters.

12.2.2.2 WATER POLLUTION ACT

Formulated prior to the EPA, the Water Pollution Act, stipulates each and every industry that is required to obtain consent from the local Pollution Control Board in order to discharge effluent into any medium in accordance with the prescribed discharge standards of the respective boards. The act also empowers the board to monitor the discharge characteristics of wastewater generators and is authorized to impose penalties and restrictions on those who flout or fail to comply with the norms.

Urban Environment - Regulatory Framework

- Environmental Protection (Prevention & Control) Act, 1986
- Water Pollution (Prevention & Control) Act
- Air Pollution (Prevention & Control) Act

12.2.2.3 AIR POLLUTION ACT

Similar to the Water Pollution Act, the Air Pollution Act directs every industrial unit with stack emissions to get consent from the local Pollution Control Board and empowers the pollution control authorities to monitor stack emissions and their emission characteristics. In addition to the above laws, laws have also been adopted to control noise pollution and discharge of hazardous waste.

12.3 SOLID WASTE MANAGEMENT

12.3.1 TARGET POPULATION PROJECTION AND ESTIMATED WASTE GENERATION

Projection of future population has been performed by evaluation of applicable and prevalent methods of population projection and the projection by Ward-wise Density Method has been recommended as the target population for planning and design of urban infrastructure. Based on the population projection, the approximate quantum of solid waste generated by residents can be estimated for design of the Integrated Solid Waste Management Scheme. Based on the projected population for the ultimate period (2039) and the standard per capita waste generation of 270 grams per day for cities with a population between 1.00 and 2.00 million as specified in the CPHEEO Manual on Solid Waste Management, it can be observed that the total waste generated would be approximately 470 MT per day at the ultimate stage. This quantity includes both bio-degradable and non-bio-degradable waste in an almost equal ratio. This is contrary to most systems where the bio-degradable component is as high as 70 percent. This lower ratio can be attributed to non-separation of building waste and other inert material from the collected quantum which has been consistently highlighted in earlier discussions with stakeholders.

Therefore, the total estimated quantity of bio-degradable waste that can form the raw material at the proposed composting facility is 230 MT per day (approximately including a 10 percent de-rating for drop in collection efficiency), which can be used as the basis for design of the proposed facility and subsequent upgrades that may be required.

12.3.2 STRENGTHENING OF EXISTING SOLID WASTE MANAGEMENT SYSTEM

12.3.2.1 SEGREGATION AND STORAGE OF WASTE AT THE SOURCE OF GENERATION

Improvement measures should evolve effective strategies to mobilize the community and citizens towards synchronizing the system of waste storage at source with primary waste collection by the ULB and cooperate with the ULB to maintain clean streets and neighborhoods, in particular, and the city in general. The local inhabitants should be advised to keep two separate bins/bags for the purposes of segregation of waste at source and adopt appropriate mode of disposal of such waste from the source as outlined in the Manual on the Municipal Solid Waste Management.

BMC should direct all waste generators (households, institutions commercial establishments and floating population) not to throw any solid waste in the street, open spaces, and vacant plots or into drains by organizing public awareness programs and/or through public notification in leading local newspapers. Any violations in this regard should be penalized and the BMC staff should be empowered to do so.

12.3.2.2 PRIMARY COLLECTION OF SOLID WASTE

Following are the broad interventions suggested for improvement of primary collection of solid waste:

- Provide daily waste collection to all households and establishments for collection of organic bio-degradable waste from the doorstep by ensuring regular and reliable service so as to clear such waste within 24 hours of its generation;
- Dry and recyclable wastes to be collected on alternative days as these do not decay and need not be collected daily; and
- Domestic hazardous wastes produced occasionally may not be collected from doorstep but the people should be advised to deposit the same in special designated bins.

Accordingly, one of the key steps to be followed towards implementing the above initiatives would be to direct the street sanitary workers to collect the wet waste (organic and bio-degradable) door-to-door during the street sweeping process on a daily basis. Initially, some of the well developed residential areas of the city that can readily afford the cost involved may

be covered through this process. This service shall gradually be extended to other areas of the city.

BMC can evaluate the option of enhancing promotion of NGOs and CBOs for collection of dry and recyclable wastes and domestic hazardous wastes from the doorstep on 'no payment on either side' basis.

12.3.2.3 STREET CLEANSING

The most important aspect of improving effectiveness of street cleansing operations may be addressed by improving the working environment of the sanitary workers and fixing norms for each sanitary worker so that the factor of accountability may be established to review the performance of each sanitary worker.

Sanitary workers shall sweep the roads and footpaths in the area allotted to them as well as collect the domestic, trade and institutional wastes in their handcart from all households, shops and establishments situated along the stretch of road/street allotted. The sweeping norms mentioned below are for cleaning streets in the first 4 hours of the working day. Roads/streets, which have a central median or divided section, should be considered as two roads. In such cases the length of the road allotted for sweeping should be reduced to half or alternatively separate sanitary worker may be engaged for sweeping two sides of the road. All above shall include the surface drains abutting the road having width less than 1 m. the sanitary workers should be assigned fixed individual beats and 'pinpoint' work according to the density of the area to be swept. Alternatively, the following guidelines may be considered while prescribing these norms:

- High-density area: 250 to 350 running meters of road length.
- Medium-density area: 400 to 600 running meters of road length.
- Low-density area: 650 to 750 running meters of road length.

Following are some of the tools necessary for efficient operation:

Table 12.3.1: Specifications and Usage of Tools for Street Cleansing Process

Tools	Specifications and Usage
Brooms	Provide long handled brooms as that will not require bending, reduce fatigue and increase their productivity. The brooms shall have a metal blade to be used to scrape the material sticking on the street and should be fixed on the top of the broom as per the prevailing system. One kilogram of broom per month as per the prevailing system shall continue for each sanitary worker for street sweeping. The bamboo (long handle) to which the broom is attached generally has a long life and shall be provided every 6 months instead of once per annum.
Metal Tray and Metal Plate	Each sanitary worker engaged in street sweeping should be given a metal tray and a metal plate for facilitating easy transfer of street sweeping from the streets into their handcart/basket.
Handcart	Each sanitary worker engaged in street sweeping should be given a handcart having 4 to 6 containers each of 30 to 40 liters capacity with total capacity to accommodate 90-100 kg). The containers should be detachable to facilitate the direct transfer of street sweepings and household waste from the container into the communal waste storage bins. The handcart should have at least three wheels with sealed ball bearing so that it can be used efficiently.

The table below provides adopted design assumptions for quantification of tools and equipment for sanitary workers.

Table 12.3.2: Design Assumptions and Quantification of Tools and Equipment for the Municipal Sanitary Workers

No.	Particulars	Design Parameter
1.	Long handled brooms and metal trays	1.5 x no. of sanitary workers
2.	Handcarts (with 4 detachable containers of 32 liters capacity each)	

No.	Particulars	Design Parameter
3.	Safety uniform sets	2.0 x no. of sanitary workers

In order to avoid inconvenience to the citizens by dust generated from street sweeping and also to facilitate sweepers to perform their duty without interruption from constant vehicular movement, it is recommended to further the already implemented “night-sweeping” arrangement in Bhubaneswar by the BMC.

12.3.2.4 TEMPORARY STORAGE OF WASTES

BMC should ensure that containers are provided at an average distance of 250 meters from the place of work of the sanitary workers. The average distance between 2 containers should, therefore, not exceed 500 meters. The distance between the containers shall be determined on the basis of the load of waste / refuse that is likely to be received at the container from the area concerned. The containers should be placed on cement concrete or asphalt flooring having a gradual slope towards the road to keep the site clean. The flooring should be flush with the border of the road (i.e. drains) to maintain hygienic conditions and facilitate the transfer of waste from the handcart/tricycle into the container. A catch pit may be provided close by if storm water drains exist in the city. In areas where placement of large containers (dumper placer containers) is inconvenient, small containers of 1.00 cu. m size may be placed on the roads, lanes and by-lanes at short distances of about 300 m. These containers should also be kept on paved flooring and cleared daily. It is of paramount importance to ensure compatibility of the containers with the existing and proposed transportation fleet.

Another option that could be used in such a situation is to avoid placing a container altogether and instead press into service small waste collection vehicles for direct transfer of waste from the handcarts/tricycles into such vehicles. Such vehicles can be parked at suitable locations in the congested areas where sanitary workers can bring the waste easily. It is suggested to use innocuous agents like bleaching powder and other permitted insecticides to prevent the menace of breeding of flies and mosquitoes at the community storage points. Further, such an application of innocuous agents would facilitate maintaining hygienic and odorless environment at the community storage points. It may be noted that the proposed containerization of wastes would prevent littering and spreading of wastes at the community storage points by stray animals. Further, proposed training of rag pickers by NGOs and CBOs would facilitate the rag pickers to collect recyclable wastes at the doorstep avoiding the necessity to pick-up such wastes from the community waste storage points.

BMC should provide litterbins throughout the city. The quantity shall be based on the requirements so that people (specifically, floating population) can deposit litter in such bins while on the move and keep the streets litter-free. The ULB should also provide litterbins at all public spaces, bus stations, markets, places where people gather or wait in queues and on important roads at reasonable distances ranging from 25 to 250 meters depending on local conditions. BMC should direct and pinpoint sanitary workers to remove waste from these litterbins during their street cleaning operations, directly transferring it to the handcarts. The ULB may also involve the private sector, giving them advertisement rights on the bins for a specified period or allowing them to put their name on bins as a sponsor.

The standards and norms prescribed in the Manual¹⁴ pertaining to temporary waste storage points are based on the total waste generation and the spacing, viz. a) the total capacity of the temporary waste storage points should be equivalent to at least 1.5 times the total waste generation, and b) the spacing between two temporary waste storage points should be less than or equivalent to 500 m.

¹⁴ Manual on Municipal Solid Waste Management.

12.3.2.5 TRANSPORTATION OF WASTES

Synchronization of collection with the transportation process is one of the key steps to be initiated by the BMC. The collection of waste needs to be containerized and the proposed transportation system should be envisaged to be compatible with the collection system. The synchronization of transportation with that of the collection process should be planned in a phased manner considering the financial capability and operation and maintenance capacity of the ULB. The vehicles used for the transportation of waste shall synchronize with that of the collection system and based on the market surveys and situation analysis and discussion with the ULB, two types of vehicles are envisaged for the city:

- Dumper Placer -Twin Container is proposed to cater to the needs of the fast moving vehicles. This vehicle would have two containers, each of capacity 3 cu. m with side loading and unloading facilities using hydraulic system. This vehicle is envisaged to undertake 4 trips per day with total waste carrying capacity of 12 MT per day, primarily used for the wider roads within the city; and
- Three-Wheeler Auto Cargo is proposed to cater to the needs of the small and congested lanes of the city especially in the Temple Town (old town) areas. These vehicles would have an open container of capacity 1.4 cu. m with manual loading and rear hydraulic unloading facilities. This vehicle is envisaged to undertake 5 trips per day with total waste carrying capacity of 3-4 MT per day.

The transportation of wastes is envisaged to be containerized as per the norms/standards prescribed in the Manual. Accordingly, it is envisaged to replace the existing open transport system in a phased manner. As per the norms/standards, it is suggested to have vehicular capacity equivalent to 1.3 times that of the actual generation of waste. However, from the economic point of view, vehicles less than 10 years (economic life) are proposed for regular routes on a daily basis while those approaching their economic life would be used as reserves and for pinpoint operations, achieving the requisite carrying capacity of the fleet. With containerization of the transport, the number of trips may be considerably increased due to saving in time for handling, loading and unloading the generated waste.

12.3.2.6 SOLID WASTE TREATMENT AND DISPOSAL

Presently, BMC has adopted only dumping as the method of waste disposal. It is recommended to implement an effective mechanism for treatment and disposal of generated solid waste. Evaluation of available technologies for solid waste treatment and disposal should be performed on the following lines:

- Available project experience information or proven technology (domestic/international);
- Suitability of process for region-specific field condition;
- Scale of operation;
- Technical feasibility;
- Feasibility of capacity upgrade;
- Economy of operation - capital and annual O&M cost;
- Requirement of land, water and power;
- Manpower and level of skill requirement;
- Capability of the BMC to manage the facility;
- Environmental impact of such technology;
- Process aesthetics; and
- Overall life cycle cost.

Based on the scale of waste generated in Bhubaneswar and viability of the treatment technologies, aerobic composting is recommended as the techno-economically feasible process for further detailed investigation and subsequent implementation. During interactions with BMC authorities, it was opined that waste-to-energy conversion technology may be considered for adoption. A detailed study needs to be made on this alternative prior to finalization.

12.3.3 ANALYTICAL FRAMEWORK - SWOT ANALYSIS

In order to appreciate and articulate the current situation and present future possibilities, the SWOT analysis was performed for the 'solid waste management' and is presented below:

STRENGTHS

- Private sector participation is encouraged for waste collection and transportation.
- Land is available and has been procured for a techno-economically feasible alternative of solid waste treatment and disposal.

WEAKNESSES

- Solid waste is presently being dumped at open grounds in proximity to residential dwellings which is a highly unsanitary option.
- Source segregation is not performed leading to a significant volume of inert material entering the sewerage system.
- At the household level, solid waste is presently dumped on the roadside and not collected through a door-to-door system.
- Transportation system is also not scientific leading to double labor-handling of waste and spillover of waste from transport vehicles onto roads.
- A system of solid waste treatment is not available resulting in significant landfill volumes
- No effective system for management of slaughter and biomedical wastes is in place, which should be evaluated for implementation.

OPPORTUNITIES

- The generated quantum of solid waste can be treated through a techno-economically feasible alternative.
- Landfill requirement can be reduced significantly through treatment of bio-degradable waste and recycling of non-bio-degradable wastes. Alternative uses for inert materials such as construction, which can be utilized as backfill material, can also be evaluated for overall landfill quantity reduction.
- As ascertained from the Demand Assessment Surveys, users are willing to pay reasonable charges for an effective solid waste management system.
- A well planned and implemented system of solid waste management will to a significant extent assist in prevention of ground and surface water source pollution in the region.
- JNNURM provides support for capital investment and capacity building.
- Private sector participation in treatment and disposal of waste including O&M of the MSW treatment plant can also be evaluated and implemented if viable.

THREATS

- Health hazard due to indiscriminate dumping of solid waste.
- Loss of potential tourism revenue due to lowered aesthetics from indiscriminate dumping of solid waste and littering.
- On an overall note, the imminent threat is that of deterioration of the "image" of Bhubaneswar City as a "Heritage Landmark".

As outlined above, it can be observed that the inherent strengths identified through evaluation are directly converted as opportunities for furthering the improvement. On similar lines, the latent weaknesses that have been identified are necessarily indicative of the imminent and progressive threats that are bound to occur if the present issues/problems remain unaddressed.

Therefore, the priority actions identified through discussions with pertinent stakeholders and the proposals evolved for improvement are specifically intended to achieve dual objectives, viz. optimal utilization of the available strengths of the system through requisite identification and creation of opportunities for system improvement and sustainability, and implementation of remedial measures based on the identified weaknesses of the system/sector to ensure that the imminent and potential (future) threats are eliminated and prevented from recurring.

Sl. No.	Priority Actions	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
7.	Augmentation of private sector participation in O&M activities	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■

12.3.5 ESTIMATED SECTORAL INVESTMENT - CAPITAL AND ANNUAL O&M COST

Based on the parameters specified in the box given at the start of this chapter, the capital and annual operation & maintenance cost has been estimated for the proposed intervention and is listed below:

Table 12.3.4: Estimated Sectoral Investment - Solid Waste Management

Sl. No.	Sector / Component Description	Investment
1.	Proposed solid waste collection & interim storage system	5.57
2.	Collection system at vegetable market	0.26
3.	Transportation system improvements - trailer & transportation vehicles	1.44
4.	Proposed transfer stations- 4 nos. & local composting at SS	4.93
5.	MSW composting plant at Tulsaidapur & miscellaneous works	12.87
	Total Capital Cost (incl. contingencies, supervision, administration and consulting charges)	25.08
	Annual O&M Cost	5.00

Rs. in Crores

Necessary clearances from the concerned ministries or authorities need to be acquired at the earliest. The authorities/ departments/agencies that are proposed to be responsible for project formulation/ implementation/monitoring are listed, but shall not be necessarily limited to the following entities:

- Nodal Agency: Bhubaneswar Municipal Corporation.
- Formulation/Implementation Agency: BMC.
- Monitoring Agency: State Pollution Control Board, Orissa, Bhubaneswar.

12.4 CONSERVATION OF WATER BODIES

12.4.1 ANALYTICAL FRAMEWORK - SWOT ANALYSIS

In order to appreciate and articulate the current situation and present future possibilities, the SWOT analysis was performed for the 'conservation of water bodies' sector and is presented below:

STRENGTHS

- Bhubaneswar City is advantageously dotted with a number of water bodies providing groundwater recharge potential and overall environment improvement.
- The areas adjacent to the water bodies are identified as a potential source of tourism development.

WEAKNESSES

- Water bodies (adjacent to temples like Bindu Sagar) are polluted due to wastes dumped from certain religious rituals and discharge of sewage in some areas.
- Most of the water bodies are heavily silted which significantly lowers the effective holding capacity and consequently groundwater recharge potential.
- There is no facility for recirculation of water such as aeration fountains which can assist effectively in maintaining the quality of water in the ponds/lakes.

OPPORTUNITIES

- Private sector participation can be introduced in maintenance of water bodies and adjoining areas.
- The adjoining areas can be developed with paved walkways, gardens with recreation facilities and related infrastructure which can serve as recreation as facility of the community.
- Development of watershed areas.
- Environment theme based parks for education purposes can also be developed.
- JNNURM provides support for capital investment and capacity building.

THREATS

- The discharge of sewage to some water bodies will pose significant health risk.
- The continuation of this situation will lead to general discontentment among the public due to religious sentiments being disregarded is also to be contended.

It can be observed that the inherent strengths identified through evaluation are directly converted as opportunities for furthering the improvement. On similar lines, the latent weaknesses that have been identified are necessarily indicative of the imminent and progressive threats that are bound to occur if the present issues/problems remain unaddressed.

Therefore, the priority actions identified through discussions with pertinent stakeholders and the proposals evolved for improvement are specifically intended to achieve dual objectives, viz. optimal utilization of the available strengths of the system through requisite identification and creation of opportunities for system improvement and sustainability, and implementation of remedial measures based on the identified weaknesses of the system/sector to ensure that the imminent and potential (future) threats are eliminated and prevented from recurring.

12.4.2 PRIORITY ACTIONS AND PROPOSALS

12.4.2.1 PRIORITY ACTIONS

As specified earlier, priority actions identified by the stakeholders, and discussed and finalized pertaining to development works related to conservation of water bodies in Bhubaneswar are furnished below:

- Identification of water bodies within BMC limits for conservation.
- Rehabilitation of existing water bodies such as Bindu Sagar Lake.
- Re-development of area adjoining water bodies for community use.
- Development of catchment facilities, water quality maintenance and groundwater recharge in water bodies.

Proposed Capital Works - Conservation of Water Bodies

- De-silting of existing water bodies;
- Rehabilitation of sidewalls and bed of water bodies;
- Development of perimeter area; and
- Water treatment and recirculation systems.

12.4.2.2 PROPOSALS

The following proposals have been identified by the study team based on reported evaluations, discussions and priority actions as required and mutually agreed upon by the pertinent Mission Stakeholders:

- De-silting of existing water bodies and development of the bed lining;
- Re-development of tank/lake bunds through slab lining;
- Re-development of perimeter area - paved walkway, area lighting, compound wall/fencing, access control and landscaping;
- Water treatment and recirculation including passive aeration systems;
- Reconstruction and restoration of drains leading into and out of the water bodies including by-pass and flood control; and
- Installation of water quality monitoring stations.

Following table presents priority actions and their implementation strategy for conservation of water bodies during the mission period (2007-2012):

Table 12.4.1: Priority Actions and Implementation Strategy - Conservation of Water Bodies

Sl. No.	Priority Actions	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1.	Identification of water bodies within BMC limits for conservation	■						
2.	De-silting of existing water bodies and development of the bed lining	■	■	■				
3.	Re-development of tank/lake bunds through slab lining	■	■	■				
4.	Re-development of perimeter area - paved walkway, area lighting, compound wall/fencing, access control and landscaping		■	■	■			
5.	Water treatment and re-circulation including passive aeration systems		■	■				
6.	Reconstruction and restoration of drains leading into and out of the water bodies including by-pass and flood control		■	■	■			
7.	Installation of water quality monitoring stations			■	■			
8.	IEC activities, awareness programs on issues related to water conservation, heritage lakes, socio-cultural issues and environmental impacts	■	■	■	■	■	■	■

12.4.3 ESTIMATED SECTORAL INVESTMENT - CAPITAL AND ANNUAL O&M COST

Based on the parameters specified in the box given at the start of this chapter, the capital and annual operation & maintenance cost has been estimated for the proposed intervention and is listed below:

Table 12.4.2: Estimated Sectoral Investment - Conservation of Water Bodies

Sl. No.	Sector / Component Description	Investment
1.	Improvements to water bodies (Heritage Lakes)	3.34
2.	Water treatment / recirculation systems (e.g. aeration fountains etc.)	0.17
	Total Capital Cost (incl. contingencies, supervision, administration and consulting charges)	3.50
	Annual O&M Cost	0.70

Rs. in Crores

The authorities/departments/agencies that are proposed to be responsible for project formulation/ implementation/monitoring are listed, but shall not be necessarily limited to the following entities:

- Nodal Agency: Bhubaneswar Municipal Corporation.
- Formulation/Implementation Agency: BMC and WRD.
- Monitoring Agency: State Pollution Control Board, Orissa, Bhubaneswar.

12.5 OVERALL ENVIRONMENT ENHANCEMENT

12.5.1 ENVIRONMENTAL MANAGEMENT - RAIN WATER HARVESTING

Most state governments have recently started to focus on rainwater harvesting to protect environmental resources, recharge the ground water table, create awareness on water usage, etc. Though the merits of rainwater harvesting are a known fact, they have not trickled down to required policy measures like pollution abatement, resource' networking, eco-system rehabilitation, etc. Therefore, it is imperative that the strategies mentioned below are implemented together with rainwater harvesting measures in an integrated manner.

12.5.2 PROTECTION OF ENVIRONMENTAL RESOURCES

One of the most critical interventions is the protection of environmental resources. The protection of natural water bodies, channels and open spaces from further encroachments shall be carried out in a coordinated manner. Areas adjoining water bodies shall be developed and clearly marked and notified to prevent further encroachment.

Strategies / Implementation Measures

- Rain Water Harvesting;
- Protection of Resources;
- Slum Networking;
- Pollution Abatement; and
- Eco systems' Rehabilitation.

12.5.3 SLUM NETWORKING PROGRAM

Slum networking should be viewed as integrated improvement of the entire city using slums, not as isolated islands, but as an urban net. The spatial spread of slums together with contiguity between informal settlements gives an opportunity to strengthen city level infrastructure networks. There is a close correlation between slum locations and the natural drainage paths of the city, which needs to be tapped and improved upon with the infrastructure services. This approach would help in building low cost service trunks, particularly for gravity-based systems of sewerage and storm drainage, together with environmental improvements such as cleaning of channels and major drains.

12.5.4 POLLUTION ABATEMENT

Industrial effluent shall be treated separately and shall not be mixed with domestic sewage. Industry shall be encouraged to take up clean technology initiatives. This is particularly applicable for small and medium enterprises. Apart from these specific measures, certain industrial units will need to be shifted to designated areas for prevention of mixing of effluents into storm water drains.

Issues - Water Pollution

- Health risks;
- Contamination of groundwater;
- Encroachments of lakes and channels; and
- Lack of coordination and unclear responsibilities among agencies.

12.5.5 MONITORING AND QUALITY CONTROL

Monitoring of water quality parameters is being conducted by the SPCB and an Environmental Management Plan has been released as a guideline for protecting the overall environment. However, it is imperative that other departments that provide urban infrastructure should consult and coordinate all developmental initiatives with the SPCB and the SPCB shall, in turn, ensure that all applicable norms and standards are complied with.

Water Quality Monitoring Parameters

- BOD levels;
- Nitrate levels;
- Extent of heavy metals; and
- Extent of toxic substances.

12.6 AIR POLLUTION CONTROL

12.6.1 INVENTORY OF AIR QUALITY

There is an imminent need to augment and update the database on air quality indicators and initiate research on the health impacts of specific contaminants. The database shall include sources, emission concentrations and identify non-scheduled industrial and commercial premises with air pollution potential so as to develop emission reduction strategies. This shall be taken up in co-ordination with SPCB and the Traffic Police.

Principal Causes - Air Pollution

- Vehicular emissions;
- Industrial emissions; and
- Construction related activities.

12.6.2 LOCAL EDUCATION AND ENFORCEMENT PROGRAM

Identification of potential air pollution sources shall require mitigation through a structured education program. This program shall be drafted in consultation with the SPCB and the Traffic Police Department. It would focus primarily on vehicular pollution and would include promotion of emission testing of vehicles.

12.7 POLLUTION FROM SOLID & HAZARDOUS WASTES

12.7.1 STUDY ON WASTE SOURCES AND CHARACTERISTICS

There is a clear inability on the part of the ULB to maintain data on waste characteristics and thereby identify suitable mitigation methods. Data from waste characteristic studies shall be periodically updated and validated to maintain information on the identification of sources of generation, per capita generation, physical and chemical characteristics of the waste.

Issues - Hazardous Waste Management

- Collection & disposal of medical waste;
- Lack of disposal facilities; and
- Lack of initiatives on reuse and recycle.

12.7.2 LOCAL EDUCATION AND COMMUNITY PARTICIPATION

With high per capita generation trends, measures shall be adopted to reduce waste generation at source. This shall be made possible only through awareness creation and by eliciting active community involvement. The BMC shall take a pro-active role in sensitizing communities on waste minimization through a robust awareness campaign and education. The support of NGOs/CBOs and other agencies can be solicited in conducting such mass awareness programs.

12.7.3 IDENTIFICATION OF COMMERCIAL OPPORTUNITIES

Identification of waste characteristics, sources and creation of public awareness is expected to open avenues for commercial opportunities for waste management. With the BMC successfully contracting out waste collection to the private sector, it would be appropriate if further avenues like treatment and disposal, etc. are explored to carry out sustainable waste disposal practices on a public-private-partnership format.

12.8 PLANNING FOR OPEN SPACES & OTHER RESOURCES

Open spaces and other connected resources have to be planned so that they become lungs for the city. The development of open spaces would also enhance overall environmental quality. It is suggested that proposals should be framed for carrying out studies or planning exercises required for framing capital projects. Some of the best practices and strategies that can be adopted are listed below.

12.8.1 SITE SELECTION AND MARKING

Potential green areas have to be identified, rehabilitated and maintained in order to reduce the deficit of open spaces and parks. Resources like gardens, parks, cemeteries, wastelands, heritage sites, industrial areas, forest, agricultural land, institutions and the road network shall be identified for potential greening activities.

12.8.2 NETWORKING OF RESOURCES

As specified in the earlier sections, open spaces along or next to water bodies shall be identified, rehabilitated and maintained in order to connect recreational and cultural areas. Restoration shall start simultaneously at various areas by clearing the obstacles and greening the areas. Special emphasis shall be given to planting trees. The aim is to restore the green cover to its original glory that was lamentably lost during the earlier devastating cyclone. The immediate action plan consists of greening areas where new developments are proposed and areas that are rapidly developing.

The integration of natural resources in the city for recreational and cultural purposes shall be targeted to attract investments, increase commercial exchanges, and create job opportunities.

12.8.3 LAND USE INTERVENTIONS

Broadly three land uses can be identified for distributing green corridors - residential, commercial and industrial. It is difficult to define clear-cut strategies to convert them to green spaces, as each will have a characteristic of its own. However, residential areas seem to be the easiest to link and make part of a green network. Industrial locations consist partly of open spaces and land reserves that can be integrated to the green corridors.

The implementation of green corridors might be slow due to access and financial constraints. A convincing argument for planting trees is the impact of the increase on property values. Areas which are not available for connection may be given incentives by the government to form green corridors.

12.8.4 MAINTENANCE OF PARKS & PLAYGROUNDS

The possibility of entrusting resident associations and private agencies with the responsibility of maintaining parks, playgrounds and the proposed green corridors can be evaluated. The tasks to be carried out like daily cleaning, watering, weeding, trimming, raising new plantations, etc. need to be clearly spelled out in a contract document. Resident associations can contribute minimum amounts towards maintenance, while the balance can be borne by the ULB.

13

URBAN POOR AND SLUM UPGRADING

13.1 GENERAL

Slum upgrading (including rehabilitation) initiatives and improving the quality of life of the urban poor in general and slum dwellers, in particular, shall be an integral part of the CDP. With the growth of the city and addition of new areas, migration of people from rural areas to the city is imminent. However, the strategies under growth management shall arrest the extent of the migration. In the wake of the new developments being planned in the city, it is necessary that they are regulated in an integrated manner.

Various schemes introduced by the State and Central governments to improve the socio-economic status of slum dwellers need to be utilized in an effective manner. The BMC needs to supplement the current initiatives on its part with aggressive strategies to fulfill the requirements of the urban poor. The best practices and strategies outlined in this chapter shall be at the macro level, specific to social development, as infrastructure provision and deficiencies are already addressed by the underlined strategies under each sector in the prior chapter on Infrastructure.

13.2 BEST PRACTICES AND STRATEGIES

The BMC shall initiate community development activities within its administrative jurisdiction and integrate this aspect in its overall plan for the development of Bhubaneswar. Hence, various Central and State Government programmes shall converge into the overall development plan.

13.2.1 INFRASTRUCTURE PROVISION

Women as Supervisors: In order to ensure the quality of work in providing infrastructure services to slums, it is very crucial to ensure that slum communities shoulder the responsibility of execution of work that will bring about transparency, accountability and quality of work. The women folk of a community shall be empowered through training programmes and discussions to function as vital pillars of the work, thereby reducing potential inequities of the system of contractors. Following steps are envisaged in this regard:

- Decision-making shall be shifted from the BMC to grass roots level.
- Conducting group meetings with the people with regard to the need to take over the responsibility of works execution in their own slums.
- Work estimates to be translated to simpler language in order that slum dwellers can easily follow the technical aspects.
- Vigilance committees to be constituted with people participation to carry out social audits, which shall improve the desired quality in execution of works.

Water Supply: As on date, the notified slums in the city have 155 tube wells, 365 public stand posts and 92 wells for catering to water supply needs, while such information for the non-notified slums is not available. While planning for infrastructure, the BMC shall explore the possibility of providing piped water supply wherever possible. Dependency on public stand posts should be reduced. The Indore and Ahmedabad experience of slum networking, which proposes individual house connections for water supply and provision of individual toilets, has proved effective is worth mentioning in this context.

Roads: A total of 40.43 km of roads connect the city's notified slums with the main arteries. About 19 percent of these roads had drainage. The BMC should make necessary arrangements for providing the missing links and also take up upgradation of roads. The upgradation shall also take into consideration the need to widen the roads for better commuting. These measures are bound to improve the other infrastructure facilities in the city. Necessary investments are already envisaged as part of the capital works that are planned for the city.

13.2.2 POVERTY ALLEVIATION AND COMMUNITY DEVELOPMENT PROGRAMS

Beneficiary Selection: The target beneficiaries need to be identified based on a socio-economic survey and efforts need to be initiated to form community development societies (CDSs) covering the target population and implement guidelines on the lines of SJSRY in beneficiary selection. The community needs to be encouraged to avail the benefits under various slum development programs by developing linkages with lead bankers and ensuring the free flow of communication and a proper reporting procedure. A city level training strategy shall be formulated to focus on the targeted beneficiaries. The strategy will aim at the people to be trained including policy makers, city officials, community members as well as the beneficiaries.

Programme Monitoring: Monitoring of the programme is equally important as implementation. Effective monitoring paves the way for replication and upscaling of such initiatives.

Social Inclusion of Vulnerable Groups: The vulnerable groups are socially under-privileged women and the aged who are generally restricted by the dominant groups in any community. Voice for these vulnerable groups in community development programs is necessary. It can be ensured only through effective awareness campaigns. Improving the literacy levels among the poor and the slum dwellers will also ensure the elimination of the differences among the communities and ensure participation of vulnerable groups. This initiative aims at a long-term goal and needs sustained longstanding efforts on the part of CDSs. The activities of the CDSs shall be monitored through an evaluation procedure on a periodic basis.

13.2.3 COMMUNITY DEVELOPMENT

Community development needs to be integrated to provide economic and employment generation activities. The BMC has to strengthen its efforts to identify NGOs and CBOs and encourage them to work specifically for the empowerment of the urban poor in general, and slum dwellers in particular.

The BMC may concentrate on organizing specific training programs on tailoring, housekeeping, mechanic work, lathe working, computer operation, coir works, etc. to guarantee employment/self-employment for the identified beneficiaries. Training needs assessment, designing the training programs, identification of training institutions and resource persons to bring in community development also needs to be focused.

Education: Support from various sections for involvement in education and to enhance opportunities for increased access to literacy development are to be encouraged. There is a need to develop strong linkages between education, training programs and resources. Value added services (computer coaching classes, tuition, etc.) may be encouraged. The BMC shall facilitate school-linked programs and support services.

Strengthening Community Development Initiatives: Strengthen efforts to involve people in the planning and decision-making at the community level that affect their lives and encourage the participation of community in physical as well as economic generation activities. Encourage government departments, schools, institutions and community-based organizations to provide opportunities for people's participation in discussions that shape decisions and effect proper coordination between the various actors in community development. The BMC has to identify NGOs/CBOs to develop appropriate linkages with city level authorities and community.

Others Policies: Following are some of the policy initiatives which support/facilitate 'best practices':

- Support transformation of informal settlements which are notified. Allow for incremental development and gradual improvement of settlements without loading excessive infrastructure and construction costs. Provide the support required to speed up the process through access to financial, organizational and technical inputs.
- Draw up a city level plan quantifying present informal settlement population, and prepare an action plan to target integration of the population into the city. Communities residing in these settlements must be encouraged towards self-assessment and identification of priorities through which they can initiate changes in their settlements.
- There needs to be a better convergence of urban poverty programmes of the centre, state and local governments. The proposed Comprehensive Development Plan should be prepared with special attention to land tenure, basic services, housing and employment needs, including informal enterprises of the poor, of women and children. Provide the poor with better access to housing finance at affordable cost through micro-credit schemes and community-based lending.
- Promote the cluster, collective or cooperative society approach in allocation of land to the poor. Develop a range of tools through which communities of the poor and their organizations begin a dialogue with the BMC on issues of tenure, infrastructure and housing.
- Develop innovations in delivery mechanism through which communities can begin to work with local authorities to ensure universal provision of basic sanitation and other amenities and services.
- The poor should be empowered to take full part in city governance and thereby access their due share of resources. Action for economic empowerment should include facilitating self-managed thrift and credit societies in order to link the poor to institutional credit.
- Eviction without provision of full resettlement and livelihood opportunities should be avoided. In-situ upgrading should always be the preferred option, except in completely untenable situations. The BMC should play an enabling role in linking poor people to a range of innovative housing and livelihood options.
- The BMC should work with communities using participatory methods to map their access to infrastructure services (water supply, toilets, drainage, garbage removal, etc.) and prioritize their needs/demands. Opportunities should be actively explored for the poor to participate in both infrastructure construction and ongoing service delivery. Although individual family facilities should be the priority, constraints of space may require innovative service delivery options such as community-managed shared facilities.

13.3 SWOT ANALYSIS

In order to appreciate and articulate the current situation and present future possibilities, the SWOT analysis was performed for the 'slum upgrading' and is presented below:

STRENGTHS

- Slum dwellers are playing a proactive role in complimenting the city's unskilled manpower requirement. Thus, bringing them into the economic mainstream would benefit the city in the long run.
- The BMC has demonstrated relatively better utilization of funds received for slum upgrading and improvement. In addition, these investment programmes were able to meet the targets set under each of them. This good success in terms of progress and performance of ongoing projects related to urban poverty alleviation and slum upgrading would go a long way in determining the interest of the BMC in undertaking pro-poor initiatives.
- There has been an active participation and involvement of slum dwellers and NGOs/CBOs in slum upgrading and urban poverty alleviation initiatives. This would provide a platform for coordinated efforts for undertaking such initiatives in future.

WEAKNESSES

- Poor housing conditions and lack of basic services & amenities is a serious concern. It is estimated that about 10-12 percent of the structures are pucca in while about 15-20 percent are semi-pucca structures and the remaining 68-75 percent are be kutcha structures, indicating huge capital investment for upgradation of existing dwelling units. In addition, most of the services are far below the normative standards, requiring augmentation.
- Number of slums and slum dwellers are increasing. An estimate indicates that about one-third of city's population is living in slums. In spite of this alarming figure, not many efforts have been taken up by the GoO/BMC to prevent proliferation of slums.
- At present, the GoO/BMC does not have a proper and updated database on the socio-economic characteristics of slum dwellers and physical features of slums. In the absence of these, it is difficult to formulate policies and investment proposals for slum upgrading.
- Lack of coordination between the GoO/BMC and the NGOs was observed during the consultations. Many of the efforts/ongoing initiatives of the NGOs are not known to the BMC.
- Lack of a slum-upgrading policy is a major deterrent for initiating slum upgrading measures. A clear-cut slum policy can give guidelines, specify priorities and provide legislative support to the BMC to take up initiatives.
- Real estate market imperfections are also causing large-scale proliferation of slums.
- Most of the non-notified slums have come up on land parcels owned by the GoO (GA Department). Pending/delayed decision to transfer these land parcels to BMC for slum upgrading initiatives would delay addressing problems and issues pertaining to land and tenure in non-notified slums.

OPPORTUNITIES

- The efforts of the BMC and responses of the slum dwellers in augmentation of SHGs initiatives and Credit & Thrift Societies have been encouraging. About 128 SHGs are functioning in Bhubaneswar as on date.
- The BMC has been proactive in privatizing civic services. Similarly, higher authorities at the BMC (incl. the Mayor) have a vision to undertake slum upgrading through public-private partnerships.
- Generally, pro-poor related initiatives suffer from lack of appropriate funding. However, the JNNURM of the GoI can fill this gap by providing support for capital investment and capacity building.

THREATS

- Increasing proliferation of slums can act as a deterrent to future planning and growth of the city.
- The slums and localities dominated by poor are highly prone to health hazards due to lack of basic services and medical facilities.
- As a whole, slums in the city can damage the city's image if not regulated and controlled. This aspect must be seriously addressed as the city has a vision to become a hub for knowledge-based industries and tourism related industries.

It can be observed that the inherent strengths identified through evaluation can be directly converted as opportunities for furthering the improvement. On similar lines, the latent weaknesses that have been identified are necessarily indicative of the imminent and progressive threats that are bound to occur if the present issues/problems remain unaddressed.

Therefore, the priority actions identified through discussions with stakeholders and the proposals evolved for improvement are specifically intended to achieve dual objectives, viz. optimal utilization of the available strengths of the system through requisite identification and creation of opportunities for system improvement and sustainability, and implementation of remedial measures based on the identified weaknesses of the system/sector to ensure that the imminent and potential (future) threats are eliminated and prevented from recurrence.

13.4 PRIORITY ACTIONS AND PROPOSALS

As specified earlier, priority actions identified by the stakeholders, and discussed and finalized pertaining to development works related to slum upgrading and urban poor in Bhubaneswar are described below. The below listed policy framework and priority actions have been identified by the study team based on reported evaluations, discussions and priority actions as required and mutually agreed upon by the pertinent Mission Stakeholders.

POLICY DIRECTIVES / ACTIONS

- Development of comprehensive 'slum upgrading' policy to identify, notify and upgrade the slums with clear assignment of responsibilities.
- Finalization of parameters for listing and categorization of slums as tenable and non-tenable category.
- Establishment of a sustainable continuous and non-lapsable fund flow for slum improvement programs.
- Appropriate institutional arrangements for transfer of land from GA Department of the GoO to BMC for undertaking slum improvement schemes and housing for urban poor.
- Exploration of the possibility of land acquisition for slums located on private lands.

PREPARATORY ACTIVITIES

- Comprehensive listing of slums.
- Notification of tenable/non-tenable slums and mapping within BMC area.
- Preparation of a database on socio-economic characteristics of all slum dwellers in the listed slums.
- Mapping and assessment of physical characteristics of slums (housing and services) for all tenable slums.
- Identification of land parcels for resettlement of slum dwellers of all non-tenable slums and involvement of NGOs/CBOs in the process.
- Preparation of DPRs for each of the slums as an integrated scheme covering both housing and services.

IMPROVEMENT MEASURES

- Provision of basic coverage/provision of water supply, sanitation, access roads, etc. in all tenable slums.
- Project formulation for integrated development of all notified tenable slums covering housing, provision of basic services and amenities.
- Formulation of public-private partnership projects for slum upgrading.
- Exploration of rehabilitation option rather than resettlement.
- Adoption of a 'community-based approach' in service provision and delivery to suit the local context and requirements.
- Ensure involvement of women and children from project formulation to implementation to achieve sustainability.
- Target service provision like water supply, sanitation and electricity on individual household basis - to facilitate improvement in performance & collection of user charges.
- Facilitation of 'e-service' provision and delivery, by communities with appropriate supervision by the BMC.
- It is recommended that the BMC bear the cost of provision of services with complete or partial recovery.

Proposed Capital Works - Slum Upgrading

- Land Acquisition/purchase;
- Construction and upgradation of dwelling units; and
- Integrated development of slum through all basic amenities like water supply, sanitation, solid waste management, roads, storm water drains, streetlights, etc.

Following table presents priority actions and their implementation strategy during the mission period (2007-2012):

Table 13.4.1: Priority Actions and Implementation Strategy for Slum Upgrading

Sl. No.	Priority Actions	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
I.	Policy Directives / Actions							
1.	Develop comprehensive 'slum upgrading' policy to identify, notify and upgrade slums with clear assignment of responsibilities	■						
2.	Finalize parameters for listing and categorization of slums (tenable & non-tenable category)	■						
3.	Establish a sustainable continuous and non-lapsable fund flow for slum upgrading programs		■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
4.	Institutional arrangements for land transfer from GA Dept. (GoO) to BMC for slum improvement schemes and housing for urban poor	■	■					
5.	Explore the possibility of land acquisition for slums located on private lands		■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
II.	Preparatory Activities							
1.	Comprehensive listing of slums		■					
2.	Notify tenable/non-tenable slums and mapping within BMC area		■					
3.	Prepare a database on socio-economic characteristics of all slum dwellers in listed slums			■				
4.	Mapping and assessment of physical characteristics of slums (housing and services) for all tenable slums			■				
5.	Identify land parcels for resettlement of slum dwellers of all non-tenable slums and involve NGOs/CBOs in the process			■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
6.	Prepare DPRs for each of the slums as an integrated scheme - both housing and services			■	■	■	■	■
7.	Implement DPR covering both housing and services in all tenable slums			■	■	■	■	■
8.	Formulate public-private partnership projects for slum upgrading			■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
III.	Improvement Measures in Notified Slums							
1.	Prepare a database on socio-economic characteristics of all notified slums	■						
2.	Mapping and assessment of physical characteristics of all notified slums (housing and services)	■						
3.	Adopt community based approach for preparing projects and involve NGOs/CBOs in the process	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■				
4.	Prepare DPRs as an integrated scheme covering both housing and services	■	■	■	■	■	■	■
5.	Implement DPR covering both housing and services in all tenable slums	■	■	■	■	■	■	■

13.5 ESTIMATED SECTORAL INVESTMENT - CAPITAL AND ANNUAL O&M COST

Based on the parameters specified in the box below, the capital and annual operation & maintenance cost has been estimated for the proposed intervention and is listed below:

Sectoral investment for the proposed intervention for this Mission Area has been estimated based on the following parameters:

- Information available/provided by concerned departments, detailed discussions with pertinent authorities (BMC, NGOs/CBOs, etc), field/site visits, techno-economic evaluation/analysis conducted by the consulting team;
- Standard Schedule of Rates issued by PWD, OP rates, prevailing market rates, and relevant information;
- Consultant's database and experience on design of projects of similar scale/nature;
- Costs indicated are only estimated costs. Detailed cost estimation shall be performed for each item of work pursuant to detailed design engineering (during the DPR preparation);
- Land procurement and/or acquisition costs have been calculated separately;
- Capital and annual O&M cost has been estimated considering techno-economically most feasible alternative technologies;
- Estimated costs are also based on recommendations and guidelines in "Plant Design and Economics" by Peters and Timmerhaus, "Compounding and Discounting Tables for Project Evaluation", A World Bank Publication; and
- Necessary provision for physical contingencies, cost escalation for implementation period greater than 18 months, administration/supervision and consultancy charges have been included.

Table 13.5.1: Estimated Sectoral Investment - Slum Upgrading and Urban Poor

Rs. in Crores

Sl. No.	Particulars / Capital Investment Components	Investment	
		Including Land Acquisition / Purchase	Excluding Land Acquisition/ Purchase
1.	Dwelling Units		
	- Land Acquisition / Purchase	986.20	
	- Cost of Construction / Upgradation	242.74	242.74
2.	Water Supply	10.50	10.50
3.	Sewerage and Sanitation	52.18	52.18
4.	Solid waste Management	0.14	0.14
5.	Roads and Pavements	12.15	12.15
6.	Street Lights	3.60	3.60
	Total Capital Cost (incl. contingencies, supervision, administration and consulting charges)	1307.51	321.32
	Annual O&M Cost	3.21	3.21

Necessary clearances from the concerned ministries or authorities need to be acquired at the earliest. The authorities/departments/agencies that are proposed to be responsible for project formulation/implementation are listed, but shall not be necessarily limited to the following entities:

- Nodal Agency: Bhubaneswar Municipal Corporation.
- Formulation/Implementation Agency: BMC (with active cooperation of GA Department, GoO).

14

FINANCIAL OPERATING PLAN

14.1 GENERAL

The Financial Operating Plan (FOP) is a multi-year forecast of finances of the urban local body. The FOP can be generated for a short-medium term of 5-7 years and also for a longer-term 20-year period. However, for generating a FOP with realistic assumptions, a short-term (5 years) or medium-term (7 years) duration is more appropriate. In the context of this assignment, the FOP is generated for the medium-term (2006-07 to 2012-13) to match with the duration of the JNNURM, as this CDP document would be utilized for accessing financial assistance from the JNNURM, which has a Mission period of 7 years.

FOPs are essentially a financial forecast, developed on the basis of the growth trends of various components of income and expenditure, based on time-series data. As stated earlier, Bhubaneswar City is administered by the Bhubaneswar Municipal Corporation (BMC), while there are various Government Departments and their Directorates with development related responsibilities and functions as described in Section 2.7 earlier. Among all service providers, only the BMC and Public Health Engineering Organization (PHEO) have their own sources of revenue, collected in the form of taxes and/or user charges though most of their revenue/income is in the form of assigned revenue and/or budgetary revenue grant. Barring the BMC and PHEO, all other service agencies are providing services through Government budgetary support. Accordingly, the financial forecast has been prepared only for the BMC and the PHEO. While preparing the FOP, all functions except water supply and sewerage are envisaged under the BMC, while water supply and sewerage are envisaged under the PHEO.

It is noteworthy that several assumptions need to be made while forecasting finances. The Team has taken every precaution to adopt various assumptions based on current growth trends, contribution pattern of various revenue drivers, and utilization pattern of various expenditure drivers. In addition, various quantifiable assets and liabilities of the BMC were also taken into account and phased over a period of time. The following section provides insight into the various assumptions made, necessary logic and justifications for such assumptions.

The Capital Investment Plan (CIP) is the multi-year scheduling of public physical improvements and investments. The scheduling or phasing of the Plan is based on analysis of fiscal resources availability (for new investments and O&M), technical capacity for construction and O&M, and the choice of specific improvements to be taken up over a period of 7 years.

Accordingly, the CIP for infrastructure services in Bhubaneswar has been formulated. Phasing of investments is also worked out considering the need for the service and the sustainability of its investments, which forms part of the FOP. The phasing/scheduling of investments has been carried out through an iterative process and the principles taken into account include:

- Priority needs, with developing wards/areas getting priority over future development areas/locations as expressed by the stakeholders;
- Inter- and intra-service linkages, viz. investments in storm water drainage shall be complemented by corresponding improvements in roads; and
- Size and duration of the requirements, including preparation and implementation period.

Goals of the Capital Investment Plan

- Provide capital facilities to serve the most pressing needs of the city populace and to enable the City deliver services efficiently to its constituents.
- Preserve the physical integrity of the City's valuable capital assets and gradually reduce the major maintenance backlog.
- Make capital investments consistent with the vision of the City Development Plan.

The CIP is an integral part of the FOP and the CIP provides essential inputs in terms of capital transactions.

14.2 CAPITAL INVESTMENT PLAN

14.2.1 PROCESS

The Capital Investment Plan involves the identification of public capital facilities to cater to the demands of the city population during different stages (design stages) as per the requirements of various urban services. The following process is adopted in identifying capital investment requirement and formulating the CIP.

Capital Investment Plan - Process

- Project Identification
- Project Screening and Prioritization
- Project Phasing

PROJECT IDENTIFICATION

The general criteria used in identifying projects were the goals of the various departments with regard to efficient service delivery, prompt customer service, environmental sustainability, strategic implementation of projects, community benefits, infrastructure maintenance needs, and the growing demand. The city stakeholder consultations and focus group discussions held as part of the CDP preparation process were another important aspect in the identification of projects. These consultations brought out deficiencies at the macro and micro levels and have provided the first platform for the identification of projects. Infrastructure delivery benchmarks in the form of indicators were also used to arrive at the demand and the gaps in service delivery, which further correlated with the results of the stakeholder consultations to arrive at specific project proposals.

PROJECT SCREENING, PRIORITIZATION AND PHASING

From the identified list of proposals and priority actions, projects are prioritized based on need and funding options. The prioritization also considered various alternatives for FOP, which are phased based on the sustainability of the BMC with regard to its finances. Specific importance is given to the Action Stakeholders and opinions/feedback of the elected representatives for institutionalizing the CIP process. As a final step, project phasing is carried out considering investment sustainability for various options of the FOP.

14.2.2 STRATEGIES

STRATEGIC CAPITAL INVESTMENT

The city shall use fiscal notes and policy analysis to assist in making informed capital investment choices to achieve the stakeholders' long-term goals. This process provides guidance for capital budgeting and long-term planning of capital facilities for all departments, for identifying and balancing competing needs, and for developing short- and long-term capital finance plans for all capital investments.

Capital Investment Plan - Strategies

- Strategic Capital Improvement
- Facility Siting
- Decision Making
- Program Funding

This process includes defining desired outcomes of capital investments, evaluating potential investments at the city level by applying standard criteria for assessing alternative investments, and making more efficient use of all potential resources. The city shall budget sufficient funds to perform major and preventive maintenance of existing facilities that is considered cost effective. The city shall use maintenance plans for capital facilities and a funding allocation plan for such maintenance, and may revise these plans from time to time.

There is a need for fiscal impact analyses of all major capital projects considered for funding. Such analyses shall include, but not be limited to, one-time capital costs, life-cycle operating

and maintenance costs, revenues from the project, and costs of not doing the project. The BMC shall make major project specific capital decisions through the adoption of the City's operating and capital budgets, and the CIP.

FACILITY SITING

Encourage the location of new community-based capital facilities. The city shall consider providing capital facilities or amenities as an incentive to attract both public and private investments.

DECISION MAKING AND PLAN FUNDING

Work together with other stakeholders towards coordinated capital investment planning, including coordinated debt financing strategies to achieve the goals of the CDP. Explore funding strategies for capital facilities, particularly for those that serve or benefit citizens throughout the region.

14.2.3 AGENCIES

In order to streamline the responsibilities for implementation and operation & maintenance (O&M) of the assets created, and in line with the provisions of the 74th CAA, Orissa Municipal Corporations Act, 2003, and the commitment/assurance of the GoO to transfer different functions to the BMC as per the 74th CAA, all the proposed capital investments have been broadly categorized under the following two agencies:

- Bhubaneswar Municipal Corporation (BMC): Capital investments and subsequent O&M pertaining to following sectors are envisaged under the BMC:
 - Heritage conservation;
 - Roads, traffic and transportation;
 - Storm water drains;
 - Street lighting;
 - Solid waste management;
 - Conservation of water bodies;
 - Slum upgrading; and
 - Urban governance.
- Public Health Engineering Organization (PHEO): Capital investments and subsequent O&M pertaining to following sectors are envisaged under the PHEO:
 - Water supply; and
 - Underground sewerage system.

It is noteworthy that the GoO is committed to transfer water supply and sewerage functions to the BMC as per the provisions of the 74th CAA. However, since the process of transfer is time-consuming and there is no clarity on the timeline, separate capital investment proposals have been made for BMC and PHEO at this point of time.

14.2.4 CAPITAL INVESTMENT ESTIMATE, CAPITAL INVESTMENT PLAN AND PHASING

An estimate of the capital investment that is required to achieve the objectives of various Mission Areas and comply with the respective Mission Statements is presented in this section. This estimate is based on the following:

- Discussions held with principal stakeholders;
- Review of available information on the existing system;
- Discussion with Mission Stakeholders during the respective stages of preparation of the CDP (please refer to Section 9.2 for details);
- Assessments through field visits and specific discussions with entities responsible for system implementation, operation and maintenance;
- Available Standard Schedule of Rates (SSOR);
- Consultant's database and experience with projects of similar scale and nature;
- Requisite cost escalation on materials and labor for 2006-2007 rates of implementation;

- Requisite cost escalation for contracts over 18-month implementation period; and
- Requisite provision for unforeseen items of work and physical contingencies.

The capital investment estimate has been prepared for the following two scenarios:

- **Optimum Scenario:** This scenario estimates capital investment based on the above parameters, duly approved by the various stakeholders. This estimate is also approved by the BMC; and
- **Potential Scenario:** Considering the importance of Bhubaneswar City as the State's capital and administrative, socio-economic and cultural importance in the region, the GoO has envisaged an additional capital investment component apart from those identified under the 'Optimum Scenario'. For the additional capital investment component, the GoO is also committed to provide additional capital investment support and budgetary support to the BMC for O&M.

OPTIMUM SCENARIO

The estimated sector-wise investment required for the mission period (2007-2012) under the 'Optimum Scenario' is furnished in the table below.

Table 14.2.1: Summary of Estimated Sector-wise Capital Investment Estimate under the 'Optimum Scenario'

Sl. No.	Mission Areas / Core Sectors	Capital Investment Estimate (Rs. in Crores)	Percentage Share
A.	Urban Infrastructure		
1.	Water Supply System	691.26	31.14
2.	Underground Sewerage System	496.29	22.35
3.	Roads, Traffic and Transportation	508.37	22.90
4.	Storm Water Drains	129.62	5.84
5.	Street Lighting	28.92	1.30
B.	Environment Improvement		
1.	Solid Waste Management	25.08	1.13
2.	Conservation of Water Bodies	3.50	0.16
C.	Other Mission Areas		
1.	Heritage Conservation	5.95	0.27
2.	Slum Upgrading	321.32	14.47
3.	Urban Governance	9.80	0.44
	Total Capital Investment Estimate	2220.11	100.00

It can be seen from the above table and chart that about one-third of the capital investment estimate is envisaged for the water supply. Roads, traffic & transportation and underground sewerage system are the other major sectors with an envisaged utilization of 24 percent and 22 percent, respectively. All other sectors together account for about 22 percent in which the major share is planned for slum upgrading and improvement (about 14 percent of the overall CIP). A detailed break-up of the above estimate is given in [Annexure - 22](#).

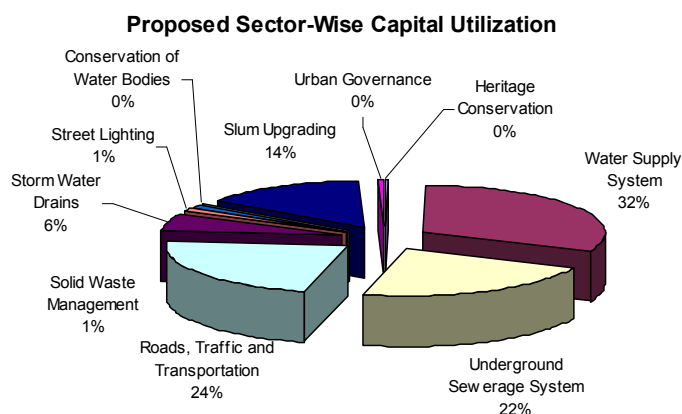


Table 14.2.2: Summary of Estimated Agency-wise Capital Investment Estimate under the 'Optimum Scenario'

Sl. No.	Agency / Core Sectors	Capital Investment Estimate (Rs. in Crores)	Percentage Share
A.	Bhubaneswar Municipal Corporation		
1.	Heritage Conservation	5.95	0.27
2.	Roads, Traffic and Transportation	508.37	22.90
3.	Storm Water Drains	129.62	5.84
4.	Street Lighting	28.92	1.30
5.	Solid Waste Management	25.08	1.13
6.	Conservation of Water Bodies	3.50	0.16
7.	Slum Upgrading	321.32	14.47
8.	Urban Governance	9.80	0.44
	Sub Total (A)	1032.56	46.51
B.	Public Health Engineering Organization		
1.	Water Supply System	691.26	31.14
2.	Underground Sewerage System	496.29	22.35
	Sub Total (B)	1187.55	53.49
	Total Capital Investment Estimate	2220.11	100.00

The Capital Investment Plan (CIP) has been prepared for a period of 7 years (FY 2006-07 to FY 2012-13) under the 'Optimum Scenario'. The phasing has been worked out based on the priorities assigned by the stakeholders and preparedness of the service providing agencies to prepare the DPRs and initiate implementation of the proposals. The right-hand chart provides insight into the year-wise utilization of capital during the Plan period. A detailed Capital Investment Plan along with detailed break-up is given in Annexure - 23. The table below provides sector-wise and agency-wise capital investment estimates and phasing under the 'Optimum Scenario':

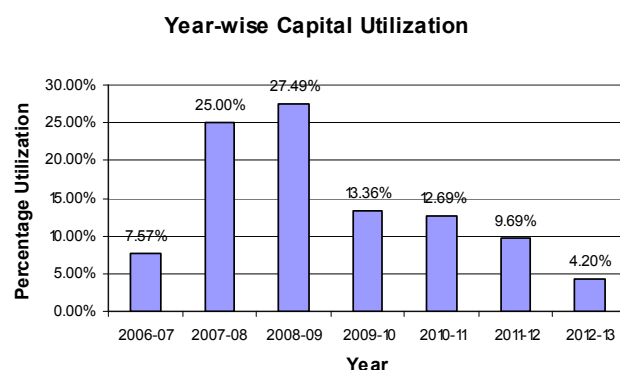


Table 14.2.3: Summary of Estimated Sector-wise and Agency-wise Capital Investment Estimate and Phasing under 'Optimum Scenario'

Sl. No.	Mission Areas / Core Sectors	Capital Investment (Rs. in Crores)	% Share	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
I.	SECTOR-WISE CAPITAL INVESTMENT PLAN AND PHASING									
A.	Urban Infrastructure									
1.	Water Supply System	691.26	31.14	0.00	99.88	150.25	120.95	153.83	123.47	42.88
2.	Underground Sewerage System	496.29	22.35	53.05	144.97	232.60	65.68	0.00	0.00	0.00

Sl. No.	Mission Areas / Core Sectors	Capital Investment (Rs. in Crores)	% Share	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
3.	Roads, Traffic and Transportation	508.37	22.90	61.44	217.91	104.67	24.35	31.80	50.00	18.20
4.	Storm Water Drains	129.62	5.84	8.78	29.44	48.19	18.01	15.75	9.45	0.00
5.	Street Lighting	28.92	1.30	1.60	12.76	14.56	0.00	0.00	0.00	0.00
B.	Environment Improvement									
1.	Solid Waste Management	25.08	1.13	8.02	8.98	5.41	2.67	0.00	0.00	0.00
2.	Conservation of Water Bodies	3.50	0.16	0.68	1.14	1.02	0.67	0.00	0.00	0.00
C.	Other Mission Areas									
1.	Heritage Conservation	5.95	0.27	0.00	2.98	2.98	0.00	0.00	0.00	0.00
2.	Slum Upgrading	321.32	14.47	32.13	32.13	48.20	64.27	80.33	32.13	32.13
3.	Urban Governance	9.80	0.44	2.45	4.90	2.45	0.00	0.00	0.00	0.00
	Total Capital Investment	2220.11	100.0	168.15	555.09	610.33	296.60	281.71	215.05	93.21
	Percentage			7.57	25.00	27.49	13.36	12.69	9.69	4.20
II.	AGENCY-WISE CAPITAL INVESTMENT PLAN AND PHASING									
A.	Bhubaneswar Municipal Corporation									
1.	Heritage Conservation	5.95	0.27	0.00	2.98	2.98	0.00	0.00	0.00	0.00
2.	Roads, Traffic and Transportation	508.37	22.90	61.44	217.91	104.67	24.35	31.80	50.00	18.20
3.	Storm Water Drains	129.62	5.84	8.78	29.44	48.19	18.01	15.75	9.45	0.00
4.	Street Lighting	28.92	1.30	1.60	12.76	14.56	0.00	0.00	0.00	0.00
5.	Solid Waste Management	25.08	1.13	8.02	8.98	5.41	2.67	0.00	0.00	0.00
6.	Conservation of Water Bodies	3.50	0.16	0.68	1.14	1.02	0.67	0.00	0.00	0.00
7.	Slum Upgrading	321.32	14.47	32.13	32.13	48.20	64.27	80.33	32.13	32.13
8.	Urban Governance	9.80	0.44	2.45	4.90	2.45	0.00	0.00	0.00	0.00
	Capital Investment (Sub Total A)	1032.56	46.51	115.10	310.24	227.48	109.97	127.88	91.58	50.33
	Percentage			11.15	30.05	22.03	10.65	12.38	8.87	4.87
B.	Public Health Engineering Organization									
1.	Water Supply System	691.26	31.14	0.00	99.88	150.25	120.95	153.83	123.47	42.88
2.	Underground Sewerage System	496.29	22.35	53.05	144.97	232.60	65.68	0.00	0.00	0.00
	Capital Investment (Sub Total B)	1187.55	53.49	53.05	244.85	382.85	186.63	153.83	123.47	42.88

Sl. No.	Mission Areas / Core Sectors	Capital Investment (Rs. in Crores)	% Share	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
	Percentage			4.47	20.62	32.24	15.72	12.95	10.40	3.61

POTENTIAL SCENARIO

The estimated sector-wise investment required for the mission period (2007-2012) under the 'Potential Scenario' is furnished in the table below:

Table 14.2.4: Summary of Estimated Sector-wise Capital Investment Estimate under the 'Potential Scenario'

Sl. No.	Mission Areas / Core Sectors	Capital Investment Estimate (Rs. in Crores)	Percentage Share
A.	Urban Infrastructure		
1.	Water Supply System	691.26	22.74
2.	Underground Sewerage System	596.29	19.62
3.	Roads, Traffic and Transportation	1,008.37	33.17
4.	Storm Water Drains	129.62	4.26
5.	Street Lighting	28.92	0.95
B.	Environment Improvement		
1.	Solid Waste Management	83.08	2.73
2.	Conservation of Water Bodies	53.00	1.74
C.	Other Mission Areas		
1.	Heritage Conservation	114.95	3.78
2.	Slum Upgrading	321.32	10.57
3.	Urban Governance	12.80	0.42
	Total Capital Investment Estimate	3,039.61	100.00

It can be seen from the above table and chart that about one-third of the capital investment estimate is envisaged for roads, traffic and transportation. Water supply and underground sewerage system are the other major sectors with an envisaged utilization of 23 percent and 20 percent, respectively. All other sectors together account for about 25 percent, in which a major share is planned for slum upgrading and improvement (about 11 percent of the overall CIP). A detailed break-up of the above estimate is given in Annexure - 24.

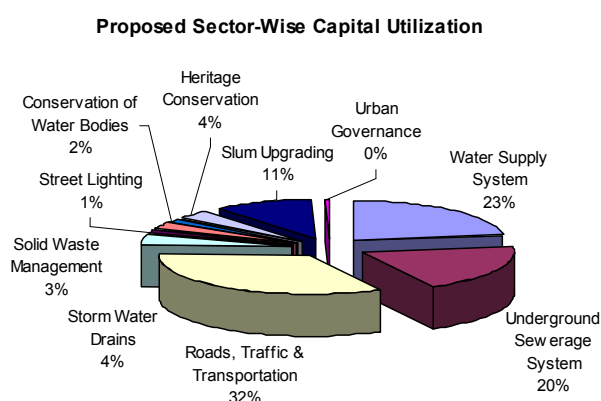


Table 14.2.5: Summary of Estimated Agency-wise Capital Investment Estimate under the 'Potential Scenario'

Sl. No.	Agency / Core Sectors	Capital Investment Estimate (Rs. in Crores)	Percentage Share
A.	Bhubaneswar Municipal Corporation		

Sl. No.	Agency / Core Sectors	Capital Investment Estimate (Rs. in Crores)	Percentage Share
1.	Heritage Conservation	114.95	3.78
2.	Roads, Traffic and Transportation	1,008.37	33.17
3.	Storm Water Drains	129.62	4.26
4.	Street Lighting	28.92	0.95
5.	Solid Waste Management	83.08	2.73
6.	Conservation of Water Bodies	53.00	1.74
7.	Slum Upgrading	321.32	10.57
8.	Urban Governance	12.80	0.42
	Sub Total (A)	1752.06	57.64
B.	Public Health Engineering Organization		
1.	Water Supply System	691.26	22.74
2.	Underground Sewerage System	596.29	19.62
	Sub Total (B)	1287.55	42.36
	Total Capital Investment Estimate	303,9.61	100.00

The CIP has been prepared for a period of 7 years (FY 2006-07 to FY 2012-13) under the 'Potential Scenario'. The phasing has been worked out based on the priorities assigned by the stakeholders and preparedness of the service providing agencies to prepare the DPRs and initiate implementation of the proposals. The right-hand chart provides insight into the year-wise utilization of capital during the plan period. The table below provides sector-wise and agency-wise capital investment estimates and phasing under the 'Potential Scenario'.

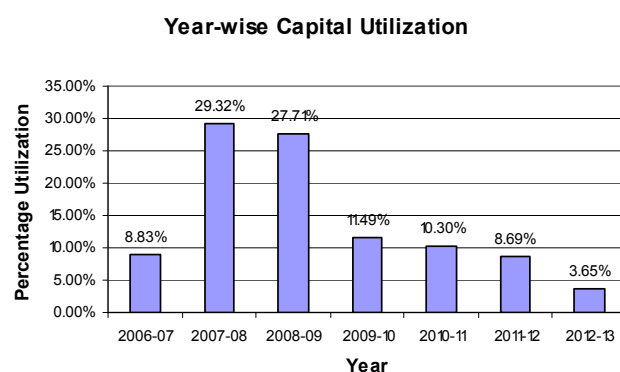


Table 14.2.6: Summary of Estimated Sector-wise and Agency-wise Capital Investment Estimate and Phasing under 'Potential Scenario'

Sl. No.	Mission Areas / Core Sectors	Capital Investment (Rs. in Crores)	% Share	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
I.	SECTOR-WISE CAPITAL INVESTMENT PLAN AND PHASING									
A.	Urban Infrastructure									
1.	Water Supply System	691.26	22.74	0.00	99.89	150.28	120.97	153.81	123.46	42.86
2.	Underground Sewerage System	596.29	19.62	63.74	174.18	279.48	78.89	0.00	0.00	0.00
3.	Roads, Traffic and Transportation	1008.37	33.17	121.91	432.09	207.62	48.30	63.12	99.22	36.10
4.	Storm Water Drains	129.62	4.26	8.78	29.45	48.19	18.00	15.75	9.45	0.00
5.	Street Lighting	28.92	0.95	1.60	12.75	14.56	0.00	0.00	0.00	0.00

Sl. No.	Mission Areas / Core Sectors	Capital Investment (Rs. in Crores)	% Share	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
B. Environment Improvement										
1.	Solid Waste Management	83.08	2.73	26.58	29.74	17.91	8.85	0.00	0.00	0.00
2.	Conservation of Water Bodies	53.00	1.74	10.35	17.17	15.39	10.09	0.00	0.00	0.00
C. Other Mission Areas										
1.	Heritage Conservation	114.95	3.78	0.00	57.48	57.48	0.00	0.00	0.00	0.00
2.	Slum Upgrading	321.32	10.57	32.13	32.13	48.20	64.27	80.33	32.13	32.13
3.	Urban Governance	12.80	0.42	3.20	6.40	3.20	0.00	0.00	0.00	0.00
	Total Capital Investment	3039.61	100.0	268.29	891.28	842.31	349.37	313.01	264.26	111.09
	Percentage			8.83	29.32	27.71	11.49	10.30	8.69	3.65
II. AGENCY-WISE CAPITAL INVESTMENT PLAN AND PHASING										
A. Bhubaneswar Municipal Corporation										
1.	Heritage Conservation	114.95	3.78	0.00	57.48	57.48	0.00	0.00	0.00	0.00
2.	Roads, Traffic and Transportation	1008.37	33.17	121.91	432.09	207.62	48.30	63.12	99.22	36.10
3.	Storm Water Drains	129.62	4.26	8.78	29.45	48.19	18.00	15.75	9.45	0.00
4.	Street Lighting	28.92	0.95	1.60	12.75	14.56	0.00	0.00	0.00	0.00
5.	Solid Waste Management	83.08	2.73	26.58	29.74	17.91	8.85	0.00	0.00	0.00
6.	Conservation of Water Bodies	53.00	1.74	10.35	17.17	15.39	10.09	0.00	0.00	0.00
7.	Slum Upgrading	321.32	10.57	32.13	32.13	48.20	64.27	80.33	32.13	32.13
8.	Urban Governance	12.80	0.42	3.20	6.40	3.20	0.00	0.00	0.00	0.00
	Capital Investment (Sub Total A)	1752.06	57.62	204.55	617.21	412.55	149.51	159.2	140.8	68.23
	Percentage			11.67	35.23	23.55	8.53	9.09	8.04	3.89
B. Public Health Engineering Organization										
1.	Water Supply System	691.26	22.74	0.00	99.89	150.28	120.97	153.81	123.46	42.86
2.	Underground Sewerage System	596.29	19.62	63.74	174.18	279.48	78.89	0.00	0.00	0.00
	Capital Investment (Sub Total B)	1287.55	42.36	63.74	274.07	429.76	199.86	153.81	123.46	42.86
	Percentage			4.95	21.29	33.38	15.52	11.95	9.59	3.33

14.3 FINANCIAL OPERATING PLAN

The objective of this section is to assess the investment sustenance capacity of the BMC and PHEO vis-a-vis the projects identified in the CIP as part of the City Development Plan.

Broadly, the water supply and sewerage components are envisaged under the PHEO, while all other components are envisaged for funding under the BMC. The FOP is in full consonance with the city's vision & approach to development and priorities and action plans approved by the stakeholders.

14.3.1 BASE AND BASIS

As stated earlier, the FOP has been separately generated for the BMC and PHEO. In order to assess the investment sustaining capacity of the BMC and budgetary support required for PHEO (as PHEO is a Department of GoO), the fiscal situation is simulated through a Financial Operating Plan (FOP). The FOP is a multi-year forecast of finances for a term of 10 years. It is used to forecast revenue income and operating expenditure for the period between FY 2005-06 and FY 2013-14. However, capital expenditure is planned from FY 2006-07. The following paragraphs provide important considerations towards simulating the fiscal situation of the BMC and the PHEO:

Following are the important considerations towards simulating the fiscal situation of the BMC and include both existing and new resources.

BHUBANESWAR MUNICIPAL CORPORATION

- Income considerations
 - Revision of property tax ARV by 35 percent in FY 2007-08 and FY 2012-13 from the existing previous base (quinquennial revision frequency);
 - Improving arrears tax collection efficiency to at least 75 percent and current collection efficiency to at least 85 percent;
 - Growth in other revenue income items based on past performance and/or likely growth; and
 - Any additional resources generated as part of proposed investments are taken into consideration.
- Expenditure considerations
 - Establishment expenditure assumed to increase at the rate of 8 percent per annum (8 percent is considered as there has been a consistent low growth rate over the past years and also there is a restriction by the GoO for fresh recruitment);
 - Repairs & maintenance to grow based on past performance and/or likely growth;
 - Proposed capital expenditure and phasing based on investments recommended;
 - Additional O&M for new investments are also taken into account.

PUBLIC HEALTH ENGINEERING ORGANIZATION

- Income considerations
 - A major revision of about 30 percent in the base tariff for water and sewer during FY 2008-09, matching with the commissioning of the new scheme has been proposed. An automatic increase of 5 percent per annum for other years as per the prevailing procedure of the GoO Notification is also taken into consideration;
 - Improving arrears tax collection efficiency to at least 65 percent and current collection efficiency to at least 75 percent; and
 - Any additional resources generated as part of proposed investments are taken into consideration.
- Expenditure considerations
 - Establishment expenditure assumed to increase at rate of 8 percent per annum (8 percent is considered as there has been a consistent low growth rate over the past years and also there is a restriction by the GoO for fresh recruitment);
 - Repairs & maintenance to grow based on past performance and/ or likely growth;
 - Proposed capital expenditure & phasing based on investments recommended; and
 - Additional O&M for new investments are also taken into account.

14.3.2 KEY ASSUMPTIONS

In forecasting income and expenditure, following are the key assumptions and guiding principles given separately for the BMC and the PHEO:

BHUBANESWAR MUNICIPAL CORPORATION

Table 14.3.1: Basic Assumptions for the FOP - BMC

Sl. No.	Particulars	Assumption for Forecast	Basis / Current Average
A.	REVENUE INCOME		
1.	Taxes		
	Property Tax		
	- ARV Revision	35% during FY 2007-08 and FY 2012-13	Proposal
	- Growth in Assessments	Ceiling 7% Gradually stabilize at 4-5%	Current rate is 6.88%
	- Collection Performance	Arrear demand - 75% Current demand - 85%	Arrear demand - 47% Current demand - 61%
	Other Taxes	5% annual growth	1163%
2.	Assigned Revenue & Compensation		
	Compensation in lieu of Octroi	Ceiling 5%	(0.46)%
	Other Assigned Revenues	--	(33.33)%
3.	Other Revenue Items		
	Rent from Municipal Properties	Ceiling 15%	14.35 %
	Fees and User Charges	Ceiling 20%	28.49 %
	Sale and Hire Charges	15% annual growth	278.14 %
	Revenue Grants, Contributions and Subsidies	Ceiling 5%	(26.49)%
	Other Income	Ceiling 15%	780.84 %
B.	REVENUE EXPENDITURE		
1.	Establishment	8% annual growth	46%
2.	Administrative Expenses	8% annual growth	15%
3.	Repairs and Maintenance - Existing Assets	12% annual growth	58%
4.	Interest and Finance Charges - Others	Based on annuity calculation on the loans outstanding	--
5.	Revenue Grants, Contributions and Subsidies	Ceiling 5%	356%
6.	Miscellaneous / Other Expenses	Ceiling 10%	265%
C.	CAPITAL STRUCTURING		
1.	Capital Grants - GoI/JNNURM	80% of capital expenditure	As per JNNURM Guidelines; for admissible components
2.	Capital Grants - GoO as Counterpart Contribution	10% of capital expenditure	As per JNNURM Guidelines
3.	BMC as Counterpart Contribution	10% of capital expenditure To be transferred from revenue surplus (primary operational surplus)	Proposal

Sl. No.	Particulars	Assumption for Forecast	Basis / Current Average
		Resource gap to be met through debt	
4.	Loans/Borrowings	8% interest repayable in 15 years.	Proposal
5.	Cost Escalation - Phasing	6% per annum	Proposal
6.	Investment phasing	<u>Optimum Scenario:</u> As per the CIP under 'optimum scenario', full investment <u>Potential Scenario:</u> As per the CIP under 'potential scenario', full investment Sustainability levels were assessed in separate scenarios	Proposal
7.	Capital investment (for BMC components only)	<u>Optimum Scenario:</u> Rs. 1,032.56 crores <u>Potential Scenario:</u> Rs. 1,752.06 crores.	As per the Capital Investment Estimate and Capital Investment Plan

PUBLIC HEALTH ENGINEERING ORGANIZATION

Table 14.3.2: Basic Assumptions for the FOP - PHEO

Sl. No.	Particulars	Assumption for Forecast	Basis / Current Average
A.	REVENUE INCOME		
1.	Water Supply		
	Water Tariff Revision	30% revision of base tariff during FY 2008-09 while commissioning the new scheme 5% automatic revision every year as per prevailing practice and GoO Notification	5% automatic revision every year as per prevailing practice and GoO Notification Revision during FY 2008-09 proposed to achieve full O&M cost recovery
	Coverage	Ceiling 85% of Property Tax Assessments	79% of PTAs
	Connection Charges	20% increase every 3 years starting from FY 2007-08	Proposal
	Collection Performance	Arrear demand - 65% Current demand - 75%	Arrear demand - NA Current demand - NA 60% overall - based on discussion
2.	Sewerage		
	Sewer Charges Revision	30% revision of base tariff during FY 2008-09 while commissioning the new scheme 5% automatic revision every year as per prevailing practice and GoO Notification	5% automatic revision every year as per prevailing practice and GoO Notification Revision during FY 2008-09 proposed to achieve full O&M cost recovery
	Coverage	Ceiling 75% of Property Tax Assessments	35% of PTAs
	Connection Charges	25% increase every 3 years starting from FY 2007-08	Proposal
	Collection Performance	Arrear demand - 70% Current demand - 75%	Arrear demand - NA Current demand - NA Data not available
B.	REVENUE EXPENDITURE		
1.	Establishment	8% annual growth	(10.31)%

Sl. No.	Particulars	Assumption for Forecast	Basis / Current Average
2.	Repairs and Maintenance - Existing Assets	8% annual growth	15%
	Water Supply	8% annual growth	7.69%
	Sewerage	8% annual growth	514%
3.	Miscellaneous / Other Expenses	Ceiling 10%	242%
C.	CAPITAL STRUCTURING		
1.	Capital Grants - GoI/JNNURM	80% of capital expenditure	As per JNNURM Guidelines; For admissible components
2.	Capital Grants - GoO as Counterpart Contribution	10% of capital expenditure as GoO Contribution 10% of capital expenditure as PHEO Contribution	As per JNNURM Guidelines
3.	Cost Escalation - Phasing	6% per annum	
4.	Investment phasing	<u>Optimum Scenario:</u> As per the CIP under 'optimum scenario', full investment <u>Potential Scenario:</u> As per the CIP under 'potential scenario', full investment	Proposal
5.	Capital investment (for water supply and sewerage components only)	<u>Optimum Scenario:</u> Rs. 1,187.55 crores <u>Potential Scenario:</u> Rs. 1,287.55 crores.	As per the Capital Investment Estimate and Capital Investment Plan

14.3.3 SCENARIOS AND FINANCIAL PROJECTIONS

Based on the above assumptions and the proposed CIP, separate FOPs have been generated for both BMC and PHEO. As stated earlier, the investments pertaining to all sectors except water supply and sewerage have been incorporated in the FOP prepared for the BMC. Pertinent O&M expenses (on new assets) and the receivables thereon are also incorporated into the FOP. The FOP for the PHEO incorporates only the income and expenditure pertaining to water supply and sewerage. The FOP is generated under the following three scenarios:

- **Base Case - Optimum Scenario:** This scenario assumes the capital investment estimate and the phasing as per the 'Optimum Scenario'. The FOP has been generated assuming full CIPs under the 'Optimum Scenario' for both the BMC and PHEO separately;
- **Base Case - Potential Scenario:** This scenario assumes the capital investment estimate and the phasing as per the 'Potential Scenario'. The FOP has been generated assuming full CIPs under the 'Potential Scenario' for both the BMC and PHEO separately; and
- **Sustainable Scenario Option:** This scenario is envisaged to ascertain a sustainable level of the BMC for the proposed CIP considering the BMC's capital investment capacity and its capacity to maintain the new assets. The FOP has been generated only for the BMC.

The following paragraphs summarize the outcome of different scenarios of the FOPs against select key indicators.

BASE CASE - OPTIMUM SCENARIO

This scenario assumes the capital investment estimate and the phasing as per the 'Optimum Scenario' (please refer to Table 14.2.3). The FOP has been generated assuming full CIPs under the 'Optimum Scenario' for both the BMC and PHEO separately based on the assumptions outlined in Tables 14.3.1 and 14.3.2 above. The following table summarizes the outcome of the FOP under the 'Base Case - Optimum Scenario' against select key indicators.

Table 14.3.3: Summary Findings of the Financial Operating Plan: Base Case - Optimum Scenario

Rs. in Lakhs

Sl.	Particulars/Items	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
A. Bhubaneswar Municipal Corporation								
1.	Opening Balance	1324.62	1938.67	1768.46	(211.68)	(3582.63)	(7819.21)	(12480.12)
2.	Revenue Receipts	3237.26	3530.69	3817.49	4085.22	4344.04	4557.79	5107.44
3.	Revenue Expenditure	2354.65	3148.11	5273.64	6999.47	7779.61	8615.50	9551.34
4.	Operating Ratio	0.73	0.89	1.38	1.71	1.79	1.89	1.87
5.	Debt Servicing Ratio	0.00	9.36	15.86	18.87	21.55	24.16	21.56
6.	Operating Deficit/ Revenue Grant Requirement	0.00	0.00	1456.14	2914.26	3435.57	4057.71	4443.90
7.	Closing Balance	1938.67	1768.46	(211.68)	(3582.63)	(7819.21)	(12480.12)	(18528.46)
8.	Capital Grant - Gol/JNNURM	9209.30	24817.59	18197.08	8797.25	10230.49	7326.61	4026.56
9.	Capital Grant - GoO	1151.16	3102.20	2274.64	1099.66	1278.81	915.83	503.32
10.	BMC Contribution - Transfers from Revenue Surplus	882.61	52.25	0.00	0.00	0.00	0.00	0.00
11.	BMC Contribution - Loan/ Borrowings	0.00	2827.50	2356.25	1413.75	1413.75	1413.75	0.00
B. Public Health Engineering Organization								
1.	Opening Balance	(1634.44)	(3132.80)	(4418.53)	(5903.20)	(7078.12)	(8038.21)	(8990.04)
2.	Revenue Receipts	1150.40	1369.88	1778.36	2123.82	2371.07	2699.19	2925.26
3.	Revenue Expenditure	2969.48	3209.94	3921.19	4173.83	4443.16	4730.32	5036.52
4.	Operating Ratio	2.58	2.34	2.20	1.97	1.87	1.75	1.72
5.	Operating Deficit/Revenue Grant Requirement	1819.08	1840.06	2142.83	2050.01	2072.09	2031.12	2111.25
6.	Closing Balance	(3132.80)	(4418.53)	(5903.20)	(7078.12)	(8038.21)	(8990.04)	(9846.31)
7.	Capital Grant - Gol/JNNURM	4244.12	19587.68	30627.59	14930.33	12306.70	9877.25	3430.57
8.	Capital Grant - GoO	1061.03	4896.92	7656.90	3732.58	3076.67	2469.31	857.64

* Shaded cells indicate problem/concern areas

Under the above scenario ('Base Case - Optimum Scenario'), if the full investment of Rs. 1,032.56 crores is assumed for BMC and the FOP is forecast based on the above assumptions, the BMC will have a deficit of Rs. 185.28 crores by the year 2012-13. Further, in order to meet resource requirements of its own contribution, the BMC would need to take loans of Rs. 94.25 crores during this period. In order to sustain the proposed capital investment, the BMC may require revenue grant support (from the GoO) to the extent of at least Rs. 163.08 crores during this period, which on average works out to Rs. 23.30 crores per annum. This is exclusive of expected capital grant contribution from the GoO at 10 percent of the total capital expenditure.

The PHEO (for capital investment of Rs. 1,287.55 crores) would require a huge revenue support to meet the gap, which is estimated at Rs. 158.47 crores during this period, which would work out to Rs. 19.81 crores per annum. This is also exclusive of the 20 percent capital contribution, which is estimated at Rs. 237.51 crores.

BASE CASE - POTENTIAL SCENARIO

This scenario assumes the capital investment estimate and the phasing as per the 'Potential Scenario' (please refer to Table 14.2.6). The FOP has been generated assuming full CIPs under the 'Potential Scenario' for both the BMC and PHEO separately based on the assumptions outlined in Tables 14.3.1 and 14.3.2 above. The following table summarizes the outcome of the FOP under the 'Base Case - Potential Scenario', where full investment (Rs. 1,752.06 crores for BMC) is assumed and the FOP is forecast based on the above assumptions. The BMC will have a deficit of Rs. 378.64 crores by the year 2012-13. Assuming that the GoO would provide the requisite capital grant to meet the counterpart contribution of 20 percent (10 of GoO and 10 percent of BMC), as per the JNNURM guidelines for the additional capital investment of Rs. 719.50 crores, the BMC would need to take loans of Rs. 94.25 crores during this period to meet resource requirements as own contribution for the capital investment estimate of the 'Optimum Scenario'. In order to sustain the proposed capital investment under the 'Potential Scenario', the BMC may require additional revenue grant support from the GoO of about Rs. 190.54 crores (i.e., at Rs. 352.26 crores - Rs. 161.72 crores for the capital investment under the 'Optimum Scenario' plus Rs. 190.54 crores for the additional capital investment under the 'Potential Scenario') during this period, which on average works out to Rs. 44.03 crores per annum. This is exclusive of the expected capital grant contribution from the GoO at 10 percent of the total capital expenditure.

Table 14.3.4: Summary Findings of the Financial Operating Plan: Base Case - Potential Scenario

Rs. in Lakhs

Sl.	Particulars/Items	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
A. Bhubaneswar Municipal Corporation								
1.	Opening Balance	1324.62	2656.96	1556.35	(3656.34)	(11668.12)	(20815.11)	(31162.78)
2.	Revenue Receipts	3237.26	3530.69	3817.49	4085.22	4344.04	4557.79	5107.44
3.	Revenue Expenditure	2354.65	3792.12	7578.52	10390.72	11651.62	12892.51	14363.23
4.	Operating Ratio	0.73	1.07	1.99	2.54	2.68	2.83	2.81
5.	Debt Servicing Ratio	6.08	25.09	36.10	38.55	40.79	43.19	38.54
6.	Operating Deficit/Revenue Grant Requirement	0.00	261.43	3761.02	6305.50	7307.58	8334.72	9255.78
7.	Closing Balance	2656.96	1556.35	(3656.34)	(11668.12)	(20815.11)	(31162.78)	(42748.14)
8.	Capital Grant - GoI/JNNURM	13793.26	46806.58	34289.28	14531.31	14021.52	13834.96	2887.97
9.	Capital Grant - GoO	1724.16	5850.82	4286.16	1816.41	1752.69	1729.37	361.00
10.	BMC Contribution - Transfers from Revenue Surplus	685.75	0.00	0.00	0.00	0.00	0.00	0.00
11.	BMC Contribution - Loan/Borrowings	1685.00	5897.50	4212.50	1685.00	1685.00	1685.00	0.00
B. Public Health Engineering Organization								
1.	Opening Balance	(1634.44)	(3132.80)	(4418.53)	(5903.20)	(7078.12)	(8038.21)	(8990.04)
2.	Revenue Receipts	1150.40	1369.88	1778.36	2123.82	2371.07	2699.19	2925.26
3.	Revenue Expenditure	2969.48	3209.94	3921.19	4173.83	4443.16	4730.32	5036.52
4.	Operating Ratio	2.58	2.34	2.20	1.97	1.87	1.75	1.72
5.	Operating Deficit/Revenue Grant Requirement	1819.08	1840.06	2142.83	2050.01	2072.09	2031.12	2111.25
6.	Closing Balance	(3132.80)	(4418.53)	(5903.20)	(7078.12)	(8038.21)	(8990.04)	(9846.31)

Sl.	Particulars/Items	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
7.	Capital Grant - Gol/JNNURM	5099.51	21925.15	34381.02	15988.80	12304.40	9876.70	3428.64
8.	Capital Grant - GoO	1274.88	5481.29	8595.25	3997.20	3076.10	2469.18	857.16

* Shaded cells indicate problem/concern areas

SUSTAINABLE SCENARIO OPTION

This scenario is envisaged to achieve the BMC's sustainable level for the proposed CIP under the 'Optimum Scenario' (please refer to Table 14.2.3), considering the capital investment capacity of the BMC and its capacity to maintain the new assets. The FOP has been generated only for the BMC based on the assumptions outlined in Tables 14.3.1 above. The sustainable option with similar resource mobilization assumptions indicates that the BMC would be able to sustain about 17.50 percent of the total capital investment as per the CIP, which works out to Rs. 180.70 crores during this period under the 'Optimum Scenario' of capital investment. Further, in order to meet resource requirements as own contribution, the BMC would need to take loans of Rs. 2.70 crores during this period. In addition, in this scenario, revenue grant support (from the GoO) is not anticipated. However, the GoO is expected to provide capital grant contribution at 10 percent of the total capital expenditure, which would be Rs. 18.07 crores. The following table summarizes the findings of this scenario, against select key indicators:

Borrowing and Investment capacity of the BMC - Shadow Credit Rating
Based on the 'shadow credit rating' exercise undertaken earlier, the BMC has a **borrowing capacity** of Rs. 35.25 crores during short-term (2005-06 to 2009-10) period while the **investment capacity** has been estimated at Rs. 58.76 crores

Table 14.3.5: Summary Findings of the Financial Operating Plan - Sustainable Scenario Option

Rs. in Lakhs

Sl.	Particulars/Items	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
A.	Bhubaneswar Municipal Corporation							
1.	Opening Balance	1324.62	2207.22	3063.29	3635.49	3955.30	4178.24	4209.62
2.	Revenue Receipts	3237.26	3530.69	3817.49	4085.22	4344.04	4557.79	5107.44
3.	Revenue Expenditure	2354.65	2674.62	3245.30	3765.41	4141.36	4550.59	5003.24
4.	Operating Ratio	0.73	0.76	0.85	0.92	0.95	1.00	0.98
5.	Debt Servicing Ratio	0.00	0.00	0.00	0.00	0.15	0.69	0.62
6.	Operating Deficit/Revenue Grant Requirement	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.	Closing Balance	2207.22	3063.29	3635.49	3955.30	4178.24	4209.62	4266.87
8.	Capital Grant - Gol/JNNURM	1611.63	4343.08	3184.49	1539.52	1790.34	1282.16	704.65
9.	Capital Grant - GoO	201.45	542.88	398.06	192.44	223.79	160.27	88.08
10.	BMC Contribution - Transfers from Revenue Surplus	201.45	542.88	398.06	192.44	196.37	0.00	72.66
11.	BMC Contribution - Loan/ Borrowings	0.00	0.00	0.00	0.00	54.00	216.00	0.00

* Shaded cells indicate problem/concern areas

Recommendations on Capital Investment Plan

- It is recommended that the BMC plan for utilizing capital investment at the sustainable level (i.e. Rs. 180.70 crores) during the period from 2006-07 to 2012-13 to effectively manage the finances of the BMC.
- In the case where the GoO assures additional budgetary support through revenue grants for the O&M of the new assets created, the BMC should explore capital investment plan under the 'Optimum Scenario'.
- However, if the GoO assures the necessary capital grant and revenue grant support as per the 'Potential Scenario', the BMC can opt for the 'Potential Scenario'.
- The decision on the capital utilization under the 'Optimum Scenario' and 'Potential Scenario' should be made only based on a commitment from the GoO on the extent of capital grant support and revenue grant support.

14.3.4 FINANCIAL RESOURCES AND RECOMMENDATIONS

The analysis of financial resources is worked out for the interventions to be carried out within the BMC area. The sectors that are not in the domain of the BMC (mainly water supply and sewerage) are not taken for financial analysis and are considered to be taken by other line agencies (PHEO) for the time being. Though innovations in terms of public-private-partnerships and private sector participation are possible in some sectors, these approaches are in a nascent stage of development and hence public spending will continue in the future.

An important aspect that needs to be considered in raising financial resources is beneficiary contribution. Of late, in many instances such as Alandur in Tamil Nadu and GBWASP in Bangalore, the beneficiary contribution is as much as 30 percent of the total cost of the project. This practice has to be promoted and the concept of user charges also needs to be introduced to make the services sustainable. The interventions should be in line with achievable targets and their potential resource generation.

The overall spatial strategy and resultant programs elaborated in the earlier chapters should be supported with financial allocations and a coordinated mechanism as specified in Section 16.1. Efforts should be directed to develop financially self-supporting projects, wherever possible, and cost recovery should be the policy for such cases. The cost of services should be pegged with the level of services and the affordability of the population. Though assistance can be anticipated in the form of subsidies and external grants (especially from the GoI), it would not be sufficient to attain the required standards and hence real earnings have to be improved. This must be the priority of the economic policies and programs formulated for the BMC.

The assessment of investment sustenance concludes that though the current finances of the BMC are healthy, they would not be in a position to match the proposed investments in infrastructure to achieve the desired vision unless the existing tax base and resource mobilization efforts are streamlined and strengthened. In order to augment/enhance its financial resources, the BMC should identify alternate resources and augment existing resources like user charges for services, parking fee, etc. The BMC should attempt to levy a higher property tax rate (surcharge) in areas that have received better infrastructure.

Recommendations on Resource Mobilization and Management

- Explore innovations in terms of Public-Private-Partnerships and Private Sector Participation;
- Mobilize Beneficiary Contribution for Environmental Services;
- Implement concept of User Charges for Sustainability of Service provision;
- Develop financially self-supporting Projects;
- Evolve cost of services in line with Level of Service and Affordability of population; and
- Streamlining and Strengthening of existing Tax base and resource mobilization efforts.

URBAN MANAGEMENT AND SECTOR REFORMS

15.1 URBAN MANAGEMENT AND REFORMS

15.1.1 GENERAL

The BMC has been very proactive in introducing reforms at the ULB level. All these reforms may be broadly categorized under the following:

- Computerization Initiatives;
- Property Tax Reforms;
- Privatization Initiatives;
- Accounting Reforms; and
- Resource Mobilization Initiatives.

A brief description on the above reform initiatives and their current stage is given in Section 8.4 of this report.

15.1.2 POLICY FRAMEWORK AND PRIORITY ACTIONS

As specified earlier, priority actions have been discussed and finalized by the stakeholders for urban management and sectoral reforms for Bhubaneswar City. The following policy framework and priority actions have been identified by the study team based on reported evaluations, discussions and priority actions as required and mutually agreed upon by the Mission Stakeholders:

STRATEGY

- Innovations both at policy and project levels to speed up the urban reform process.
- Reforms to have in-built mechanism of participation and commitment.
- Institutional strengthening and financial capacity building to be an integral part of the reform measures.
- Areas of reform measures include property tax (holding tax), accounting and auditing and resource mobilization and revenue enhancement.

PROPERTY TAX (HOLDING TAX)

- Bringing transparency and uniformity in taxation policies.
- Tax policy and operational procedures should be simple and clear.
- Development of templates for property tax (for self-assessment) to increase tax collection (without levying fresh taxes), including implementation strategies.
- Mapping of properties and developing GIS-enabled property tax management system for enhancing property tax net/coverage and better administration.
- Collection of arrears through innovative ideas and approaches using tools for community participation and fast track litigation methods.
- Property tax base should be de-linked from rental value method and should be linked to unit area or capital value method.

ACCOUNTING AND AUDITING

- Accounting reforms - shifting from single entry cash based accounting system to accrual based double entry accounting system.
- Legislative changes in the accounting systems and reporting requirements.

- Designing of accounting procedures.
- Accounting manual - chart of accounts, budget codes, forms and formats, etc.
- Standardized recognition norms for municipal assets and revenues.
- Auditing of accounts should be carried out effectively and regularly to promote transparency and accountability.

RESOURCE MOBILIZATION AND REVENUE ENHANCEMENT

- Increasing revenue through measures for better coverage, assessment, billing, collection and enforcement.
- Controlling growth of expenditure.
- Improving the organization and efficiency of the tax administration system.
- Augmentation of resource mobilization/revenue generation from properties belonging to BMC for improving the overall financial health.
- Energy audit of fuel and energy consumption by various depts. of BMC to minimize expenditures on fuel and energy, including energy audit and metering of street lights.
- Streamlining and strengthening of revenue base of the BMC:
 - Strengthen the fiscal powers of BMC to fix tax rates, fee structure and user charges through specific guidelines and notifications, which should find a place in the Municipal Rules. Prepare model guidelines for the city to allow greater flexibility in levying taxes, fees and user charges, borrowing funds and incurring expenditures;
 - The annual report of the BMC shall devote a section highlighting the amounts of subsidy given to a particular service, how the subsidy was funded, and who were its beneficiaries;
 - Implementation of MIS to provide relevant information on accounts, commercial and operating systems for better decision-making and information dissemination to citizens; and
 - Application of e-Governance is equally important for municipal finance.

Apart from the above, following are some of other reform measures which should be implemented to support the above identified key municipal reforms.

URBAN ENVIRONMENTAL MANAGEMENT

The costs of maintaining a healthy urban environment need to be recovered through various municipal taxes and user charges following the “polluter pays” principle. For this, the functional role of the ULB as envisaged in Item 8, 12th Schedule of the Constitution has to be resolved keeping in view the role of the State Pollution Control Board, Orissa and the organizational and fiscal strength of the BMC.

ACCESS OF URBAN SERVICES TO THE POOR

Since “ability-to-pay” for the cost of environmental infrastructure service’ provision is an important criterion, cross-subsidization of tariffs, innovative project structuring and user/ community participation is the means to ensure access of these services to the poor. Again the functional and financial role of BMC with respect to the Items 10 and 11 of 12th Schedule vis-a-vis those of central and state government agencies need to be resolved.

In addition to the above, the GoI has formulated a Reform Agenda under JNNURM. Adherence to this Reform Agenda and Timeline is mandatory for accessing funds under the proposed JNNURM. A brief note on the above, preparedness of the GoO/BMC, and the broad timeline is given in Section 15.3 of this report.

15.1.3 CAPITAL INVESTMENT ESTIMATE

In order to provide financial assistance for continuing ongoing reforms and strengthening these reforms in line with the priority actions and proposals highlighted above, Rs. 9.80 crores have been estimated for this purpose and incorporated in the CIP. The above estimate has

been prepared based on the information available/provided by concerned departments, detailed discussions with pertinent authorities (BMC and Orissa Computer Application Center), and Consultants database and experience on similar initiatives.

The Indo-USAID FIRE (D-III) Project plans to provide necessary technical assistance to the GoO and BMC for implementing certain of the above reform initiatives both at the State level and City level.

15.2 URBAN GOVERNANCE

15.2.1 BHUBANESWAR MUNICIPAL CORPORATION

Good governance in the municipal context stands on two broad principles, viz. transparency and civic engagement and capacity building measures. Following sections highlight key elements of the above two principles of good governance specific to BMC.

TRANSPARENCY AND CIVIC ENGAGEMENT IN MUNICIPAL MANAGEMENT

Laws/rules/regulations specific to city/local issues should be employed to facilitate effective implementation. These should be lucid and easily understood. Participatory mechanisms should be so structured that they have legal standing and administrative power. Local bodies should be responsive and innovative and involve community participation in civic engagement as follows:

- Specific code of conduct for municipal executives and elected representatives.
- Public education, resource mobilization, good leadership and transparent processes applied to municipal finance and development work.
- Closer networking with media and their engagement in creating public awareness and creating demand for good governance. Cautious engagement of private sector with continuous monitoring is necessary.
- Setting in place an active and online public Grievances' Redressal System, with automated department-wise complaint loading and monitoring system.
- Instruments to improve efficiency through enhanced technical, administrative and financial capacities.
- Credit enhancement options other than state guarantees need to be adopted.
- Preparation of annual Environmental Status Report through a multi-stakeholder consultation process.

CAPACITY BUILDING OF THE BMC

Following are some of the key aspects of capacity building measures for BMC:

- The BMC shall maintain data to generate indicators as suggested in this document for evaluating its performance.
- Prepare and conduct capacity building programmes for elected representatives, especially women representatives, with a view to enable them to focus on gender based issues.
- Promote the creation of interactive platforms for sharing municipal innovations, and experiences among municipal managers.
- Better human resource management through assessment of the training needs of personnel involved in urban administration to enhance management and organizational capabilities.
- Assessment of fund requirement and resource persons to tackle the training needs of all personnel.
- Development of training material in the local language and impact and evaluation studies of the training programmes.
- Capacity building to better position the urban local body to employ highly qualified staff and seek superior quality of out-sourced services.

As specified earlier, priority actions have been discussed and finalized by the stakeholders for urban governance for the Bhubaneswar City. The following policy framework and priority

actions have been identified by the study team based on reported evaluations, discussions and priority actions as required and mutually agreed upon by the Mission Stakeholders.

TECHNOLOGY INTERVENTIONS THROUGH COMPUTERIZATION

- Billing and collection of taxes and user charges through e-services.
- Speed up development of e-Governance system and accounting system.
- Database management of assets, records, lands, properties, etc.

HUMAN RESOURCE DEVELOPMENT

- Staffing pattern, organizational restructuring and performance appraisal.
- Development of MIS for effective and efficient management & decision-making.
- Publication of newsletters for creating awareness and participation.
- Staff training, exposure visits and motivation programs to bring about awareness on recent developments and technologies.

CITIZEN ORIENTATION AND INTERFACE

- Conduct citizen satisfaction surveys & analysis on annual basis to assess citizen needs and demands including satisfaction levels.
- PR strategies to enhance community participation and create awareness.
- Innovative citizen complaint redressal system including e-Governance.
- Augment and strengthen new initiatives on citizen interface and orientation.
- Regular interface with citizen associations/forum to understand public needs.

15.2.2 PUBLIC HEALTH ENGINEERING ORGANIZATION

The Indo-USAID FIRE (D-III) Project plans to provide technical assistance to the GoO to evolve a State-level road map for urban water sector reforms and thus assist the GoO/PHEO in delivering better service. The major objectives of this technical assistance are to develop and institute:

- Urban water and sanitation policy;
- Strategy for reform of water and sanitation services;
- Legislative reform to enable service improvements and to comply with the provisions of 74th CAA; and
- Institutional restructuring plan including enabling framework for outsourcing service delivery.

The above assignment will be carried out under the supervision of the FIRE (D-III) Project team with full support from the GoO. The outcome of the above assignment shall provide clear guidelines and impetus to PHEO for good urban governance.

15.3 REFORM AGENDA AND TIMELINE

As stated earlier, the GoI has formulated a Reform Agenda to access financial assistance under the proposed JNNURM. Adherence to this Reform Agenda and Timeline is mandatory for accessing funds under the proposed JNNURM. This section provides a brief note on preparedness of the GoO/BMC and a broad timeline.

15.3.1 AGENDA FOR REFORM

The main thrust of the JNNURM strategy of urban renewal is to ensure improvement in urban governance so that ULBs become financially sound with enhanced credit rating and ability to access the market capital for undertaking new programmes and expansion of services. In this improved environment, there would be greater possibility of public-private participation in provisioning of various services leading to more investment into the sector and better delivery of urban services. To achieve this objective, the State Governments and urban local bodies

will be required to accept implementation of an agenda of reforms. The reforms spelt out under JNNURM fall under two categories, viz. mandatory and optional. In order to accomplish the desired reform agenda and to provide an holistic approach, it is proposed to initiate various state level and city level reforms (termed as general reforms) to facilitate smooth and effective implementation of all reforms identified/specified under the JNNURM Guidelines. Accordingly, the suggested reform agenda has the following set of reforms:

- General Reforms - State Level Reforms (Reform Initiatives A.1 to A.3)
- Mandatory Reforms - State Level Reforms (Reform Initiatives B.1 to B.7)
- General Reforms - Urban Local Body Level Reforms (Reform Initiatives C.1 to C.5)
- Mandatory Reforms - Urban Local Body Level Reforms (Reform Initiatives D.1 to D.5)
- Optional Reforms (Reform Initiatives E.1 to E.10)

15.3.2 MANDATORY URBAN REFORMS

STATE-LEVEL REFORMS

- Implementation of decentralization measures as envisaged in 74th CAA, 1992, of the GoI: The GoO has amended the Orissa Municipalities Act in 1994, as per the 74th CAA and promulgated the Orissa Municipal Corporation Act, 2003. As per these acts, GoO has constituted Municipal Corporations, Municipalities and Municipal Councils. It has also reserved seats for women, SCs, and STs. It has also constituted District Planning Committees. At present, there are no metropolitan areas in the State, and Metropolitan Planning Committees (MPC) need not be formed. Functions specified in Schedule 12 have been incorporated into the municipal acts. However, the functions of town planning, regulation of land use and construction of buildings, water supply and sewerage have not yet been actually transferred to the ULBs. Operationalization of this would be required through suitable institutional changes, executive orders and some legal actions.
- Repeal of Urban Land Ceiling and Regulation Act: This Act has been repealed in the State.
- Reform of Rent Control Laws: There is no Rent Control Act in the State.
- Rationalization of Stamp Duty to bring it down to no more than 5 percent within the next seven years: At present the Stamp Duty in the State is revised at 8 percent. Some states like Maharashtra and Karnataka have already reduced their stamp duty to less than 5 percent. The experience is very positive with stamp duty revenues increasing due to better compliance. The GoO may consider reducing the Stamp Duty in a phased manner.
- Enactment of Public Disclosure Law: Public disclosure of municipal budget proposals, performance, service levels and other information required by citizens on a six-month basis through appropriate methods like display at ward/zonal offices, newspapers, web page, etc. This will increase transparency of the ULBs and bring in efficiency. This can be done by incorporating new clauses in the Municipal Corporation and Municipal Acts.
- Enactment of Community Participation Law: Institutionalizing citizen participation in municipal affairs through community participation in different aspects of municipal administration will improve the municipal citizen interface and enhance effectiveness of administration. This also can be done by incorporating new clauses in the Municipal Corporation and Municipal Acts.
- Associating elected ULBs with City Planning and Civic Service Functions: Suitable action suggested as under 'Implementation of decentralization measures as envisaged in 74th CAA, 1992, of the GoI may be taken.

REFORMS AT ULB LEVEL

- Adoption of modern, accrual-based double entry system of accounting in ULBs: At present, the BMC maintains accounts on a cash based system. This is not sufficient to get

information on the financial health of the BMC and to improve the financial management. The GoI and the Comptroller and Auditor General of India (C&AG) have developed the National Municipal Accounting Manual (NMAM). There is need to introduce modern, accrual-based double entry system of accounting in the BMC in line with the above manual. As a first step, a State-Level Municipal Accounting Manual should be prepared based on the NMAM. The new system should be introduced in both municipal corporations (Bhubaneswar and Cuttack) of the State. Based on this experience, it may be introduced in other ULBs of the State in a phased manner. The Municipal Corporation Act enables introduction of the new accounting system. The Municipal Act needs to be amended to introduce this system in the municipal councils of the State.

- Introduction of system of e-Governance in ULBs: Introduction of e-Governance in ULBs is recommended to improve delivery of services and help them to create citizen-centric and business-centric environments for good governance. This will also be in line with the proposed e-Governance project of the GoI. The BMC has already taken initiative in this regard as explained above.
- Reform of Property Tax in ULBs: Introduction of objective based property tax system such as unit area and self-assessment systems will help rationalize the tax base. Moreover, introduction of MIS and GIS based mapping will help to bring all properties into the tax system and increase tax collection. The Orissa Municipal Corporation Act has the enabling provision to introduce the unit area based and self-assessment systems. Similar provisions are to be introduced in the Municipal Act. Based on the experience of other states it may be ascertained whether any changes in the Municipal Corporation Act are needed.
- Levy of reasonable user charges by ULBs to recover full cost of operation and maintenance: At present cost recovery from urban water supply and sewerage services is about 30 percent of O&M costs. Low cost recovery is one of the reasons for poor efficiency of the services. It is necessary that user charges for these services reflect the actual costs and recover at least O&M costs.
- Provision of basic services to urban poor: Provision of basic services to the urban poor including security of tenure at affordable prices, improved housing, water supply, sanitation, while ensuring delivery of other already existing universal services of the Government such as education, health and social security is required.

15.3.3 ISSUES FOR APPROVAL OF THE GOO

- Town Planning: Views of the ULBs should be incorporated in town planning and regulation of land use and building construction. In cities with Development Authorities, the Mayor should be made a member of the Development Authority. In the case of municipal councils, the town planning department should form a consultation committee to review town plans. Similarly, Municipal Commissioners should be made members of committees with responsibility for granting approvals for large-scale layouts and building constructions. Provisions may be made for obtaining the views of municipal councils/corporations on development plans. Size of building (by use) and layout plan will be decided from time to time through a Government Order. Necessary changes may be made in the Town Planning Act and Rules.
- Water Supply and Sewerage: At present, PHEO is responsible for delivery of these services. Consequent to the 74th CAA, the ULBs are responsible for ensuring these services to the citizens. It is planned to undertake a phased restructuring of PHEO so as to devolve the responsibilities to ULBs. Different options of service management either by the ULB or by a corporatized PHEO, or through a management contract with a ULB or outsourcing, are to be explored. Necessary amendments should be carried out to the Municipal and Public Health Engineering Acts and Rules. Moreover, the State should prepare an Urban Water Supply Policy.

- Reduction in Stamp Duty: Stamp Duty to be reduced to 5 percent from the existing 8 percent over coming seven years at the rate of 0.50 percent per year. The Finance Department may initiate the necessary action in this regard.
- Public Disclosure: The existing Municipal Acts may be amended to incorporate a provision for public disclosure of budgets, capital projects, revenue and expenditure, level of services, etc. The type, periodicity and method of disclosure will be as per rules made from time to time under these provisions in the Acts.
- Increasing Community Participation: The Municipal Acts may be amended to enable formation of area committees in municipal corporations and ward committees in municipal councils. Number and manner of selection of members and functions of the area/ward committees will be as per rules framed under provisions in the Acts from time to time.
- Accounting System: Amend the Municipal Act to enable introduction of the accrual-based double entry accounting system. Prepare a State-Level Municipal Accounting Manual based on NMAM. The new system should be introduced in all municipal corporations of the State.
- e-Governance: e-Governance should be introduced in ULBs of the State. It should cover the following functions in the first phase: (a) registration and issue of births/deaths certificates; (b) payment of property tax, utility bills; (c) grievances and suggestions; (d) building approvals; (e) procurement and monitoring of projects; (f) health programs; (g) accounting system; and (h) personnel information system.
- Property Tax: The Municipal Act should be amended to introduce the unit area and self-assessment system for property tax. Rules for introduction of the unit area and self-assessment system for property tax to be prepared under Orissa Municipal Corporation Act.
- User Charges: PHEO should prepare an information system that provides data on O&M for water supply and sewerage services in municipal corporations and other ULBs. Pricing of water supply and sewerage services should reflect actual costs and should cover O&M costs within five years. The GoO will provide support to ULBs to implement this reform.
- Delivery of Services to Poor: The State Government should support ULBs to extend basic services to the urban poor. A policy paper on this subject should be prepared.

It is worthwhile to mention that adherence to the above reform agenda and efficient performance, especially the city level reforms, would go a long way in improving the creditworthiness of the BMC and in enhancing sustainability of the proposed capital investments.

Based on the above, a suggestive timeline for the reform agenda has been developed in close consultation with the Housing & Urban Development Department of the GoO and the BMC, and is furnished below:

PLEASE INSERT SUGGESTIVE TIMELINE FOR REFORM AGENDA (PAGE 1 OF 4)

PLEASE INSERT SUGGESTIVE TIMELINE FOR REFORM AGENDA (PAGE 2 OF 4)

PLEASE INSERT SUGGESTIVE TIMELINE FOR REFORM AGENDA (PAGE 3 OF 4)

PLEASE INSERT SUGGESTIVE TIMELINE FOR REFORM AGENDA (PAGE 4 OF 4)

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IMPLEMENTATION FRAMEWORK

16.1 PROJECT FORMULATION

Pursuant to identification of the required investments, development of Detailed Project Reports is an important activity that will essentially jump-start the pre-implementation process. The following recommendations are made to ensure effective project formulation:

- A “Project Formulation & Design Coordination Committee” shall be instituted which may be composed of senior engineers from relevant departments, boards and experts who are involved in related engineering, research and development activities
- A central design database shall be developed by the Committee containing the following information:
 - Design infrastructure (specifications and drawings) from earlier contracts and on the existing system.
 - Design information on the proposed improvements.
 - Details and data on surveys and field investigations performed (topographical/geotechnical/bathymetry/trial pits/traffic volume counts, etc.).
- The aforementioned database shall be upgraded and validated into a “Project Implementation and Commissioning Database”, which is explained in the following section.
- The Committee shall also ensure efficient and reliable data sharing between the various entities that are involved in preparation of the projects for subsequent implementation; this measure is intended to mitigate and possibly prevent future rework.
- It is also recommended that the aforementioned Committee be involved in the implementation stage to ensure that the design intent is conveyed into system implementation, operation and maintenance.

16.2 PROJECT MANAGEMENT

It is recommended to appoint a Project Management Consultant (PMC) who will be entrusted with, but not necessarily be limited to, the following responsibilities:

- Overall project management including financial (specific to project-related investment) management.
- Field coordination of capital works between the client, contractor and design consultant to ensure that the approved design intent is conveyed into implementation and that system operation reflects the same.
- Quality control and specification compliance in all spheres of equipment, labor, material and construction methods.
- Verification and provision of critical decision-making support and recommendations on change orders and/or physical contingencies.
- Facilitate approvals from pertinent authorities for implementation, commissioning and licenses to operate.
- Enforce stringent adherence to an Environmental Management Plan that should be developed specific to each project/sectoral improvement.
- Facilitate creation and operation of a “Project Implementation & Commissioning Database” which shall contain at a minimum, the following information:
 - All information from the Central Design Database;
 - Documentation pertaining to the present project:
 - Design
 - Specifications

- Drawings
 - Change orders
 - As-built drawings
 - Communication/correspondence files.
-
- It is also imperative for the PMC to perform the aforementioned responsibilities to the highest degree of quality since this database will be the ultimate record of the project for future upgrades/modifications.
 - Specific attention needs to be paid to documentation/correspondence files since these files will provide future insight to the past chronology of events, issues, resolutions and other relevant information.
 - The PMC must also facilitate and assist in implementing a system for sequentially and chronologically appending future modifications to the database, so that all changes made are accurately reflected and available for future reference.

16.3 THE WAY FORWARD

A City Development Plan is essentially a road map to achieve a set of development objectives within a specific period. This City Development Plan for Bhubaneswar has identified and articulated the needs and aspirations of the citizens of Bhubaneswar through a comprehensive consultative process involving a broad set of stakeholders comprising representative from government, para-statal, non-government, citizen forums, institutions, commerce and related entities. The priority actions recommended for each identified Mission Area is listed below:

- Urban Economic Development
- Urban Infrastructure and Environment Improvement
- Urban Poor & Slum Upgrading
- Reforms towards improved and responsive urban governance.

The onus is now on the nodal and implementing agencies to take the task forward and set the ball rolling towards a revitalized and invigorated Bhubaneswar that can exceed the expectation of its residents and set the standard for other state capitals to draw lessons and develop along the same lines.