

Draft City Development Plan for Gangtok-2041

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City Development Plan for Gangtok-2041

Draft Report

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Abbreviations

ACE	Additional Chief Engineer
ADB	Asian Development Bank
AIR	All India Radio
ASHA	Accredited Social Health Activist
ASI	Archaeological Survey of India
BMS	Basic Minimum Standard
BOD	Biochemical Oxygen Demand
BPL	Below Poverty Line
BRGF	Backward Regions Grant Fund
BSUP	Basic Services for the Urban Poor
CAA	Constitutional Amendment Act
CBD	Central Business District
СВО	Community Based Organization
CBR	Crude Birth Rate
CBUD	Capacity Building for Urban Development
CCS	Commissioner-cum-Secretary
CDP	City Development Plan
CDR	Crude Death Rate
CET	Clean Eco Technology
CHC	Community Health Centre
CIP	Capital Investment Plan
CMP	Comprehensive Mobility Plan
СРСВ	Central Pollution Control Board
CPHEEO	Central Public Health and Environmental Engineering Organisation
CPWD	Central Public Works Department
CRIS	CRISIL Risk and Infrastructure Solutions
CRISIL	Credit Rating Information Services of India Limited
CSP	City Sanitation Plan
DDFCPL	DDF Consultants Pvt. Ltd.
DDP	District Domestic Product
DHH	Directorate of Handicrafts & Handlooms
DPC	District Planning Committee
DPH	Diesel Power House
DPR	Detailed Project Report
EIA	Environmental Impact Assessment



EWS	Economically Weaker Section
FAB	Fluidized Aerobic Bioreactor
FOP	Financial Operating Plan
GDDP	Gross District Domestic Product
GDP	Gross Domestic Product
GHG	Green House Gas
GICI	Government Institute of Cottage Industries
GIS	Geographic Information System
GLSR	Ground Level Service Reservoir
GMC	Gangtok Municipal Corporation
Gol	Government of India
GPA	Gangtok Planning Area
GWP	Global Warming Potential
HPEC	High Powered Expert Committee
HRDD	Human Resource Development Department
IAS	Indian Administrative Service
IDA	International Development Association
IDC	Institutional Development Consultancy
IEC	Information, Education, and Communication
IHSDP	Integrated Housing and Slum Development Programme
ISNA	Information and Services Need Assessment
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
LEED	Leadership in Energy and Environmental Design
LIG	Low Income Group
LPCD	Litres per Capita per Day
LRTS	Light Rail Transit System
MGD	Million Gallons per Day
MLD	Million Litres per Day
MoUD	Ministry of Urban Development
MRTS	Mass Rapid Transit System
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NCEUS	National Commission for Enterprises in the Unorganized Sector
NERCCDIP	North Eastern Region Capital Cities Development Investment Program
NGO	Non-Governmental Organization
NHAI	National Highways Authority of India
NIPFP	National Institute of Public Finance Policy

NRCD	National River Conservation Directorate
NRW	Non-Revenue Water
NSDP	National Slum Development Programme
NUPAM	National Urban Poverty Alleviation Mission
ORCHID	Online Registration and Certificate handling, Issuance and Delivery Systems
PHC	Primary Health Centre
PHED	Public Health and Engineering Department
PHSC	Primary Health Sub-Centre
PMU	Project Management Unit
PPP	Public-Private Partnership
PVC	Polyvinyl Chloride
RAY	Rajiv Awas Yojana
RCC	Reinforced Cement Concrete
RFP	Request for Proposal
RPCR	Red Panda City Runner
RTI	Right to Information
RTO	Regional Transport Office
SCADA	Supervisory Control and Data Acquisition
SGDP	State Gross Domestic Product
SHDB	Sikkim Housing and Development Board
SIPMIU	State Investment Program Management and Implementation Unit
SJSRY	Swarna Jayanti Shahari Rozgar Yojana
SLB	Service Level Benchmark
SNT	Sikkim Nationalized Transport
SPCB	Sikkim State Pollution Control Board
SPM	Suspended Particulate Matter
SSDMA	Sikkim State Disaster Management Authority
STDC	Sikkim Tourism Development Corporation
STNM	Sir Thodup Namgyal Memorial
STP	Sewage Treatment Plant
SWM	Solid Waste Management
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TCPO	Town and Country Planning Organization
TNA	Tashi Namgyal Academy
TOD	Transit Oriented Development
TPD	Tons per Day
TVC	Town Vending Committee



- UDHD Urban Development and Housing Department
- UFW Unaccounted for Water
- UIG Urban Infrastructure & Governance
- ULB Urban Local Body
- ULCRA Urban Land Ceiling & Regulation Act
- UMTA Unified Metropolitan Transport Authority
- URDPFI Urban and Regional Development Plan Formulation and Implementation
- WAPCOS Water and Power Consultancy Services
- WSS Water Supply and Sanitation
- WTP Water Treatment Plant



1. Project Background

1.1 Context

The need for an overall urban improvement and development to sustain the economic growth momentum post the liberalization era first found its expression in the mandate of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) launched by the Government of India (Gol) in December 2005. The project endeavoured to bring about an improvement in the quality of urban life and make them as investment destinations. The programme derived its initial rationale from the "National Common Minimum Programme" of Gol that laid stress on the expansion of physical infrastructure, and therefore, comprehensive urban renewal and slum development could be taken up. The second rationale for such a large-scale programme was derived from India's international commitment to achieving the Millennium Development Goals; Gol proposed to facilitate investments in the urban sector and strengthen the existing policies in order to achieve these goals.

In recognition of the above mandate, the JNNURM programme was conceived. The scale of the programme was aimed to be in the mission mode primarily to make the cities realize their full potential and become engines for growth. It is argued that the urban sector contributes to over 50% of the country's gross domestic product (GDP), and therefore, focused attention is required for urban infrastructure development.

As already mentioned above, JNNURM is the first flagship national programme for urban development of this nature and size launched by Gol. The programme sought to bring about a change in the way urban development has been perceived. It recognized the importance of two major aspects for urban development in the country:

- The need for urban infrastructure improvement in order to improve quality of life and sustain the local economy as well as to attract more investments; and
- The need for investment to undertake urban infrastructure improvements.

In doing the above, the programme brought about the necessary awareness among the urban local bodies (ULBs) regarding planning and implementation of projects, the need for systematizing urban services and their management, and the need for involving stakeholders in project planning and raising revenues for the urban areas that can sustain the urban infrastructure. Significant emphasis was given to urban governance reforms and the need to link reforms with investments. Assistance therefore to the state governments and ULBs was proposed to flow through a reform-linked plan. Introduction of such reforms was considered crucial for developing sustainable infrastructure that would include,

- Efficient management of created physical assets so as to increase self-sustainability; and
- Enhance efficient service delivery.

Both these aspects were to be achieved through the agenda of reforms in the cities.

Over the past nine years, the programme has committed over Rs. 286 billion for 552 projects involving a total investment of over Rs. 620 billion. Some of the key achievements of the project include the following:

- The mission has been successful in catalyzing multi-year investments and reformed development in urban infrastructure;
- There has been a visible improvement in the delivery of municipal services in many cities;

- Some cities have prepared development/master plans for the first time. There is also greater awareness in the ULBs regarding the need to develop systematic plans for improvement in infrastructure. There is also an increase in aspiration levels among communities and there is a demand for better infrastructure and services;
- Several projects, especially in the transport sector, have been taken up within the JNNURM framework, which has significantly improved the quality of life in the cities; and
- There has been good progress in the implementation of reforms at policy level at state and central level. Most of the states have framed their policies on reforms and started implementing the same. ULBs have started implementing the reforms in the areas of accounting, e-governance, property tax, and user charges.

While there has been a significant change in the urban sector due to JNNURM, several challenges have emerged, which need to be addressed:

- The city development plan (CDP) was seen as an investment plan for projects in the immediate term, and not as a vision document for the city, resulting in very limited cities revising the same;
- While preparing the CDP, consultation with the stakeholders was limited and mostly restricted to the line departments and parastatal agencies;
- The pace of project execution has been found to be slow. Some states have been able to take greater advantage of the programme than others;
- Cities have also not been very successful in leveraging JNNURM funds to raise finances on their own or to attract private or PPP-based investment;
- The ULBs are not in a position to take over all the functions mentioned under the 12th Schedule of 74th Constitutional Amendment Act (CAA) at present. Most of the ULBs are also not in a position to take over functions like roads and bridges, water supply sewerage, drainage, and urban forestry due to their present incapacity to do so; and
- Institutional strengthening and capacity building initiatives are yet to be initiated in most of the ULBs. Most of the ULBs are facing capacity-related issues such as lack of staff (staff recruitment has not been carried since long).

The Planning Commission of Gol, through a committee, has devised a framework for the next urban mission. This framework has been prepared after studying and analyzing the successes and challenges in implementing JNNURM and the initiatives taken by other ministries in urban development.

The High Powered Expert Committee (HPEC) report published in 2011 further identified about Rs. 39,000 billion of investment in infrastructure in the urban areas of India.



Figure 1: Urban Infrastructure Investment Requirement 2012-2013



1.2 Revised CDP under Capacity Building for Urban Development (CBUD) Project

1.2.1 CBUD Programme

In order to give an impetus to reforms under JNNURM, the Ministry of Urban Development (MoUD) and Ministry of Housing and Urban Poverty Alleviation (MoHUPA) have launched a new project called "**Capacity Building for Urban Development**" (**CBUD**). The project has been launched with support from the World Bank (WB). Gol has received financing from the WB/International Development Association (IDA) towards the CBUD project. The broad aim of the project is to address the major constraints of urban development and specifically focus on the capacity building requirements for successful urban management and poverty reduction across the selected ULBs in India.

The project will contribute to Gol's overarching objective of creating economically productive, efficient, equitable, and responsive cities. Achieving this objective will help sustain high rates of economic growth, accelerate poverty reduction, and improve services, especially to the urban poor.

The project has three components as presented in Figure 2.





- 1. Capacity Building for Strengthened Urban Management: This component is aligned with the infrastructure and governance sub-mission of JNNURM and will thus support technical assistance across the several urban management topics.
- 2. Capacities Building for Effective Urban Poverty Monitoring and Alleviation: These capacity-building initiatives are aligned with the basic services to the urban poor sub-mission. They reflect the need for building information systems, sharing experiences, and designing strategies for urban poverty alleviation.
- 3. Implementation Support: This component will support a national project management unit (PMU) for providing overall technical and managerial support during the implementation of the programme. The PMU will have a critical role in promoting and support the project.

1.2.2 Preparation of Revised CDP under CBUD Programme

In order to identify broader issues for intervention and areas of assistance pertaining to development of cities, CDPs, which were already available for most of the cities under JNNURM, need to be revised as per the revised CDP Guidelines (April 2013) issued by MoUD.

MoUD has identified 30 cities across India under the CBUD project to facilitate the support. MoUD invited proposals and entrusted CRISIL Risk and Infrastructure Solutions (CRIS) with the responsibility of preparing the CDPs.

1.3 Revised CDP Guidelines – Key Areas of Emphasis

The revised guidelines issued by MoUD further incorporate certain additional aspects; these aspects shall be covered while preparing both fresh and revised CDPs. The aspects to be incorporated are:

- Formation of CDP Committees Policy and Technical;
- Inclusion of heritage, health, and education sectors in the CDP;
- Stress on infrastructure management aspects;
- Outcome parameters of projects;
- Revenue enhancement initiatives, expenditure management initiatives, and asset management initiatives;
- Special emphasis on PPP projects; and
- Transit-oriented development (TOD).



Some of the other key areas of importance in the revised guidelines are as follows.

1.3.1 Vision-Led Planning

The revised guidelines specify that unlike the past CDPs, the city vision needs to be more detailed. The city vision need to be based on understanding the strengths, weaknesses, opportunities, and threats (SWOT) for the city and the needs and priorities of the people of the city. The people must be encouraged at workshops and consultation sessions to visualize the future of the city, their aspirations, and the consequent growth that they anticipate in the city. This vision finally can be translated into respective sectoral visions.

1.3.2 Resource-Based Planning

Every city in India in the context of its regional location has particular strengths in terms of its resource endowments. Such resources need to be assessed and their strengths realized for city development. The approach for plan preparation could be: a) national resource led planning for cities endowed with natural resources like water bodies) OR b) Economy based (for an industrial or trading city), OR c) Tourism based for heritage cities OR d) combination of the above. This helps in setting the city apart from the rest. The approach can be identified based on:

- a) Existing city strengths and opportunities,
- b) Regional role of the city in the context of state development, and
- c) Needs of the city.

1.3.3 Participatory Approach

As already mentioned above, the revised CDP guidelines have specified that the CDP should be treated as a "living document". For this, periodic revision and updation of the CDP is necessary. Such revisions have to and must be conducted with a participatory planning approach. The CDP guidelines outline that local area plans need to be prepared in consultation with the ward committees to fulfil the expectations of the citizens. Also, the guidelines specify that such an approach is necessary to ensure equity concerns and poverty issues are integrated in the CDP. Consultations also need to be carried out at every stage of the plan preparation and implementation. The citizens must be able to prioritize and choose their needs for infrastructure development.

1.3.4 Equity Concerns, Poverty, and Local Economy Development

Poverty and local economy development go hand in hand. Understanding the local economy would help in devising appropriate infrastructure development strategies that can help in/be conducive to the growth of the local economy and thereby nurture local talent and resources. These need to be given adequate focus in the present CDP exercises, and therefore help in not just local economy development but also in regional economy development.

The 12th Five Year Plan has also started a mission for National Urban Poverty Alleviation Mission (NUPAM) for targeting housing and poverty alleviation based on recommendations of the NUPAM identifying the issues of poverty and housing in city and implementation status of programmes such as Rajiv Awas Yojana, Integrated Housing and Slum Development Programme (IHSDP), etc. Integration of these aspects would be crucial in making the CDP relevant to state and central government policies.

1.3.5 Capacity Building in ULBs

The ULBs presently face serious human resource shortage for planning, development, and urban management activities (including operations and maintenance, monitoring and evaluation, financial management, and procurement). This issue has been highlighted by the study on the appraisal of JNNURM projects as well. The CDP guidelines have proposed that the CDPs must address this issue.

Also, it has been suggested in the guidelines that urban reforms need to be implemented with greater participatory approach. The strategies to arrive at the vision for a city should be linked to the reform agenda. ULBs should be asked to outline the reforms and propose a timeline to achieve the same. Administrative and structural reforms should be made mandatory and carried out as soon as possible. Financial thresholds need to be decided and adhered to in terms of the central assistance under JNNURM being given as a soft loan or a grant. This approach would help in designing an appropriate capacity-building strategy.

1.3.6 Sectoral Action Plans with Goal-Oriented Targets

The revised guidelines specifically highlight the need for preparation of sectoral action plans with targets that are oriented towards specific goals. Action plans are specifically required for sectors including Local Economic Development Plan, Infrastructure Development Action Plan, Housing and Poverty Alleviation Action Plan, Comprehensive Mobility Plan (CMP), Heritage Management Plan (where needed), Financial Management Plan, Institutional and Capacity Building Action Plan and Environment Management Plan (including disaster management). Such sectoral plans would be based on clearly identified goals. Also, inter-sectoral as well as intra-sectoral linkages need to be addressed through the CDP.

1.3.7 Monitoring and Evaluation Arrangements

The guidelines clearly spell out the need for monitoring and evaluation at regular intervals as to the extent of implementation of the CDP. Also, the development of monitoring arrangements would go a long way in securing community participation, who can be involved in the process of monitoring.

1.4 Objective of the Assignment

The CDP aims to identify an integrated solution to the challenges facing the city. It recognizes the economic growth strategy as well as the actions that would be required by various agencies to ensure the sustainable development of the city. The CDP is the ULB's strategy that presents the vision of the desired future for the city, and the mission statements on how the ULB, together with other stakeholders, intends to work towards achieving this long-term vision. The CDP incorporates the assessment of city majorly at four levels: socio-cultural and economic environment; physical environment; infrastructure services and institutions; and urban poverty and heritage.

The primary objective of this assignment is – to revise and update the existing CDP.

The scope of work in brief shall entail:

- Profiling the present status of the city, providing an in-depth analysis of its demographic, economic, financial, infrastructure, physical, environmental, and institutional aspects;
- Based on the above analysis, developing a perspective and a vision for the city, which would be prepared in consultation with its relevant stakeholders. In order to achieve the vision, a



formulation strategy for bridging the gap between where the city is at present and where it wishes to reach need to be prepared;

- The CDP should provide for a Capital Investment Plan (CIP), based on which the concerned ULB will be able to access funds under central/ state government schemes as well as from own and other sources based on priority actions and projects identified in the CDP;
- The document should also provide Financial Operating Plan (FOP) to direct the ULBs for mobilizing various financial resources to implement the identified projects. The inter-sectoral and intra-sectoral issues need to be addressed by the CDP;
- Preparation of the CDP will consist of city development strategies that will emerge out of a structured consultative process. The process will enable elected representatives, key staff of departments of Municipal Corporation/ Municipal Council, parastatal agencies and other institutions, policy makers and the citizens to participate and plan for spatial, social and economic development of the concern cities; and
- The CDP has to adhere to the latest revised toolkit prepared by the MoUD for CDP preparation published on its website <u>www.jnnurm.nic.in</u> in April 2013.

1.5 Approach and Methodology

The approach to the assignment is based on the consultative and analytical assessment of the existing situation. The inputs from stakeholders have been used to prioritize areas of development and to formulate the strategies in order to make the revised CDP an implementable document. The approach of revised CDP preparation is presented in Figure 3.



Figure 3: CDP preparation approach

The revised CDP has been prepared for the period of next 30 years, i.e. 2041. It is a forward-looking consensus program for the city that outlines the path with respect to the following aspects:

Infrastructure Development – Assessment, gap analysis, arriving at investment requirement (short term and long term) and prioritization of various services provided by Municipal Corporation - water supply, sewerage, storm water drainage, roads, traffic & transportation, street-lighting, solid waste management, firefighting, education, health, etc.

Slum Development – Preparation of programme for the development of slum pockets in the city. This includes access to all the basic services as well as housing for urban poor.

Economic Development – The revised CDP focused critically on tapping the existing potential and identifying key economic development opportunities for the city.

Social Development – The revised CDP has taken into account the social development needs of the city such as the need for hospitals, education institutes, and recreational centers.

Institutional Development – Assessment of capacity building required for ULBs to undertake development of city.

Financial sustainability -The revised CDP has assessed the revenue sources, areas of expenditure and current and future investment requirement of the city. Based on this, sustainable investment capacity has been arrived and measures to improve revenues and control expenditures have been suggested.

Reform Assessment Plan –The revised CDP also discussed status of various reforms undertaken by the ULBs to bring about improvements. These reforms are in the areas of accounting, e-Governance, property tax, user changes, building byelaws, etc.

Moreover, the approach is based on the philosophy of developing workable solutions. The methodology for undertaking the work of preparation of revised CDP is presented inFigure 4. Broadly, five steps in a sequential order have been undertaken in this work.



Figure 4: Revised CDP preparation methodology

1.6 Brief on 1st Generation CDP-2006

1.6.1 Review of CDP document

Gangtok CDP was prepared in 2006 under JNNURM. A city-level SWOT analysis was undertaken to assess the status of various urban infrastructure sectors of Gangtok. A number of constructive discussions were held during the CDP preparation.



1.6.1.1 Vision formulated

The CDP has a vision of developing Gangtok as "the growth nucleus of north-eastern India". The vision is as under: An eco-city that provides adequate, equitable, sustainable access to urban services for all cities; a city that is safe, liveable, and that promotes the growth of its citizens. The details of sectoral vision of Gangtok is presented in Figure 5.

Figure 5: Sectoral vision of Gangtok CDP, 2006

•To ensure access to safe drinking water supply to all	
Sewerage& Sanitation	•100% underground sewerage system, promote environmentally safe sanitation practice for waste water treatment.
Solid Waste Management	 Achievement of environmentally sustainable waste management practices
Roads & Transportation	Development of new roads and appropriate public transport system
Slum Development & Poverty Alleviation	To provide access to housing and basic infrastructure
Urban Environment	 To promote a healthy, clean environment with emphasis on creation of a safe and livable city

1.6.1.2 Projects envisaged in CDP 2006

The projects were finalized based on stakeholder consultations. The projects were related to water supply, sewerage, storm water drainage, solid waste management (SWM), roads, public transport, and others. The details of sector-wise investment plan are presented in Table 1.

Table 1: Investment envisaged in CDP 2006

S. No.	Sector	Investment Envisaged (Rs. crore)
1	Water Supply	195.4
2	Sewerage	108.2
3	SWM	6.5
4	Drainage and Landslip Protection	100.0
5	Urban Transport	1000.0
6	Traffic and Transport and Street Lighting	368.0
7	Urban Renewal	50.0
8	Tourism and Environment	92.0
9	Crematoria / Burial grounds	6.0
10	Heritage	20.0

Ministry of Urban Development, Government of India

S. No.	Sector	Investment Envisaged (Rs. crore)
11	Other Development Projects	60.0
12	Upgradation of Slums - Facility for Urban Poor	62.0
13	Social Housing	30.0
14	Urban Governance and Institutional Strengthening	19.0
15	Land Acquisition	100.0
	Total	2217.0

Source: Gangtok City Development Plan, 2006

The estimated investment required for the identified projects would be Rs. 2,217 crore. The maximum investment for the development of transport infrastructure sums up to Rs. 1,368 crore, i.e., 62% of the total investment envisaged in the CDP. The water supply projects account for 9% of the total investment, followed by the sewerage and sanitation sector projects, which account for 9% of the total investment. The details of sector-wise project proposals are discussed in **Annex-2**.

Further, drainage and landslide protection, land acquisition, and tourism and environment development are the major projects accounting for more than Rs. 90 crore of investment each. The breakup of the proposed investment has been presented in Figure 6.



Figure 6: Sector-wise distribution of investment proposed in 1st generation Gangtok CDP

Source: City Development Plan, 2006

Apart from CDP (2006), various other planning and infrastructure reports have discussed about the city infrastructure demand-supply gap. As part of the study, CRIS collected and reviewed these documents to understand the current situation of the city. The reports at a glance are as follows:

1.7 Brief on Gangtok Structure Plan, 2009

The Gangtok structure plan was prepared by Surbana International Consultants Pvt. Ltd., Singapore, and the final report was submitted in October 2009. The plan explains the pattern of urban growth, urban land use, and infrastructure needs for the Gangtok Planning Area (GPA) up to 2040. The plan



also proposed two major zones, i.e., natural and cultural zones, in the northern and southern parts of GPA. As part of proposed land use plan (see Figure 7), GPA was divided into 7 planning communities and discussed on land use, tourism, basic services, power supply strategy and planning.



Figure 7: Proposed land use of GPA as per structure plan

1.8 Brief on Gangtok Comprehensive Mobility Plan, 2010

The comprehensive mobility plan (CMP) for Gangtok city has been prepared as per the guidelines and toolkits for urban transport development issued by the Ministry of Urban Development, Gol, for funding projects under JNNURM.

The CMP mainly explains the existing transport system, analysis of existing traffic situation, development of vision and goals for transport development, travel demand model, future urban growth scenario, future transport network scenario, travel demand forecast, public transport improvement plan, regulatory and institutional measures, social and environmental considerations, and implementation programmes. The CMP also estimated the cost of required traffic and transportation projects to be Rs. 875 crore. The proposed projects include development of 15 km of ropeway (with a cost of Rs. 154 crore), city roads, inner and outer ring roads, footpaths, and foot over bridges.

1.9 Brief on Slum Free City Plan of Action for Gangtok, 2012

The slum-free city plan of action (SFCPoA) for Gangtok was prepared by the RAY cell of the Urban Development and Housing Department (UD&HD) of Sikkim, and the final report was submitted in 2012. The report mainly discusses the present status of slums, which broadly comprises municipal information base for slums, updated list of slums, slum assessment, and tenability analysis and prioritization of slums. The report also explains the estimation of housing demand, likely future housing gaps and supply and demand, and investment requirements for the period of implementation of SFCPoA. The SFCPoA report estimated about Rs. 2,028 crore (see Table 2) for slum-free city development of Gangtok with a 15-year implementation period.

Source: Gangtok Structure Plan, 2009

Particulars	Phase-I	Phase-II	Phase-III	Total
Housing	378.69	128.05	252.34	759.08
Infrastructure	543.94	175.56	323.46	1,042.96
Capacity Building, Community Mobilization	18.13	5.85	10.78	34.76
Contingency, O&M, Others	108.78	29.25	53.9	191.93
	1,049.54	338.71	640.48	2,028.73

Table 2: Investment requirement for Gangtok SFCPoA

Source: SFCPoA for Gangtok, 2015

1.10 Projects implementation after 1st generation CDP

The CDP was approved by MoUD in 2006. Under the mission, water supply, sewerage, slum housing, and public transport (city buses) projects were sanctioned in Gangtok city. Apart from JnNURM, under North Eastern Region Capital Cities Development Investment Program (NERCCDIP), water supply and solid waste management projects have been implementing in Gangtok.

Projects under JNNURM:

- Water Supply: The project of up gradation and modernization of raw water trunk mains and water treatment plants was sanctioned in 2009 under JNNURM. The sanctioned project cost is Rs. 72.61 crore, and project is in advanced stage of completion;
- Sewerage: The rehabilitation of trunk sewer project (rehabilitation of trunk sewer along NH starting from Hospital Dara to STP and sewer mains) was sanctioned under JNNURM in 2007. The sanctioned amount is Rs. 23.92 crores, and the project has been completed.
- City Buses: Under the bus funding programme, 25 min/midi buses (see Figure 10) were sanctioned for Gangtok city, at Rs. 2.5 crores. MoUD has sanctioned 90% of the total cost, i.e., Rs. 2.25 crores, to the state government. Apart from that, in January 2014, MoUD sanctioned 53 buses for Gangtok, worth Rs. 13.25 crores. Under the intelligent transport system (ITS) and bus related infrastructure, Rs. 6 crores were sanctioned to Gangtok;
- Slum Housing: 202 dwelling units in Rangpo area and 52 dwelling units and with other infrastructural facilities (like footpaths, drainage system, community centre¹, etc.) in old slaughter house area are under implementation (see Figure 11). Rangpo slum housing is in the construction stage, with 60% physical progress², and slaughterhouse area the slum housing, physical progress is more than 90%. Both the slum housing projects cost Rs. 33.56 crores.

Projects under NERCCDIP

Water Supply: Under the ADB funded North East Region Urban Development Programme (NERUDP), two water supply projects were sanctioned for Gangtok. Under Tranche-I, Rs. 15 crores were sanctioned, and the project has been completed. Civil works under Tranche-1 commenced on 6 December 2011, and the estimated duration of works is 18 months. The projects aim to provide full water supply coverage to two wards, Burtuk and Chandmari, located at higher elevations of GMC.

¹ At slaughterhouse area, community hall construction is under BSUP Phase-II package.

² Progress up to November 2014



Treated water is sourced from one of the clear water reservoirs at the WTP site is pumped to a newly constructed GLSR of 11.55 lakh litre capacity at Bulbuley on the AIR Transmitter Station Road in Chandmari Ward. Then, water is distributed through a distribution network of 36 km of pipes of sizes varying from 250 mm to 32 mm.

The physical progress as of February, 2015 is 95%. All civil works have been completed, and testing of GLSR and pipelines is underway. Installation of UPS for the electromagnetic flow meters is pending.

Under Tranche-2, Rs. 35 crore has been sanctioned, and the project's physical progress is more than 50% (see Figure 8). The project aims to scale up the water supply augmentation under Tranche-I, to the entire city and solve the water scarcity problems experienced due to an inadequate distribution system. Will provide a new looped system with proper hydraulic zoning in place of the bunched long lengths of GI pipes laid to consumer ends through open drains and roads, from various service reservoirs.

Solid Waste Management: Under NERUDP, Gangtok is implementing a comprehensive SWM project. The project envisages to introduce to the city of Gangtok the practice of systematic and scientific disposal of solid waste. It will bring in a system of primary collection, secondary collection, transportation, and safe disposal of waste. Solid waste, segregated at households into wet and dry waste, is transported through a system of primary and secondary collection vehicles, to the compost plant and sanitary landfill site at Martam (see Figure 9), where the wet waste is composted after due mechanical processes and the dry waste is again segregated into inerts and recyclables. The inerts are scientifically disposed into the landfill that is constructed under this sub-project, and the recyclables are sent for recycling. There is a provision for the construction of a leachate treatment plant to treat and dispose the leaching effluent from the sanitary landfill.

Figure 8: Water supply project implementation (construction stage) in Gangtok





Figure 9: Solid waste management project implementation in Martam

Figure 10: JNNURM buses plying on Gangtok roads



Figure 11: Integrated slum housing in Rangpo and old slaughterhouse area of Gangtok



Based on the number of projects taken up by UD&HD, WS&PHED and SNT under various programmes, the service levels are discussed in respective sectors in the subsequent chapters of this report.

Table 3: Infrastructure projects under	r taken under JnNURM and NERCCDIP
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S.No.	Project Name	Programme	Project Cost (Rs. in Crore)	Current Status/Remarks
1	Water Supply Project (Tranche-1)	NERCCDIP	15.00	Physical Progress- 95%. Only electrical



Ministry of Urban Development, Government of India

S.No.	Project Name	Programme	Project Cost (Rs. in Crore)	Current Status/Remarks
				work is pending
2	Water Supply Project (Tranche-2)	NERCCDIP	35.00	Physical Progress- 50% above
3	Solid Waste Management (Tranche-2)	NERCCDIP	17.00	Physical Progress- 60%
4	Upgradation and modernization of raw water trunk mains and water treatment plant for Greater Gangtok	JNNURM	72.61	Physical Progress- 70%
5	Rehabilitation of Trunk Sewer along NH starting from Hospital Dara to STP and sewer mains along Tibet Road New Market along MG Marg at Gangtok	JNNURM	23.92	Completed
6	City Bus Services for Gangtok	JNNURM	22.75	25 out of 78 buses plying on Gangtok roads
7	Urban Slum housing Improvement	JNNURM	33.56	Completed
	Total investments		219.84	

Source: SIPMIU, Gangtok and UD&HD

1.11 Need for the revision of CDP

The rationale for revising the CDP is to comply with latest CDP guidelines as issued by MoUD, Gol in April, 2013. The revised CDP shall also focus on urban environment & disaster risk management, preservation & conservation of existing water bodies and culture & Heritage apart from the municipal infrastructure services.

1.12 Key process undertaken for CDP preparation

CRIS has been appointed by MoUD for the preparation and revision of CDPs for 13 selected cities under Package 1 and 17 selected cities under Package 2. A kick-off meeting was organized by MoUD to review the work plan and approach for the assignment. The meeting was chaired by Ms. Nisha Singh IAS, Joint Secretary and Project Director, and was attended by senior officials from MoUD, PMU from CBUD, and officials from TCPO, CPWD.

CRIS Team made a presentation on the following aspects:

- Our Experience in Preparation of CDPs
- Details of Assignment Coverage
- Our Approach Revised CDP Toolkit
- Proposed Teaming

The minutes of the kick-off meeting have been provided in Annex-1.

1.12.1 List of meetings

The list of meeting carried out during the CDP revision process with UD&HD and ULB officials, parastatal agencies, city stakeholders, Technical Advisory Committee and CBUD team have been outlined below.

S.No.	Meeting	Date and Venue	Participants	
		2 nd December 2013	UD&HD officials & CRIS team	
1	Inception meeting	3 rd December, 2013	GMC Officials & CRIS team	
		4 th December, 2013	SIPMIU Officials & CRIS team	
2	Stakeholder consultations (One to one interactions)	4 th June to 6 th June 2014	UD&HD, WS&PHED officials, Health, Education, Environment Department, SIPMIU, GMC and CRIS Team	
3	Inception Stage Presentation	18 th November, 2014	UD&HD Officials and CRIS team	
4	1 st City level stakeholder workshop	29 th January, 2015 at Sikkim Election Commission Conference Hall	UD&HD Officials, GMC commissioner, ine department officials, community organizers, Architects, NGOs and CRIS team	

Table 4: List of meetings during CDP revision process

1.12.2 Data Collection

Secondary data on various sectors had been collected from the respective departments like UD&HD, GMC, SPIMIU, WS&PHED, and SNT. Major documents like comprehensive mobility plan (CMP), Gangtok structure plan, Gangtok SFCPoA report, Gangtok tourism plan, Gangtok inception report (IDC-ADB), detailed project report (DPR) for water supply and SWM projects, municipal budget, and physical progress of on-going projects were collected. CRIS team carried out consultations with various stakeholders of the city (architects' association, Sikkim Hotel and Restaurant Association, Gangtok City Taxi Drivers' Association, Damodhar Ropeway Limited, etc.) and carried out a city-level assessment and SWOT analysis.

1.12.3 Technical and Policy Committee Formation

UD&HD is the nodal agency for capacity building for urban development programmes in Gangtok. The Department is still in the process of forming technical and policy committees.

1.12.4 Stakeholder Consultations

To ensure a participatory and inclusive development process, CRIS team carried out a wide range of stakeholder consultations and focus group discussions with the city stakeholders of the city. The exercise involved mapping of the key stakeholders in the city, followed by discussions on city-level issues. As indicated in the figure below, one-to-one consultations were carried out with the government officials, business and trade organisations, academicians, and CBOs. Further, focussed group discussions were carried out at identified slums.


Figure 12: Stakeholder consultations

1.12.5 Stakeholder workshop

A snapshot of various stakeholder workshops conducted during the revision of CDP for Gangtok is presented below. The detailed discussion on these workshop has been presented in the City vision, development goals and strategies section.

a. In	ception	meeting
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Stage 1	Inception meeting		
Agenda	The objective of the inception meeting was to discuss with UD&HD and GMC officials the process for CDP preparation and the role of GMC and other line departments in the preparation process, etc. and explain the relevance of formation of policy and technical committees as envisaged in the revised CDP toolkit.		
Timing	The inception meeting was organized on 2 nd , 3 rd , & 4 th December 2013 at UD&HD, GMC, and SIPMIU respectively to initiate the commencement of CDP preparation process.		
Venue	Special Secretary Chamber, UD&HD Commissioner Chamber, GMC Project Director, SIPMIU		
Participants	 Officials from UD&HD, GMC, SIPMIU Representatives from CRIS 		
Outcomes	1. Awareness among the officials on the revision of CDP		

Stage 1	Inception meeting				
	2. Discussion on formation of policy committee and technical committee.				
	 UD&HD special secretary appointed the Joint Chief Architect-Town Planner as nodal officer for the revision of CDP 				
	 1st generation CDP reviewed and inception report submitted to MoUD and UD&HD on 31st December 2013 				

b. Interim workshop

Stage 2	Interim workshop
Agenda	To present the status and performance of service delivery mechanism in Gangtok, and city SWOT analysis to the stakeholders. In addition, to understand aspirations of the citizen on city development and framing of the vision for Gangtok city
Timing	The workshop was conducted on 29th January 2015.
Venue	Conference Hall, Office of Chief Electoral Officer, Election Department, Gangtok, Sikkim
Participants	The special secretary chaired the workshop, and there were 40 participants including the representatives from parastatal agencies, NGOs, and academicians. (See Annex-3)
Outcomes	The views and suggestion provided were noted down. Sectoral issues and suggestions were identified. Vision formulation exercise was carried out. (See Annex-4)

Figure 13: Stakeholder workshop at interim stage





2. Introduction to the City

Sikkim is a small state in the north-eastern region of the India. Gangtok is the capital and largest town of Sikkim and is known for its clean surroundings and temperate climate. Gangtok as a core centre of Sikkim has potential command area over different tourist spots in East Sikkim.

Gangtok rose to prominence as a popular Buddhist pilgrimage site after the construction of the Enchey Monastery in 1840. In 1894, the ruling Sikkimese Chogyal, Thutob Namgyal, transferred the capital to Gangtok. In the early 20th century, Gangtok became a major stopover on the trade route between Lhasa in Tibet and cities such as Kolkata (then Calcutta) in British India. After India won its independence from Britain in 1947, Sikkim chose to remain an independent monarchy, with Gangtok as its capital. In 1975, after the integration with the Union of India, Gangtok was made India's twenty-second state capital.

The Nathula Pass, located about 50 km (31 mi) from

Gangtok - Clean Tourist City

The hospitality industry is the largest industry in Gangtok as the city is the main base for Sikkim tourism. Summer and spring seasons are the most popular tourist seasons. Many of Gangtok's residents are employed directly and indirectly in the tourism industry, with many residents owning and working in hotels and restaurants. Ecotourism has emerged as an important economic activity in the region, which includes trekking, mountaineering, river rafting, and other nature oriented activities.

Gangtok, used to be the primary route of the wool, fur, and spice trade with Tibet and spurred economic growth for Gangtok till the mid-20th century. In 1962, after the border was closed during the Sino-Indian War, Gangtok fell into recession. The pass was reopened in 2006, and trade through the pass is expected to boost the economy of Gangtok.

2.1 Location and Connectivity

The city is located in the east district of Sikkim and lies between 27°21' to 27°16' N latitude and 88° 37' longitude at an altitude of about 2,000 m above mean sea level (MSL). Gangtok is also the headquarters (HQ) of the East Sikkim district, and it is geographically located at the southeast corner of the state, as shown in **Figure 14.**

Gangtok is connected by National Highway-10 (NH-31A)³ to Siliguri in West Bengal, which is the gateway to the northeast. The city is connected by road to Darjeeling, Kalimpong, and to all the district headquarters and sub-divisions within Sikkim. Though the high altitude and terrain acted as a barrier in the process of connectivity, engineering advances made it possible to improve the connectivity to Gangtok.

There is no rail connectivity to Gangtok. The nearest railway station to the city is Siliguri Junction, which is at a distance of 120 km, and it is a part of the Northeast Frontier Railway. There is no airport in Gangtok. The nearest airport to the city is Bagdogra domestic airport, which is located at a distance of 130 km.

³ NH 31A changed as NH 10 (National Highway 10). On 28 April 2010, the Ministry of Road Transport and Highways officially published a new numbering system for the national highway network in the Gazette of the Government of India. It is a systematic numbering scheme based on the orientation and the geographic location of the highway. This was adopted to ensure more flexibility and consistency in the numbering of existing and new national highways.

However, the city has helicopter connectivity from Bagdogra airport. The state government has introduced the helicopter service from November 1998. At present, the Sikkim Tourism Development Corporation (STDC) handles this service.





Source: Sikkim Tourism Development Corporation





Figure 15: Gangtok City Road Connectivity

2.2 Regional Settings

The capital city of Sikkim is fittingly called as Gangtok. This means 'the town of the hill top' in the local Bhutia language.

Economic linkages:

The city has a large chunk of tourists from West Bengal and neighbouring states. Siliguri is the nearest prominent commercial centre from Gangtok and which is located at a distance of 110 km. The city acts as a gateway to Sikkim and a base point to explore the various exotic locations in North, East and West Sikkim. The population in north Sikkim and east Sikkim are dependent on the city for education and health facilities. Gangtok as a core centre of Sikkim has potential command area over different tourist spots in East Sikkim, which are directly linked by a network of roads centering Gangtok and are faultlessly accessible for one-day trips. Trade and commerce are the most important

Draft City Development Plan - Gangtok

functional linkages between Gangtok and its neighbouring regions. As a result, the entire state of Sikkim depends on Gangtok to meet its economic requirements.





2.3 Administrative Boundary

The Gangtok Municipal Corporation is established in 2010. The municipal area has been divided into 15 wards with a total area of 1928 ha (19.28 sq. km). The municipality does not administer the city directly, but through various departments of the Government of Sikkim, particularly UD&HD and the Public Health Engineering Department (PHED). These departments look after the civic functions such as garbage disposal, water supply, sewerage network, user charges, and civic infrastructure. An administrator appointed by the state government heads UD&HD. The administrative boundary of GMC is presented in Figure 17.







Source: UD&HD

2.4 Defining the Study Area

The study area considered for the preparation of the revised CDP is the GMC jurisdiction, which is 19.28 sq. km with 15 wards. As per Census 2011, GMC total population is 100,286.

2.5 Physical Settings

2.5.1 Topography and Geography

Gangtok is located in the central portion of the leaf shaped Rongni Chu catchment, surrounded by Rani Khola in the west and Roro Chu in the east. The Gangtok ridgeline divides the city into two parts, viz., eastern and western.

The general slope of the western side of the ridge varies from 30° to 42°, but in certain stretches around Adampool below Amdo Golai and Rani Khola areas of Sichey, slopes are gentler and vary from 10° to 15°. On the eastern side, the slopes vary from 20° to 40°. In areas with more than 60% slope (30° from horizontal).



Gangtok is topographically undulating. Gangtok is situated between the elevations of 1300 m and 1600 m. The city is located in the Lesser Himalayas, and it is on the either side of the ridge with elevation of 1600 m. The ridge runs in the southwest to northeast direction. The settlement pattern is affected by the physiographic character of the ridge, and due to this reason, Gangtok is developing as a linear town.

Geologically, the region forms a part of inner belt of the Lesser Himalayas and consists of three main lithological units. The regional strike of all these lithological units is northwest-southwest (NW-SE) with a dip of 150–600 towards the northeast (NE). These are young mountains with loose soil and high water holding capacity and are more prone to slope failure. Majority of the Gangtok is characterized by high-grade pelitic rocks (mica schist with or without garnet, etc.).

According to the Bureau of Indian Standards, Gangtok falls under seismic zone-IV⁴ near the convergent boundary of the Indian and the Eurasian tectonic plates and is subject to frequent earthquakes.

2.5.2 Soil

The soil in the region is excessively drained, coarse to fine loamy with slight surface stoniness. The soil is acidic in nature with pH below 6.0. The soil shows contrasting morphologies under varying topographic settings. Soil in the northern and eastern part of the Gangtok is thin and highly sandy compared to the soil in the western part. Such soil has low strength and permeability, high sensitivity, and compressibility and is not suitable for construction activity.

2.5.3 Climate

Temperature and Humidity

Gangtok features a monsoon-influenced subtropical highland climate. Because of its elevation and sheltered environment, Gangtok enjoys a mild, temperate climate all year round. Like most Himalayan

⁴ on a scale of I to V, in order of increasing seismic activity



towns, Gangtok has five seasons: summer, monsoons, autumn, winter, and spring. Temperature ranges from an average maximum of 22 °C in summer to an average minimum of 4 °C in winter. Summers (lasting from late April to June) are mild, with maximum temperature rarely crossing 25 °C. In winter, temperature averages between 4 °C and 7 °C. Annual temperatures range from a high of 25 °C in summer to a low of about 3 °C in winter. Snowfall is rare, and in recent times, Gangtok has received snow in 2004, 2005, and 2009.

Rainfall

The monsoon season from June to September is characterized by intense torrential rains often causing landslides that block Gangtok's land access to the rest of the country. Rainfall starts to increase from pre-monsoon in May, and peaks during the monsoon, with July recording the highest monthly average of 649.6 mm. Annual rainfall varies from about 1,300 mm to 5,000 mm. Important climatic features of Gangtok are presented in Table 5.

Month/ Parameters	Average High Temperature (℃)	Average Low Temperature (℃)	Precipitation (mm)
January	13	4	31.9
February	14	5	79.4
March	18	9	122.2
April	21	11	270.9
Мау	22	14	527.7
June	22	16	611.3
July	22	17	628.6
August	22	16	563.2
September	22	15	463.4
October	21	12	177.9
November	18	9	41.7
December	14	6	21.1
Yearly	19.1 (Avg.)	11.2 (Avg.)	3539.3 (Total)

Table 5: Average temperature and total annual rainfall in Gangtok

Source: NERCCDIP Water Supply Initial Environment Examination Report, ADB, 2011

The Lower Himalayas in general are composed of labile rock formations and therefore prone to landslides even in dry seasons. These landslides can result in the capital being cut off from other parts of Sikkim and the mainland India.

Wind Direction

The monsoon winds blowing from the south-easterly direction bring heavy precipitation.

2.5.4 Water Resources

The city is flanked on the east and west by two streams, namely, Roro Chu and Ranikhola, respectively. These two streams divide the natural drainage into two parts, the eastern and western parts.

The main source of water supply in the city is the Rateychu River, located about 16 km from the city, at an altitude of 2,621 m. The Rateychu River is snow-fed and has perennial streams. Since there is no habitation in the catchment area, there is little environmental degradation. The Rural Management and Development Department (RM&DD) use the seasonal local springs to supply water to the outlying rural areas.



2.5.5 Forest Resources

Gangtok has the highest density of population in the state, and the places in and around Gangtok are rich in biodiversity. Flora around Gangtok includes temperate, deciduous forests of poplar, birch, oak, and elm, as well as evergreen, coniferous trees of the wet alpine. Densely forested regions of these evergreens lie just around the town. A wide variety of rare orchids is often displayed in flower shows around the city. Sunflower, marigold, poinsettia, and other flowers bloom in November and December. Bamboo grows in abundance along the slopes of Gangtok. In the lower reaches of the town, the vegetation graduates from alpine to subtropical and temperate deciduous.



3. Demographic Profile

The chapter presents a detailed overview of the demographic profile of the city and its overall position with reference to the state and district. The chapter also describes the population growth trends, spatial distribution, and other demographic characteristics of the city. Moreover, the population projections have been carried out for to establish the base on which the need assessment would be carried out.

3.1 Background

3.1.1 Sikkim Urbanization

The development of a particular city, town, or a region depends upon natural, physical, and socioeconomic factors. Among these factors, the population assumes significance in determining the future pattern of progress and development.

Sikkim is the least populous state in India with a total population of 610,577 of which 153,578 (25.1%) is urban as per Census 2011. The total population of Sikkim has grown from 5, 40,851 in 2001 to 610,577 in 2011, implying a decadal growth rate of 12.9%, which is way below the national average of around 17%. However, the urban population growth rate for the same period is 153.4%. The urban population share in Sikkim state is 25%, which is below the national average of 31%. The details of Sikkim urban population are presented in Table 6.

Year	Total Population	Urban Population	Urban Share
1971	2,09,843	19,668	9%
1981	3,16,385	51,084	16%
1991	4,06,457	37,0065	9%
2001	5,40,851	59,870	11%
2011	6,10,577	153,578	25%

Table 6: Sikkim Population and Urban share (1971-2011)

Source: Census of India, 2011

⁵ During 1991-2001, the urban population was reduced due to the reduction in the size of the urban area



Figure 18: Sikkim urban centres and its population

Source: Slum Free City Plan for Action for Gangtok, 2012

There are total nine (9) urban centres in the state (see Figure 18). Out of these, East Sikkim district accounts for 80% of total state urban population. Gangtok city accounts for 65% of the total state urban population, followed by Namchi with 8%. Overall, it indicates that Gangtok city holds significant presence in the state urban population.

3.1.2 East Sikkim District

East Sikkim district is the largest district the state in terms of population. The district occupies an area of 964 sq km; the district has four (4) urban centres including Gangtok. The district has a total population of 283,583, out of which, 122,487 is the urban population. The district has more than 40% of the urban population. Apart from the Gangtok Municipal Corporation (GMC), the district has two (2) town panchayats (Singtam and Rangpo) and 1 census town (Rhenak). Gangtok accounts for 82% of the total district urban population, followed by Rangpo with 9%.



Figure 19: Urban Centres in East Sikkim District

Source: Census 2011, CRIS analysis



Table 7: Urban Population in Sikkim Districts

S.No.	District	Urban Population
1	East	122,487
2	South	21,199
3	West	5,248
4	North	4,644
	Total Urban Population	153,578

Source: Census of India, 2011

3.1.3 Gangtok City Population

The area under the jurisdiction of the GMC is 1962 ha (19.62 sq km) with a density of 51 persons/ha. As per Census 2011, the total population of Gangtok is 100,286,

GMC population accounts for 65% of the state urban population.

having 52,459 males and 47,827 females. GMC population accounted for 16% of the total state population and 35% of the district population. Gangtok city population accounts for 82% of the district urban population. The comparison of Gangtok population to the total population and urban population in the state and district is presented in Table 8.

Table 8: Comparative population of Gangtok

State/District/City	Population			% of urban population w.r.t. total	Comparison – Urban population	Comparison – Total Population	
	Total	Rural	Urban	population	population	population	
Sikkim state	610,577	456,999	153,578	25%	65%	16%	
East Sikkim district	283,583	161,096	122,487	43%	82%	35%	
GMC	100,286	0	100,286	100%	100%	100%	

Source: Census 2011

3.2 **Population Growth Trends**

The population trend has been compiled from the population documented by the census and the studies on Gangtok. It has been noted that Gangtok has historically and consistently recorded a very high growth rate of population. Gangtok population was 58,242 in 1991 and 82,149 in 2001 (decadal growth rate of 41%). The preceding decade of 1981 to 1991 experienced a much higher growth of 58.5%. The last decade, i.e., 2001-2011, has shown the growth rate of 22%. The increase in population of Gangtok can partially be attributed to the formulation of GMC. The population trends over last the five decades are presented in **Table 9** and **Figure 20**.

Census Year	Population (as per census)	Population of merged villages in GMC area ⁶	Total Population	Decadal change	Growth rate (%)
1961	6,848	-	6,848	-	-
1971	13,308	-	13,308	6,460	94.3
1981	36,747	-	36,747	23,439	176.1
1991	25,0477	33,195	58,242	21,495	58.5
2001	29,354	52,795	82,149	23,907	41.0
2011	100,286	0	100,286	18,137	22.1

Table 9: Population trend in Gangtok

Source: Census of India, Gangtok Water Supply DPR



Figure 20: Population growth trends in Gangtok

3.3 **Population Density**

Gangtok city is divided into 15 administrative wards. The population distribution in Gangtok is uneven. The gross population density for the city is 5,201 persons per sq.km, but it shows a wide variation ranging from 33,049 persons per sq km in Lower MG Marg to 1,934 persons per sq km in Lower Sichey. The ward-wise population distribution is presented in **Table 10** and **Figure 22**.

⁶ Merged villages' population has also taken into account in GMC population for better growth trend analysis.

⁷ Population reduced from 1981-1991 due to the reduction in the size of the urban area.

Figure 21: High dense built up pattern in Gangtok



It can be observed that the population density in Lower MG Road is highest in Gangtok. Diesel Power House, Upper MG Road, Deorali, Arithang, and Tibet Road are the other developed areas with a higher population density.

Ward Name	Ward No.	Population	Area (sq km)	Density (persons/sq km)
Burtuk	1	9,957	4.33	2,300
Lower Sichey	2	5,873	3.04	1,934
Upper Sichey	3	7,979	0.73	11,006
Chandmari	4	6,177	2.89	2,140
Development Area	5	6,723	0.73	9,210
Diesel Power House	6	3,987	0.17	23,046
Syari-Tathangchen	7	11,028	2.39	4,622
Lower MG Marg	8	4,032	0.12	33,049
Upper MG Marg	9	2,664	0.13	20,651
Tibet Road	10	3,266	0.29	11,420
Deorali	11	6,938	0.30	23,282
Dara Gaon	12	9,605	1.58	6,083
Tadong	13	9,325	1.24	7,508
Ranipool	14	4,520	1.02	4,449
Arithang	15	8,212	0.34	23,942

Table 10: Ward-wise population of GMC, 2011

Ward Name	Ward No.	Population	Area (sq km)	Density (persons/sq km)
Total	15	100,286	19.28	5,201 (city level)

Source: Census 2011 and CRIS analysis

Figure 22: Population growth trends in Gangtok



Source: CRIS Analysis, Census of India, 2011

3.4 Average Household Size

The average household size is about 4.2 persons in Gangtok. The city household size is slightly low compared to the district and state. The average household size in the city, district, and state is given in **Table 11**.

Table 11: Average household size

SI.No.	Parameter	Gangtok	East District	Sikkim
1	Number of Households	23,773	61,567	129,006
2	Average Household Size	4.2	4.6	4.7

Source: CRIS Analysis, Census of India, 2011

3.5 Literacy Rate

Gangtok has a literacy rate of 89% (higher than the national average of 74%) of which 93% are males and 86% are females. The city literacy rate is also high compared to the district and state, and the details of the same are given in **Table 12**.

Table 12: Literacy rate details

Parameter	Gangtok	East District	Sikkim
Literates	81,309	214,329	444,952
Literacy rate	89%	84%	81%

Source: CRIS Analysis, Census of India, 2011

3.6 Sex Ratio

As per Census 2011, the sex ratio stands at 912 females for 1000 males. The city has a better sex ratio compared to the district and state, as presented in Table 13.

Table 13: Sex ratio details

SI.No.	Parameter	Gangtok	East District	Sikkim
1	Male Population	52,459	151,432	323,070
2	Female Population	47,827	132,151	287,507
3	Sex ratio	912	873	890

Source: CRIS Analysis, Census of India, 2011

3.7 Schedule Caste (SC) and Schedule Tribe (ST) Population

The SC and ST population constitutes about 5% and 28% of the total population of Gangtok, respectively. The city ST population share is lower than the state (34%) and is equivalent to the district share (28%). The SC population share in the city is same as the district and state. The details of SC and ST population in the city, district, and state are presented in **Table 14**.

Table 14: SC and ST population details

SI.No.	Parameter	Gangtok	East District	Sikkim
1	SC Population	4,793	15,305	28,275
2	ST Population	28,514	78,436	206,360

Source: CRIS Analysis, Census of India, 2011

3.8 Key Observations

- Sikkim's urban population share is around 25%, which is on the lower side as compared to India's urban share (31%);
- The city has performed very well in literacy rate (89%) as compared to the district and the state;
- Around 65% of state urban population is residing in Gangtok city and around 80% of state urban population is residing in East Sikkim district only;
- Averege household size is low in Gangtok city compare with other parts of the state;

- Lower MG marg, Deorali, Diesel Power House and Upper MG marg are densly populated wards of the city; These wards are covered with high commercial and high raised residential areas of the city;
- Lower Sichey, Burtuk and Chandmari are the low population density wards in the city;

3.9 **Population Projections**

The population projections would play a vital role in the assessment of future needs for the city. The projected population would assist in estimating the demand for water supply, sewerage, solid waste management, and social infrastructure facilities such as schools, hospitals, and parks for the design years. In accordance with this, the population projections have been carried out for the study area for next 30 years using various methods. Following sections describe the method adopted and population projections for the study area.

3.9.1 Methodology Adopted for Estimation of Population

In order to estimate the population for the next 30 years, initially, CRIS reviewed the population projections estimated in the 1st generation CDP, slum free city report, CMP, and water supply project DPR. The review indicated that the population projected in the 1st generation CDP and slum free city report is more or less same. However, the population projections in the CMP were at higher side compared to the projections estimated in other studies. The trends in population projections in various studies are presented in Figure 23.





Table 15: Gangtol	city population	projections in various	s studies (Figures are in lakhs)
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Year/Report	1st generation CDP	Slum Free City report	Water Supply project DPR	СМР
2021	1.35	1.25	1.58	2.01
2031	1.60	1.50	1.93	3.60
2041	Not available	Not available	2.28	6.44

Source: 1st generation CDP (2006), CMP (2010), Slum free city plan report (2012), and Water supply DPR (2012)

Further, based on the population trends during the past four decades, CRISIL has projected the population for the study area using the following methods:



- Arithmetic;
- Geometric;
- Incremental increase;
- Exponential;
- Power;
- Log;
- 2nd order polynomial; and
- 3rd order polynomial.

It can be observed from the below chart that the population projected using the log, 3rd order polynomial, and 2nd order polynomial methods are at the lower side. The exponential projections are at the higher side as compared to other projections. It is estimated that the population would increase to 8.6 lakhs by the end of 2041. Similarly, results of the methods such as geometric and power projections are on the moderately higher side. The population projections based on the 2nd order polynomial and arithmetic methods are almost similar. It is estimated that the population would increase to 1.6 lakhs by the end of 2041. The population projections using various methods for the next three decades have been presented in the Figure 24 and **Table 16**.

Figure 24: Population projections using various methods



Table 16: Population projections using various methods

Method/ Year	2021	2031	2041
2nd order polynomial	1.20	1.38	1.54
3rd order polynomial	1.15	1.22	1.20
Arithmetic	1.21	1.42	1.63
Incremental	1.25	1.55	1.88
Geometric	1.62	2.63	4.25

Method/ Year	2021	2031	2041
Exponential	3.28	5.32	8.64
Power	1.64	1.94	2.25
Log	1.11	1.18	1.24

Source: CRIS Analysis – (The figures are in lakhs)

3.9.2 Considerations for Population Projection

While adopting the population for the next three decades, the following factors influence the city's future growth:

- Economic activities such as tourism and hospitality development in the city;
- Migration from surrounding rural areas to Gangtok city for employment opportunities; and
- Last few decades population growth rate of Gangtok city.

3.9.3 Recommended Population Projection

The population projection has been carried out for the GMC jurisdiction using arithmetic, geometric, incremental, and exponential methods for the years 2021, 2031, and 2041.

The population projected using various methods has been compared with the population projections finalized in the 1st generation CDP, water supply project, and CMP. The power method projection is in line with the water supply DPR projection. Taking into consideration of all the existing studies on Gangtok, *CRIS has considered the power method to estimate the projected population for the city.* As per the power method, the population would increase to 1.94 lakhs and 2.25 lakhs in 2031 and 2041, respectively.

Further, the results of the various methods were presented during the 1st city-level stakeholders' workshop. The results of all the methods were discussed with UD&HD, GMC officials.

Table 17: Projected population for Gangtok

Year	Incremental method (population in lakhs)
2021	1.64
2031	1.94
2041	2.25

Source: CRIS Analysis



4. Economic Profile

The chapter presents the detailed assessment of the economic profile of the city such as key economic drivers of the city, spatial distribution of economic activities, workforce participation rate, workers classification, state level economic policies that impact the city's economy, key economic indicators with reference to the state and district, and informal sector activity in the city. Further, the key issues with respect to the economic base have been detailed out at the end of the chapter.

4.1 Background

Sikkim's economy is largely agrarian, based on traditional farming methods, on terraced slopes. The rural populace grows crops such as cardamom, orange, apple, tea, and orchid. Sikkim has the highest production and largest area under the cultivation of cardamom in India. Compared to the agricultural sector, the industrial sector of the state is still weak and under developed. The industries of Sikkim can be classified as cottage, small and medium scale industries. Because of the hilly terrain and lack of reliable transportation infrastructure, there are no large-scale industries. Breweries, distilleries, tanning, and watch making are the main industries in the state. Despite the state's minimal industrial



infrastructure, Sikkim's economy has been among the fastest-growing in India since 2000; the state's GDP expanded by over 13 per cent in 2007 alone.



In recent years, the Government of Sikkim has stated promoting ecotourism. Sikkim has a vast tourism potential and by tapping into this, the state has grossed an earnings windfall. Ecotourism has emerged as an important economic activity in the region, which includes trekking, mountaineering, river rafting, and other nature-oriented activities. The State Government is emphasizing on upgrading the horticulture, agriculture, livestock and fisheries.

4.2 Economic Situation of State and Town

People of Sikkim engage in different economic activities, prominent among which are tourism, industries, horticulture and agriculture, etc. giving rise to a definite occupational structure.

4.2.1 Sikkim State

Sikkim's economy is driven by the secondary and tertiary sectors. The secondary and tertiary sectors are the largest contributors to Sikkim's economy. The graph below shows that the state gross domestic product (SGDP) of Sikkim has increased significantly over a period. The SGDP is about Rs.

3,642 crore, at constant prices (2004-05), and the GDP has grown at 13% from Rs. 1,739 crore in 2004-05. The details of Sikkim GDP are presented in **Figure 25**.



Figure 25: GDP of Sikkim State at Constant Price (at 2004-2005)

4.2.1.1 Agriculture

Agriculture in the state is practiced under diverse conditions. It is the major economic activity and is practiced on terraced fields that have been laboriously created from steep hillsides. The hill slopes have been converted into farmlands using terrace-farming techniques and is used for cultivation. The principal crops of the state are maize, rice, and large cardamom. Along with maize, soya bean is raised as an intercrop initially. Sikkim produces 80% of India's large cardamom, which enjoys a high value export market in Pakistan, Singapore, and the Middle East. The Sikkim's gingers are of good quality and have export prospects. Fruits, exotic flowers, ginger, honey, and tea are the agro-based products that have a strong potential for development of agriculture economy in the state.

4.2.1.2 Industry

Sikkim is one of the least industrially developed states of India. The units that are engaged in the manufacturing sector are mainly dealing with pharmaceuticals, chemicals, liquors, foam mattresses, food products, iron rods, etc. These units are small and medium enterprises. There are very limited large scale industries in the state. The locational factors are not yet conducive for the establishment of large scale industries in Sikkim. The mountainous terrain and geographical isolation, small and scattered domestic market, and limited mineral resources make large scale industries and a few medium scale units. There is only one tea factory in Sikkim and it is located in Temi and is called Temi Tea Estate.

4.2.1.3 Service Sector

There are some small and medium enterprises engaged mainly in service activities like hotels and resorts because of the development of tourism in the state. The service-oriented sectors of Sikkim's economy are its major strengths. A structural shift in the Sikkimese economy has been very remarkable with the tertiary (services) sector contributing the second major share to the state

Source: Department of Economics, Statistics, Monitoring and Evaluation, Government of Sikkim



domestic income. People are primarily engaged in public sectors as teachers, engineers, lawyers, doctors, police, military, bureaucrats, diplomats and so on.





Overall, the secondary sector share has grown over the years, while the primary sector share has decreased between 2004-05 and 2012-13. The Sectoral share of SGDP is presented in Figure 26.

4.2.2 East Sikkim District

East Sikkim is the third largest district in terms of area, but the most populous district in Sikkim. It is the economic and connectivity hub of the state. The GDDP of East Sikkim was Rs. 106,030 lakh as of 2007-08. This district alone has contributed to roughly 52% of the state's GDP. The per capita district domestic product (DDP) was Rs. 39,937, making it the highest per capita DDP in Sikkim.

4.2.2.1 Agriculture

Cardamom is the main cash crop in the district. Besides, other crops like rice, millet, and corn are also grown in limited quantities. Cabbage and potato are produced in large quantities in the Lachung Valley and are exported. Radish too is exported from this area. Besides, other normal vegetables of daily consumption like peas, cauliflower, and green leaves are available all over the district. Major fruit that is grown in the district is apple, which is found in the Lachung Valley. Other fruits like peach, guava, orange, and plum grow in plenty.

4.2.2.2 Industry

The district is home to a number of pharmaceutical companies (Zydus Cadila, Torrent, Cipla, Sun, Alkem, and Unichem). The district has more than 400 micro, small, and medium-sized industries in operation.

4.2.2.3 Service Sector

Tourist places like Nathula Pass, Changu Lake, and Baba Mandir are located in the district. These places are considered as the some of the most sought after tourist destinations in Sikkim. Beside

Source: Department of Economics, Statistics, Monitoring & Evaluation, GoSK, 2013

these, Gangtok, the capital of Sikkim, has many places of tourist interest. The main economy of the service sector in the district comes from tourism activities such as hotels, tours and travel, and transport.

Overall, the tertiary sector share is high in the district due to the tourism and hospitality industry. The sectoral share of East Sikkim district is presented in Figure 27.



Figure 27: Sectoral share of East Sikkim DDP

Source: Department of Economics, Statistics, Monitoring and Evaluation, Govt. of Sikkim, 2012-13

4.2.3 Gangtok City

Nathula Pass, located about 50 km from Gangtok, used to be the primary route of the wool, fur, and spice trade with Tibet and spurred economic growth for Gangtok till the mid-20th century. In 1962, after the border was closed during the Sino-Indian War, Gangtok fell into recession. Nathula Pass was reopened in 2006. Because of the mountainous terrain, Sikkim lacks train or air links, limiting the area's potential for rapid industrial development. The government is the largest employer in the city, both directly and as contractors. The hospitality industry is the largest industry in Gangtok as the city is the main base for Sikkim tourism.









A. Agriculture

The main market in Gangtok provides many of the state's rural residents a place to offer their produce during the harvest seasons. Around 2% of the working population is engaged with agriculture activities in the city.

B. Industries

Gangtok's economy does not have a large manufacturing base, but has a thriving cottage industry in watch-making and handicrafts. The micro, small and medium scale industries such as such as watch-making, country-made alcohol and handicrafts are present in the city. Among the handicrafts are the handmade paper industry made from various vegetable fibres or cotton rags. Less than 2% of the working population of the city is engaged in industrial activities.

C. Service Sector

The economy of Gangtok city is majorly based on the hospitality industry. Many of the city residents are employed directly and indirectly in the tourism industry, with many residents working in hotels and restaurants. MG Marg (road) is one of the central attractions in Gangtok. Ecotourism has emerged as an important economic activity in the region, which includes trekking, mountaineering, river rafting, and other nature-oriented activities. Due to the presence of numerous tourist destinations, most of the income of city comes from the tourism industry.

4.3 Industrial and Commercial Activities

4.3.1 Informal Business and Local Economy

MG Marg (or Mahatma Gandhi Road) is the main marketing area of Gangtok for tourists. The road is lined with all types of shops on both sides. A pert of the shopping area here is known as New Market. The Directorate of Handicrafts & Handlooms (DHH) is located at the end of Tibet Road and has a large sales emporium. It sells all types of traditional Sikkimese handcrafted items and artwork made by local and well-known artists and craftsmen. Lal Bazaar market area is located below MG Marg and it is a local market with full of shops.

More than 1500 vendors⁸ practicing the commercial activities in these areas. Handicrafts, books, baskets made from bamboo, pottery, prayer flags, Khukri (traditional curved Nepali knife), Sikkimese cups and other local articles available in these market areas.

⁸ Based on discussion with Local vendors in MG road and Lal bazar

S.No.	Market Name	Major Goods/articles	Category of Vendors	Number of Vendors (Approx.)
1	MG Marg	Dress materials, shoes, souvenirs & gifts, trinkets, eateries, food courts,	Stationary	500
2	Lal Bazar (Old)	Traditional Bhutia and Nepalese dress materials, Sikkimese dress materials for women, artwork, handcrafted products and bags.	Peripatetic	750
3	Lal Bazar (New)/ <i>Kachendzonga</i> <i>Shopping Complex</i>	Vegetable market, Local handicrafts, dried fish, yak's cheese and yeast for producing local alcohol, dry fruits.	Stationary	350

Table 18:	Prominent	Markets in	Ganatok	and Wor	k flow
	1 I Uninterne	markets m	Gangton		

Source: Discussion with local vendors, MG Marg, Lal bazar and New Market

4.3.2 Wholesale Trade

Cardamom is among the world's oldest spices and is the third most expensive spice after saffron and vanilla. Sikkim has the largest area under cultivation of large cardamom and the highest production of large cardamom in India. Gangtok has the major trading share in cardamom export from India.

Trade in the hill state of Sikkim is upbeat on the prospect of Indo-China trade through Nathula. Lhasa, the capital city of Tibet, is 431 km from Nathula and little over 1100 km from the port of Kolkata. At present, goods are transported to Lhasa through Beijing and Shanghai. As the present route is of considerable distance, the trading community is expected to take advantage of the logistics for export of goods from India to Lhasa through Nathula.

Gangtok being located en-route to Nathula and presently being the administrative and business capital of the state has to capture the immense gains that would emerge from the Nathula Trade Route.⁹

⁹ Sikkim Tourism Master Plan, 2012







Source: Generated by CRIS

4.3.3 Informal commercial activity

Street vending is an indispensable economic activity in urban India. It is the largest informal sector which caters to the livelihood of the urban poor. Since the era of economic reform in the country, the sector has faced many challenges. Street vendors count for about 2 per cent of the population and provide "affordable" as well as "convenient" services to a majority of the urban population.

Report on Conditions of Work and Promotion of Livelihoods in the Unorganized Sector, 2007 of the National Commission for Enterprises in the Unorganized Sector (NCEUS), suggest that the vendors" earnings are very low although they vary from trade to trade and from location to location. The men's average daily income is around Rs. 70 in most cities and women earn considerably less – Rs. 40 per day.

Articles 39 (a) of the Constitution clearly mention that the State shall in particular direct its policy so that - (a) the citizens, men and women equally, have the right to an adequate means of livelihood. To improve the condition of urban street vendors, Government of India made numerous legislative attempts starting from the regulation of hawker trade in Bombay Municipal Corporation in 1980 till The Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014.

Of the major attempts made, The National Policy on Urban Street Vendors, 2009¹⁰ was a comprehensive attempt that promoted spatial, legal and participative means of improving the conditions of the urban street vendors. According to this policy, a 'Street Vendor' is defined as 'a person who offers goods or services for sale to the public in a street without having a permanent built-up structure.' The policy was somewhat similar to its predecessor and got a feeble response from the states, to overcome the shortcomings of this policy a draft bill entitled "Model Street Vendors (Protection of Livelihood and Regulation of Street Vending) Bill, 2009 was introduced but Governments did not take sufficient legislative action. However, the Bill was critiqued to have ignored many pressing issues. The foremost problem that it overlooked was the issue of natural markets which sprang up in places where consumers found them useful. Further, it ignored the vending rights of those who were already selling on the street, still the policy was somewhat able to recognize certain issues related to the street vendors and has provided certain powers to ULBs to regulate, monitor and promote street vendors in towns / cities.

The policy recognized and explicated the positive role of street vendors in providing essential commodities to people at affordable prices and at convenient places. It also recognized the need for regulation of street vending by way of designated Restriction-free Vending', 'Restricted Vending' and No Vending 'zones based on certain objective principles. Overall the Policy meant to foster a congenial environment for the urban street vendors to carry out their vocation and at the same time ensuring that it does not lead to overcrowding or unsanitary conditions at public spaces and streets.

4.3.4 Specific Norms for the Urban Local Bodies

I. Spatial Planning norms - demarcation of vending zones

¹⁰ In 2004, the National Urban Street Vendors Policy (NSVP) was announced. It was the first national level regulatory framework on street vending which was left to the States to adopt and implement. In 2009, the NSVP was revised and the Central government presented a Model Draft Bill on the subject. The States and Union Territories were to implement the National Policy for Urban Street Vendors of 2004, taking into account this Model Bill. However, it received a feeble response from the States and soon demands were made for a mandatory central legislation on the subject. (National University of Juridical Sciences, 2012)



- The demarcation of hawking zones should be city/town specific. The master plans, zonal plans etc. should take into account the natural propensity of the street vendors to locate in certain places at certain times in response to patterns of demand for their goods/services.
- City authorities should provide sufficient spaces, designated as "vendors markets" in layout plans at locations of natural markets and they should permit mobile vending in all areas even outside the designated markets, unless designated as "no-vending zone" through a participatory process.
- Designation of vendors markets / no-vending zones should not be left to the sole discretion of any civic or police authority but must be accomplished by a participatory process by a **Town Vending Committee** (which for large towns / cities may be constituted on the basis of wards) whose membership may be as follows: Municipal Authority, Traffic and Local Police, Public Land Owning Authority, Associations, Representative from associations of Street vendors, representative from lead Nationalized Bank / Commercial Bank.

II. **Quantitative norms-** refer to the norms on amount of space and facilities to be provided for vendors" markets by the civic authorities. At the town / city level enough space should be designated for vendors" markets at least to the extent of 2% to 2.5% of the total city population. The facilities that are required to be provided at the vendor markets invariably include: solid waste disposal facility, Public toilets to maintain cleanliness¹¹, Aesthetic design of mobile stalls/ push carts, electricity, drinking water facility, protective covers to protect their wares as well as themselves from heat, rain and dust and Storage facilities including cold storage.

III. **Regulatory Process:** The policy thrusts on having the system of registration of hawkers and nondiscretionary regulation of access to public spaces in accordance with the planning standards and nature of trade/ service. The **Town vending committee**¹² / **Ward vending Committee** has the power to register the vendors¹³. All vendors in each city should be registered at a nominal fee and the registration should be renewed after every three years. The TVC should issue identity cards to the vendors and it should charge a monthly fee for access to various services. For better system of regulation, there should be direct linkage between the urban local bodies (ULBs) and hawkers.

4.4 Workforce Participation Rate

As per the 2011 census, the city has 43,776 workers, accounting for 44% (workforce participation rate) of the total population. The main workers account for 86% of the total workers, and the remaining are marginal workers. The marginal workers involved in employment for less than 6 months, form a very small segment of the total workers.

Sikkim has 50% of working population and East Sikkim district, 49%. Gangtok working population share is surprisingly less compared to the state and district. The details of workforce share are presented in **Figure 29**.

¹¹ In spite of the government's fervent concern regarding public sanitation and safety, a number of public events, bazaars, religious festivals and other activities take place on our streets with the whole-hearted approval of government authorities. ¹² The committee has no fixed tenure and there is no removal mechanism mentioned.

¹³ The National Policy on Urban Street Vendors, 2009. Under Provision 4.5.4 of this Policy, the Municipal Authority is under an obligation to undertake a comprehensive census of the existing vendors in consultation with the Town Vending Committee for the purpose of granting them lease to vend. Hence, we see that here the burden of registration is on the Municipality, which significantly smoothens the exercise of registration and to a large extent simplifies the process for street vendors.



Figure 29: Work force share in Sikkim, East Sikkim district, and Gangtok

Source: Census, 2011

4.5 Worker Classification

The workers are classified into primary sector, secondary sector, and tertiary sector workers. The primary sector workers comprise agriculture and cultivation labourers. The secondary sector workers comprise manufacturing and household industry workers. The tertiary sector workers comprise workers involved in the service sector, trade and commerce, and informal business activity.

96% of Gangtok's working population (41,963) is engaged in the tertiary sector. As mentioned in the earlier part of the report, the city has mostly depends on tourism and hospitality based economic activities.



Figure 30: Sectoral workforce in Sikkim, East Sikkim district, and Gangtok

Source: Census, 2011

SI.No.	Sector	Male Working Population	Female Working Population	Total working population
1	Primary	525	467	992
2	Secondary	580	241	821
3	Tertiary	29,832	12,131	41,693

Table 19: Sectoral workforce in Gangtok

Source: Census of India, 2011

The above table reveals that Gangtok's working population mainly depends on the tertiary sector for their economic activities. Surprisingly, the primary sector working population is more than secondary sector working population. The table indicates that Gangtok industrial activity is limited in the city region.

4.6 Horticulture

Horticulture is one of the major economic activities of the state. The important fruits grown in the state are mandarin orange, banana, guava, papaya, mango, peach, plum, pear, apple, avocado, etc. The state is also rich in genetic diversity of minor or wild fruits. Presently, mandarin orange is an important commercial fruit crop of Sikkim. The Department of Horticulture is deeply involved in motivating and providing technical guidance to the local farmers. Sikkim is also a paradise for flowers. Gladioli, anthodium's, lilies, premolars, rhododendrons, orchids as well as many other floral species thrive here. The state is home to an amazing 450 species of exotic orchids alone. There is immense potential for developing floriculture on a commercial basis, and the Department of Horticulture is making concerted efforts to turn this sector into an export-oriented industry.

4.7 Future employment scenario in Gangtok city

With respect to the rich culture and scenic beauty of the place, along with availability of vast natural resources with tremendous scope of tourism development, tourism is going to be the key driver of economic development of the city. This is further going to be boosting up the economy as both city and state government are keen on developing the tourism potential of the city and the region as part of eco-tourism spot.

4.8 Key observation

- Gangtok, by virtue being a tourist base, offers a wide range of shopping arena for the city residence and tourists;
- Informal markets are significant economic activity as main stay of trade and commerce of Gangtok;
- 53% of the state GDP is being contributed by the east District of Sikkim alone which is quite high in comparison to other three districts;
- 80% of the state GDP is being contributed by secondary and tertiary sectors;
- 2% of the city's population is engaged in agriculture;
- Service sector is the key driver of Gangtok city economy; and
- Availability of rich natural resource make it a hot spot for the tourism which is a key driver of economy;

5. Physical Planning and Growth Management

The present chapter provides a detailed assessment of the planning area, spatial growth trends and distribution of population, critical appraisal of development plan and master plan, and land use analysis (existing and proposed). The assessment of existing and proposed land use has been compared with the Urban and Regional Development Plans Formulation and Implementation (URDPFI) guidelines. Also, the roles and responsibilities of ULB and parastatal agencies in urban planning functions have been discussed in the chapter.

5.1 Background

Gangtok exhibits a linear pattern of development, where growth has been accelerated as a response to increased economic opportunities. The primary growth axis for Gangtok is towards the south and southwest direction, along NH-10 (NH-31A) on the Selep-Ranipul axis. The terrain in this axis is relatively more favourable and accessibility is enabled by NH-10 (NH-31A). Gangtok's growth as a response to accessibility in the absence of proper planning intervention has been organic. This has resulted in a mixed land use pattern, where no specific activity has been earmarked.

5.2 Constituents of Planning Area

In the past few years, Gangtok has experienced unprecedented spatial expansion. In 2010, the Gangtok Municipal Council was upgraded into a municipal corporation, with an area of 19.28 sq km. The primary growth axis for Gangtok is towards the south and southwest direction, along NH-10 (NH-31A) on the Setipul-Ranipul axis.

Gangtok does not have a statutory master plan as such, and the growth of the city has been mainly along the major transport corridors. The city development plan of Gangtok, which was prepared in 2006, gives an overview of the existing land use pattern. A structure plan has also been prepared in 2009, which discusses the land requirement and proposed land use in 2040. This plan may be translated into a master plan in near future.

5.3 Projected Population under Development Plan

A guided development plan (land use structure plan) has been prepared for Gangtok in 2009. The population projections for Gangtok have been carried out for the years 2015, 2025, and 2040.

Year	2006	2015	2025				

Population	94,145	138,600	149,310
		P	

Source: Gangtok Structure Plan, 2009

040

160.875



5.4 Spatial Growth Trends

The existence of steep slopes, vulnerability due to landslides, large forest cover area, and inadequate access to most areas have been major impediments to the natural and balanced growth of the city. The existing physical pattern is dictated primarily by the availability of land that is safe with respect to stability. In view of the development constraints like landform, topographical features, watercourses, drains, ecology, and growth propensity, the future direction of growth needs to be spread over a larger area. Underdeveloped areas within the notified city area need to be opened up for development through better accessibility and traffic and transport measures.



Figure 31: Evolution of Gangtok (1977-2012)

Source: Slum Free City Action Plan for Gangtok, 2015

The city's spatial growth is mostly towards northern part of the city. The Gangtok structure plan has identified a Gangtok Planning Area (GPA) for the future growth of the town. The structure plan has planned for an additional 7.2 sq km area to accommodate the existing population. It has identified the eastern side of Gangtok as a logical growth area, and proposed the future spatial growth in the rural corridor on the eastern side.

5.5 Spatial Distribution of Population

MG Marg is the central business district (CBD) of the city and is the most developed area. Residential, commercial, public, and semi-public buildings such as banks, offices, schools, hostel, hospitals, etc. are located in this area. The existing buildings have an average of 4-5 floors, and the maximum number goes up to 7 floors. The MG Marg ward has the highest density of around 33,000 persons/sq km.

Gangtok is one of the landslide prone areas and falls under earthquake zone IV. Due to tough terrains and lack of accessibility to basic infrastructural facilities in the region, unevenly distributed population can be observed in Gangtok. The main city areas have a higher population density compared to the other areas. Due to the tough terrains, the development scope of the city in terms of infrastructure such as road widening and laying of pipelines is highly restrictive.

5.6 Existing Land Use

It is observed that the total developed area has been increasing for the past three decades. The highest growth rate has been seen in the industrial sector due to coming up of new industries along NH-10 (NH-31A). There has also been considerable increase in the transport and recreational sector. However, areas under residential, commercial, and public uses have been growing at a slower pace.

Land use	1975	1985	1995	2006
Residential	65.6	54.8	49.6	43.0
Commercial	6.9	6.4	4.6	4.0
Public & Semi-Public	0.6	1.7	4.2	15.0
Transportation	13.4	12.2	10.6	19.0
Industrial	1.1	7.3	9.0	5.5
Recreational	12.5	17.7	22.0	13.5
Total	100.0	100.0	100.0	100.0

Table 21: Change of Land use over a period of 1975-2006

Source: UD&HD, Gangtok

Gangtok city has an organic growth pattern, and mixed land use is the prominent feature of the city. The land use distribution for 1995 and 2006 shows a decline in percentage share in the residential area. This is mainly because of expansion of city outside municipal boundary. However, there is a considerable increase in public and semi-public land use share. It is due to new institutions and other public buildings coming into being.

5.7 Brief of Gangtok Structure Plan (Land use)

5.7.1 Land Use Analysis of Structure Plan Provisions

Since Gangtok does not have an approved master plan, there are no definite land development policies. The Gangtok structure plan presents the existing land use pattern for GPA for the year 2009. According to the plan, the land use under open space is around with 59%. Residential use accounts for 21%, followed by institutional area at 9%. The open space is mostly occupied by hills/valleys and green areas, which are mostly unfavourable for city development activities. The existing land use break-up has been presented in **Figure 32**.



Figure 32: GPA land use details for 2009

Source: Gangtok Structure Plan



5.7.2 Comparison with URDPFI Guidelines (for Hill Cities)

The comparison with URDPFI guidelines for hill cities has been carried out to assess the adequacy of existing area under various zones. As indicated in the table below, the city has adequate land use share under residential, Industrial, public & semi-public, recreational category.

Category	URDPFI guidelines (Hilly areas)	Gangtok Land use, 2006	Met the requirement
Residential	48-52	43.0	No
Commercial	2-3	4.0	Yes
Industrial	4-5	5.5	Yes
Public & Semi-Public	8-10	15.0	Yes
Recreational	15-18	13.5	No
Transportation	5-6	19.0	Yes
Ecological (Agricultural/Vacant/Forest & water bodies)	8-10	Included in Recreational area	-

Table 22: Existing land use Comparison with URDPFI guidelines

Source: URDPFI Guidelines, 2014 and Gangtok Structure Plan, 2009

5.7.3 Residential Use

As per the existing land use, residential and mixed residential use comprises 43% of the total land use. As indicated in the table above, the percentage of land use under residential is less than the URDPFI standard for hill towns (medium size).

5.7.4 Commercial Use

The commercial use is spread over an area of 4% sq. km. It is observed that the share of commercial land use is meeting the URDPFI requirement. This is due to the fact that the city is a major base of economy and commercial centre in the district.

5.7.5 Development Proposals

Since Gangtok does not have an approved master plan, there are no definite land development policies. As per the Gangtok structure plan, to enable better sector planning for local facilities, GPA has been proposed to be divided into 7 planning communities. The detailed proposed land use breakup and URDPFI guidelines (hill towns) are compared in the Table 23.

S. No.	Land use	Suggested land use (%)- as per URDPFI guidelines	Proposed land use (%) for GPA - (2040)
1	Residential	48-52	35.4
2	Commercial	2-3	5.6
3	Industrial	4-5	2.1

Table	23:	Land	use	Breakdown	in	GPA	for	2040

Ministry of Urban Development, Government of India

S. No.	Land use	Suggested land use (%)- as per URDPFI guidelines	Proposed land use (%) for GPA - (2040)
4	Institutional	8-10	5.0
5	Sports & Recreational	15-18	0.5
6	Transportation	5-6	Included in ecological land use
7	Ecological (Agricultural/Vacant/Forest & water bodies)	8-10	35.5
8	Restricted land Use	-	10.6
9	Public Green	-	5.3
	Total	-	100.0

Source: Draft URDPFI guidelines and Gangtok Structure Plan, 2009

About 35.6% of the land is allotted for residential use. The land area under commercial land use has been increased to 150 ha, which amounts to 5.6% of the total area. Only 2% of the land area has been allotted for industrial uses, which is on the lower side compared to URDPFI guidelines.

The structure plan has not outlined land use under transport activity, whereas transport is an important land use, which actively contributes towards economic development of the city. Considering the fact that Gangtok falls in an ecologically sensitive zone, almost 35% of the area has been falls under this land use.

Real Estate in Gangtok:

The Gangtok real estate market has been slowly looking upwards. A part of the capital for building the physical infrastructure will come from the state and the center. Nonetheless, a large portion of investment will depend on the private sector.

Industries such as IT, education, healthcare, and adventure tourism are expected rapid growth in the region. This will undoubtedly improve the real estate market by increasing the demand for residential properties Gangtok.

5.8 Urban Planning Functions and Reforms

The Town Planning Cell under UD&HD administers the urban planning and development in Gangtok. WS & PHED departments independently at the state level undertake the planning and engineering works for water supply and sewerage.

- The building permissions are given through UD&HD. The usual time taken is 1-2 months, based on the area of the building and usage. Building bye-laws are uploaded on UD&HD website;
- Property tax collection is not yet implemented by GMC;
- GIS mapping of the properties is underway;
- No separate fund allocation or demarcation of land for EWS housing is practiced by GMC;
- User charges such as water tax and sewerage charges are not volumetric based;


5.9 Roles and Responsibilities of ULB and Parastatal

Gangtok follows an organic development pattern, and most of the infrastructure is developed on demand-based requirements. Infrastructure facilities are developed only after the buildings are constructed. However, building construction regulations are in place, and building approval from UD&HD is mandatory. The present ULB doesn't have sufficient manpower or expertise for project planning (only 43 regular staff members, most of the regular staff members are on deputation from other departments).

The function of town planning has not been transferred in real-time basis to GMC. As mentioned earlier, UD&HD and GMC are responsible for the urban planning function within the region. The key role and responsibilities of the agencies are indicated in the table below.

Agency	Role and Responsibility
	Under the city planning functions, urban planning and preparation of master and land use plans are the responsibility of UD&HD.
ODAND	Post preparation of the plans, the plans would be handed over to GMC for enforcement as per the applicable state building byelaws.
GMC	GMC is responsible for the enforcement of the plans and regulation of development as per the state byelaws.

5.10 Key observations

- Presently, UD&HD is governing the planning and development of Gangtok;
- The civic services are proposed to be gradually transferred to GMC;
- Since all the planning and implementation are done by the parastatals independently, the inter-department coordination and transparency is lacking;
- GMC should act as the nodal agency for the comprehensive development of GMC area, by getting involved in the decision making process;
- Planning of relevant training and capacity building programmes and will help in improving the overall efficiency and quality of urban service delivery systems; and
- The ULB should emphasis on easy and efficient procedural process for formalities and encourage PPP for the delivery of the civic services.

Since the ULB is in the process of evolving, there is a huge scope of implementing the best practices in other ULBs to improve the service delivery mechanism. The ULB should also focus on the implementation of a revenue-based financial model for the collection of user charges and fees, to ensure a self-sustainable financial model.

6. Social Environment

The 1st generation CDP has not focused on the social and cultural status such as the health, education, and recreation facilities in the city. However, the revised CDP guidelines have emphasised on the health and education sectors. Keeping in the view the revised CDP guidelines and the significant role of the health education sector in the city, a quick assessment has been carried out to understand the status these sectors from the 1st generation CDP to till date. The summary of the findings would certainly assist in taking appropriate actions while revising the CDP for the city for these sectors.

The chapter presents a detailed assessment of the social environment, which includes health services, education and role of various agencies involved in the service provision. The key findings of the analysis indicate the status of Gangtok city in terms health, education, and recreation service provision. The existing facility has been compared with the URDPFI guidelines to arrive at the gap in the service provision.

6.1 Health Facilities

Sikkim has 147 primary health sub-centres (PHSC), 24 primary health centres (PHC), 4 community health centres (CHC), one state referral and one central referral hospital cum medical college. Out of this, major hospitals like State and Central referral hospitals are located in Gangtok.

Health Infrastructure	Required	In Position	Shortfall
Sub-Centre	109	147	-
Primary Health Centre	17	24	-
Community Health Centre	4	4	0
Multipurpose Worker (Female)	171	267	-
Health Worker (Male)	147	147	0
Health Assistants(Female)	24	18	6
Health Assistants(Male)	24	8	16
Doctor at PHCs	24	38	-
Surgeons	4	1	3
Obstetricians & Gynaecologists	4	1	3
Physicians	4	1	3
Paediatricians	4	2	2
Total specialists at CHCs	16	5	11
Radiographers	4	9	-
Pharmacist	28	0	28
Laboratory Technicians	28	32	-
Nurse Midwife	52	90	-

Table 25: State-level health facilities and shortfall

Source: Gangtok Structure Plan



No.	Hospitals	Number of Beds
1.	State Referral Hospital (STNM Hospital) Gangtok	300
2.	Central Referral Hospital cum Medical Collage, 5 th Mile, Tadong (Private Hospital)	500

Table 26: Medical facilities in Gangtok city

Source: Department of Health & Family Welfare, Government of Sikkim

6.1.1 Existing Situation - Gangtok

As discussed earlier, Gangtok has two major hospitals – a state referral hospital and a central referral hospital. The former is a state government hospital with 300 beds. This is one of the important hospitals in the state and it popular in the name of STNM (Sir Tashi Namgyal Memorial) hospital.

The central referral hospital, which is also called Manipal central referral hospital, has a capacity of 500 beds. This is the major private hospital in the state.



6.1.2 Disease Prevalence

Gastro-intestinal disease is widespread, affecting up to 60% of households with 140,000 cases reported annually. Coping costs are an estimated 150 lakhs per annum; the effect on poor households is particularly acute¹⁴. As per the Referral hospital study (Gangtok), nearly 20% of women were diagnosed the gallstones during last three years.

6.1.3 Basic Public Health Indicators

As per the available data the crude death rate of Sikkim is lower that of Indian average which signifies better health facility in the State.

¹⁴ The Challenge of Gangtok, Eleventh Meeting of the Urban Think Tank, DFID

Figure 33: Health Indicators of Sikkim



Source: Annual Report (2012-13), Health Care, Human Services & Family Welfare Department, Sikkim

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Indicators	Sikkim	India
Crude birth rate (CBR) (per 1000 population) ¹⁵	17.2	21.6
Crude death rate (CDR) ¹⁶ (per 1000 population)	5.4	7.0
Infant mortality rate (per 1000 live births) ¹⁷	24	42
Total fertility rate	2.02	2.70

Source: Annual Report (2012-13), Health Care, Human Services & Family Welfare Department, Sikkim

The infant mortality ratio of Sikkim is 24 infant deaths per 1000 live births, which is better than the India ratio (42 infant deaths per 1000 live births). The total fertility rate is only 2.02, which shows the level of awareness regarding family planning in the state.

Stray animal protection

The section 8 of the Sikkim stray dogs and rabnies control act, 2000 states that local authorities are responsible for the management of stray animals. The animal husbandry department responsible for supervising dogs issues in the City. The department does not have adequate work force to conduct a sterilization programme. As decided, the UD&HD would provide the labour, except for Panchayat level areas, while Animal Husbandry Department would give vehicles and supervisors.

¹⁵ Crude birth rate is the number of resident live births for a specified geographic area (nation, state, county, etc.) during a specified period (usually a calendar year) divided by the total population (usually mid-year) for that area and multiplied by 1,000.

¹⁶ Crude death rate is the total number of deaths to residents in a specified geographic area (country, state, county, etc.) divided by the total population for the same geographic area (for a specified time, usually a calendar year) and multiplied by 1,000.

¹⁷ The Infant mortality rate (IMR) is the number of deaths of children less than one year of age per 1000 live births.



6.1.4 Comparison with URDPFI Norms

The existing healthcare facility has been compared with the URDPFI guidelines to check the status of healthcare infrastructure and further identify the gap in the healthcare facilities. As on date, the demand for general hospitals meets the requirement. Moreover, the existing facilities are on the higher side as compared to URDPFI guidelines.

Table 28: Healthcare facilities in Gangtok

healthcare facility	URDPFI Guidelines	Requirement as per guidelines	No. of hospitals	Met the Benchmark
General Hospital	1 for 2.5 lakh population	1	3	Yes
Veterinary Hospital for pets and animals	1 for 5 lakh population	1	1	Yes

Treatment for ailment for which facilities do not exist in the State are referred for treatment outside Sikkim and financial aid provided by the Government. This is a unique feature of the state.

6.1.5 Issues

- Currently, GMC has limited role in provision of health related facilities to the citizens;
- Due to limited man power and other administrative challenges, GMC is not actively initiating health awareness programmes in the city area;
- City-level hospitals information and infrastructure monitoring cell is absent in the city;

6.2 Educational Facilities

6.2.1 Existing Situation

The Human Resource Development Department (HRDD) is the nodal agency providing and monitoring the educational facilities in Sikkim.

Sikkim University was established as a Central university at Gangtok. There are 12 colleges for higher learning and higher educational institutions in Sikkim. Sikkim has one state university called Sikkim Manipal University, which offers different streams in higher education such as engineering, management, medicine, etc.

Gangtok today boasts of one central university, one medical college, one engineering college, one pharmacy institute, three polytechnic institutes, and computer institutes and schools.

As per the HRDD report, East Sikkim district has around 230 government schools and 157 private schools.

Table 29: Student enrolment (up to senior secondary schools) in Sikkim

	District	Boys	Girls	Total
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Ministry of Urban Development, Government of India

District	Boys	Girls	Total
East	23,133	25,386	48,519
West	14,856	15,609	30,465
North	3,803	4,106	7,909
South	14,967	16,031	30,998
Total	56,759	61,132	11,7891

Source: HRDD, 2013

Table 30: Teacher-student ratio (only government schools) in Sikkim.

Schools status	2008-09	2011-12
Pre-primary School	1:18	-
Primary School	1:13	1:15
Middle	1:13	1:16
Secondary	1:08	1:16
Sr. Secondary	1:13	1:14

Source: HRDD, 2013, and Sikkim Statistical Journal, 2013

In the case of schools, the ratio is better than the preferred norm of 1:30 as per the Right to Education Act.

6.3 Recreational Facilities

The Nehru Botanical Park, Chogyal Park, and Deorali Orchid Sanctuary are popular the city parks in Gangtok.

Botanical Park: The Jawaharlal Nehru Botanical Park is one of the important tourist attractions of Gangtok, and it was established in 1987. Since the establishment of the park, it has been one of the contributors of tourism in the state. The park is situated adjoining the Retek Monastery and the Among Luo Wildlife Sanctuary.

The park is an ultimate destination for nature lovers. The varied species of trees in the park give the onlookers a feel of awe. The park has recreational centres inside the park and also a playing spot for children. The best time to travel to the park is from March to May and October to December.

Zoological Park: The Himalayan Zoological Park is situated at Bulbuley area in Gangtok. It is first of its kind in the northeast designed based on the concept of a modern zoo in which animals are kept in simulated natural conditions. The Himalayan Zoological Park was established in 1991. The park has been set up with the objective of conservation and breeding of endangered and other Himalayan species of animals and birds. The park is spread over an area of 205 ha of mountainous land. It is situated at an altitude of 1780 m. The terrain is suitable for high altitude animals and birds.

Sikkim Deer Park: The deer park is also known as Rustamji Park. The park is located on a ridge at the side of the new secretariat, and it was established in the 1950s. The park was named after Rustamji who was one amongst the dewans of the Chogyal of Sikkim.

The park is famous for being the home to several species of deer. The deer in the park have been brought from other parts of Sikkim as well as the neighbouring states. The park has an open



enclosure. Different species of deer are kept in enclosures. There are also cages for red panda, Himalayan bear, and other animals. The park also houses a huge statue of Buddha. It is said that the park has been built to commemorate Buddha's reincarnation as a musk deer. From the peak of the park, tourists can have a view of the nearby hills.

6.3.1 Sports Facilities

Paljor Stadium, also known as Palzor Stadium, located in the city. It is currently used mostly for football matches. The stadium can hold 30,000 people.

6.3.2 Issues

- Gangtok primarily lacks organised recreational facilities like parks and children's play fields and other leisure and entertainment facilities that are essential for its citizens;
- Apart from a tiny park near the Paljor Stadium, Gangtok does not have a single park for the children to play;
- In the stakeholder consultation also, most of the stakeholders are requested to propose city level recreational places in the city.

7. Infrastructure and Services

7.1 Water supply

The Water Security and Public Health Engineering Department (WS & PHED) administer water supply in Gangtok. The main source of water is perennial glacier fed surface water at Ratey Chu, 17 km away from the city. Natural springs are also one of the major sources of water in Gangtok. Water supply from the Ratey Chu River and natural springs meets the water demand of the city.

7.1.1 Existing Water Supply Situation

The natural slope and gradient of the area is used for water supply distribution. Pumping is required only for water supply in Burtuk-I, Chanmari and Burtuk-II, as they are at a higher altitude. WS & PHED do not provide industrial water supply. Since WS & PHED administers water supply in the entire state, availability of specific information on Gangtok is limited.

a. Transmission and treatment facilities

To divert the stream water to the sedimentation tanks, a retention wall is constructed on the stream, with an iron grating at the way in. Pre-sedimentation is done by three subsequent collection chambers of size 10'X7' approximately. The water is then diverted to the water treatment plant (WTP), which is located at Selep. There are two WTPs at Selep with a total capacity of 29.25 MLD.



b. Distribution system

At present, treated water from the main reservoir at the Selep treatment plant is conveyed to the city through a bunch of gravity feeder mains, which branch to form a primary distribution network consisting of pipes of size ranging from 300 mm to 40 mm feeding a number of zones and sub-zones commanded by separate reservoirs for each zone. Individual service lines to households and other properties take off from the supply tanks. Bunches of as many as 50 to 100 service lines taking off from a single supply tank are a common sight in Gangtok. The service lines, mostly of 15 mm pipes of galvanized iron (GI) or flexible polyvinyl chloride (PVC), are laid above ground and in many areas through roadside storm water drains.





Figure 34: Value chain of Water supply services

Source: WS&PHED, UD&HD, Government of Sikkim

c. Tariff and O&M cost recovery

Water connection charges are collected from the users based on the number of connections per building. The revenue officer from WS & PHED counts the numbers of connections at the time of providing connections. The service charge collected as water charges is based on the number of taps as listed below.

Table 31: Water collection charges in Gangtok

No. of Taps	User Charges		
	Domestic	Commercial	
Up to 4 Taps	Rs. 80	Rs. 160	
4 to 8 Taps	Rs. 130	Rs. 260	
8 to 12 Taps	Rs. 225	Rs. 350	
Volumetric Rate	Rs. 5/kL	Rs. 5/kL	

Source: WS & PHED, Gangtok

The total O&M expenses for the year 2012-13 for WS & PHED for entire Sikkim are Rs. 800 lakhs (approximately). As per the discussion, about 25% of this cost is estimated to be incurred for Gangtok only. Due to frequent landslides and high transportation costs, the expenses on operation and maintenance are very high. The user charges collected do not meet the water supply expenses.

Table 32: Collection of water charges in Gangtok

Collection (Rs. Lakh)	2008-09	2009-10	2010-11	2011-12
Arrears	111.50	105.13	113.20	124.44
Current	200.00	205.00	200.67	199.49
Total Collection	311.50	310.13	313.87	323.93

Source: WS & PHED, Gangtok

d. Service-level indicators

Table 55. Status of water supply in Gangton	Table 33:	Status	of	water	supply	in	Gangtok
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Parameters	Status
Present population	100,286
Floating population	4 lakhs (approximately) per annum
Quantity of water produced	30 MLD
Length of network	250 km (up-gradation is in process)
No. of house connections	10,571 (2012-2013)
No. of public posts	15
Duration of water supply	4 hours per day

Source: IDC Inception Report, Gangtok, 2012

7.1.2 Ongoing Projects

JNNURM funding is received for WTP augmentation up to 42 MLD with a design period till 2040. The project also includes replacement of pipes (from 6" to 14") from collection chambers to WTP" and construction of road in the project area. The total project cost is Rs. 72.66 crore, of which Rs. 42.78 crore has already been received. All the funds are routed through UD&HD. Due to the earthquake in 2010 and frequent landslides; the project completion has been delayed.

Figure 35: Existing water supply pipes affected by the earthquake and subsequent landslide



ADB funds are utilized for increasing water supply network to Burtuk-I, Burtuk-II, and Chanmari. Due to higher altitude than the WTP levels, water pumping is required for better supply in these areas.

7.1.3 Water Supply – Future Demand

The clear water demand has been calculated on the basis of per capita water supply demand (135 LPCD) and average water supply losses. As indicated in the table below, the water supply losses are assumed to decrease from 35% in 2013 to 20% in 2041. Accordingly, the per capita water supply has been determined as 212 LPCD.

Table 34: Water Demand esti	imation
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Indicator/year	2014	2021	2031	2041
Per capita Water Supply Demand	135	135	135	135



Ministry of Urban Development, Government of India

Indicator/year	2014	2021	2031	2041
Water losses (%)	35%	30%	25%	20%
Per capita Water Demand – (LPCD + losses)	182	176	169	162

Source: CRIS analysis

Table 35: Water supply demand projections

Year	Projected City Population	Projected floating population (Tourist & Business)	Total Design Population	Water Demand for City	Water Demand for Army	Total Water Demand
2014	116,270	12,577	128,847	22.5	4.32	26.82
2021	164,182	17,202	181,384	31.74	4.32	36.06
2031	194,289	25,118	219,407	38.40	4.32	42.72
2041	225,396	33,074	258,470	45.23	4.32	49.55

Source: CRIS Analysis

Based on the per capita water supply, clear water demand has been forecasted on basis of the population projections finalized in the demography section. Accordingly, the city would require around 36 MLD of clear water by 2021, 42 MLD by 2031, and 49 MLD by 2041. The water supply demand projection for the design year has been presented in Table 35.

7.1.4 Post-1st Generation CDP Scenario - Critical Analysis

The 1st generation CDP has envisaged an investment Rs. 137 crore covering the following aspects: zonal reservoirs, primary and secondary network, metering of individual houses, and bulk metering.

Indicator Status at the time of 1 st generation CDP		Current scenario	MoUD Guidelines
Coverage of water supply connections	50%	66.5%	100%
Per capita water availability at consumer end - LPCD	90	135	135
Extent of metering	0% 0%		100%
Extent of non-revenue water (NRW)	50%	40-45%	20%
Continuity of water supply	2 to 4 hours	4 hours	24 hours
Adequacy of treatment and quality of water supplied	-	100%	100%
Efficiency in redressal of complaints	-	-	80%
O&M Cost recovery	-	96%	100%

Table 36: Service levels before and post CDP scenario

Indicator	Status at the time of 1 st generation CDP	Current scenario	MoUD Guidelines
Collection efficiency of water charges	-	-	90%

Source: 1st generation CDP, WS & PHED, SIPMIU, and GMC

The Selep waterworks has a present treatment capacity of only 30 MLD. The expansion of treatment facilities to accommodate the entire volume of 42 MLD is in progress, which is the Urban Infrastructure & Governance (UIG) component of JNNURM. The distribution network will be streamlined under the ADB programme. The Tranche-I ADB project covering Burtuk and its surrounding areas and Chandmari block is 60% completed. The Tranche-II ADB project covering the rest of GMC is in progress and is targeted to be completed by June 2015.

7.1.5 Institutional Framework

Till recently, Gangtok was not administered by a municipality, but directly by various departments of the Government of Sikkim, particularly UD&HD and WS & PHED.

WS & PHED is responsible for capital works planning, implementation, management, operation and maintenance of water supply services, and sanitation in the state, including the capital city of Gangtok.

The principal chief engineer cum secretary assisted by the chief engineer head WS & PHED departments. He is supported by circles headed by superintending engineers, divisions headed by executive engineers and subdivisions headed by assistant engineer. Due to lack of autonomy, Government of Sikkim controls the WS&PHED's operation completely. WS & PHED happens to be one of the major departments in the state. WS & PHED are also responsible for planning, creating, and maintaining all rural water supply schemes in Sikkim.

The principal chief engineer cum secretary, assisted by one chief engineer, one special secretary heading the administrative wing, one additional chief engineer, one additional director – accounts, and three superintending engineers, heads the department. The divisional engineer revenue assisted by the assistant director - revenue heads the Gangtok revenue sub-division of PHED.

There are 5 divisions and 9 sub-divisions for executing various project works, which are also responsible for the operation and maintenance of the completed schemes.

7.1.6 Key Issues

- The town has increased not only in terms of population but also in terms of built-up areas. The growth has been causing immense problems in laying of planned water distribution, service pipe grids, water reservoirs, control point, distribution chamber, etc.;
- All the water supply sources are spring or surface water sources, which are very sensitive to pollution and environmental degradation;
- Water supply systems in the city are based on gravity flow. Leakages develop at many points in the pipeline grid, resulting in wastage of water;
- There is a huge amount of unaccounted water, primarily due to distribution losses, pipe leakages, illegal tapping, mechanical damages, etc;
- Lack of capacity and shortage of funds to carry out repair and replacement works, and dependence on the central government for funding most of the capital works are the inadequacies in the present setup;



- The existing water supply system is quite old and suffers from leakages and inadequate carrying capacity;
- The natural slope and gradient of the Gangtok are used for water supply distribution in majority of the areas. Pumping is required for water supply in Burtuk-I, Chanmari, and Burtuk-II, as they are at a higher altitude.
- Water connection charges are collected from the users based on the number of connections per building.
- Disaster management issues The raw water transmission lines are damaged due to frequent landslides.
- Due to frequent landslides and high transportation costs, the expenses on operation and maintenance are very high.

7.2 Sewerage and Sanitation

The detailed assessment of the existing sewerage system includes assessment sewerage generation, sewerage network, treatment facility and the existing institutional arrangement has been presented in the sub-sections below. Further, the section highlights the key is the sewerage and sanitation system.

7.2.1 Existing Sewerage and Sanitation System

a. Generation and collection system

The sewerage system in Gangtok is under WS&PHED. Sewage is collected from various ward areas through a collection system consisting of chambers and sub-mains ranging from 150 mm to 225 mm diameter and mains of 300–600 mm diameter. Sewage is conveyed to the sewage treatment plant (STP) through sewage mains.

b. Network and coverage

Gangtok has an organized sewerage system which caters to only a part of the town, about 45%. The existing system covers the areas of New Market, Old Market, Tibet Road, Development area, GICI area, Diesel Power House area, Arithang area, Church Road area, and parts of Sichey area.

The sewer network was implemented during the early '80s. Initially, it consisted of main trunk sewer lines and few sub-mains feeding the high rate trickling filter type STP at Adampool having a capacity of 1.26 MGD. Subsequently, it has been augmented.

The sewerage network divides Gangtok into 4 zones for sewerage collection. The sewerage network in Zone-1 is the oldest sewerage network in the entire state and is functional since 1980. The sewerage networks in zone 2, 3, and 4 are under construction. A separate STP is being constructed for all zones, equipped with the latest treatment technologies (FAB¹⁸ type). The details of the STPs for each zones is given below.

Table 37: Zone-wise STP details

Zone	STP Type	Capacity	Status
Zone- I	FAB	8 MLD	Functional

¹⁸ Fluidised Aerobic Bio

Ministry of Urban Development, Government of India

Zone	STP Type	Capacity	Status
	FAB	4.69 MLD	Up-gradation of old system
Zone-II	CET (tentatively)	1.97 MLD	Proposed
Zone-III	-	-	DPR under preparation
Zone-IV	-	3.69 MLD	Under construction

Source: Sewerage Department, WS&PHED, Gangtok

c. Treatment

Generation

The existing STP, based on the trickling filter principle and of 5 MLD capacity, was constructed some 25 years back. Another plant of 8 MLD capacity, based on the FAB technology, is being built adjacent to the old plant. The construction is nearing completion, and the plant is expected to be commissioned soon. The system is operated and maintained by WS&PHED. The wastewater from non-sewered areas is either directly or through household septic tanks discharged into the nearest stream or *jhoras*. Surveys carried out in 2005 under the an Australia aided study suggest that much of the 150 mm sewers are choked due to inadequate maintenance as also guite a few stretches of trunk sewers, which are cracked and badly damaged, needing rehabilitation/replacement.

d. Operation and maintenance

Individual septic tanks are not covered under WS & PHED and hence, the exact numbers of septic tanks is not available with the department. The sewerage from individual septic tanks is discharged in the natural springs, 'jhoras'. The entire city drains in the Roro Chu and Ranikhola rivers, which divides the natural drainage into two parts, the eastern and western parts. The community toilets are under by UD&HD. The monthly charges for connecting the individual households to the government chambers are collected based on the number of water closets (W/C). Prior approval is required from UD&HD for such connections. Community toilets are developed by UD&HD. JNNURM funds are used for the renovation of pipe replacement in zone-1.



Figure 36: Value chain of Gangtok Sewerage system



Network

Details	Charges
1 st W/C	Rs. 35 per month
For each additional W/C	Rs. 30 per month
Initial connection charges (including the cost of form)	Rs. 510 per household per connection

8 MLD under constructiuon

Treatment

Source: Sewerage Department, PHED, Gangtok

Chu

Disposal/Reuse

and



Table 39: Status of sewerage system in Gangtok

Parameters	Status
No. of Sewer zones	4
Total no. of sewerage connections	3,256
Total No. of Community Toilets	12

Source: Sewerage Department, PHED, Gangtok

Table 40: Service level indicators of Sewerage

SI.No.	Indicator	Status at the time of preparation of 1 st generation CDP	Post CDP scenario	MoUD Benchmark
1	Coverage of toilets	-	-	100%
2	Coverage of sewerage network services	40%	90%	100%
3	Collection efficiency of sewerage network	40%	90%	100%
4	Adequacy of sewerage treatment capacity	-	-	100%
5	Quality of sewerage treatment	-	-	100%
6	Extent of reuse and recycling of sewerage	-	-	20%
7	Extent of cost recovery in sewerage management	-	-	100%
8	Efficiency in redressal of customer complaints	-	-	80%
9	Efficiency in collection of sewerage related charges	-	-	90%

Source: Gangtok CDP (2006), SLB Handbook, CRIS analysis

7.2.2 Future Sewage Generation

The sewage generation has been calculated with an assumption that 80% of the water supplied for consumption. Accordingly, the sewage generation has been projected as 133 MLD for 2021, 164 MLD for 2031, and 202 MLD by 2041. The sewage generation projected for various horizon years has been presented in the table below.

Table 41:	Sewerage -	- Future	generation
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Year	Sewage generation in MLD
2021	25.4
2031	30.7
2041	36.2

Source: CRIS analysis

The present treatment capacity of the plant at Adampool is 8 MLD only, although the liquid waste generation is to the tune of 13 MLD. The sewer network and treatment capacity is being augmented under the National River Conservation Directorate (NRCD) programme.

Augmentation projects:

- JNNURM funding is being used for the up-gradation of the existing sewerage pipes in Zone-I. The total project cost is approximately Rs. 23 crore. The project also includes the construction of a new FAB type STP of capacity 4.69 MLD;
- Construction of STPs in Zone-II and Zone-IV is also in process. In Zone-IV, 40-50% of the work has already been completed, whereas for Zone-II, the project has been sanctioned. The project is funded under the National River Conservation Directorate under MoEF. The total cost of the project is Rs. 66.78 crore and Rs. 79.2 crore for Zone-II and Zone-IV, respectively; and
- Construction of the STP in Zone-III is proposed to be funded by ADB. The preparation of DPR is in process.

7.2.3 Institutional Framework

WS&PHED is responsible for providing sewerage services in Gangtok. The details of organization structure have been discussed in the earlier part of the report.

7.2.4 Key Issues

- Certain areas lack sanitary systems, use of conventional methods such as septic and soak pits, or directly disposing waste into nearby drains;
- A large number of developing areas are still to be covered by the sewerage system, namely, Upper Sichey, Development Area, Tashi Namgyal Academy (TNA) area, Burtuk, some parts of Tadong, and Lower Tadong area;
- About 55% of the population does not have safe sanitation facilities, which results in health hazard in the city;
- The existing sewerage system in some parts of the town has become obsolete and is not functioning.

7.3 Solid Waste Management (SWM)

The detailed assessment of the existing SWM systems includes waste generation, collection, transportation and treatment facility and the existing institutional arrangement has been presented in the sub-sections below. Further, the section highlights the key is the SWM sector.

7.3.1 Existing SWM System

a. Generation

As per the studies conducted in November 2010, the per capita waste generation is 390 grams. This includes all types of wastes such as domestic waste, commercial waste, construction and demolition waste, market waste, and street sweepings. It is estimated that the waste generation per day in Gangtok and adjoining areas is approximately 39 tons per day (estimated based on Census 2011 population).



b. Types of Waste

The segregation of at-source solid waste is also not practiced. Segregation of recyclable waste is done inside the vehicle, and the roadside vendors unload them on way to the dumping ground. The restriction on use of plastics in the city has however helped to reduce the environmental hazards.







The samples collected during the study were analyzed to arrive at bulk density and segregated into constituents for physical composition and were recorded. Components of all the waste sample were segregated in various categories like Food/fruit, Leaves/hay/straw, Paper/cardboard/packaging, Rubber/leather, Plastic/polythene, Textile, wood, Glass and crockery, Tin cans, Stone/brick, Coal ash/fine earth/dust and metals.

c. Street sweeping

GMC undertakes both street sweeping and jhora desilting activities. Thirty-six sweepers have been engaged for various areas, viz., VIP colony, zero point Nehru park, Baluwakhani, development area, hospital point, Share Punjab flyover, and others. Due to disposal in jhoras, frequent desilting of drains becomes necessary and are carried out by six persons.

One of the major activities of solid waste management is street sweeping, which is time consuming and labour intensive. GMC has 99 persons for SWM, 80 are Safaikarmacharis, 15 are Garbage Vehicle drivers, 4 Supervisors with 28 permanent workers and rest are on Master Roll basis.

d. Collection and transportation

Door-to-door solid waste collection is undertaken with the help of community participation. The collection is outsourced to local co-operative societies and groups. At present, 12 groups are involved in door-to-door garbage collection on regular basis. The solid waste collected is then transported to the dumping grounds using the vehicles provided by GMC. At present, there are 17 vehicles, of which 2 are non-functional. About 6-7 vehicles are rented to private groups for solid waste collection. The back packers manually up to the road where the pick-up vans will collect the waste do collection of waste from the inaccessible areas. The pick-up vans are specially designed covered waste collection vehicles that transport 500 to 600 kg of waste.

e. Processing and disposal system

The solid waste dumping ground at Martam is about 20 km from the city and adjacent to NH - 31A in unscientific way. It has a hilly terrain/topography and the terrain gradually slopes from the northwest to southeast, wherein Ranikhola River a tributary to Theesta River exists. The present waste disposal does not conform to the prevalent rules and positive threat to the pollution of River Ranikhola from the

leachate as also through surface run off during monsoon. The present practice of manual handling is also a health hazard to the workers.



Figure 38: Value chain of Gangtok Solid Waste Management

f. Landfill or dumping site

GMC had a 4.2 hectare landfill site with 50 TPD compost plant situated about 20 km from Gangtok. Currently, the solid waste treatment plant is non-functional. Solid waste is also disposed in the jhoras.

g. User fee and O&M cost recovery

The total garbage collection fee from the residents goes to the co-operative society and groups. For the commercial solid waste collection (as most of the buildings are of mixed use), garbage fees are collected during the commercial license renewal annually.

SI.No.	Indicator	Status at the time of preparation of 1 st generation CDP	Post CDP scenario	MoUD Benchmark
1	Household level coverage of solid waste management services	-	60%	100%
2	Efficiency of collection of municipal solid waste	40%	80%-90%	100%
3	Extent of segregation of municipal solid waste	0%	0%	100%
4	Extent of municipal solid waste recovered	0%	0%	80%
5	Extent of scientific disposal of municipal solid waste	0%	0%	100%
6	Efficiency in redressal of customer complaints	-	-	80%
7	Extent of cost recovery in SWM services			100%
8	Efficiency in collection of SWM charges			90%

Table 42: Service level indicators of Solid Waste Management



Area	Manpower		Coverage Collection		Payment to GMC	
	Garbage Collector	Bill Collector	-	efficiency		
Pani House, Deorali	5	1	267 HH	100%	Rs. 2000 per month For truck including driver and fuel	
Lower & upper Sichey	8	3	-	80%	Rs. 5000 per month For 1 truck with driver. Fuel cost & maintenance cost borne by the society	
Tadong	8	2	825 HH	70-80 %	Rs. 1000 per month. For 1 truck with driver. Fuel cost & maintenance cost borne by the CBO	
Burtuk	5	-	620 HH 50 non- residential	97%	Rs. 1000 per month. For 1 truck with driver. Fuel cost & maintenance cost borne by the CBO	
Ranipool	2	2	-	60%	-	
Deorali	2	1	300 HH	80-100%	Rs. 2000 per month For truck including driver and fuel	
Chandmari	4	3	890 HH	60%	Rs. 3000 For truck with driver charge. Fuel cost & maintenance cost borne by the CBO	
Lower MG Marg	15	3	725 HH	90%	Rs. 8000 For truck for 1 & driver charge.	
Daragaon	6	1	400 HH	90%	-	
Arithang	7	5	2623 HH 44 Hotels 157 Shops	80%	Rs. 5000 per month. Against monthly instalment payment for vehicles	

Table 43: Status of SWM in Gangtok

Source: GMC, Gangtok

7.3.2 Future solid waste generation

The waste projections are carried out by considering a daily per capita waste generation of 390 (2012) grams, as given below.

Table 44: Projected waste generation in Gangtok Municipal Area

SI.No.	Year	Projected Population	Waste	Generation Waste (Tons/Day)
1	2021	181,385	386	63

SI.No.	Year	Projected Population	Waste	Generation Waste (Tons/Day)
2	2031	219,407	394	76
3	2041	258,471	400	90

Source: CRIS Analysis

7.3.3 Post-1st Generation CDP Scenario - Critical Analysis

The Government of Sikkim is amongst the first state of the country to successfully enforce a total ban on the use of polythene bags. The state has also (i) passed the Non-biodegradable Garbage (Control) Rules in 1997 to minimize the generation of such waste as also its indiscriminate dumping on roads and streets and in jhoras and (ii) installed a compost plant at Martam to dispose the biodegradable waste, thus reducing the waste generation for disposal.

7.3.4 Institutional Framework

The Solid waste management is partially transferred under GMC. GMC is responsible for solid waste collection and collection of user charges only, whereas the dumping ground and the treatment plant are still under UD&HD.

7.3.5 Key Issues

- Collection of waste from interior areas are initiated in few areas (about 16 % only by local NGOs viz., The Golden Circle, United Arithang, Watsan Committee covering 4000 households is highly appreciable and needs to be extended to all other areas);
- High precedence of garbage admissible into Jhoras;
- Absence of waste segregation at source;
- Inadequate number of vehicles and equipment for efficient collection and transportation;
- Inadequate manpower to collect and dispose the waste;
- Waste is collected and loaded on to small vehicles and trucks manually and is not covered during transportation;
- No safety or protective equipment being used by workers while handling the waste manually;
- Waste being dumped without treatment in unscientific manner;
- Non-availability of scientifically designed landfill;
- Waste due to winds often finds its way into the stream flowing adjoining the dumping area posing threat to the health and environment;
- Unhygienic disposal of waste in open dumping areas posing threat to public health; and
- Compost plant is available but non-functional last few months.

7.4 Storm Water Drainage

7.4.1 Existing Drainage System

At present, the densely populated urbanized area of Gangtok does not have a combined drainage system to drain out storm water and wastewater from the buildings.



7.4.2 Post-1st Generation CDP Scenario – Critical Analysis

A detailed design of the storm water drainage system for Gangtok has been prepared by WAPCOS. The report discusses the existing storm water drainage system of the city and suggested measures such as surface drains, Jhora training works, slope protection measures, and an institutional arrangement for operation and maintenance.

The 1st generation CDP estimated around Rs. 100 crore for up-gradation of storm water drains in the city. The proposed projects mainly focus on scaling and restoration of 47.33 km of jhoras and already cemented jhoras needs to be cleaned & upgraded and the un-cemented jhoras needs to be cemented.

However, no project has been taken up under JNNURM in the storm water drainage component.

7.4.3 Key Issues

Household drains and storm water drains are inadequate. During heavy downpour, the roads turn into rivers where water from the storm drains flood onto the roads.

With the increasing pace of urbanization, more and more built-up, paved areas are coming up, and therefore, the runoff volume is increasing. With the construction of the new roadside and city drainage network, the peak runoff in the jhoras is increasing and is likely to continue in future. It is worth mentioning that the same drainage system needs to carry the wastewater from the household also. Volume of wastewater is also increasing with the increase in population density. Further, the telephone cables and water supply lines running in the jhoras cause the clogging of jhoras and cause overflowing and infiltration of storm water in subsoil, triggering landslides.

The existing system is inadequate and gives rise to the following problems:

- Erosion of natural streams;
- Slope failure and creep, causing damage to the existing structures;
- Road damages; and
- Health hazards.

8. Traffic and Transportation System

This section presents the assessment of the existing traffic and transportation in the city. Further, the section provides the key observations, key issues, and the institutional responsibility for delivery of the services.

8.1 Existing Road Infrastructure

8.1.1 Road Network System

Gangtok is a linear city that has developed along the arterial roads, especially NH-10 (NH-31A). The length of the city is about 25 km. The city is connected mainly by road with rest of the regions. NH-10 (NH-31A) is the major connector of Gangtok to Siliguri, Darjeeling, and Kalimpong. North Sikkim Highway, Indira bypass, NH-10 (NH-31A) and JN Road act as the major regional roads converging at or passing through the city. Apart from these, the other major city roads are Tibet Road, MG Marg, Kazi Road, Paljor Stadium Road, Indira bypass, and Namnang Road, that connects to the national highway.

Among the roads NH-10 (NH-31A) North Sikkim Highway, and Jawaharlal Nehru Road are trade route links between China and India.

Gangtok is also the main tourism hub of Sikkim. Since the work centres, commercial centres, recreational centres, and transport terminals are the major traffic generating nodes. A large amount of traffic is generated by to and fro traffic to these work centres. Significant seasonal traffic is generated during the peak tourist seasons. Gangtok is well connected by roads, however, in a few areas the roads are in a bad condition.

8.1.2 Road Hierarchy

Gangtok's road network clearly lacks road hierarchy, which is essential for the smooth functioning of the road-based transportation system. All the roads, whether major or minor, allow direct access to abutting properties irrespective of the nature of traffic they carry. Further, this results in slowing down of traffic and disruptions due to parking and pedestrian related conflicts with the traffic.

The major classification of roads is national highway (NH), state highway (SH), major road, and other roads. The total length of the road network is close to 90 km. Of this, NHs constitute about 21%, SHs constitute about 25%, and major roads and other roads together constitute about 54%.

Indicator	Length (km)	% of total roads
National Highway (NH 31A)	18.24	21%
State Highway	21.78	25%
Major Roads	32.10	36%
Other Roads	16.10	18%
Total length of the Roads	88.22	100%

Table 45: Distribution of road network in Gangtok



Source: Gangtok CMP, 2010

Most of the roads in Gangtok have two-lane undivided carriageways with footpath on one side and drain on the other. About 75% of the primary road network has a carriageway ranging from 6 to 8 m. Another 25% of the road length has a carriageway ranging from 8 to 10 m. The only road with divided carriageway in the city is MG Marg, which is the major commercial centre of the city. The Gangtok CMP (2010) reveals that the average travel speed in Gangtok is from 11 kmph to 27 kmph.





Source: Gangtok Structure Plan, 2009

The existing roads of Gangtok are essentially narrow to accommodate the high volume of traffic, and the road geometry inappropriate.

8.1.3 Important Junctions

A junction, when discussed in the context of transport, is a location where traffic can change between different routes, directions, or sometimes modes of travel. The efficiency of the road network is highly dependent on the performance of traffic intersections and bottlenecks. The intersections that are over

the capacity with higher degree of saturation will result in higher junction delays, traffic jams and chaos. Road congestion in Gangtok is on the rise, and at least nine junctions have recorded very high levels of congestion.

Major Junctions in Gangtok:

- Metro-MG Marg
- Hospital Junction
- Community Hall
- Lal Bazaar
- Deorali
- Tadong
- Sikkim Government College Entrance
- MP Golai
- Zero Point Junction

At present, the RTO and Gangtok Traffic Police are regulating the traffic in Gangtok city. The enforcement of all traffic rules is as per the National Motor Vehicle Act, 1988. There are no signalized junctions in the city, and the traffic is managed manually.

8.1.4 Bridges, Flyovers, and Interchanges

Gangtok has a number of bridges built over numerous mountain streams cutting the city. These bridges form the lifeline of the city. Most of these bridges are bailey bridges¹⁹, which needs to be converted into reinforced cement concrete (RCC) bridges. The RCC Bridge over the Ranikhola River is the most important connector between Ranipool and Gangtok. This bridge is one of the major links for freight movement into the city. This bridge is in a very poor state and requires immediate repairs. There is no flyover in the city.

Gangtok has two bus terminals serving both interstate as well as intra-state buses at PS road and Police headquarters. These consist of 7 bus bays. Another 7 are expected to come up in the second phase of construction. The local taxi and private vehicle owners are presently using these terminals also. The bus terminals act as major interchanges in the city.

8.1.5 Non-Motorised Transport facilities

Significant portions of the trips (43%) in Gangtok are made completely by walk. In the city, footpaths are constructed along the NH-10 (NH-31A) only, and foot over bridges have been constructed at only a few junctions. The width of the footpath is 1.2 m, inclusive of the railing, and appears inadequate given the high pedestrian volume.

Only 20%²⁰ of the city's roads have footpaths (one side). Maximum length of footpath is available on NH-10 (NH-31A) from PS Road to Gurudwara (2.1 km) in at a stretch. The width of the footpath is 1.2 m inclusive of the railing and appears inadequate given the high pedestrian volume. According to the report of Wilber Smith (2008)²¹, Gangtok



¹⁹ The Bailey bridge is a type of portable, pre-fabricated, truss bridge

²⁰ CMP,2010, Gangtok

²¹ Study on Traffic & Transportation Policies and Strategies in Urban Areas in India



was given a ranking of 1.1 on a scale of 5, meaning that pedestrian facilities are quite inadequate.

Footpaths are present on all the major roads, but their width is not adequate to carry the present load of pedestrians. There are 3 foot over bridges at Arithang Junction near Lal Market, Hospital Junction, and MG Bazar Road Junction. These are highly inadequate keeping in view the heavy vehicular flow in the internal roads.

8.1.6 Issues and Key Challenges

- Most of these areas have poor approach and internal roads are located on steep slopes, do not have proper footpaths;
- Inadequate road infrastructure in the city (narrow carriageways, junctions, signage and traffic management, etc.);
- Road safety in terms of drainage and landslide issues needs to be addressed holistically for all the areas;
- Typical terrain and network conditions are the constraints for expanding the road widths and further the road conditions restricting the capacity of lanes.

8.2 Existing Traffic and Transportation System

DDF Consultants Pvt. Ltd. (DDFCPL) prepared the CMP for Gangtok in 2010 under of JNNURM programme fund. As a part of the CMP study, the consultants to identify road network, traffic, and travel characteristics conducted various traffic and transport surveys. These surveys including the network inventory, speed and delay, traffic volume counts, origin-destination and pedestrian counts in the major roads of the city.

8.2.1 Traffic Volume

It is seen that about 10,000 vehicles enter or leave Gangtok Municipal Area on a typical working day. The traffic at different locations varies from 670 PCUs (563 vehicles) at Assam Lingsay Road to 4485 PCUs (3747 vehicles) at Ranipool throughout a normal fair weather working day. The table given below shows the traffic volume counts both in terms of numbers of vehicles and passenger car units (PCUs) computed for the total daily (16 hour) traffic at various outer cordon locations²².

The traffic volume data recorded at various locations bring to light that out of 10 locations, 6 locations experience a gush of more than 10,000 PCUs during the day.

SI.No.	Location	Traffic	PCUs
1	Ranipool	3747	4485
2	Assam Lingsay	563	670
3	Setipool	905	1084
4	Tashi View Point	1457	1756
5	Rumtek	1200	1257
6	3rd Mile	712	1025

Table 46: Traffic volumes on outer cordon points

²² Gangtok CMP,2010

SI.No.	Location	Traffic	PCUs
7	Rumtek-Sang	660	686

Source: Gangtok CMP, 2010

The morning peak hour volume varies from 68.5 PCUs (60 vehicles) at Assam Lingsay road to 520 PCUs (462 vehicles) at Ranipool. The evening peak hour volume varies from 65 PCUs (71 vehicles) at Rumtek Sang Road to 368.5 PCUs (324 vehicles) at Ranipool. The peak hour factor is observed to be 6.7% to 14.3% at various locations. At most places, the peak hour factor is 9% to 11%.

The daily traffic composition at outer cordon locations exhibits predominance of fast moving passenger traffic varying from 77% to 94%. The share of slow moving vehicles varies from 6% to 23% with the average of about 13%. The share of bus traffic is as low as 1% at Rumtek road, 3rd Mile, and Rumtek Sang road and as high as 3% at Tashi View point road with an average of about 1%.

Traffic Volume at Junctions

The traffic volume counts both in terms of numbers of vehicles and PCUs computed for the total daily (16 hour) traffic at various intersection locations in Gangtok Municipal Area, are presented in **Figure 40**. It is observed that the traffic at different locations varies from 13227 PCUs (12366 vehicles) at 2nd Mile Ganesh Tok Intersection to 19769 PCUs (19759 vehicles) at Lal Market Intersection throughout a normal fair weather working day. Other locations that exhibit high traffic volumes (more than 15,000 PCUs) are Amdo Golai (Indira Bypass) Intersection, and Lal Market Intersection.



Figure 40: Traffic volumes at important junctions

Source: CMP, Gangtok, 2009

Travel Pattern

As shown in **Table 47**, the major originating and attracting zones accounting for more than 55% of vehicular trips. Lowe MG road is major traffic attraction zone in the city

SI.No.	Major Originating Zone	% share in total trips	Major Destination Zone	% share in total trips
1	Lower MG Marg	17.7	Chandmari	9.9
2	Lower Sichey	8.7	Deorali	8.8
3	Ranipool	8.2	Lower MG Marg	12.9



Source: CMP, Gangtok, 2009

Travel Purpose

Out of the total vehicular trips intercepted at the selected locations in and around the city (CMP, 2010), about 38% of the trips are made for work, 15% for education, 17% for shopping, and the remaining 30% for other purposes. Of the total goods vehicle intercepted at Gangtok city limits, approximately 66% of LCVs/tempos and 75% of two- and three-axle trucks have both the origin and destination within Gangtok city. The goods traffic desire patterns reveal that 63% of the trips are to Gangtok.

8.2.2 Registered Vehicles and Growth

The annual growth rate of registered motor vehicles in Sikkim was in the region of 11% to 13.6% during 1998-99 to 2004-05, with the annual growth rate of taxis and cars in the region of 33-46%, particularly in 2002-2005. The growth rate of vehicles between 2003 and 2010 averaged to 12% per annum with a total of 90% increase in the number of registered vehicles in 2010 as compared to 2005.

As far as the profile of vehicles is concerned, there is a substantial increase in the purchase of fourwheelers and even amongst the four wheelers, the trend of purchase of vehicles that fall in the category of sport utility vehicles and multi-utility vehicles is on the rise.





Source: Road Transport Year Book, 2011, Ministry of Road Transport & Highways, GOI



Figure 42: Details of registered vehicles in Sikkim (2007-009)

Source: Road Transport Year Book, 2011, Ministry of Road Transport & Highways, Gol

The figure shows that the total number of registered cars and taxis in Sikkim is increasing every year. Cars/jeeps account for the maximum share of vehicles and account for 36% of the total vehicle strength in the state. 25% of the total vehicles are taxis, which is on the higher side due to tourism activities. Buses account for a very minor proportion (less than 1%) of the total vehicles.

The annual growth rate of registered motor vehicles in Sikkim was 11% to 13.6% during 1998-99 to 2004-05. In the last three years, the annual growth rate of taxis and cars has been observed to be very high, to the tune of 33-46%. This has direct relevance to the road

Gangtok has comprehensive mobility plan (CMP) prepared in 2010 under of JNNURM programme fund.

congestion, as the road width has remained the same. Around 45% of the total registered vehicles were in the car/van category, i.e., personalized vehicles, while 26% were in the taxi or passenger car category. The reason can be attributed to absence of alternative transport mode.

8.2.3 Modes of Transport

From the Gangtok CMP, it's found that walk trips are at any time more than motorized trips, i.e., 42.57%. The next bigger share of mode trips is occupied by taxis (36.2%) operating in the absence of an organized public and intermediate public transport system. The private vehicular trips take up the share of 20%. Cars (17.51%) and two-wheelers (2.36%) share this. Bus mode trips are scanty (0.77%), shared by city buses (0.71%)



and school buses (0.06%). Trips by trucks are the least (10.47%), especially for goods both civil and defence purpose. Tourists for sightseeing and shopping generate the 50% of the trips of private taxis.



Taxis are the most widely available local transport in Gangtok. The core city residents use twowheelers and cars for daily conveyance. The combined share of private vehicles and taxis is 98%²³ of city total vehicles. Strong tourism and commercial activities in the city has caused an exponential growth in vehicle population in Gangtok.

City Bus Services (Public Transport)

Public transport (city bus service) has a share of less than 1%. Sikkim Nationalized Transport (SNT) provides public transport service in the state. In Gangtok, 5 buses catering to city bus service by the name of Red Panda City Runner (RPCR). The RPCR runs on 5 routes with 1 bus on each route, a frequency of 1 hour and 4 round trips between 7 am and 6 pm. The city buses run with an average fuel efficiency of 4.08 kmpl, and Rs. 1.20 as the average fare per km. As per Gangtok CMP, 2010, the bus occupancy ratio varies from 13.5 to 28 and averages out at 20.7

The city has sanctioned 25 mini buses under the bus-funding scheme of JNNURM. All these buses have been already procured by the state government and are in operational.

Non-motorized Transport

The share of slow moving vehicles is absolutely nil as such type of terrains reduces the usage of cycles and cycle rickshaws due to extra human effort required in its operation. The pedestrian traffic volume is high mainly on MG Road, Indira Bypass, and Deorali Bazar Road. This high volume of pedestrian traffic is due to commercial activities in these areas.

Intercity Transport

SNT operates buses on routes from Gangtok to Siliguri, Mangan, Jortang, and Rangli. There are two bus terminals in the city at PS Road and Police Head Quarters, which serve both interstate as well as intrastate buses.

Freight Transport

The share of goods traffic varies from 1.4% to 5.7%, and the average is about 3.7%. There are no designated terminal facilities (transfer station) for goods. The freight transport services are provided both by SNT and private operators in the city.



8.2.4 Ropeway



In Gangtok, ropeways are used for three destinations. The total span covered by ropeways is 1800 m. The cable car connects lower Gangtok suburbs with Sikkim Legislative Assembly in central Gangtok and the upper suburbs. Due to higher costs, ropeways are not popular with local commuters; however, tourists mostly use these ropeways as an additional attraction to see the beauty of the city and for an aerial view of the whole city from the cable car.

²³ Gangtok CMP, 2010

The cable car services were introduced by the Urban Development & Housing Department (UD&HD) under the initiative of State Government. Other than ferrying tourists, the motive was to use this service as a mode of transportation by locals whose office is at the Secretariat and Assembly House. This in a way has proved helpful to the office goers, especially during peak traffic hours.

It's a double-cable zig back ropeway which is operational since December 2003. Each cable car can carry up to 24 passengers. There are three stations in this 1.8 km long ride. The lowest station is at Deorali near Institute of Tibetology. From the road a stairway leads up to the ticket counter. The Gangtok Ropeway Services are designed, constructed and operated by the Damodar Ropeways & Construction Company Private Limited. With 25 working staffs, the Gangtok Ropeway provides non-stop services from 9:30 in the morning till 5:30 in the evening.

8.2.5 Parking

At present there are two multi-level parking spaces constructed at the main taxi stands and market areas by UD&HD and maintained by GMC. The parking fee/charge is being collected by GMC, through agencies appointed for parking fee collection. The parking charges are nominal (Rs. 10 each entry) at all the parking areas.



8.2.6 Traffic Safety and enforcement

The Regional Transport Office (RTO) and Gangtok city traffic police regulate the traffic in the city. The enforcement of all traffic rules is as per the National Motor Vehicle Act, 1988. There are no signalized junctions in the city, and the traffic is managed manually. For pedestrians, guarded footpath only exists along the national highway and no footpaths have been provided for remaining roads. There are 3 foot over bridges at Arithang Junction (near Lal Market), Hospital Junction, and MG Bazar Road Junction.

8.2.7 Issues and Key Challenges

- The road network is limited in its capacity to carry traffic and potential for improvement or capacity expansion. This along with the rapid increase in private vehicle ownership has resulted in extreme levels of congestion during peak hours and safety issues;
- There are no organised facilities available for intercity travel in terms of bus or taxi terminals, thereby causing inconvenience to tourists and other city travellers;
- There are no organised facilities available for commercial goods traffic, though a truck terminal is under construction. Goods vehicles mix with passenger traffic, resulting in safety and congestion problems.

8.3 **Review of Institutional Systems and Investments**

8.3.1 Institutional and Financial Situation

The road and transportation system in Gangtok is administered and maintained by Department of Road & Bridges and National Highways Authority of India (NHAI). The Border Roads Organisation maintains few of the roads connecting Gangtok with the peripheral areas.



The institutional framework for Gangtok is at two levels. UD&HD has the administrative and legal jurisdiction along with the responsibility to develop the city infrastructure and provision of services to its citizens. At the other levels, the other government agencies PHED and PWD, Power, and Transport have an independent charge of the operations relating to their agencies. PWD is responsible for the construction and management of roads and buildings.

8.3.2 Key Issues

CRIS has identified the important issues in traffic and transportation in Gangtok based on field visits and review of Gangtok CMP and 1st generation CDP. The details of traffic and transportation issues are given in **Table 48**.

SI.No.	Issue	Remarks
1	Land Development	Widening of the roads is almost impossible in the city due to the existence of steep slopes, vulnerability to landslides, and large forest cover. Hence, the city is not serving the growing traffic and transport infrastructure demands.
2	High-Density Core Area	Due to high-density commercial development of the core city area, there is high traffic movement within the core area creating the huge congestion. On-street parking is also playing the key role in high-end congestion in the city.
3	Road Network	Most of the roads in the city have two-lane undivided carriageways. The steep gradient of different road stretches coupled with multiple corners turns act as a constraint for the smooth flow of vehicular as well as pedestrian traffic. Typical terrain and network conditions are the constraints for expanding the road widths and further the road conditions restricting the capacity of lanes. The steep slopes and curves further limit the road capacity and safety.
4	Public Transport	The public transport share in the city is less than 1%. The city is moving on shared jeeps (taxi) and which is cover more than 30% of city trips. Due to a weak public transport system, the private vehicles' movement is high that creating huge traffic congestion.
5	Pedestrian traffic	As mentioned in the earlier part of the report, walk trips are high in the city. This high volume of pedestrian traffic in the core city area is due to the commercial activities. Footpaths are present on all the major roads, but their width is not adequate to carry the present load of pedestrians. The roadside pedestrian walks are leading to slow movement of vehicles, further creating congestion in peak hours.
6	On-street parking	The typical vehicle parking characteristic in the city is on-street parking, which is occupying one complete lane of the road. Due to this, the actual width of the carriageway is not in use, leading to congestion.
7	Freight Traffic	There are no traffic restrictions on freight traffic in day time. This is also one of the reasons for congestion and slow traffic movement in peak hours.

Table 48: Traffic and transportation issues in Gangtok city

8.4 **Post-1st Generation CDP Scenario - Critical Analysis**

8.4.1 1st Generation CDP

Shristi Urban Infrastructure Development Ltd. prepared the 1st generation CDP for Gangtok in 2006. The CDP proposed projects to improve the traffic and transportation conditions in the city. The details of projects and estimated cost are presented in Table 49

SI.No.	Project Category	Estimated Cost (Rs. Crore)
1	Parking Bays	15.00
2	Multi-storeyed Car Parking	75.00
3	Shopping Malls	120.00
4	Taxi Stands	10.00
5	Improvement of Junctions	60.00
6	Laying of Arterial Road	11.00
7	Construction & Development of Bus/Truck Terminals	40.00
8	Foot over Bridges	12.00
9	Street Lighting	25.00
	Total	368.00

Table 49: Transport projects proposed in CDP, 2006

Apart from the above, the CDP also suggested a mass transport system (light rail transit system) with an estimated cost of Rs. 1,000 crore. The CDP has mentioned about ropeways but not provided the estimated cost for the same.

As part of stakeholders participation in CDP preparation, the consultants were conducted a workshop with stakeholders at Gangtok in November 2006. The stakeholders in the traffic and transportation area pointed out a number of issues, and the same are presented here:

- Low operating speeds
- Congestion in the city
- Inadequate parking space
- Improper traffic management
- Poor public transportation system
- Lack of pedestrian facilities
- Inadequate road capacities

8.4.2 Post-1st Generation CDP Status Review

As mentioned earlier, the 1st generation CDP proposed traffic and transportation projects with an estimated cost of Rs. 368 crore. However, no projects have been sanctioned under the JNNURM programme from these projects during the last 9 years. However, under city bus funding, 25 buses were sanctioned to Gangtok (discussed in chapter 1).



9. Housing and Urban Poverty

The section provides a detailed over view of the existing housing scenario in the city in terms of present housing stock, quality of housing and housing requirement for future projected population. The Urban poverty section explains the demographics, social profile and the status of coverage of key infrastructure services in the urban poor area of the city. Also, the status of the projects related to urban poor has been discussed.

9.1 Housing Scenario

9.1.1 Housing Stock

The households of Gangtok Municipal Corporation (2011) are 23,773 and the average household size as is 4.2. The housing stock in the city has calculated as part of slum free city plan for action, 2012 and that reveals the absolute shortage was nil in GMC area. The number of household in the city is 23,773 and the number of census houses under residential and residential – cum –other use is 23,910. The table below shows the housing situation in GMC.



Census Year	sus Year Population Number of households		Number of census houses	Average household size
1991	25,024 (Town)	7,103	7,682	3.52
2001	29,354 (Town)	9,655	10,386	3.04

Ministry of Urban Development, Government of India

23,910

2011

Census Year	ar Population Number of household		Number of census houses	Average household size	
2011	100,286 (GMC)	23,773	23,910	4.22	

Source: Census of India, UD & HD, Govt. of Sikkim, Slum free city plan of action for Gangtok, 2012

There has been a considerable increase in number of census houses in past decade. There has been an increase in the permanent houses in Gangtok, with 85% of houses being permanent structures as per census 2001. With the increase in permanent structures over the decades (from 62% in 1981 to 85% in 2001), the city has also seen a corresponding decline in semi-permanent houses. The percentage of temporary houses has not changed much over the decades.

10,386

2001



Figure 43: Housing stock in Gangtok

9.1.2 Quality of Housing Stock

7,682

1991

	Total			Temporary			
Year	Number of Houses	Permanent	Semi- Permanent	Total	Serviceable Kutcha	Non Serviceable Kutcha	
1981	4654	2895	1635	124	83	41	
1991	6926	4917	1801	208	139	69	
2001	9442	8031	1209	202	135	67	

Table 51: Distribution of houses according to type of structure

Source:

15,000

10,000

5.000

0



Figure 44: Housing structure in Gangtok



Source:

The quality of housing stock available from the year 1981 to 2001 has been analysed. As per census It has been observed about 83% of the houses are permanent structure.

Year	Total Number of Households	No. Of HHs With Electricity	In %	No. of HHs with Toilet Facility	In %	HHs with Tap Connection	In %
1981	5030	3754	74.6	2924	58.1	3852	76.58
1991	7103	5432	76.5	4088	57.6	6401	90.12
2001	9655	9475	98.1	9405	97.4	9394	97.30
2011	23938	23736	99.1	23075	96.4	22260	93.00

Table 52: Housing Amenities Status

Source: Census of India 2011

9.1.3 Housing Demand based on Projected Population

In order to estimate the housing stock requirement for the next three decades, we have adopted the following assumptions. The assumptions are as follows;

- Population projections as finalized in demography section above
- Household size has been considered as 4.2 over the next decade, 4.0 for the subsequent decades;
- Residential and mix use would increase by 2% over the next three decades
- Residential and mix use would increase by 2% over the next three decades and 10% reduction in the dilapidated houses in the city.

Following table, provide the assumptions and housing demand gap assessment requirement in the city for the next three decades. Based on the above assumptions, the city will need 0.7 lakh new houses by end of 2041.

Table 53: Future housing requirement for the city

Year	2001	2011	2021	2031	2041
Population/Projected (in lakhs)	0.82	1.00	1.64	1.94	2.25
Household size	4.20	4.20	4.00	4.00	4.00

Ministry of Urban Development, Government of India

Year	2001	2011	2021	2031	2041
Total Census houses (In lakhs)	0.20	0.24	0.41	0.49	0.56
Residential Share	72%	74%	76%	78%	80%
Residential Housing stock (In lakhs) - Demand	0.14	0.18	0.31	0.38	0.45
Residential Housing stock (In lakhs) - Gap		0.04	0.17	0.24	0.31
Dilapidated Houses (%)	4.00	3.60	3.24	2.92	2.62
Residential Housing stock -Dilapidated Buildings (In		0.01	0.01	0.01	0.01
Residential Housing stock -Total (In lakhs) - Gap		0.04	0.18	0.25	0.32

Source: Census of India, CRIS analysis

9.2 Urban Poverty and Slums

9.2.1 Number of Slums

"A slum is a cluster of compact settlements of 5 or more households which generally grow very unsystematically and haphazardly in an unhealthy condition and atmosphere on government and private vacant land. Slums also exist in the owner based household premises." Considering its unique conditions of hilly terrain, the Govt. of Sikkim has notified exact definition of slum by the government vide Gazette notification no 02/ HOME/ 2003 dated 27/01/2003.

Due to tough terrains of the region and uneven population distribution and development, the slums are mainly found near the rural areas. With-in the GMC boundary, most of the slums are scattered in small pockets. Together, notified and un-notified slums (including areas having slum like conditions) contributes to 25% population of the total Gangtok population, below the poverty line with poor access to basic infrastructural services.

There are 58 slums spread across 15 wards of Gangtok. Total number of slum households is 6085. The total slum population is estimated to be 23,580 out of the total population of 1,00,286 (as per Census 2011). This means that about 23.51% of the total population is living in slums. In terms of households 26% are living in slums. This figure is way above the national average of 17% slum households of the total urban households



Out of the total 58 slums, 12 are notified slums and rest 46 are non-notified. Year of notification for all 12 notified slums is 2003.


9.2.2 Spatial Distribution of Slums

Each ward of the Gangtok city has at least one slum. Chandmari ward has 12 slums and which are occupied in a total area of around 21 ha. Tibet area and development area wards are having one slum in each. The details of ward-wise slums are presented in **Table 54**.

As mentioned above, slums are present all over the city but in varying degrees. Percentage of slum population varies from 2.63% of total population in the Daragaon Ward to 61.58% of the population in Diesel Power House.

SI.No.	Ward name	No.of slums	Area (ha)	No.of Households	Slum Population	Density (Persons/Ha)
1	Burtuk	5	15.87	534	2107	133
2	Lower Sichey	3	3.94	48	204	52
3	Upper Sichey	4	6.45	155	652	101
4	Chandmari	12	20.56	718	2860	139
5	Development Area	1	4.57	555	1945	425
6	Diesel Power House	3	5.05	637	2455	486
7	Syari-Tathangchen	2	9.02	605	2553	283
8	Lower M.G Marg	4	9.45	330	1365	144
9	Upper M.G Marg	2	0.68	33	130	193
10	Tibet Road	1	1.31	88	428	327
11	Deorali	3	2.25	60	245	109
12	Dara Gaon	4	1.02	59	253	248
13	Tadong	6	5.96	212	756	127
14	Ranipool	3	7.54	650	2666	354
15	Arithang	5	21.56	1401	4961	230
	TOTAL	58	115.24	6,085	23,580	3,350

Table 54: ward-wise slum details in Gangtok

Source: Slum free city plan of action for Gangtok, 2012

9.2.3 Average Slum Size

Gangtok city slums have an average of seven ha area. The largest slum in the city is Arithang, which is occupies an area of 21 ha and with a population of 4,961. The smallest slum is Upper MG Marg with an area of less than a hectare and population is 130.

9.2.4 Infrastructure Available

As described in Gangtok slum free city plan for action, 2012, around 79% of the total households in slums have access to tap water connection within premises. Slum households in wards like Upper Sichey and Development Area have 100% access to tap water.

Figure 45: Drinking water facilities in Gangtok slums



Slum Households by Access to Drinking Water

9.2.5 Land and Tenure-ship of Slums

Land ownership status of the slums is a vital parameter for assessment of slum up gradation / redevelopment opportunities. Slums often come up in marginal land lying vacant, irrespective of its land ownership status. However, it is observed across cities and states that the most critical hurdle in implementation of slum redevelopment /Up gradation projects is the ownership status of the slum land.

Land Ownership Type	No. of Slum	in %
Private	38	65.52
State Government	9	15.52
Government (Forest/Defence)	1	1.72
Private and State Government	6	10.34
Private Institutional	3	5.17
Public Institutional	1	1.72
Total	58	100.00

The ownership status of slums in Gangtok shows that majority of the slums are in private lands. While only 'private' accounts of 65.52% of the total slums (38), slums that are in partly private and partly state land described as 'private and state government' accounts for another 10% of the slum. Only 15.52% (9nos) are in government land.

9.2.6 Housing Stock-Slums

About 70% of the slum houses are pucca, but shows wide wardwise variation with 3 wards namely Upper MG Road, Doragaon and Deorali having no puca houses. Development Area, Ranipool, Arithang and Diesel Power House have maximum proportion of Pucca houses. On the other hand, at Upper MG road, all the slum houses are kutcha.



Figure 46: Type of slum housing structure in Gangtok

Source: Slum free city plan of action for Gangtok, 2015

9.3 Government Initiatives

The implementation of the poverty alleviation schemes of the Central and State Governments is done through the UDHD. Slum up-gradation also falls within the purview of the UDHD. In the pilot phase of the scheme implementation, Gangtok was also identified among RAY Pilot cities in the country. These Slum free city plans of action (SFCPoA) have been formulated taking into account all the crucial factors and the precise characteristics of slums in the city. Under JnNURM Schemes, total 254 no. of units have been taken up under BSUP. The UEPA cell deals with SJSRY and NSDP, the only two programmes being availed of by the state. Neighborhood Committees (NHCs) are formed as per the SJSRY programme that was launched in Gangtok in 1999.

Following are the various slum improvement programmes sponsored by central and state government in the city.

Institutions Pr	Programme	Project cost	Status
Multilateral agency	NA	NA	NA
Central Government In Ho De Pr (II	ntegrated Housing and Slum Development Programme IHSDP) phase -II	Approved cost - Rs. 33.56 Crore	Slaughterhouse area slum housing (Phase-I& Phse- II)- Completed Rangpo area slum housing- Physical

Table 56: Slums and poverty related programmes by various agencies

9.4 Post- 1st Generation CDP Scenario

The CDP has estimated that about 8% of Gangtok's population live in the nine notified slums and squatter settlements, all on Government land. The CDP has identified the notified slums as shown in Table 57.

Table 57: Notified Slums and slum	population in Gangtok.	CDP (2006)
Tuble of . Notified of and Staff	population in dangton,	

SI.No.	Notified Slum Name	Population (persons)
		(persons)

Ministry of Urban Development, Government of India

SI.No.	Notified Slum Name	Population (persons)
1	Old Slaughter House (Arithang Area)	723
2	Diesel Power House(DPH) + Bhanugram (Arithang Area)	1339
3	Munshi Colony (Development Area)	916
4	Area Between Kazi Road and Tibet Road	149
5	Namnang (Adjacent to Lal Bazar, GurungGaon)	355
6	Tathangchen	791
7	Chandmari, Below Ganesh Tok	1,031
8	Burtuk	1,334
9	Ranipul (3 pockets)	1,355
	TOTAL	7,993

As per 2011 Census, there are 58 slums spread across 15 wards of Gangtok. From 2006 to 2011, slum population has increased from 7,993 to 23,580. The slum population has been increased from 9% to 23% during last 9 years.

9.5 Policy, Regulatory and Institutional Framework

The Urban Development & Housing Department is responsible for all the physical planning in the state of Sikkim including the city of Gangtok. The Sikkim Housing & Development Board was constituted by the State Legislature under the Sikkim Housing & Development Board Act, 1979 and is regulated by the Sikkim Housing & Development Board Meeting, Procedure and Disposal of Business Regulation, 1980. As per the decision of the State Cabinet Meeting held on 26.11.2002, the State Government of Sikkim had decided to wind up the Sikkim Housing and Development Board. Presently the Board is in the process of recovery of its loans with only the necessary staff while others have been deputed to the UD&HD.

9.6 Key Issues

- There has been an upsurge in the absolute numbers of the urban poor, as is the trend, engaged in informal services, due to urbanisation. This has also led to the formation of squatter settlements and there is a steady rise of urban slums where people have little or no access to basic amenities such as water and sanitation facilities.
- Gangtok's below poverty line (BPL) households are vulnerable from economic, social and physical standpoints. Most of the poor depend upon work as unskilled or semi-skilled hired for labour on daily wages, or small business such as fish or egg vending. The poor are less literate than the general population, and more vulnerable to suffer from communicable diseases.
- The slums in Sikkim differ from the slums in the plain areas due to topographical conditions. The definition of urban poverty requires to be studied in the light of the following indicators that may be altered to suit local conditions. Slum or squatter settlements as generally understood in other parts of India, are not visible in Gangtok



- Slums of Gangtok are characterised by poor sanitation, hygiene and toilet facilities. Also due
 of unavailability of land, most of the toilets do not have septic tanks and dispose the sewage
 directly into the jhoras / drains.
- Settlements are usually located on steep, unstable and landslide prone slopes, thus increasing the vulnerability of the poor people in terms of health, natural hazards and safety.
- Solid Waste Management is a major issue within Gangtok. Garbage from the slum areas is generally thrown in the Jhoras and slopes creating environmental pollution.
- Spatial Characteristics of Poverty is that neither all BPL population are concentrated in the slum areas nor the notified slum areas constitute only BPL population. Prioritizing the areas for community up gradation and targeting of the poor for the poverty alleviation programmes, therefore, becomes a critical issue.
- Poverty Alleviation and Slum Upgradation programmes have so far had minimal impact on the poor.

10. Baseline Environment: Urban Environment and Disaster Management

The chapter would describe the major sources of pollution in the city. Further, the chapter shall describe the various inherent issues of the urban environment. The detailed overview of the existing water bodies, green cover has been provided. Moreover, the vulnerability of the city has been discussed.

10.1 Pollution Level

The Sikkim State Pollution Control Board (SPCB) monitors air quality in Gangtok. Data shows that particulate matter is high at one location, mainly due to dusty roads and vehicular traffic surrounding land. Suspended Particulate Matter (SPM) exceeds National Ambient Air Quality Standards (NAAQS). In contrast, levels of chemical pollutants (oxides of sulphur and nitrogen) are below national standards, presumably because there are no pollution sources like industries.

10.1.1 Ambient Air Quality

The air quality surveillance and monitoring is under taken to detect any deterioration in air quality arising from industrial, vehicular, residential and natural sources of pollution, as there are large seasonal variation in the concentration of various air pollutants. Air quality monitoring is the measurement of various pollutants to study the pattern and movement of air masses and deterioration of air quality.

The Sikkim State Pollution Control Board (SPCB) has a regular Ambient Air and Water Quality Monitoring Programme to assess the status of pollution in the natural environment. These monitoring programme are funded by the Central Pollution Control Board, Ministry of Environment & Forests, Government of India.

Air Quality Monitoring of Gangtok town was initiated out under the project "Assessment of Pollution & Formulation of Action Plan" during the year 2000-2001 and as per the report the air quality of Gangtok town is represented in the Table 58.

	Sulphur dioxide (SO ₂)								
	CP	CB standard	s		Vario	us locat	ions in Ga	ngtok	
SI.No.	Moderate	High	Critical	Tadong	Indira Bypass	Deorali	Bazar Area (near Metro Point)	Hospital Point	Zero Point
1	40-80	80-120	120	16.2	17.4	18.6	22.3	19.6	10.2

Table 58: Gangtok Ambient Air Quality - SO2 (Annual Average) in (µg/m3)

Source: State Pollution Control Board, Sikkim



Oxides of Nitrogen (NO ₂)									
	CP	CB standard	S		Various locations in Gangtok				
SI.No.	Moderate	High	Critical	Tadong	Indira Bypass	Deorali	Bazar Area (near Metro Point)	Hospital Point	Zero Point
1	40-80	80-120	120	15.7	22.6	16.1	20.4	18.6	12.3

Table 59 : Gangtok Ambient Air Quality - NO2 (Annual Average) in (µg/m3)

Source: State Pollution Control Board, Sikkim

Table 60: Gangtok Ambient Air Quality - SPM (Annual Average) in (µg/m3)

	Suspended Particulate Matter (SPM)								
	CPCB standards			Various locations in Gangtok					
SI.No.	Moderate	High	Critical	Tadong	Indira Bypass	Deorali	Bazar Area (near Metro	Hospital Point	Zero Point
1	140-180	180- 360	>360	108	137	118	145	122	98

Source: State Pollution Control Board, Sikkim

The regional pollution control board is monitoring the critical parameters of ambient air quality such as Oxides of Sulphur, Oxides of Nitrogen and SPM at various locations of the city as mentioned in the table. The comparison of observed values of the critical parameters with Central Pollution Control Board (CPCB) prescribed standards in (μ g/m³). The parameters such as SO₂ and NOx are within the permissible limits. However, the SPM registered at bazar area is 145 μ g /m³, which is at moderate level. This is mainly due to heavy vehicular movement in that area.

10.1.2 Noise Pollution

Noise is notified as pollutant under the Air (Prevention and Control of Pollution) Act.

To understand the noise levels of Gangtok, the noise values have been compared with CPCB average permissible values. It is observed that all the seven locations have crossed the average noise levels. This is an alarming situation in Gangtok. The existing situation as per the study done by CPCB can be seen in the Table 61.

SI.No.	Place	Activity zone	CPCB Standards Day Average Leq in dB (A)*	Gangtok Day Average Leq in dB (A)*	CPCB Standards Night Average Leq in dB (A)*	Gangtok Night Average Leq in dB (A)
1	Hospital Point	Silence	50	62	40	63
2	District Court	Silence	50	50	40	44
3	Tadong	Residential	55	61	45	58
4	Deorali Govt.Quarter	Residential	55	61	45	57
5	Development Area	Residential	55	66	45	51
6	M.G.Marg	Commercial	65	70	55	62
7	Indira Bypass	Commercial	65	73	55	69

Table 61: Noise pollution levels in Gangtok

Source: State Pollution Control Board, Sikkim

* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

10.1.3 Water Pollution

Water is the fundamental basis of life. The drinking water has a direct impact on human health and considering this fact the regular monitoring of drinking water supplied to Gangtok town at different localities reveals the following facts. A detail study under taken by Pollution Control Board assesses the quality of the urban water supply network. As a very little work has been carried out on the water quality of the other parts of the State hence the information's provided under are based on the detail study of the water quality of the capital town only. Drinking water is supplied to Gangtok town by the Public Health and Engineering Department. The source of drinking water is at Tamzey at an altitude of 14,000ft above mean sea level.

The water quality is under continuous monitoring at various points from where it is used for consumption and for this purpose seven localities have been identified by SPCB. The zones are Deorali, Lall Market, New Market, Old market, Hospital Point, Development area and Balwakhani area.

Drinking water samples are collected from the zones specified by State Pollution Control Board (SPCB). At least three samples are collected from each zones on weekly basis.

pH: pH is the negative logarithm of hydrogen ion concentration. pH is used to measure the alkalinity and acidity of water. The pH values of all the select zones in the city lie within the Indian standard of 6.5 to 8.5. The pH value is between 6.4 to 8.2.

Biochemical Oxygen Demand (BOD): The quality of water is determined by BOD value, the higher the value of BOD worse the quality of water. Three study zones (Deorali, Lall Market & Balwakhani area) shows 2.2 mg/ltr BOD value, which are more than CPCB prescribed limit of 2mg/ltr.

Dissolved Oxygen: The dissolved oxygen of all the select zones is above 6mg/ltr, which is the prescribed value.



Source Name	Source	D.O	D.C0 ₂	CI.	Alk	Aci.	Hard.
Goshkhan ihora	Spring	5.332	89.34	4.496	201.83	49.67	199.46
Hospital jhora	Spring	8,532	20.66	2.596	118.67	15.17	93.476
Paljor Stadium ihora	Spring	8.132	27.34	1.659	84.67	11.33	68.26
Fisheries ihora.	Spring	8.468	7.34	11.418	72.33	4.33	75.436
Diesel Power House jhora	Spring	7.868	11.34	18.907	58.67	6.83	63.844
Rani Khola	Stream	8.468	4.34	6.624	16.33	1.33	14.164
Adam Pool Khola	Stream	6.868	9.34	8.269	20.67	5.33	12.884

Source: State Pollution Control Board, Sikkim

10.2 Gardens, Open Spaces and Urban Forests

A memorial park situated at Deorali near Namgyal Institute of Tibetology, it is dedicated to the memory of Miwang Chogyal Chenpo Palden Thondup Namgyal, a valiant and benevolent successor of Phunstsog Namgyal and a pioneer in advocating the modern system of Governance in Sikkim.



10.3 Environmentally Sensitive Areas

Gangtok city itself is an environmentally sensitive region due to its weak geology, slope instability, frequent seismicity coupled with the variable and high rainfall, soil erosion and unplanned growth. The city faced several landslides every year and most of landslide prone area are located along the NH-10 (NH-31A) where major urban development and construction activities are taking place.

In Gangtok there is rapid deforestation occurring due to mainly commercial logging for sale as timber or pulp. Logging can occur selectively where only the economically valuable species are cut. Commercial logging uses heavy machinery such as, bulldozers, road graders and log skidders to remove or cut trees to build roads. There are other reasons for deforestation such as, building construction, city expansion. Population is growing at very fast rate especially in and around Gangtok town. Deforestation is leading to soil erosion, hydrological imbalance and causes landslides and floods. Therefore, there is a need to keep a balance between development and conservation of natural resources & environmentally sensitive areas to avoid calamities.



Figure 47: landslides location map of Gangtok city

Source: Sikkim State Disaster Management Report

10.4 Disaster Management

Landslides:

Gangtok has disaster assessment study report prepared by SSDMA (Sikkim State Disaster Management Authority). The study identified the potential susceptible slide areas in the city as mentioned in Figure 48. The study point out the landslide affected areas based on landslide vulnerability map:

About 7% of the area fell in very high risk zone with 2% of total settlement to be affected;



- About 25% of the area fell in medium high risk zone with 18% of total settlement to be affected;
- About 34% of the area fell in medium risk zone with 39% of total settlement to be affected;
- About 33% of the area fell in medium low risk zone with 40% of total settlement to be affected; and
- About 1% of the area fell in low risk zone with 1% of total settlement to be affected.

The above details show that 60% of the settlement in the Gangtok city is vulnerable for landslides. This concluded the city should ready with strong disaster management plan and approach to minimize the human and infrastructure losses.





Figure 48: Susceptibility to landslide hazard in Gangtok

Source: Sikkim State Disaster Management Report

Earthquake:



The area's most likely to be affected by earthquake were in and around below Arithang area, below Paljor stadium and area around Amdo Golai, Burtuk,etc.

- About 29% of the area fell in very high risk zone with 19% of the total settlement to be affected;
- About 14% of the area fell in medium high risk zone with 15% of the total settlement to be affected;
- About 31% of the area fell in medium risk zone with 42% of the total settlement to be affected;
- About 17% of the area fell in medium low risk zone with 21% of total settlement to be affected;
- About 9% of the area fell in low risk zone with 3% of the total settlement to be affected;

Figure 49: Susceptibility to Earthquake hazard in Gangtok



Source: Sikkim State Disaster Management Report

As per Gangtok disaster assessment study, about 51% of the Gangtok settlement fell in fire hazard medium risk zone and about 2% of city settlement area fell in high-risk zones.

Figure 50: Susceptibility to fire hazard in Gangtok



Source: Sikkim State Disaster Management Report



10.5 Disaster Management Mitigation Measures

The Disaster mitigation at city level is a holistic management of the disasters (both manmade and natural). It involves management of events to minimize the damage during a disaster and development of preparedness to cope with the disasters to reduce the risk and losses.

State Disaster Management Plan formulated by State Disaster Management Authority is a valuable document where vulnerability & risk assessment mapping, hazard risk assessment and vulnerability maps are incorporated.

Sikkim State Disaster Management Authority (SSDMA) is a part of the State Government and is a nodal institution for planning, co-ordination and monitoring for disaster prevention, mitigation, preparedness and management. SSDMA lays down policies on disaster management for the state. It approves disaster management plan in accordance with the guidelines laid down by National Authority and co-ordinates its implementation. It provides guidelines and reviews the measures being taken for mitigation, capacity building and preparedness by the Government and issue guidelines as necessary. SSDMA recommends provision of funds for mitigation and preparedness measures.

District Disaster Management Authorities (DDMAs) headed by the District Collector or District Magistrate or Deputy Commissioner as the case may be, to spearhead and adopt a holistic and integrated approach to DM.

State Emergency Operation Centre (SEOC) has a small permanent cadre staff and a continuous Duty Officer system to monitor events within the State on behalf of the State Authority. When activated in support of disaster-affected communities, the SEOC establishes communication with relevant DEOC for coordinating necessary information and resource support. The SEOC provides 'situational awareness' of disaster events to the State Government and is accountable to the State Executive Committee.

District Emergency Operation Centre (DEOC) may be permanent or temporary facilities provided within each District to support the District Authority during disaster events. Each DEOC is responsible to provide prompt and relevant information to both LEOCs and the SEOC concerning any disaster event occurring within their District. These centres are also responsible for the coordination of all local and state resources within their district and those allocated to it for disaster management purposes.

Local Emergency Operation Centre (LEOC) may be permanent or temporary facilities provided within each local government area or combined local government area to support the local committee during disasters.

Status of disaster management in Gangtok

As discussed above, the city is prone to natural disasters like landslides, earthquake and manmade disasters like fire outbreaks and road accidents. The road accident does incur major loss of assets. However, it involves causality and hindrance to traffic movement. Hence, these events have been considered under manmade disasters.

As indicated in the table below, presently GMC is involved in relief measures during floods. In addition, their role is limited to evacuation from flooded areas and distribution of malaria medicines.

Table 63: Agencies responsible for disaster management in the city

Disaster/calamity in the city	Agency	responsibl	е				
Earthquake	District departme	Collector ents, SEOC	cum /DEOC	District C/LEOC	Disaster	Manager/All	line

Disaster/calamity in the city	Agency responsible
Landslides	District Collector cum District Disaster Manager
Floods	Irrigation and Flood Department
Fire outbreak	Sub-Collector/Police/ Fire Brigade
Road accidents	Traffic police

In order to achieve disaster preparedness (pre disaster), dissemination of warnings (during disaster) and relief measures (post disaster), GMC has prepared the city level disaster mitigation plan.

10.6 Key Issues

- The city prone to natural disasters like landslides and earthquake. The landslides are a major concern due to the city topography;
- During monsoon, landslides along the major roads are one of the major issues in the city. The city required to construct road embankments at major/identified landslide prone areas to avert this problem;
- Inadequate drainage management accentuates the high landslide risk and has caused building collapses and casualties. Steep slopes are overloaded with multi-story buildings, which leads landslides in monsoon period;
- The city falls under high risk earthquake zone (V). This is a serious concern of the city; and
- City noise pollution levels are very high than permissible limits suggested by CPCB.



11. Climate Change & Sustainable Development

For centuries, human activities have released large amounts of carbon dioxide and other greenhouse gases into the atmosphere. The majority of greenhouse gases come from burning fossil fuels to produce energy, heating houses, and transportation purpose. Deforestation, industrial processes, and some agricultural practices also emit gases into the atmosphere. This has led to Climate change which is refers to any significant change in the measures of climate lasting for an extended period of time.²⁴ In other words, the climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer. Various evident impacts of the ongoing climate change at broad level are as follows;

- Rise in global average temperature near Earth's surface.
- Change in the monsoon pattern.
- Change in the pattern of wind.
- Increase in incidents of natural calamities such as floods, droughts, earthquake, severe heat waves, cyclones, etc.
- Affect on agriculture yields
- Melting of ice and rise in sea level, etc.

The impacts of the climate change are evident from the past incidents around the countries and presents challenges for the societies and environment. Thus, planning to mitigate the impact of climate change and reduce the emission of greenhouse gases is becoming more important for sustenance of our present societies and to save for future generation. This is possible by adopting sustainable and low carbon emission development measures.

11.1 Climate change & city

Rapid high carbon intensive urbanisation is one of the emerging concerns in the environmental and global warming debates in the context of environmentally fragile and sensitive areas like the Himalayas. Rapid urbanisation and urban growth leads to rapid destruction of green infrastructure, high emission of GHG from transportation, construction, manufacturing and associated sectors. High waste generation and improper management and disposal of waste further aggravate the problem.

Gangtok is also witnessing change in air quality and increase in GHG emissions. Generally the air quality in hill stations to be clean. But in case of Gangtok the pollution levels in many areas is a cause of concern. Although the situation is still not grave but this should be treated as one of the major future threat as the air pollution rate will continue to increase with greater level of urbanization, energy consumption and vehicular emissions. Local heat island effects, temperature inversion may worsen the situation.

Air and noise pollution in Gangtok has increased significantly over the last few decades primarily due to vehicular emissions, construction and increased energy consumption at the household level.

²⁴ Definition of Climate change is adapted as described by United states Environmental Protection Agency (EPA). Web link – "http://www.epa.gov/climate change/basics/"

Temperature data for 35 years (1996-2000) have been analyzed²⁵ to understand the climate variability scenarios in the city. The annual mean minimum temperature in Gangtok has increased consistently over last three decades due to increased construction and lessening ground absorption, greater emission as a result of increasing vehicles, etc. This means there is an increase in temperature in winter season in the region which can lead to greater rate of glacier melting at the higher altitude and increased riverine flows and floods in the lower catchment areas.

The temperature during monsoon and post monsoon season shows greater fluctuations which can affect the monsoon rainfall in the region. Variability and intensity of rainfall pattern may also impact water resources and trigger disaster and hazard pattern. These changes can have singnificant impact on the regional hydrology affecting the ecological services like water supply to Gangtok city especially during the dry seasons from March to May. It can also affect the vegetation, bio-diversity of the region and supply of day to day necessities like vegetables, dairy products and other local food crops thereby affecting the food security and increasing the ecological footprints.

The temperature in Gangtok has been rising at the rate of 0.2-0.3 °C per decade and the annual rainfall is increasing at the rate of nearly 50 mm per decade. Therefore, the temperature in Gangtok has risen by 1 to 1.5 °C since 1957. Comparison of long term meteorological data available for Gangtok station (1957 to 2005) with the trend over the last few years (2006-09), shows an acceleration of these patterns, with winters becoming increasingly warmer and drier.

Increasing climate variability as witnessed in the region may lead to increasing frequency of disasters in the region with adverse impact on human lives and property.

11.1.1 Learning from the past

Gangtok is an environmentally sensitive region, which is required more attention in terms of climate change. City is already experiencing the rapid urban growth, need to take more measures towards sustainable urban development by talking into consideration all environmental guidelines.

Rapid economic development, changing environment and climate variability has increased the vulnerabilities of hill communities. It is therefore important to understand that the future of disasters on the life of the population of the region will depend on adaptation and preparedness level of communities and Government. Vulnerability refers to degree to which people, property, resources, systems, cultural, economic, environmental and social activity is susceptibility is a concept that links people with their environment. It's also the extent to which changes could harm a system, or to which a community can be affected by the impact of a hazard. Vulnerabilities can be simple or multiple in the context of hill areas with exposure to multiple hazard and climate variability identification of multiple vulnerabilities is important.

As indicated before the key factors that are responsible for increasing vulnerability potential of the Gangtok city are unplanned high density developments, increase in traffic volume, violation of building byelaws and changing pattern of temperature, rainfall as well as poor urban environmental management practice.

²⁵ The details are extracted from published article (Carbon Intensive Urbanization, Climate Variability and Urban Vulnerabilities in Hill Areas) on Gangtok city by Dr. Shrawan Kumar Acharya, Prof. Saswat Bandyopadhyay



11.1.2 Current Practice

The table (Table 64) infer that the existing system is weak to tackle the emerging challenges of urbanization and climate change. Therefore, inclusion of adaptation and mitigation strategies into mainstream urban and regional planning practices in Gangtok is important.

Table 64:	Environmental	practice i	n Gangtok
		p	

SI.No.	Required	Existing Practice
1	Environmental Cell	There is no separate agency for environmental monitoring and assessment within local body in Gangtok
2	Environmental Plan	No environmental/climate change related plans have been prepared
3	EIA guidelines	EIA measurement have not been exercised in the city;
4	Follow the byelaws & regulations	Very poor and inefficient implementation mechanism of implementing byelaws and regulations
5	City level awareness programme	No city level awareness generation strategies have been formulated to combat with disasters

11.2 Carbon Footprint mapping

As part of the *Carbon Intensive Urbanization* study (2012), the carbon footprint data has been calculated for the transport sector, which indicates pollution load from different modes. The carbon footprint for Gangtok city has been calculated for the transport sector. The calculated carbon footprint will help analyse the ward emitting maximum carbon and the modal split. Thus, modifying or changing the modal split would help to reduce the emission of the Gangtok. The emissions ware converted into GWP (Global Warming Potential).

The study reveals that the existing carbon emissions and local heat island potential is maximum in the central and northeastern part of Gangtok city, which is due to trips for working, and market/shopping. The study also forecasted for 2030 and it has observed that northern and central part of the region would be the worst affected areas.

11.3 Impact & Imperatives

Spatial planning at urban and regional level is one of the most important policy tools proposed for delivering sustainable development at local level. It will shape and influence many aspects of the area development including economic, social and environmental. This instrument besides optimizing land use has important indirect potential to reduce the energy consumption, improve mobility patterns of the citizens by locating new development along existing public transport lines and promoting mixed used by providing residence, work and services in the same area. This can have a significant impact on reducing pollution and energy demand of the hill communities in the region.

Spatial environmental planning strategy in Gangtok should emphasize environmental content, strategic sustainable planning policy formulation and effective stakeholder participation. This vision should be accompanied by a range of planning action like avoiding urban sprawl and ensuring efficient and optimal use of land. Competing environmental, social and economic demands for limited

space should be resolved through innovative high quality design of public space, buildings and infrastructure like the redesigned MG marg. planning at the regional level is important. It also internalizes the requirement of the 74th Constitutional Amendment Act by institutionalizing the District Planning Committee (DPC).

The impact and imperatives





11.4 Climate Resilience & Carbon Reduction Strategy

In the area like Gangtok which is affected by multiple hazards like landslides, earthquakes, cloud burst and other climate induced extreme events multi hazard vulnerability assessment should be the base for land use and regional planning exercise. This exercise incorporates micro zonation of the urban settlements. Hazard vulnerability/risk management can be considered as an attempt to synchronize various natural hazards (e.g. floods, earthquake, etc.) and manmade disasters characterised by the dimensions of time and place.

With available modern technologies construction of earthquake resistant green building should be promoted in Gangtok. Green buildings are energy efficient, recycle and use waste are often built with local materials thereby reducing the carbon footprints and are appropriate and sustainable. Green building offers a comprehensive set of best practices to design and construct efficient, healthy homes that benefit the community, the environment and the people. Byelaws, zonal regulations and development control regulations can be formulated for earthquake resistant green building technology. Green building design evaluation system like LEED (leadership in energy and environmental design) should be internalized in building codes and byelaws. The national sustainable habitat mission also intends to internalize these concerns in habitat planning exercise in the future.



12. Cultural Resources, Heritage and Tourism

Cultural resources mean historic and cultural significance of the city. The cultural resources include the tangible heritage in terms of built environment including the monuments, public buildings, and historic areas, open spaces of social, ecological and historical importance. The integrated tourism and culture development would benefit the local economy as well.

Moreover, the detailed assessment has been carried on the heritage value, heritage management plan and projects being implemented. The key findings of the analysis indicate the status of heritage value and the need of the hour to conserver the heritage monuments and heritage management plans. The chapter presents over view of built heritage, fair, festivals and tourism scenario in the city.

12.1 Historical Importance

Unlike many cities in the sub-continent, Gangtok remained as an unknown hamlet. According to the epigraphists, not much known about the early history of Gangtok. The region has never been subservient to any monarchial rule due to which the region remained unnoticed for several decades.

Early Period

Although the city's early history remains unknown and vague, the place earned its name as a popular Buddhist learning centre in India. The oldest citation of Gangtok can be traced back to the year 1716 with the construction of a small monastery. During that period, the province served as a rural community of Buddhist monks. After the establishment of the Enchey Monastery in 1840, the place became an important religious center. Legend states that a sage by the name Padmasambhava, who spread the teachings of Vajrayana Buddhism in Bhutan and Tibet, suppressed the powers of protecting deities like Khangchendzonga, Yabdean and Mahakala, present in the monastery.

British India

The state of Sikkim allied with the British in order to fight off invaders from Nepal. This involved the intervention of English officials in the region. It was in the 19th century that the British understood its military and trading prospective in the region. The British officials had set up a military garrison in one of the districts of Tibet. Gangtok during this time became a regular halting point among merchants travelling between Tibet and Colonial India. During this period, Gangtok was a flourishing town. Apart from the growth in trade, the town's infrastructure and communication sectors also grew. By the end of the nineteenth century, the city saw constructions of roads and buildings and the installation of a telegraph centre. Thutob Namgyal, who was the reigning 'chogyal' (emperor) during that period, shifted his capital in the year 1894, to Gangtok. This, in turn, raised the significance of Gangtok. The king of Sikkim then ordered the construction of a palace and other state buildings in Gangtok.

Post-Independence

After India's independence in 1947, the state of Sikkim including the territory of Gangtok was considered to be a 'geo-political entity' commonly known as a 'nation state'. Pandit Jawaharlal Nehru signed a treaty with the royal chogyal monarchs in the region stating that the place would remain suzerain to India if Sikkim was allowed to maintain its independency. The 'Nathula' and 'Jelepla' passes located near Gangtok were responsible for the growth of the silk trade in the region. The path leading to these two passes was called as the 'silk route' and connected to several countries in Europe, North Africa and West Asia. In 1962, when the Sino-Indian war took place, the trading

mountain passes where closed until 2006, due to the rising hostility present in the area. By 1975, the monarchy of Sikkim was withdrawn and Sikkim became an Indian state with Gangtok as its capital.

12.2 Existing Heritage Buildings in Gangtok

Raj Bhavan: On a hilltop above the Himalayan town of Gangtok stands a splendid two-storey Victorian mansion built in the style of a typical British country house. Somewhat out of place, it stands as a reminder of the British Raj and its eventful role on the Tibetan Frontier. The Residency, as it used to be known, was the official residence of the political officers in charge of overseeing the British Empire's interests in the region and its relations with Tibet and the Himalayan kingdoms of Sikkim and Bhutan.



Between the year of its construction in 1890 and the departure of its last British incumbent in 1948, the Residency was the home of extraordinary men who all shared a fascination with Tibet or Central Asia.

From Residency to Raj Bhavan:



In 1975, the institution of the Chogyal was abolished and Sikkim was formally inducted into the Indian Union as her 22nd State. For having made this culmination possible, Shri B.B. Lal was made Governor of Sikkim on 18th May, 1975 the very day that the amending Bill received the President's assent. This marked the conversion of Residency into Raj Bhavan.

In its previous designation as India House or "Baara Khoti", it had been rated as one of the India's best Ambassadorial residences-it would now qualify as India's most attractive Raj Bhavan. Sited well above the town and

insulated from the noise and fumes of the bazaar, the classic gabled structure lends into the greenery and trees of the landscape and looks on the entire Kanchendzonga range.

The area of the compound is at approximately 75 acres consisting of lawn and garden as well as kitchen garden and fruit orchids.

White Memorial Hall:

The White Memorial Hall has historical value and is situated on the Ridge. It is a two storied structure and has typical British architecture and was built in 1932. It is so called not because it is, painted white but because it was built in memory of the first Political Officer of Sikkim, Claude White. There is an Officers' Club and a badminton court in the White Hall. Gangtok, Sikkim



12.3 Tourism Scenario

Gangtok as a core centre of Sikkim has potential command area over different tourist spots in East Sikkim, which are directly linked by a network of roads centering Gangtok and are perfectly accessible for one-day trips. The tourist attractions of East Sikkim are clustered mostly in and around Gangtok, the state capital. The town spreading from Talangchang to Bhurtuk along the western slopes of the hills is located at the altitude of 1200 meter to 1700 meter.

In the north of Gangtok town there are hills, which gradually gain their altitude leading up to the ranges of the Kanchendzonga, which are towards the north west of Gangtok and the third highest mountain of the world. Trade and commerce are the most important functional linkages between Gangtok and its neighbouring regions. As a result, the entire state of Sikkim depends on Gangtok to meet its economic requirements. Gangtok, as base town offers the best infrastructural facilities to visiting tourists.

The tourist attraction in Gangtok can be classified under (i) natural sightseeing, (ii) monasteries, (iii) sanctuaries of different kinds viz., alpine and wildlife sanctuaries, (iv) manmade sightseeing and (v) cultural and historical places. The tourist attraction places of Gangtok and its surroundings are shown in below table.

SI.No.	Category	Locations
1	Natural Sight Seeing	 Tsomgo lake Tashi View Point Bridge B2 Water falls Nathula Pass
2	Monasteries	 Rumtek Monastery Enchey Monastery
3	Sanctuaries	 Fambhong –Lho Wildlife Sanctury Kyagnos-la Alpine Sanctury
4	Man Made Sight Seeing	 Ganesh Tok, 2. Hanuman TOk Flower Show, 4. Saramsa Garden, 5. JLN Botanical Garden Tourist Village, Rumtek, 7.Zoological Garden Coronation Garden and Deer Park
5	Cultural & Historical Attractions	 Directorate of Handicraft and Handloom Do-Drul Chorten Tibetology Sa-ngor Chotsnog Centre

Table 65: Tourist Attractions (category wise) in and around Gangtok

12.3.1 Major Tourism Spots

Gangtok is a centre of Buddhist learning and culture. There are innumerable monasteries in Gangtok. There are many interesting places to visit in and around Gangtok. Some of the sites of tourist interest are listed below:

Table 66: Brief on tourist attractions in and around Gangtok

Tourist Gangtok	Attractions	in	and	around	Pictorial view
		-			

Namgyal Institute of Tibetology (NIT)

It was built in 1958 and is a research center for Mahayana Buddhism and Tibetan culture. Besides being a museum of traditional and old artifacts, tourists can also buy Buddhist religious books and other objects of craft.

The most prestigious of its king in India-this Buddhist Institute is a treasure trove of vast collection of rare Lepcha, Tibetan and Sanskrit manuscripts, Statues and rare Thankas (Tapestries used in Buddhist liturgy) and has over 200 Buddhist icons and other prized objects of art. Today, it is a renowned worldwide centre for study of Buddhist Philosophy and religion

Rumtek Monastery

The institute is abode of the head of the Kagyupa order of Tibetan Buddhism as well as a learning centre. Devotees and tourists visit the monastery throughout the year.

About 45 minutes drive from Gangtok, 24 kms away, is the Rumtek Dharma Chakra Centre, the seat of the Kagyu order, one of the 4 major Tibetan Buddhist sects. since the late 1960s, after the arrival of His' Holiness the 16th Gyalwa Karmapa, the Centre houses some of the world's most unique religious scriptures and religious art objects. Traditional in design, it is almost a replica of the original Kagyu headquarters in Tibet.

Tsomgo Lake

Located near Nathula pass lies in the northeast direction of Gangtok.Tourists require special permits to visit this picturesque lake.

It is also known as the "Source Of The Lake" in Bhutia language. Just about 40 kms away from Gangtok, the capital of the State, this serene lake is situated at an altitude of 3780 metre. The lake is about1 km long, oval in shape, 15 metres deep and is considered scared by the local people. This placid lake remains frozen during the winter months upto mid-May. Between May and August it is possible to see a variety of flowers in blooms. including the rhododendrons, various species of primulas, blue and yellow poppies, irises etc. It is also an ideal habitat for the Red Panda and









Tourist Attractions in and around	Pictorial view
various species of birds.	
various species of birds. Hanuman Tok, It is 11 kms away from Gangtok town, above Ganesh Tok with a Hindu Temple where the devotees come and offer prayers. Because of its locational advantage the view of the mountains along the horizon is just magnificent, especially on a clear sunny morning.	
Ganeesh Tok. It is situated on a ridge and is only 7 kms from Gangtok. From this spot one gets bird's eye view of sprawling Gangtok town down below while across the hills Mt.Khangchendzonga and Mt. Siniolchu loom over the horizon.	CANESH OK
Directorate of Handicraft & Handloom Instituted with the aim of promoting and keeping alive the State's traditional arts and craft, the Directorate of Handicrafts & Handloom lies a storehouse of hand woven woolen carpets with traditional motifs, blankets, shawls in Lepcha weaves and exquisitely carved 'choktse' or table and many other gift items.	
Enchey Monastery An important seat of the Nyingma order, the Enchey Monastery is built on the site blessed by Lama Druptob Karpo, a tantric master known for his power of flying. This	





Tourist Attractions in and around Gangtok	Pictorial view
Jawaharlal Nehru Botanical Garden 24 kms away from Gangtok is the JN Botanical Garden Rumtek situated at an altitude ranging between 1800 mtrs. to 2200 mtrs. established in the year 1987. It comprises of virgin temperate forest of Oaks and as many as 50 different kinds of trees species.	
Water Garden Water Garden at Martam Khola is on 31-A National Highway some 16 kms South of Gangtok. It is an ideal spot for picnic with a small swimming pool for children.	
Nathula 56 Kms away from Gangtok is a Nathula Pass at an alt. of 14200 ft. bordering between India and China in the Tibetan Plateau. It is one of the highest motorable roads and richly covered by many varieties of Alpine Flora & Fauna	





12.3.2 Sikkim Tourist Arrivals

Month wise arrivals indicate that April, May, June and October appear to be the peak season. There have been reasonably satisfactory inflows during the months of March, September to December as well.

Major source markets for domestic tourists were West Bengal, Maharashtra, Delhi and Gujarat. The share of other states appears to be only marginal.

Year	Domestic	International	Total
2005	241,697	16,827	258,524
2006	292,486	18,026	310,512
2007	331,263	17,837	349,100
2008	460,564	19,154	479,718
2009	615,628	17,730	633,358
2010	700,011	20,757	720,768
2011	552,453	23,602	576,055
2012	558,538	26,489	585,027

Source: Ministry of Tourism, Gol.



Figure 52: Month-wise Tourist arrivals in Sikkim (2010)

12.3.3 Gangtok Tourist Arrivals:

It was mentioned earlier the total tourists' arrival in Sikkim during the year of 2012 was 585,027 persons. From the discussions with people in tourism industry like tourism department people, tour operators, travel agents, hotel associations, etc. it is understood that almost 70% of the tourists visit East Sikkim particularly Gangtok while the balance is distributed among the other three districts of the State. Based on the above assumption the Gangtok tourist arrivals have been calculated.

Year	Tourists
2005	180,967
2006	217,358
2007	244,370
2008	335,803
2009	443,351
2010	504,538
2011	403,239
2012	409,519

Table 68: Gangtok Tourist arrivals

The number of tourist arrival in Gangtok has shown an increasing trend from 1000 visitors in 1980 to 1,16,500 in 1997 and has reached 4,00,000 tourist in year 2012.

12.3.4 Infrastructure facilities for Tourists

Tourism infrastructure comprises mainly a number of good hotels, well connected to different tourist spots, a transport network, health units, marketing etc. to promote the growth and development of tourism.

The number of hotels, especially belonging to budget category, has been increasing in Gangtok at a very rapid rate. The city has tourists Reception-cum- Information Center (TRICs) on M.G.road.

The government has taken up various steps to promote tourism in the state by developing tourist infrastructure and facilities. In order to disperse tourist from town and urban areas, the department is promoting the concept of village tourism and home stays in rural areas. There are many village tourism committees and home stay facilities in the state. Many tourists domestic as well as international are visiting these village tourism facilities. The visiting tourist learns about local culture, custom & traditions and rural people are directly benefited. Gangtok city has more than 200 small and medium range (budget) hotels and having a capacity of around 5000 beds.

Grade	No. of Hotels	Tariff Range
Grade -A	20	2000- 4500
Grade - B	170	900 - 2000
Grade-C (Lodges)	50	500-1200

Table 69: Hotels in Gangtok

Source: Department of Tourism, Sikkim

12.3.5 Tourism Development Initiatives

The Government has maintained cordial relationship with the private sector players to promote Public Private Partnership. The Adventure Cell of the department has been organizing and exploring other viable adventure tourism activities in various parts of the State. In order to promote Skiing, the department has already conducted two Reece in North and East Districts (Gangtok) and both the areas have potentials for developing into Skiing destination.

Some of the major initiatives taken by the department in the adventure sector is as under:



- 1. Conducted feasibility study of adventure sports
- 2. Notification issued on Basic Minimum Standard (BMS) on Adventure Sports Guidelines.
- 3. Feasibility study of adventure sports in some of the Village tourism projects.

12.4 Fairs and Festivals

Flower Festival

Flower exhibitions are organised round the year at the flower show venue near the White Hall Complex, Gangtok. Orchid shows held during the spring tourist season is one of the most popular shows organized in the State.

Food Festival:

December is the month for the annual Gangtok Food and Culture Festival organized by the Sikkim Tourism department. Sikkim's multi-cultural cuisine, along with traditional music and dance performances are presented for the tourist. Food stalls decorated in ethnic style are put up in the Titanic park at MG Marg and a cultural show is presented in the huge set erected opposite the Tourism and Civil Aviation Department.

12.5 Traditional- Handicrafts

Handloom and carpet weaving, thanka painting, wooden mask marking, woodcarving, bamboo and cane craft are indigenous product of Sikkim. Bamboo and cane craft are deep rooted in traditional culture of Sikkim. Various attractive eco-friendly products are made out bamboo and cane, such as Lepcha hats, fruit and vegetable baskets, mugs, flower vases, tea trays, carry bags, containers, baskets dustbins, mats, etc.

12.6 Key Issues

- Poor basic infrastructure (Only single highway, No Airport, No Railway line;
- Expensive travel costs due to absence of public transport system;
- Quality of accommodation, facilities & services beyond urban areas, limited community participation; and
- Lack of strong Brand identity/ USP for the City;

13. Assessment of Institutions, Systems and Capacities

This chapter would briefly elaborate on the urban governance status in GMC, role of GMC and Parastatals in service delivery, status of human resources along with the trainings and requirements, and key issues in the urban governance.

13.1 Urban Governance System

Status of Transfer of 12th Schedule functions to ULB

SI.No.	Functions	Status of Transfer	Current agency	
1	Urban Planning including town planning	No	UD & HD	
2	Regulation of land-use and construction of buildings	No	UD &HD	
3	Planning for economic and social development	No	UD & HD	
4	Roads and bridges No		Department of Roads & Bridges, National Highway Authority of India (NH-10/NH-31A)	
5	Water supply for domestic, industrial and commercial purposes	No	Water Security & Public Health Engineering Department (WS &PHED)	
6	Public health, sanitation, conservancy and solid waste management	Partial	GMC: primary collection and transportation of Solid waste, UD&HD : Dumping ground and compost plants Department of Health Care, Health Services & Family Welfare: Vaccination	
7	Fire services	No	Fire Directorate of Department of Home	
8	Urban forestry, protection of environment and promotion of ecological aspects	No	Department of Environment and Forest	
9	Safeguarding the interests of the weaker sections of society, including the handicapped and the mentally retarded	No	Department of Social Justice, Empowerment and Welfare	
10	Slum improvement and up- gradation	No	UD & HD	
11	Urban poverty alleviation	No	UD & HD	
12	Provision of urban	No	UD & HD	

Table 70: Transfer of 12th schedule functions in Gangtok



Ministry of Urban Development, Government of India

SI.No.	Functions	Status of Transfer	Current agency
	amenities and facilities such as parks, gardens, play-grounds		
13	Promotion of cultural, education and aesthetic aspects	No	Department of Cultural Affairs & Heritage
14	Burial and burial grounds; cremation and cremation grounds and electric crematorium	No	Primarily UD & HD
15	Cattle pounds and prevention of cruelty to animals	No	Department of Animal Husbandry & Veterinary Services
16	Vital statistics including registration of births and deaths	NO	Department of Health Care, Health Services & Family Welfare
17	Public amenities including street lighting, bus-stops, public conveniences	Partial	GMC: Car parking, Markets UD&HD: footpaths, sidewalks, over bridges, beautification Energy & Power Department : Street Lighting
18	Regulation of slaughter houses and tanneries	No	Department of Animal Husbandry & Veterinary Services

13.2 Urban Reforms

13.2.1 Status of JnNURM Scenario

The section provides a brief on the status of key reforms undertaken under JnNURM. The section also highlights the key benefits derived by GMC. In addition, for the on-going reforms we have identified the current status as discussed below.

13.2.2 State Level Reforms

As mentioned earlier, Gangtok is one of the cities in JnNURM UIG cities. The details of each JnNURM reforms discussed below:

SI.No.	State Level Reform		Status
1	Implementation of 74th CAA		Gangtok municipal corporation has constituted in 2010. District Planning committees are constituted in Sikkim. As on date only 2 functions were transferred to GMC and remaining 16 functions are with various state departments.
2	Integration of City Planning Delivery Functions	&	Transfer of planning functions are pending

Table 71: State level reforms implementation status - Sikkim

Ministry of Urban Development, Government of India

SI.No.	State Level Reform	Status
3	Reform in Rent Control	Sikkim has Rent Control Act.
4	Stamp Duty Rationalization to 5%	The current rate of stamp duty is 1% and the registration fee is 4% on the valuation of the landed property. Hence, the current rate of stamp duty including other levy is 5%. The annual revision of guidance value is not practicing by State. Hence, the reforms is not considered as achieved.
5	Repeal of ULCRA	The State does not have a ULCRA at present and hence the need for its repeal does not arise. Hence, the reform considered as achieved.
6	Enactment of Community Participation Law	The new Municipalities Act 2007 envisages the process of community participation through three tiers of Municipality, Ward Committees and Area Sabhas. However, the constitution of ward committees are pending in Gangtok. Hence the reform considered as not achieved.
7	Enactment of Public Disclosure Law	State RTI act is present. However, the disclosure of citizen charter and other related information is not present in website. Hence, the reform is considered as not achieved.

13.2.3 ULB Level Reforms

There are 6 ULB levels under JnNURM. The details of each reform are presented in below table.

SI.No.	ULB Level Reforms	Status
1	e-Governance	e-Governance is not in place and will be implemented gradually after substantial transfer of functions is done. DPR has already been sent to NEGP for approval.
2	Municipal Accounting	With the help of UDHD, Sikkim Urban Local Bodies Accounting manual has been developed and already been approved. Cash-based Double Entry System of accounts, developed with the support of ADB is currently being used by the ULB with the assistance from ADB for maintaining its accounts. The ULB practices a close computerized monitoring of all the expenses and maintains regular audited balance sheet by external and state agency. Post-audit mechanism by state as well as by internal auditors is practiced in GMC. However, credit rating for the GMC is not been done yet.
3	Property Tax	Property tax is currently not levied. It is proposed to implement the Property Tax on Unit Area Method however there is stiff resistance.
4	User Charges	Water Security & Public Health Engineering Department, GoSK currently provides the water supply

Table 72: ULB level reforms implementation status - Gangtok



SI.No.	ULB Level Reforms	Status
		and sanitation services (WSS) for the city of Gangtok. The water supply recovery has been achieved at
		61.21% and Solid Waste Management is at 54%.
5	Internal Earmarking of Funds for Services to Urban Poor	The state has adopted and formulated a policy on earmarking of funds for urban poor. It has a targeted expenditure of 20-25% for the urban poor
6	Provision of basic services for urban poor	All the ULBs in the state have been directed to constitute a Basic service for urban poor fund and create appropriate budgetary mechanism to ensure that basic funds allocated for urban poor are spent efficiently.
		The state had finished Household survey aimed at Poverty and Slum Profiling in Gangtok.
		Services such as health and education are free to all the citizens and housing schemes are being implemented under IHSDP. Social security sechems such as old age pension scheme and crop protection schemes are provided to the citizens of the state.

Source: Reform Appraisal Report, Gangtok

13.2.4 Optional Reforms

There are10 optional reforms to be undertaken under JNNURM. The details of each reform are presented in the table below.

Table 73: O	ntional reforms	implementation	status -	Sikkim/Gangtok
10010 70.0		implementation	Status –	Sikkini Gangtok

SI.No.	Reform	Status
1	Introduction of Property Title Certification System in ULBs	The state also has computerized records for all the properties indicating their area, property number, registration details etc.
		However, the State does not have any legal framework for property title certification.
2	Revision of Building Bye laws – streamlining the Approval Process	The approval system has been simplified but as it is in the draft stage it is still considered to be in progress
3	Revision of Building Bye laws – To make rain water harvesting mandatory	Notification has been passed for revising building byelaws to mandatorily provide for rain water harvesting
4	Earmarking 25% developed land in all housing projects for EWS/LIG	Notification has been passed for reservation of 20-25% of land in all housing projects for EWS/LIG housing.
5	Simplification of Legal and Procedural framework for conversion of agricultural land for non-agricultural purposes	The current system for conversion of agricultural land for non-agricultural purpose is covered by the Sikkim Land (Requisition and Acquisition) Act 1977. The land conversion process is generally completed within six months by paying the conversion fee to the revenue department

winistry of orban Development, Government of mula

SI.No.	Reform	Status
6	Introduction of computerized process of Registration of land and Property	The process of property registration in the state is managed by an E-Governance System "ORCHID" (Online Registration and Certificate handling, Issuance and Delivery Systems) which is capable of processing and register all types of properties online and issue certificate of registration. It is a complete work-flow automation system with re-engineering of few steps in the web-based technology with finger- print enabled access system. The process involves capturing of photos of the buyers and the sellers.
7	Byelaws on Reuse of Recycled Water	As per the notification of Sikkim Building Construction (Amendment) Regulation 2008, all new buildings having an area and measuring 20000 sq ft or more shall have reuse and recycle system for waste water to be used for washing of vehicles, gardening and flushing etc. as prescribed and provided by the ULBs
8	Administrative Reforms	The reform is reported to be in progress. The ADB assisted project in the state with MoUD as the central executive agency has the provision of funding (100%) on the IDC project. The staff and officials have already undergone trainings in NIPFP New Delhi after the formation of the ULB.
9	Structural Reforms	Though few initiatives have been taken for ULB organization, but to complete this reform the state needs to prepare a detailed framework to create a cadre of municipal staff at state level for different technical disciplines.
10	Encouraging Public Private Participation	The state has a separate PPP cell. The state is also undertaking initiatives for planned development through PPP. Sikkim has made an attempt by covering 2 wards under PPP for solid waste management as a pilot project.

13.2.5 Projects status (UIG & BSUP)

Under UIG component, 2 projects were approved for Gangtok and both the projects were related to water supply system in the city. The details of the projects are discussed below:

Table 74: JnNURM projects	implementation status - Sikkim
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SI.No.	Project	DPR Approved Cost (Rs. in Crore)	Date of Approval	Current Status
1	Rehabilitation of Trunk Sewer along NH starting from Hospital Dara to STP and sewer mains	23.92	23-Nov-07	Project Completed


SI.No.	Project	DPR Approved Cost (Rs. in Crore)	Date of Approval	Current Status
	along Tibet Road New Market along MG Marg at Gangtok			
2	Upgradation and modernization of raw water trunk mains and water treatment plant for Greater Gangtok	72.62	20-Nov-09	Physical progress- 80%

13.3 Role of Responsibilities of various Institutions

GMC: The Municipal Commissioner is the executive head of the GMC and the municipal administration is under his control. The Municipal Commissioner (Chief Municipal Officer) heads GMC and there is one Deputy Municipal Commissioner along with other officers and staff working under the Municipal Commissioner. At present, the there are five sections in GMC, comprising of

- 1. Technical section
- 2. Bazaar section
- 3. Administration section
- 4. Solid Waste Management Section, and
- 5. Finance section

UD&HD: Commissioner-cum-Secretary (CCS) heads the UD&HD. The head office is based in Gangtok and there is one district level office stationed at Jorethang and two sub-divisional offices at Mangan and Namchi. The department is divided into various sections for functional purposes (Town planning, JnNURM, Administrative, etc.).

WS&PHED: The department is headed by a Principal Chief Engineer Cum Secretary and under him, there is a Chief Engineer and an Additional Chief Engineer. There are three Superintending Engineers heading the North & East, South & West, and Sewerage Divisions. The organization is divided into sections based on functions. The sections of WS&PHED are:

- 1. Administration/establishment section;
- 2. Technical Section (including Water Supply, Sewerage and Planning); and
- 3. Revenue and Accounts Section;

Water Supply

The Principal Chief Engineer cum Secretary oversees the functioning of the Department and is assisted by an Additional Chief Engineer (ACE). Under the ACE, there are two Superintendent Engineers, who looks after North East to South West Circles. There are six Divisional Engineers assisted by Junior Engineers and Assistant Engineers.

Sewerage and Sanitation

Sanitation in Gangtok is monitored by Public Health Engineering Department (PHED). PHED is well staffed and has the capacity to carry out repairs and replacement works as required in the operation of a modern water and sewerage utility.

13.4 Key Issues

- GMC is lagging behind in the implementation of ULB level reforms;
- There exists no municipal cadre for various levels of officials. Since GMC is at a formational stage, it will be very pertinent to bring up its own cadre of officials who will have the knowledge and ownership to perform municipal functions;
- There is no clarity of job descriptions, which is leading to ad-hoc working arrangements, mixed functions, and lack of accountability;
- There is no computerized database available for municipality employees; and
- At present, there are no defined training days and no training calendar exists for internal training of staff.



14. Financial Assessment

14.1 Existing Municipal Finance

14.1.1 Financial Planning:

All the development works and the projects are highly depended on external funding (state or central government and funding agencies etc) for financing. UD&HD being the major administrative body in Gangtok, with majority of the services still under it, the budgets required for developmental works are sent through them. Based on the past expenses, the budget is estimated and demand is sent to the Government. There are no specific standards or methods for budget preparation or fund allocation to GMC. As GMC and the para-statals (UD&HD and PHED) work independent of each other, the funds are received by each one of them under Plan (for development work) and Non-plan (for salaries and other establishment cost) heads. The funds received by the para-statals are then distributed to various zones based on the population and area of the zone. The budgets for infrastructural developmental works are prepared by UD&HD and PHED at the state-level and Gangtok specific budget and expenses for the same are unavailable with these departments. GMC or the parastatals doesn't have separate budget allocated for urban poor.

14.1.2 Municipal Financial Status

Gangtok Municipal Corporation was formed in 2008. However, it was functionalized in 2010. The financial statements for the financial year 2011, was the first balance sheet of the Municipality. The budgets are prepared for one and half year. As per the Sikkim Municipality Act, the Chief Councilor presents the budget estimate to the Municipality by 31st August every year.

Head of Accounts (Rs in lakhs)	2011	2012
Opening Balance	0	96.20
Add:		
Revenue Receipts	314.18	597.32
Capital Receipts	50.17	566.12
Less:		
Revenue Expenditure	155.24	333.64
Capital Expenditure	112.92	515.64
Closing Balance	96.20	314.16

Source: GMC, Gangtok

14.1.3 Source of revenue:

Major source of revenue for the corporation is fee and use charges which includes mainly car parking fee and bazar tax. Water tax, property tax, etc. are yet to be implemented in Gangtok. However, it is proposed to implement the property tax where property tax will be calculated based on the unit areas

method. Though most of the services are given for free, connection charges are efficiently collected from the users. The ULB or the parastatal's revenue generation from the investments made in various infrastructural projects is negligible. Since UD&HD is in process of transferring the functions under GMC, revenue forecast has not yet been done for the ULB. Transfer of site regularization and advertisements and hoardings is proposed to be transferred under GMC. It is also evident that revenue grants, contributions & subsidies are also highly contributing to the income of the municipality. Currently, all the development work for the civic services is dependent on Government grants and aids and funding agencies in the state. The details of the source of revenue and expenditure for GMC are given below:

Head of Account (Rs. In lakhs)	2010-11	2011-12
Income		
Tax Revenue		25.51
Rental Income from Municipal Properties		0.09
Fees & User Charges	42.18	214.20
Sale & Hire Charges	18.27	6.14
Revenue Grants, Contributions & Subsidies	257.89	272.50
Income from Investment	0.55	11.96
Interest Earned	1.00	2.20
Other Income	2.14	1.91
A. Total	322.03	534.52
Expenditure		
Establishment Expenses	145.66	262.65
Administrative Expenses	24.18	65.31
Operations & Maintenance	7.03	49.92
Interest & Finance Expenses	0.01	0.02
Programme Expenses	0.00	0.45
Revenue Grants, Contributions & Subsidies	0.00	1.00
Provisions & Write off	0.00	0.00
Misc. Expenses	0.00	0.00
Depreciation	2.98	8.79
B. Total	179.86	388.14
Gross Surplus/ (deficit) of income over expenditure before Prior Period Items	142.17	146.38
Add: Prior Period Items	0.00	0.26
Gross Surplus/ (deficit) of income over expenditure before Prior Period Items	142.17	146.12
Less: Transfer to Reserve Funds	0.00	0.00
Net balance being surplus/ deficit carried over to Municipal Fund	142.17	146.12

Table 76: Income and Expenditure details of Gangtok Municipal Corporation

Source: GMC, Gangtok

14.1.4 Government Grants

Gangtok Municipal Corporation receives Grant-in Aid from the government to meet its financial expenses. Since the corporation doesn't have a revenue generation model based on the taxes from the services provided, it is highly dependent on Government grants and Aids for its functioning. The grants are received under two heads: Plan- for the development works, and Non-plan- for the administrative expenses. The GMC also receives a small grant under 13th FC. The details of the Grant-in- Aid are given below:

Table 77: Details of	Government	Grant-in-Aid	to Ganato	k Municip	al Corr	oration
	advernment		to Gangio	k municip		Joration.

Grant-In-Aid (Rs. In lakhs)	2010-11	2011-12
Plan	135.90	118.08
Non-Plan	114.09	138.97
13 th FC	7.89	6.95
Total	257.88	264.00

Source: GMC

The GMC receives central government funds under projects / schemes such as 13th FC, SJSRY, BRGF, Disaster Management, Earth-quake relief fund and ASHA Health program. It can be seen from the table below, the funds under 13th FC, which linked to the performance of the ULB has reduced drastically from 2011 to 2012. After the earthquake in 2011 in Gangtok, GMC received a funding of Rs 232.14 lakhs from Central Government for the rescue and redevelop of the victims. Gangtok also receives funds under Backward Region Grant Funds for the development of the infrastructures. Also, since 2011, GMC is conducting the survey under RAY and receiving funds under SJSRY.

Funds (Rs. In Lakhs)	2010-11	2011-12	2012-13
13 th FC	7.96	15.81	1.84
SJSRY	-	35.42	17.42
BRGF		15.10	36.84
Disaster Management	24.95	-	-
Earthquake relief Fund	-	232.14	214.63
ASHA Health program	-	8.25	6.00

Table 78: Details of various Central Government funds received by GMC

Source: GMC, Gangtok

14.1.5 Financial reforms

With the help of UD&HD, Sikkim Urban Local Bodies Accounting manual has been developed and already been approved. Cash-based double entry system of accounts, developed with the support of ADB is currently being used by the ULB with the assistance from ADB for maintaining its accounts. However, training is required for the existing staffs on the new double entry accounting program developed. The accrual entries are being passed at the year-end.

Use of computerization for bill payments by the citizens is in use currently. Since the ULB is newly formed, all the financial details are computerized and closely monitored.

The ULB practices a close computerized monitoring of all the expenses and maintains regular audited balance sheet by external and state agency. Post-audit mechanism by state as well as by internal auditors is practiced in GMC. However, credit rating for the GMC is not been done yet.

Since only functionaries have been partially transferred to the ULB and most of the functionaries are still with the parastatals, the assets listing and valuation is done only for the assets under GMC. Listing and valuation of the fixed assets, capital assets and liabilities to be transferred to the Gangtok Municipal Corporation is not yet been done by the concerned parastatals.

The present officials lack experience in project financing tools and mechanism. The ULB needs to conduct training and capacity building programs on project financing for the officials.

Municipal Financial Indicators

Indicators	Value
Own revenues as a proportion of total revenue receipts (Rs 246 lakhs/ Rs 535 lakhs)	46%
Per capita own revenues (Rs 246 lakhs/ 0.98 lakhs)	Rs 249
Non-tax revenues as a proportion of own revenues (Rs 220 lakhs/ Rs 246 lakhs)	90%
Per capita property tax demand	Property tax is
Coverage for property tax net	not levied
Property tax collection performance	
Water charges collection performance	NA
Operating ratio (revenue expenditure/ revenue receipts) (Rs.388 lakhs / Rs.535 lakhs)	0.73
Per capita O&M expenditure (Rs.50 lakhs / .98 lakhs)	Rs 51
Salary as percentage of Revenue Income (Rs.263 lakhs / Rs.535 lakhs)	49%
Salary as percentage of Revenue Expenditure (Rs.263 lakhs / Rs.388 lakhs)	68%
Staff per 1000 population ((43 on roll + 108 on contract) / 0.98 lakhs))x 1000	1.5
Debt Servicing Coverage Ratio (<=1.50) - (O.S+D.S / D.S)	NA
Debt Service Ratio (Max 25%) - (Debt/ Revenue income)	NA

Table 79: Gangtok municipal finance indicators

14.2 Key Issues

- Role of ULB in preparation of budget is minimal. UD&HD prepares the budget for major development works;
- Levy of property tax is pending in Gangtok;



15. SWOT Analysis

The competitive position of the city in terms of efficiency in governance, completive economic growth, sustainable development, and infrastructure efficiency, skilled labour has been analysed to under the strengths, weakness, opportunities and threats in the city. The competitive position increases or decreases based on the projects/initiatives taken up by GMC and other parastatal agencies. The present competitive position of GMC (as identified by city stakeholders) has been presented in the table below.

Parameter	Scale	Remarks
Efficiency in Governance	Low	e-Governance reform is not implemented. Transfer of 12 schedule functions to ULB is still pending.
Competitive economic growth	High	Gangtok has high potential in hospitality sector.
Sustainable environment	Medium	Providing administrative powers to GMC, may provide more sustainable environment to the city
Efficient Infrastructure	Low	Lack of sewerage and storm water drainage system and solid waste disposal mechanism
Skilled and motivated workforce	Medium	The total workers percentage in the city is only 44%.
Tourism Infrastructure	Medium	Tourism infrastructure is low (sign boards, public transport, etc.)

Table 80: Competitive position of the city

15.1 SWOT Analysis

The SWOT analysis gives a cursory snapshot of existing potentials that favour growth in the city. Further, issues curbing the city development are discussed. The ranking of importance in a scale of high to medium has been developed through interactions with stakeholders and officials. In case of opportunities and threats, the possibility of occurrence has also been identified.

Gangtok being the most urbanized city and capital of the state offers huge potential for employment opportunities. However, in spite of the conducive environment for tourism, trade and commerce, the city is yet to grow. The table below presents the strength and weakness in the city.

Strengths	Importance
Tourism based economic activity	High
Development of small scale in industrial activities	High
State Capital and Centre for Administrative, Economic and	High
Political power	
High literacy rate & skilled manpower available	High
Weakness	Importance
Role of Municipal Corporation is very low	High

Strengths	Importance
Poor regional connectivity (NH-10 (NH-31A) is the lifeline of the city)	High
No public transport system	High

The following table presents the ranking of identified opportunities and threats in terms of impact on the city and the possibility of occurrence.

Table 82: Opportunities and threats in the city

Opportunities	Possibility of occurrence	Impact on city
Airport under construction	High	High
Gangtok has a potential tourism state among the NE States	High	High
Opportunities for development of trade Medium High		High
and commerce		
External financial assistance (ADB, MoUD etc.)	High	High
CBUD project and potentiality to be JNNURM city in High the second phase		High
Threats	Importance	
High vulnerable for Disaster (Earthquakes, landslides)	High	High
Lack of industrial investment in-spite of	High	High
liberal policies		
Infrastructure deficiencies	Medium	High

15.2 SWOT

Table 83: SWOT Summarized

Strength	Weakness
 The city blessed with nature and religious tourism which is driving the hospitality &service industry of the city; Capital city of the state – (access to all institutions and administration); Due to vicinity to International border, possibility for international trading activities in near future; Availability of developable land in peri-urban area; 	 City economic activities are mostly seasonal due to fragile environment; Due to difficult terrain, provision of infrastructure facilities is major challenge; The city has connected with only one major road (NH-10/NH-31A), which is in poor condition Except hospitality and service sector, city is not providing significant employment opportunities in other sectors;
Opportunities	Threats
 New airport development near Pakyong which will improve the connectivity to the city; Opportunities for development of trade and commerce; 	 High vulnerability levels for establishment of large scale industrial development due to earthquake seismic zone (IV); Unscientific disposal of solid and liquid waste could create environmental hazard;



 Pilgrimage/Buddhist for International 	Inadequate drainage management account unter the high landelide risk and
Market;	accentuates the high landslide risk and
 Natural resources & all Climatic zones, 	has caused building collapses and
 Ecotourism options yet to be explored to improve the further economic development for the city; 	with multi-story buildings

16. City vision, Development goal and Strategies

Stakeholder consultations is the most key aspect while undertaking a planning of a city, as the planning is for the citizens and their views and suggestions are of utmost importance in shaping the future of the city. The CDP aspires citizen to discuss and emanate a Vision and direction for future growth of the city. 'Vision' in the context of the CDP is a vivid and idealized description of a desired outcome that inspires, energizes, and helps the stakeholders in creating a future picture of the city with positive changes. It can also be defined as the position which the city aspires to reach in the medium to long term (beyond 10 years but within 20-30 years). It is important that the vision for a city is defined in simple terms, which all citizens can share and identify with.

In the above context, CRIS team had conducted a wide range of stakeholder consultations in the city. Further, the team in association with UD&HD organized a consultative workshop on 29th January, 2015 at Election Commission hall. The objective of the workshop was to discuss the status and performance of the service delivery and to understand the aspirations of the citizens on city development and framing of the vision for Gangtok. The workshop was attended by the various stakeholders of the city.

The CDP guidelines lay special emphasis on undertaking stakeholder consultation at various stages of CDP preparation. In that context, consultations both in the form of workshop and individual focus group discussions were carried out during the preparation of CDP for Gangtok.

- Inception meeting 2nd December 2013
- Focus group discussions 4th to 6th June, 2014 & 17th & 18th November 2014;
- City level stakeholder consultation- 29th January, 2015

The present chapter provides a documentation of the discussions carried out with various city based stakeholders. Further, the details of the 1st stakeholder workshop conducted in the city for vision formulation has been provided. The sector wise vision, development goals and action plans to fulfil the overall vision for the city has been discussed.

16.1 Stakeholder Consultation

City Development Plan is a vision document of a city, where vision, objectives and strategies for development of city and sectors is formulated. And these are to be formulated by the citizens and stakeholders of the city themselves.

Moreover, the Government of India has envisaged the revised CDP preparation process through consultative and participatory approach. This requires the involvement of various stakeholders at the ULB, and state level. In view of this, CRIS team conducted consultative meetings with city wide stakeholders to discuss the status and performance of the service delivery mechanism and aspirations of the citizens on city development, and to ensure a participatory and inclusive development process.

Further, CRIS team has carried out prioritization exercise during consultations with various stakeholders about priority sectors for service improvement. The table below presents the priority sectors suggested by the stakeholders.



Sector	Requirement	Priority
Urban transportation	Development of sustainable public transport for Gangtok city (may be ropeway).	1
	Pedestrian friendly facilities, multi level car parking, Junction improvements, ring roads (as suggested by Structure Plan, CMP), other transport related infrastructure facilities	
Sewerage and sanitation	Underground drainage system with safe disposal and treatment of sewage	2
Strom water drainage	Channelizing the Jhoras, embankments of storm prone areas	3
Solid waste management	Scientific landfill at the dumping yard and waste recovery mechanisms	4
Water supply	Improve the water supply coverage area and duration of supply (may be 24x7);	5
Urban poverty	Provide the basic infrastructure facilities in slum areas and provide affordable housing	6
Environment Management	Development of parks, pollution free mobility options	7
Promotion of local economy	Creation of infrastructure for local market activity;	8
Governance	e-Governance, Online payment kiosks;	9

16.2 Consultative meetings

The team has conducted stakeholder consultations with Government department officials of various Parastatals agencies, Business and trade organisations like chamber of commerce, Sikkim Taxi Drivers Association, Damodar Ropeway, Hotel & Restaurant association, etc. Further, the views of academicians and city level CBOs and NGOs have been gathered. Focussed group discussions have been conducted at identified slums. The table below presents a snapshot of various categories of consultations carried out in the city.

Table 85: List of consultations with UD&HD officials

S.No.	Stakeholder
1	Shri L B Chhetri, Special Secretary
2	Shri. R.D. Bhutia, Chief Engineer
3	Shri. Rajesh Pradhan, Additional Chief Town Planner
4	Shri. Dinker Gurung, Joint Chief Architect-Town Planner
5	Ms. Barsha Gurung, Asst. Architect/Planner

Table 86: List of consultations with GMC officials

S.No.	Stakeholder
1	Shri. Shakti Singh Chaudhary, Deputy Mayor

S.No.	Stakeholder
2	Shri. C.P.Dhakal, Commissioner

Table 87: List of consultations with parastatal agencies

S.No.	Stakeholder
1	Shri. KPT Bhutia, Additional Chief Engineer, WS&PHED
2	Shri. A.B. Subba, Superintendent Engineer, WS&PHED
3	Shri.L.P.Chettri, Director, SIPMIU
4	Shri. Dilip Sharma, Project Engineer, SIPMIU

Table 88: List of Academicians and business organisations

Sr. No	Stakeholder
1	Shri. Santhosh Singh, Vice President, Sikkim Chamber of Commerce
2	Shri.Chhatra Singh Singhi, Architect
3	Shri. Parayan Dixit, Architect
4	Shri. Arson Suba, Architect

Table 89: List of CBOs/NGOs

Sr. No	Stakeholder
1	Shri. Dilip Dhahod Travel Agents Association of Sikkim (TAAS)
2	Shri. Chamling Sikkim Local Taxi Drivers Association

16.3 Interim Level Stakeholder Consultation

The city level stakeholder consultation was held on 29th January 2015 at Sikkim State Election Commission Office, Gangtok. There was significant participation from various institution during the workshop. The Deputy Mayor, Special Secretary and Commissioner of Gangtok Municipal Corporation and several senior officials from urban development and housing department were participated. A brief presentation of the Preparation of Revised City Development Plan was delivered by CRISIL Team, and the key points that emerged out of the discussions were as follows:

The workshop continued for about three hours. The list of stakeholders present during the workshop is provided in the figure below.

Figure 53: Stakeholder consultations at Interim Level



During the consultation, the consultants made aware all the stakeholders with the process of the revised CDP preparation and presented sector wise findings and challenges in infrastructure development and management and sought opinion and suggestions of the stakeholders on the key focus areas and strategies for infrastructure improvement. Following are the key issues and strategies suggested by the stakeholders who attended the workshop:

Following table provide the key issues identified in the each sector during the city level workshop.

Sector	Issues Raised by Stakeholders
Water Supply	 Water supply duration is less than 2 hours; Quantity of water is insufficient; Need for improvement in water supply coverage area; Grievance redressal is negligible;
Sewerage and Sanitation	 The existing network is intermittent and open in many areas; There is no check on households admitting night soil into the open drains;
Solid Waste Management	 Waste being dumped openly; No municipal waste recycling plant; Composting plant is not working properly; The existing landfill site beside river is creating serious health hazards;
Strom Water Drainage	 Lack of collection and recycling methods to utilize the rainwater runoff
Traffic and Transportation	 Lack of sufficient parking facilities in the city; Existing RoW in many of the major roads very narrow; Inadequate Road Infrastructure – narrow carriageways, junctions, signage and traffic management, etc; Several road stretches within the city is vulnerable to floods Low Share of Public Transport resulting in traffic menace and environmental degradation; There are no designated terminal facilities for goods vehicles; Required more ropeway connectivity
Municipal Finance and Governance	 Public disclosure of budget books has not been initiated

Table 90: Key issues raised by Stakeholders

Sector	Issues Raised by Stakeholders
	 Absence of e-Governance system;
Urban Environment	 Air and sound pollution is increased significantly due to increase of vehicle emission;
	 Several natural water outlets are polluted with solid waste;
Urban Poverty and Social Infrastructure	 Most of the slums are located on steep, unstable and landslide prone slopes, thus increasing the vulnerability of the poor people in terms of health, natural hazards and safety;
	 Garbage from the slum areas are generally thrown in the Jhoras and slopes creating environmental pollution;
	 Most of the slums are non-notified in Gangtok and not having proper infrastructure facilities
Spatial Planning and	 Drainage and landslide issues need to be addressed holistically;
Land Use	 Commercial units need to be earmarked for an organized growth pattern as there is no proper land use pattern in Gangtok;
	 Decentralization of urban growth required
	 City lacks public parks and play grounds;
Tourism and Heritage	Location signage and guidebooks required for tourists;Protect the heritage and culture of Gangtok

At the end of the session, the stakeholders also discussed on the emerging "Swachh Bharat Mission and Smart city" concepts and suggested that Gangtok should also be developed along these lines and awaited for more detailed policy of Government of India in this respect.

16.4 Potential, Challenges and Aspirations

The stakeholders have also shared their views on the key potential areas of the city, the challenges and their aspiration for Gangtok.

The Potential, Challenges & Aspirations	Views
Special Features of Gangtok	 Tourism, Hospitality and Culture Clean City
Key suggestions for development of Gangtok	 Infrastructure development key areas Treffic and transportation (Reneways, public transport and
	parking);
	 Solid waste Management (Scientific landfill site & waste recycling);
	 iii. Local recreational places (Parks, Gardens, playgrounds); iv. Public toilets
	 Proper planning and strict implementation (Land use control, decentralized economic activities);
	 Slum free and eco-friendly city development
	 Comprehensive planning for addressing all problems
	 More public participation in city planning activities;
	 e-Governance

Table 91: The Potential, Challenges & Aspirations



The Potential, Challenges & Aspirations	Views
Aspirations	Most beautiful and eco-friendly city; andEnvironmentally safe and clean city.

16.5 Vision Statement

Subsequent to the group discussion on the issues and strategies, the discussion carried out on the city vision. The City vision has been framed based on the common consensus emerged among the stakeholders during the workshop. The vision statement has been framed to balance the competing demands rising from the various sectors as well as from the different stakeholder in the city.

The Gangtok city has set its goal for ensuring a multi-dimensional development of the basic infrastructure to keep abreast of the unprecedented growth of the city in recent years; an efficient and sustainable service delivery mechanism and amelioration of the living conditions of all its citizens.

Keeping in the view of various tourism based economic activities in the city and the existing infrastructure status in the city, the vision for Gangtok city has framed as;

Develop a clean and eco-friendly safe city by emphasizing on tourism and culture by 2021

17. Sector Plan, Strategies and Investment Plan

Sector plans in line with the identified vision for the city has been prepared through a comprehensive process of gap assessment and through stakeholder consultation. This assessment has also led to the identification of sector specific strategies, implementation actions, and associated reforms with specific inputs from stakeholders too.

The strategies adopted primarily have three dimensions: improving the service delivery by efficiency measures, improving service delivery by creating infrastructure assets: and improving the governance aspects. This section summarises the sector plans and capital investments required for creating infrastructure assets and various strategic interventions required in the implementation of such projects. The phasing of the identified projects and investments is based on the following principles:

- Priority needs, with developed areas receiving priority over future development area
- Inter and intra-service linkages, viz. water supply investments shall be complemented by corresponding sewerage/sanitation improvements
- Size and duration of the requirements, including preparation and implementation period
- Project-linked revenue implications

The need for the CIP is on account of:

- Assessment of city growth and infrastructure needs
- Scheduling of investments for on-going projects
- Assigning of priorities within the constraints of available financial resources

The CIP is the multi-year scheduling of identified and prioritized investments. The scheduling or phasing of the plan is based on:

- Studies of fiscal resource availability (for new investments and O&M),
- Technical capacity for construction and O&M, and
- The choice of specific improvements to be carried out for a period of four to five years.

17.1 Institutionalizing CIP

The CIP is an important element and is significant in terms of the city's management process and sustainability with regard to the delivery of basic services. The CIP also provides a framework for the annual budget cycle for the future 6-10 year period. The CIP identifies the roles and responsibilities of various stakeholders in the implementation of identified projects. The CIP involved the identification of public capital facilities to cater to the demand of the city population for the medium and long term infrastructure needs.

The project identification has been carried out through a demand-gap analysis and the stakeholder consultation. Further, project prioritisation and strategising of the investments/phasing of investment are based on the strategies listed out under each service sector as identified through stakeholder consultations. The projects derived are aimed at ensuring the optimal and efficient utilisation of existing infrastructure systems and enhancing the capacity of the systems/services to cater to the



demands of future population additions. Certain projects have been identified in consultation with the stakeholders.

The CIP and forecasted future needs for provision of capital facilities under each identified sector are presented below. These assets will help to universalise services for the current population as well as accommodate the expected increase in population.

In sectors where long-term planning is required (for example, source development for water supply, sewerage, etc.), a 25-year planning horizon is considered. Assets created in such sectors consider the projected population in this horizon. These infrastructure assets would not only guarantee services to the citizens but also signal a proactive commitment to potential investors considering the region.

17.2 Water supply sector plan

The key challenges with respect to water supply sector are that, Gangtok has increased not only in terms of population but also in terms of built-up areas. The growth has been causing immense problems in laying of planned water distribution, service pipe grids, water reservoirs, control point, distribution chamber, etc. The existing source of water supply is predominantly through spring and surface water sources which are prone to environmental degradation. The distribution system in the city are based on gravity flow. Leakages develop at many points in the pipeline grid, resulting in wastage of water. Also, there is a huge amount of unaccounted water, primarily due to distribution losses, pipe leakages, illegal tapping, mechanical damages, etc. Pumping is required for water supply in Burtuk-I, Chandmari, and Burtuk-II, as they are at a higher altitude.

As stated in the water supply assessment, the SIPMIU is implementing Water supply improvement project in Gangtok city in three trenches, under ADB assisted North Eastern Regional Capital city Development Implementation (NERCCDI) programme. The project involves laying of distribution network, construction of ESRs and metering (domestic and bulk) in the 15 wards of GMC. Hence the sector plan has been developed address the issues of water transmission, augmentation of treatment capacity and development of SCADA system.

	Water Supply Sector
Sector goals	 100% coverage of water supply system in the city The quality of the water should meet the CPHEEO standards. Undertake tariff revision and reduction to achieve 100% O&M cost recovery Minimize the energy consumption during water supply operations
Design parameters	 Base year as 2014 and design year as 2041 Demand estimation based on the projected population for GMC Additional floating population of 0.12 lakh for the base year and 0.33 lakh for 2041. Daily water supply demand (182 LPCD) calculated on the basis of daily per capita water supply norm (135 LPCD +15% Un accounted for Water+10% consideration to account for floating population+10% firefighting service demand) Quality of water as per CPHEEO standards 100% treatment capacity 33% of water supplied as storage capacity Cost recovery through user charges (100% O&M expenses)

Table 92: Water supply sector plan

Water Supply Sector							
Demand gap	Component	2014	Curren	it	2021	2021 20	
assessment			ga	p (Sho	ort term)	(long	
				Demand	Gap	Demand	Gap
	Source (Daily Supply in MLD)	25.0	0.	0 33.1	8.1	47.1	22.1
	Treatment capacity (% of Water Supply)	29.3	0.	0 33.1	3.8	47.1	17.9
Desired		2014	201	7 2019	2021	Remarks	
outcomes	Network coverage to households (%)	66%	70%	% 80%	90%	-	
	Per capita supply (LPCD)	135	13	5 135	135	-	
	Extent of metering (%)	0%	20%	% 40%	60%	-	
	Quality of water	100%	100%	6 100%	100%	-	
	Non-revenue water	40- 45%	35%	% 30%	20%	-	
	Cost recovery	96%	100%	6 100%	100%	-	
Action Plans	Activities						
Increase the household level coverage	 Increase wa Provide wat areas. 	ter supply er supply t	coverage to newly c	through indiv leveloped/dev	idual serv veloping a	rice connect areas and ur	ions. ncovered
Comprehensive Water Supply Plan	 This focuses on source augmentation, adequate storage, and distribution network and treatment facilities for future requirement. 						
Operation and Maintenance Plan	 This focuses on development of the asset inventory. Conducting workshops on water supply and other services to educate the citizens. Preparation of training calendar to impart training to all the staff members throughout the year on O&M of assets Trainings for expenditure control and reduction of O&M cost on key services. 						
Unit Rates	Component		U	Init	Unit	Cost (Rs in	Lakhs)
	Distribution tunnel		L	S			30000.00
	Treatment capacity		Ν	1L			50.00

17.2.1 Capital Investment Plan

Based on the above key requirements in the water supply sector, the capital investment plan for water supply project is presented in the below table.



Table 93: Water supply capital investment plan

Project	Sub project	Estimated cost in Rs. Crores
A) Augmentation of Water supply source	1. Augmentation of additional 22 MLD source for Gangtok.	18.6
B) Main trunk line development	1. Construction of tunnel for water supply distribution	300.0
C)Treatment capacity and clear water mains	1. Construction of Water Treatment Plants (WTPs) with a capacity of 17.9 MLD for Gangtok city for 2041 demand	10.7
D) Installation of SCADA system	 Installation of SCADA system to monitor the water supply losses in the distribution 	2.0
Total investment identified for 204	331.3	
Total investment required for 202	1	315.6

Note: The investment for training and capacity building for operation and maintenance plan has been included in the urban governance sector.

17.2.1 Project details

The key projects and project details in water supply sector is presented in the below table.

Table 94: Water	^r supply	project details
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Project	Project details
A) Augmentation of Water supply source	 The project involves development of 22 MLD source in order to meet the future requirement for the ultimate population of 2041. The estimated cost is inclusive of construction of raw water pipe lines.
B) Main trunk line development	 The project involves construction of tunnel for water supply distribution.
C)Treatment capacity and clear water mains	 The project involves construction of additional treatment capacity of 17.9 MLD to serve the demand for the year 2041.
D) Installation of SCADA system	 One of the key strategies suggested by the stakeholders is to develop the existing water supply system to 24x7 water supply system. This suggested system would be sustainable only if 100% metering is achieved at intake and outflow points and at the consumer end. Further, in order to prevent transmission and distribution losses, regular water monitoring and SCADA system has been proposed.

17.2.2 Phasing of investment

The phasing of investment under water supply sector for the various components has been presented in the table below:

Se	ector/Component	Impleme nting agency	Total	201 5- 16	201 6- 17	201 7- 18	201 8- 19	201 9- 20	202 0- 21	202 1- 22
						(Rs	. In Cr	ore)		
А	Augmentation of Water supply source	WS& PHED	9.3	0.0	0.9	2.8	2.8	2.8	0.0	0.0
в	Main trunk line development	WS& PHED	300.0	0.0	30. 0	60. 0	60. 0	60. 0	60. 0	30. 0
С	Treatment capacity and clear water mains	WS& PHED	5.4	0.0	1.1	2.1	2.1	0.0	0.0	0.0
D	Installation of SCADA system	WS& PHED	1.0	0.0	0.2	0.4	0.4	0.0	0.0	0.0
Тс	otal		315.6	0.0	32. 2	65. 3	65. 3	62. 8	60. 0	30. 0

Table 95: Water Supply Projects Phasing

17.2.3 Possibility of PPP

The entire project from source augmentation to metering of water connections can be developed on the public-private partnership mode.

Under PPP, WS & PHED would undertake implementation of O&M of water supply system which involves the following steps:

- WS & PHED shall fix the tariff for water user charges.
- Handover the assets to the operator for operation and maintenance
- Billing and collection of the water charges should be done by the private operator.
- The assets would be maintained by the private operator, and GMC shall pay revenues to the private operator.

Under the PPP model, the developer would have the following responsibilities

- The entire project can be awarded for a period of 30 years
- Developers can bid on either tariff required to operate and maintain the project or annuity support from WS & PHED

Key service level parameters

Ws&PHED need to set performance parameters for the private developer to be obliged during the contract period. The performance parameters would in the area of;

- daily hours of supply
- supply levels as stipulated by WS&PHED
- quality of water as per CPHEEO norms
- Improvement in coverage of water supply connections
- Reduction in non-revenue water
- Improvement in collection efficiency
- Frequency of billing of water bills
- No. of complaints received

Key note:



WS&PHED would require to appoint a transaction advisor to undertake a detailed feasibility assessment, preparation of bid documents (request for qualification – RFQ, request for proposal – RFP), and bid process management leading to award of contract to private developer.

17.3 Sewerage and Sanitation sector plan

A large number of developing areas are still to be covered by the sewerage system, namely, Upper Sichey, Development Area, Tashi Namgyal Academy (TNA) area, Burtuk, some parts of Tadong, and Lower Tadong area. About 55% of the population does not have safe sanitation facilities, which results in health hazard in the city. The existing sewerage system in some parts of the town has become obsolete and is not functioning.

As per the gap analysis, the city requires 29 MLD capacity of sewerage treatment plan and 139 km sewer lines by the end of 2041. Also, for the short term requirement (2021), the city requires 18 MLD STPs .The sector plan for sewerage and sanitation system in the city has been presented in the table below.

Sewerage and Sanitation Sector							
Sector goals	 Ensure 100% treatment of sewerage water and safe discharge into the rivers/water bodies. 						
	 Explore the possibility of reuse and recycled of wastewater 						
	 Maximize the c 	ost recov	ery and co	llection effic	iency		
Design	Base year as 2	014 and 0	design yea	r as 2041			
parameters	 Treatment cap 	acity – 80	% of water	supply			
	 Sewerage pur the city 	nping syst	ems – as p	per the syste	em desig	n and topog	raphy of
	 Sewer network 	would co	ver 75% of	f road netwo	ork in the	city	
	 Household leve supply connect 	el coveraç tions (80-9	ge – Sewei 90%)	rage connec	ctions as	percentage	of water
	 Public toilets a 	s per the	requiremer	nt in the slur	ms and p	ublic areas.	
Demand gap	Component	2014	Current	202	1	204	1
assessment			gap	(Short term)		(long term)	
				Demand	Gap	Demand	Gap
	UGD network (km)	70.0		90.9	20.9	109.9	39.9
	Sewerage Treatment Plant (MLD)	8.0	0.0	26.4	18.4	37.7	29.7
Desired		2014	2017	2019	2021	Remarks	
outcomes	Sewerage network coverage	90%	100%	100%	100%		
	Cost recovery on sewerage services	40%	50%	60%	70%		
Action Plans	Activities						
Comprehensive sewerage plan	 Achieve 100% coverage of sewerage network within city limits Replace the existing out-dated sewerage network 						

Table 96: Sewerage sector plan

	Sewerage and Sanitati	on Sector				
	 Explore cost effective STPs to meet the present and future demand Explore treatment technologies which consume less area 					
Institutional strengthening and capacity building	 To develop sludge management in initial phase and phase out onsite sewage disposal mechanisms. Carry out mapping of the onsite sewage disposal facilities in the city. The faecal sludge management (FSM) could be carried by private operators registered with the ULB. Hence investment has not been identified towards FSM. 					
Operation and maintenance plan	 Develop the asset inventory Conduct the workshops on sewerage sector to educate the citizens Prepare the training calendar and provide trainings to all the staff members throughout the year on O&M of assets 					
Unit Rates	Component	Unit	Unit Cost (Rs in Lakhs)			
	UGD network	Km	52.80			
	Sewage Treatment Plant	MLD	98.40			
	Sewerage cleaning equipment	Nos.	100.00			
	Community toilets	Nos.	12.00			

17.3.1 Capital Investment Plan

Based on the above key requirements in the sewerage and sanitation sector, the capital investment plan for 2021 and 2041 has been estimated and presented in the below table.

Table 97: Projects identified	I and phasing –	Sewerage and	sanitation
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Project	Sub project	Investment estimated in Rs. crore
A. Construction of Under Ground Sewerage network for 2041 for Gangtok.	1. Construction of Under Ground Drainage of 39.9 kms for 2041 for Gangtok city including the pumping chambers and trunk sewers.	21.05
B. Construction of Sewerage Treatment Plant	1. Construction of 29.7 MLD Sewerage Treatment Plant for 2041.	29.21
C. Procurement of Sewerage cleaning equipment	1. Procurement of sewerage cleaning equipment.	4.0
D. Development of public sanitation facility	 Construction of 6 public toilet blocks in Gangtok for 2041²⁶. 	0.72
Total investment required for 204	54.98	
Total investment required for 202	27.49	

²⁶ It is recommended that facilities for specially able persons should be provided in all the public toilets.



17.3.2 Project details

The key projects and project details in sewerage sector have been presented in the below table.

Table 50. Flojecis Delais – Sewerage and Samilation	Table 98: Proj	ects Details -	- Sewerage	and	sanitation
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Project	Project details
A. Construction of Under Ground Sewerage network for 2041 for Gangtok.	 It has been estimated that a network of 39.9 km of branch/house sewers would be required by 2041. The project also comprises laying of trunk sewers and pumping stations in the city.
B. Construction of Sewerage Treatment Plant	 The project involves development of 29.7 MLD sewerage treatment plant for Gangtok city by 2041.
C. Procurement of Sewerage cleaning equipment	 Procurement of sewerage cleaning equipment to carry out desiltation of drains has been estimated.
D. Development of public sanitation facility	 Investment has been identified for the development of community toilets in identified public areas and identified slums. Following are the recommended areas for locating the public toilets: Lalbazaar, MG Road, Kanchendzonga Market area, Diroli rope way junction. In order to ensure safe and hygiene way of disposal of the sewage disposed from the public toilets and ensure recyclability of the waste generated, modular compost toilet models could be installed in public areas and slums. A proto type of the modular toilet developed by Jindal steel under the Swachh Bharat Mission has been presented below: Figure 54: Proto type of modular and recyclable public toilet Source: http://www.indiacsr.in/en/jindal-stainless-launches-first-of-its-kind-stainless-steel-modular-toilets

17.3.3 Phasing of investment

The phasing of investment has been carried out for short term horizon (2021). The sewerage project components have been divided into various components and timelines have been proposed for

implementation purpose. The phasing of investment and implementing agency for sewerage and sanitation sector for 2021 has been presented in the table below.

Table 99: Proje	ct Phasing -	Sewerage and	sanitation
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Se	ector/Component	Implementi ng agency	To tal	201 5- 16	201 6- 17	201 7- 18	201 8- 19	201 9- 20	202 0- 21	202 1- 22
					((Rs. In	Crore	s)		
A	Construction of Under Ground Sewerage network for 2041 for Gangtok	WS&PHED	10 .5	0.0	1.1	2.1	2.1	2.1	2.1	1.1
В	Construction of Sewerage Treatment Plant	WS&PHED	14 .6	0.0	2.9	5.8	5.8	0.0	0.0	0.0
С	Procurement of Sewerage cleaning equipment	WS&PHED	2. 0	0.0	0.8	1.2	0.0	0.0	0.0	0.0
D	Development of public sanitation facility	WS&PHED	0. 4	0.0	0.1	0.2	0.0	0.0	0.0	0.0
Тс	otal		27 .5	0.0	4.9	9.4	7.9	2.1	2.1	1.1

17.3.4 Possibility of PPP

WS&PHED could undertake Construction, Operation, and maintenance of STPs under PPP model:

- Invest WS&PHED's financial contribution and take care of any additional cost under the project
- The project can be awarded for a period of 30 years

Under the PPP model, the developer would have the following responsibilities

- WS&PHED shall handover the land for construction of STPs.
- O&M of STPs has to be carried out by private operator as per the contract period.
- The operator would be responsible for the O&M of STPs and further selling of the treated sewerage water to potential users.
- The revenue sharing between WS&PHED and the private operator can be explored.
- WS&PHED can ask private developer to consider selling of treated water as part of contract
- WS&PHED need to set performance parameters for the private developer to be obliged during the contract period.
- The annuity payment should be a factor of performance parameters achieved by the developer

Key service level parameters

- The performance parameters would in the area of
 - Quality of treated water
 - Number of closure days of STP

Key note

The above model is indicative. WS&PHED would require to appoint a transaction advisor to undertake a detailed feasibility assessment, preparation of bid documents (request for qualification – RFQ,



request for proposal – RFP), and bid process management leading to award of contract to a private developer.

17.4 Solid Waste Management sector plan

As discussed in the Solid Waste Management sector assessment, the city suffers from unhygienic disposal of waste in open dumping areas posing threat to public health; Non-availability of scientifically designed landfill; inadequate number of vehicles and equipment for efficient collection and transportation. In order to overcome this, investment has been identified towards purchase of 82 MT rated capacity vehicles, 50 MT treatment capacity and 17 acres of landfill site. The sector plan for Solid Waste Management in Gangtok has been presented in the table below.

Table 100: Solid Waste Management sector plan

	Soli	d Waste	Managemo	ent Sector			
Sector goals	 Effective implementation of outreach mechanisms to improve door-to-door collection and segregation at source Improve the infrastructure related to treatment of waste (to ensure recovery of at least 50% waste collected) Develop Naidu pet dumping yard as a regional landfill site with scientific closure mechanism Introduce new solid waste management user charges 						
Design parameters	 Coverage of all households under the door-to-door waste collection system Segregation of waste at source – (ensure 70 % of waste would be segregated at the source) Optimum fleet utilization (No. of trips/ vehicle/ day - average minimum of 2 Desired SWM treatment capacity – 50% of generated waste Desired landfill site – 50% of the waste generated 				system. ould be im of 2)		
Demand gap assessment	Component	2014	Current gap	20 (Shor)21 t term)	204 (Iona t	1 erm)
				Demand	Gap	Demand	Gap
	Vehicles for transportation of waste (capacity in MT)	46	12	87	41	125	79
	Waste Treatment (Tonnes)	0	0	35	35	50	50
	Landfill (in acres)	5	0	5	0	22	17
Desired		2014	2017	2019	2021	Remarks	
outcomes	Door-to-door waste collection	0%	50%	80%	100%	-	
	Segregation at source	0%	50%	80%	100%	-	
	Mechanised waste handling	25%	50%	80%	100%	-	
	Waste treatment capacity	0%	10%	30%	50%	-	

	Soli	d Waste	e Managem	ent Sector		
	Scientific waste disposal	0%	75%	80%	100%	-
	Cost recovery of O&M	0%	80%	100%	100%	-
	Private sector participation		50% primary waste collection	100% primary waste collection	Complete collection, transport, treatment, and disposal	-
Action Plans	Activities					
Door-to-door waste collection	 City level taskforce could be appointed for the effective implementation of the programme and further to achieve the desired goals. 					
Source segregation and collection of commercial waste	 The segregation of biodegradable and non-biodegradable wastes should be done at the source level. This segregation of waste would improve the recovery from waste collected since the calorific value of the dry waste is not affected. 					
Composting of organic waste	 About 50% of the waste generated in the city is organic in nature. Hence, the technology and treatment plant should be in line with the waste generated in the city. It is recommended that animal waste collected in the city could be used in the biogas plants. 					
Scientific Iandfill	 A regional landfill site with closure mechanism for inorganic wastes is to be developed in accordance with the CPHEEO norms. 					
IEC	 For effective solid waste management in the city, regular awareness campaigns have to be conducted in the city on 4R strategy (reduces, reuse, recycle, and recover). 					
Unit rates	Component		U	nit	Unit C	ost (Rs. in Lakhs)
	Vehicle capacity		Т	onne		2.50
	Treatment capacity		Т	onne		18.00
	Landfill facility Acres				24.00	

17.4.1 Capital Investment Plan

Based on the above key requirements in the SWM sector, the capital investment plan for Solid waste management is presented in the below table.

Table 101	: Projects	identified -	Solid	waste	management
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Project	Sub project	Investment estimated in Rs. crores
A. Improvement of Primary collection system for	1. Purchase of pushcarts for Door to Door collection	4.7
Gangtok city for 2041	2. Purchase of community bins along major roads	



Project	Sub project	Investment estimated in Rs. crores
	 Development of scientific resource management and IEC 	
B. Fleet augmentation for Secondary transportation	1. Purchase of 79 MT rated capacity vehicles for secondary transportation.	2.0
C. Construction of treatment facility	1. Construction of 30 MT waste processing and compost plant for 2041	9.0
	2. Construction of 20 MT RDF facility	
	3. Construction of Biogas plant	
D. Development of scientific landfill facility	1. Construction of 17 acres landfill facility for 2041 for Gangtok	4.1
Total investment required for 204	1	19.8
Total investment required for 202	1	9.9

17.4.2 Project details

The key projects and project details in SWM sector is presented in the below table.

Table 102: Projects Details – Solid waste managemen

Project	Details
A. Improvement of Primary collection system for Gangtok city for 2041	 The components envisaged under primary collection are purchase of push carts (1 push cart for 350 Household) and community bins along the main roads. Information and education campaigns (IEC) are recommended for effective primary collection and segregation at source.
B. Fleet augmentation for Secondary transportation	 Investment has been proposed for purchase of tractors, compactors, JCB and heavy transport vehicles. Development of transfer stations with compactors and recycling units
C. Construction of treatment facility	 Investment envisaged towards development of compost plant cum waste processing plant, RDF plant and Bio gas plant. The capacity has been designed to cater to 50% of the waste that would be collected by 2041.
D. Development of scientific landfill facility	 The area required for scientific landfill has been projected in view of accumulated waste and future waste generation. It is assumed that on development of treatment facility, about 50% of waste would be sent for landfilling. Accordingly, the investment has been envisaged for the development of a landfill of 17 acres with required infrastructure.

17.4.3 Phasing of investment

The SWM project components have been divided into various components for implementation purpose. Further, the timeliness and implementing agency have been proposed for each component, and the same have been presented in the table below.

Sector/Component		Implem enting agency	To tal	201 5-16	201 6-17	201 7-18	201 8-19	201 9-20	20 20- 21
					(Rs.	In Cro	res)		
A	Improvement of Primary collection system for Gangtok city for 2041	GMC	1.0	0.0	0.4	0.6	0.0	0.0	0.0
в	Fleet augmentation for Secondary transportation	GMC	1.0	0.0	0.4	0.6	0.0	0.0	0.0
С	Construction of treatment facility	GMC	4.5	0.0	0.9	1.8	1.8	0.0	0.0
D	Development of scientific landfill facility	GMC	2.1	0.0	0.4	0.8	0.8	0.0	0.0
		Total	9.9	0.0	2.2	4.2	3.6	0.0	0.0

Table 103: Phasing of investment – Solid waste management

17.4.4 Possible PPP interventions

- PPPs in SWM are in accordance to nature of work, viz.,
 - Collection and transportation of waste
 - Landfilling
 - Composting
- GMC can explore PPP in collection and transportation of waste under which
 - GMC would procure the vehicles or can ask a private developer to deploy vehicles and manpower
 - Undertake door to door collection of waste from all residential and commercial premises
 - Such contracts can be awarded for 1 or 2 years and can be renewed based on performance
 - The private operator can bid on the tipping fee per ton of waste collected
 - GMC need to set performance parameters for the private developer to be obliged during the contract period. The tipping fee should be a factor of performance parameters achieved by the developer
 - The performance parameters would in the area of
 - Coverage of door to door collection of waste
 - Amount of waste collected
 - Complaints received
- Landfilling This can be developed on BOT basis. GMC would provide the land to the developer, and the developer shall be responsible for the construction and O&M of the facility. The private developer can bid on annuity support required to construct and operate and maintain the project.
- Composting GMC may create market by floating tenders wherein the developer can be asked to set up a composting facility, and the maximum contribution from the revenues bid by the developer shall be the winning bid.



GMC would require to appoint a transaction advisor to undertake detailed feasibility and preparation of bid documents (request for qualification – RFQ, request for proposal – RFP) and bid process management leading to award of contract to private developer.

17.5 Storm Water Drainage Sector Plan

As discussed in the sector assessment, the major issues in the storm water drainage sector are due to erosion of Erosion of natural streams; Slope failure and creep, causing damage to the existing structures; Road damages; and Health hazards. In order to improve this situation, project has been proposed to develop 91 kms of primary closed storm water drainage network by 2041. The sector plan with strategies, action plans and proposed projects to improve the storm water drainage sector has been discussed below.

Table 104: Strom Water Drainage sector plan

Strom Water Drainage sector								
Sector goals	 Improve the storm water collection efficiency with proper drainage system Minimize the water logging areas and flooding incidence in the city 							
Design parameters	 Storm water network on all roads and link to major channels. Storm water drains as percentage of road length considered as 130%. Roads with dividers should have drains on either side of the road. 90% of the storm water drains as pucca closed Design of drain sizes according to the rainfall and runoff. 							
Demand gap	Component	2014	Curren	202	21	204	2041	
assessment			yap	(Short	term)	(long	term)	
				Demand	Gap	Demand	Gap	
	Pucca closed drains (km)			66.2	66.2	90.8	90.8	
Desired		2014	2017	2019	2021	Remarks		
outcomes	Storm water drainage network coverage	-	30%	50%	70%	-		
Action Plans	Activities							
Storm water drainage rehabilitation plan	 Identification of water logging areas, contour survey of areas Development of pre-monsoon maintenance plan to include cleaning and desilting of the surface drains 							
Up-gradation of roadside storm water drains	 Upgrade and extend the road side surface drains across the city. 							
Unit Rates	Component			Unit	Unit	Cost (Rs in	Lakhs)	
	Pucca closed drains			Per km			60	

17.5.1 Capital Investment Plan

Based on the above key requirements in the storm water drainage sector, the capital investment plan for storm water drainage is presented in the below table.

Table 105: Projects identified – Storm water drainage

Project	Sub Project	Estimated cost in Rs. Crores	
A. Development of storm water drainage network	1. Construction of 90.8 Kms of storm water drainage network	54.5	
B. Institutional studies and mapping	0.9		
C. Jhoras development			
Total investment required for 2041	55.4		
Total investment required for 2021	27.7		

17.5.2 Project details

The key projects and project details in storm water drainage is presented in the below table.

Table 106: Projects Details – Storm water drainage

Projects	Project Details			
A. Development of storm water drainage network	 The project involves construction of 90.8 kms. of drainage network by 2041. 			
B. Institutional studies and mapping	 Carry our studies for developing contour map and water logging areas with micro delineation. 			

17.5.3 Phasing of investment

The storm water drainage project components have been divided into various components for implementation purpose. Further, the timeliness and implementing agency have been proposed for each component, and the same have been presented in the table below.

Sector/Component		Implem enting	To tal	2015 -16	2016 -17	2017 -18	2018 -19	2019 -20	2020 -21	2021 -22
		agency				(Rs. In	Crores	5)		
A	Development of storm water drainage network	WS&PH ED	27. 3	0.0	0.0	2.7	5.5	8.2	8.2	2.7
в	Institutional studies and mapping	WS&PH ED	0.5	0.1	0.2	0.2	0.0	0.0	0.0	0.0
С	Jhoras development	WS&PH ED	15. 0	0.0	0.0	1.5	3.0	4.5	4.5	1.5
		Total	42. 7	0.1	0.2	4.4	8.5	12.7	12.7	4.2



17.6 Urban Roads, Traffic and Transportation Sector Plan

Due to hilly terrain, the city has limited right of way, inadequate road infrastructure, narrow carriageways, junctions, signage and traffic management, etc. The city does not have proper parking facilities and most of the vehicles have parked on the roads thus adding to the congestion. The city has ribbon development along the primary road network which is one of the major constraints towards capacity improvement of road networks. The city doesn't have a proper public transport system.

Urban Roads and Traffic and Transportation					
Sector goals	 Maximize the share of public transport and reduce traffic congestion Minimize road accidents and improve the pedestrian related infrastructure Improve parking facilities across the city Develop the alternative public transport system (possibly ropeway) 				
Design parameters	 As per structure plan, 15% of land use to be under roads. Ensure minimum 15% of road to have concrete surface. All major roads should have utility corridors for laying of telecom, gas, and electrical infrastructure in future. Streetlight spacing – should be 30 m between the poles 				
Demand gap assessment	The demand gap assessment for Traffic & transportation has been adopted from Gangtok CMP, 2010				
Action Plans	Activities				
Development of public transport system	 Encouraging public transport by developing ropeway network and development of bus bays, bus stands/shelters Regularisation of hawking zones and parking management Development of skywalks and walkways in the city; Prohibition of truck traffic in the city during day time by developing logistic parks 				
Development of Transport Infrastructure	 Widening and upgrading the arterial, sub arterial and collector roads as well as improving the residential streets Development of skywalks/subways, pathways Development of logistics park/truck terminals at outskirts of the city Development of transit centres for changing the modes inside city 				

Table 108: Urban Roads and Traffic and Transportation

17.6.1 Capital Investment Plan

The existing road network of Gangtok city is congested and has limited scope for road widening. Therefore a strategy has been developed for decongesting their roads with two tier ring roads- inner and outer and identification of inner ring road and NH31A for public transport i.e. City Bus service on demarcated bus lanes, widening and strengthening of connecting roads, pedestrian network, side walk and sky walk, strengthening of stairs/ steps connecting road network, ropeway network, inclined trains at selected places, Airport at Pakyong and railway line to Bhusuk via Setipool up to crossing of Assam Lingzey road. Based on the above key requirements in the traffic and transportation sector, the capital investment plan for traffic and transportation is presented in the below table.

Project	Sub project	Estimated cost in Rs. Crores
A. Development of Roa	d 1. Widening and Strengthening of roads (70.94 km)	30.74
Network	2. Development of New Road Links (1.26 km)	3.15
	3. Construction of new bridge (link)	3.51
	4. Construction of Inner Ring Road (23.17 km)	34.91
	5. Construction of Outer Ring Road (25.85 km)	51.93
	6. Road connectivity to greenfield airport proposed in Pakyong	39.26
	7. Road connectivity to proposed railway station	90.00
B. Development Footpaths	 f 1. Footpath improvement (at 9 locations - length 14.5 km); 	2.18
	2. New footpath construction- at grade (at 3 locations- 8 km);	2.00
	3. New footpath construction- Elevated (at 3 locations- 3.9 km)	15.60
	4. Stairs Improvement	0.90
	5. New staircases	3.00
	6. New pedestrian Foot over bridge	40.00
C. Junction Improvements	1. Junction improvements at 11 locations	2.75
D. Bus infrastructure	1. Development of Bus shelters and bus bays	15.26
	2. Development of Bus terminals	30.00
E. Ropeway	1. Development of 15.45 km ropeway in Gangtok city (Refer Annex-7)	154.50
F. Parking	1. Parking at 8 locations	235.07
G. Freight Terminal	1. Construction of freight terminals at 4 locations	85.00
H. Others	1. up gradation of Helipad	5.00
	2. RAAS (Road Accident Analysis System) & RMMS (Routine maintenance Management Scheme	
I. Street lighting	1. Installation of 111 of tube lights, 2166 LED lamps and 46 high mast lamps required by 2041	2.30
Total investment requir	847.06	
Total investment requir	471.66	

Table 109: Pro	iects identified -	- Traffic and	transportation
	jeolo laentinea	manne ana	liunsportation

17.6.2 Project details

The key projects and project details in traffic and transportation is presented in the below table.



Table TTO, Projects Details- Traffic and transportation

Project	Project Details
A. Development of Road Network	 They are of narrow width to accommodate the high volume of traffic, inappropriate geometry high road gradient at certain lengths which require special consideration in projects proposal.
	 Inadequate Carriageway of these roads at various locations creates traffic congestion and bottleneck; Therefore it is proposed to widen and strengthen identified city roads;
	 More than 70 km of road length need to be widen and strengthen to smooth movement of vehicular traffic in the city; To reduce the traffic volume on central spine especially, through traffic inner and outer ring road has been proposed.
B. Development of Footpaths	 There is a long list of footpath stretches that need be constructed or need improvement in existing stretches; New Footpaths and skywalks are also proposed at places, due to heavy pedestrian and vehicular traffic. In many stretches, road widening and provision of footpaths is not possible, due to extended shops along the roads;
C. Junction Improvements	 Most of the junctions in Gangtok city are at acute angles. Improper geometry, make these junctions accident prone and also lead to traffic congestion. Improvement of junctions will lead to free flow of traffic, avoid congestion and also reduce chances of accidents
D. Bus infrastructure	 To avoid movement of Interstate Buses and further congestion inside the city, bus terminals have been proposed;
	 To encourage public transport system, demarcated bus lanes with Bus Shelter and Bus Bays have been proposed
E. Ropeway	 The structure plan has also suggested to strengthen the ropeway network with provision of ropeway towers on all four prominent sites located in the North, South, East and West and additional ropeway stations. This Network will cover almost the whole of Gangtok and take care of its congestion problem;
F. Parking	In Gangtok parking of vehicles is a major problem and may assume a critical dimensions unless appropriate measures are identified and implemented. In the absence of public transport system and heavy tilt of modal split in favour of taxis and cars, the need for organised parking spaces are pressing hard. Due to terrain condition and organic development of the city parking at grade is very difficult hence only multilevel parking facilities at strategic locations could be a solution
G. Freight Terminal	All trucks and tankers enter Sikkkim through either Malli Check post or Rangpo Check post where SNT have their counters. Majority of freight movement is passing through Rangpo check post. At present, the freight vehicle movement is restricted to night hours from Evening 7 P.M to morning 7 A.M. There are no freight terminals in Gangtok. Major roads within the city, as the trucks are parked off street and reduce the carriageway;
H. Others	 The existing Helipad is located in Sichey ward. Presently, the helicopter service is limited and even the frequency is low.

Project	Project Details
	This service is proposed to be upgraded by increasing the frequency of services at least during the peak tourist season;
	 Concrete steps need to be taken for traffic management Maintenance of public vehicles will reduce overall emission, thus reducing pollution and increasing efficiency. The development of RAAS will give inputs for traffic management measure to reduce accidents.
I. Augmentation of Street lighting system	 The uncovered areas may be taken up on priority basis for installation of streetlights.

17.6.3 Phasing of investment

The traffic and transportation project components have been divided into various components for implementation purpose. Further, the timeliness and implementing agency have been proposed for each component, and the same have been presented in the table below.

Sector/Component		Implement ing agency	Total	2015 -16	2016 -17	2017 -18	2018 -19	2019 -20	2020 -21	202 1-22		
36	ector/Component		(Rs. In Crore)									
А	Development of Road Network	UD&HD	142	0	7	8	30	35	35	27		
в	Development of Footpaths	UD&HD	64	0	18	28	18	0	0	0		
С	Junction Improvements	UD&HD	3	0	0	1	1	1	0	0		
D	Bus Infrastructure	SNT	23	0	3	7	9	4	0	0		
Е	Ropeway	UD&HD	77	0	15	15	15	8	8	15		
F	Parking	UD&HD/ GMC	118	0	13	37	35	33	0	0		
G	Freight Terminal	UD&HD	38	0	0	8	15	15	0	0		
Н	Others	UD&HD	8	0	1	1	1	3	3	0		
Ι	Street Lighting	UD&HD	1.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2		
		472	0	56	105	124	98	45	42			

Table 111: Phasing of investment– Traffic and transportation

17.7 Basic Services for Urban Poor Sector Plan

The Slums of Gangtok are characterised by poor sanitation, hygiene and toilet facilities. Also due of unavailability of land, most of the toilets do not have septic tanks and dispose the sewage directly into the jhoras / drains. The sector plan for basic services for urban poor has been presented in the table below.



Basic Services for Urban Poor							
Sector goals	Improve the access to physical and social infrastructure to slum dwellersDevelop livelihood strategies to improve the work force participation						
Design parameters	 New houses to households living in kutcha houses and dilapidated structures in merged areas 						
	 Water Supply – Individual house service connections to households or group connections 						
	 Sewerage - Individual house s 	service connection	าร				
	 Sanitation – Community toilets 	S					
	 Solid Waste Management - Coverage of all slum households under door- to-door collection and awareness campaigns on source segregation 						
Action Plans	Activities						
Integrated development of	 Slum networking strategies to be adopted to improve the services in the slums. 						
slums	 This would help in building the low cost service in the slums (especially in water supply, sewerage, and SWM sector). 						
Rehabilitation of slums	 Pucca housing with infrastructure facilities to be developed in feasible locations. 						
Construction of housing	 The slums in low lying areas and along the natural drains could be proposed for relocation. 						
	 A suitable financing strategy could be developed to minimize the burden on the beneficiaries. 						
	 The beneficiaries could be provided access to banks for availing the long- term housing loans. 						
Livelihood restoration	 Activity centres to be establish 	opment programmes					
Unit Rates	Component	Unit	Unit Cost (Rs in Lakhs)				
	Housing along with Infrastructure development (New layouts)	Per dwelling unit	5				
	Vocational training/Livelihood improvement	Per slum	5				
	Insitu up gradation of existing slums	Per Slum	500				

Table 112: Basic Services for Urban Poor sector plan

17.7.1 Capital Investment Plan

Based on the above key requirements in the basic services to urban poor sector, the capital investment plan for basic services for urban poor is presented in the below table.

|--|

Project				Su	b project	Estimated cost in Rs. Crores		
A.	Develo Housir develo	opment of ng and opment	inf	affordable rastructure	1.	Construction of 1,826 dwelling units for the Urban poor in the city	91.3	
В.	Insitu	development	in	identified	1.	Slum Improvement in 10 identified	50.0	

Project	Sub project	Estimated cost in Rs. Crores
slums	slums	
C. Livelihood development in the city slums	 Establishment of vocational training institutes enhance the skill of slum dwellers 	2.9
Total investment required for 2041	144.2	
Total investment required for 2021	72.1	

Note: The housing demand has been calculated as per the existing number of kutcha houses in the slums.

17.7.2 Project Details

The key projects and project details in basic services to urban poor is presented in the below table.

Table 114: Urban poverty alleviation - Projects Details

Pro	ojects						
Α.	Development of affordable Housing and infrastructure	•	New housing and infrastructure requirement for 1, dwelling units has been projected for the year 2041. It is recommended that in slums where relocation				
	development	•	It is recommended that in slums where relocation is possible, <i>in-situ</i> up-gradation may be taken up.				
В.	Insitu development in identified slums	•	<i>In-situ</i> up-gradation is proposed along the feasible slums.				
C.	Livelihood development in the city slums	•	Vocational training for employment generation and development of social security mechanisms has been proposed in the prevailing slum settlements in the city.				

17.7.3 Phasing of investment

The basic services to urban poor project components have been divided into various components for implementation purpose. Further, the timeliness been proposed for each component, and the same have been presented in the table below.

Table 115: Urban poverty alleviation	on – Phasing	of in	vestme	ent	
	Implomon		201	201	201

Se	ector/Component	Implemen ting agency	To tal	201 5- 16	201 6- 17	201 7- 18	201 8- 19	201 9- 20	202 0- 21	202 1- 22	
				(Rs. In Crores)							
А	Development of affordable Housing and infrastructure development	UD&HD	45 .6	0.0	0.0	9.1	13. 7	13. 7	9.1	0.0	
в	Insitu Redevelopment of identified slums	UD&HD	25 .0	0.0	0.0	5.0	7.5	7.5	5.0	0.0	
С	Livelihood development in the city slums	UD&HD	1. 5	0.0	0.0	0.3	0.4	0.4	0.3	0.0	
Total			72	0.0	0.0	14.	21.	21.	14.	0.0	


Sector/Component	Implemen ting agency	To tal	201 5- 16	201 6- 17	201 7- 18	201 8- 19	201 9- 20	202 0- 21	202 1- 22
		.1			4	6	6	4	

17.8 Social Infrastructure and Heritage Sector Plan

As discussed in the assessment chapter, the key challenges are lack of adequate education infrastructure for pre-primary, primary, and higher secondary education. There is a need for health care infrastructure at both neighbourhood and city level. Socio-cultural infrastructure like community centres are to be developed in identified wards. Further, as discussed in the cultural resources section, integrated heritage linked city development strategies are also proposed to preserve and reuse the identified heritage structures in the city.

Social Infrastructure						
Design parameters	 Schools, hospitals, socio cultural and parks and playground requirements assessed as per URDPFI guidelines 					
Demand gap	Component	2021	2041			
education	Pre-primary, nursery school	66	311			
Infrastructure	Primary school					
	Senior secondary school	22	259			
	Integrated school (with hostel facility)	2	26			
	School for physically challenged	4	39			
Demand gap	Component	2021	2041			
assessment for healthcare	Dispensary	13	150			
infrastructure	Nursing home, child welfare and maternity centre	3	75			
	Polyclinic	2	56			
	Intermediate Hospital (Category B)	9	14000			
	Family Welfare Centre	3	244			
	Diagnostic centre	3	282			
Demand gap assessment for	Veterinary Hospital for pets and animals	0	14			
healthcare infrastructure for animal protection	Dispensary for pet animals and birds	2	68			
Demand gap	Component	2021	2041			
assessment for Socio cultural	Anganwadi - Housing area/cluster	33	45			
infrastructure	Community hall, mangal	11	15			

Table 116: Social infrastructure sector plan

Social Infrastructure						
	karyayala, barat ghar/ library					
	Music, dance and drama centre	2	2			
	Meditation and spiritual Centre	2	2			
	Recreational Club	2	2			
	Old age home	0	0			
Demand gap	Component	2021	2041			
Parks and play grounds	Organised green areas (in hectares)	46	63			
3	Play grounds (in hectares)	45	62			
Action Plans	 Identification of areas for development of new schools and hospitals. Development of schools with hostel facilities and schools for especially abled children. Development of ward level community centers and Anganwadi. Development of night shelters, old age home in the city limits. 					
Strategies for protection of stray animals	 The UD&HD, GMC are responsible for management of stray dog menace in the city. UD&HD, GMC should take up construction of animal protection cells to provide veterinary services for stray animals, In order to avoid indiscriminate killing of the stray animals and spread of diseases. 					
Unit Rates	Component	Unit	Unit Cost (Rs in Lakhs)			
		1.0				
	Pre primary, nursery school	LS	4			
	Pre primary, nursery school Primary school	LS	4			
	Pre primary, nursery school Primary school Senior secondary school	LS LS LS	4 6 10			
	Pre primary, nursery school Primary school Senior secondary school Integrated school (with hostel facility)	LS LS LS LS	4 6 10 12			
	Pre primary, nursery school Primary school Senior secondary school Integrated school (with hostel facility) School for physically challenged	LS LS LS LS LS	4 6 10 12 9			
	Pre primary, nursery school Primary school Senior secondary school Integrated school (with hostel facility) School for physically challenged School for mentally challenged	LS LS LS LS LS LS	4 6 10 12 9 8			
	Pre primary, nursery school Primary school Senior secondary school Integrated school (with hostel facility) School for physically challenged School for mentally challenged Intermediate Hospital (Category B)	LS LS LS LS LS LS LS	4 6 10 12 9 8 100			
	Pre primary, nursery school Primary school Senior secondary school Integrated school (with hostel facility) School for physically challenged School for mentally challenged Intermediate Hospital (Category B) Intermediate Hospital (Category A)	LS LS LS LS LS LS LS LS	4 6 10 12 9 8 8 100 250			
	Pre primary, nursery school Primary school Senior secondary school Integrated school (with hostel facility) School for physically challenged School for mentally challenged Intermediate Hospital (Category B) Intermediate Hospital (Category A) Multi-Specialty Hospital (NBC)	LS LS LS LS LS LS LS LS LS	4 6 10 12 9 9 8 100 250 600			
	Pre primary, nursery school Primary school Senior secondary school Integrated school (with hostel facility) School for physically challenged School for mentally challenged Intermediate Hospital (Category B) Intermediate Hospital (Category A) Multi-Specialty Hospital (NBC) Family Welfare Centre	LS LS LS LS LS LS LS LS LS LS LS	4 6 10 12 9 9 8 100 250 600 65			
	Pre primary, nursery school Primary school Senior secondary school Integrated school (with hostel facility) School for physically challenged School for mentally challenged Intermediate Hospital (Category B) Intermediate Hospital (Category A) Multi-Specialty Hospital (NBC) Family Welfare Centre Diagnostic center	LS LS LS LS LS LS LS LS LS LS LS LS LS	4 6 10 12 9 9 8 100 250 600 65 75			
	Pre primary, nursery school Primary school Senior secondary school Integrated school (with hostel facility) School for physically challenged School for mentally challenged Intermediate Hospital (Category B) Intermediate Hospital (Category A) Multi-Specialty Hospital (NBC) Family Welfare Centre Diagnostic center Veterinary Hospital for pets and animals	LS LS LS LS LS LS LS LS LS LS LS LS LS L	4 6 10 12 9 9 8 100 250 600 65 75 30			
	Pre primary, nursery school Primary school Senior secondary school Integrated school (with hostel facility) School for physically challenged School for mentally challenged Intermediate Hospital (Category B) Intermediate Hospital (Category A) Multi-Specialty Hospital (NBC) Family Welfare Centre Diagnostic center Veterinary Hospital for pets and animals Dispensary for pet animals and birds	LS LS LS LS LS LS LS LS LS LS LS LS LS L	4 6 10 12 9 9 8 100 250 600 65 65 75 30 30			
	Pre primary, nursery school Primary school Senior secondary school Integrated school (with hostel facility) School for physically challenged School for mentally challenged Intermediate Hospital (Category B) Intermediate Hospital (Category A) Multi-Specialty Hospital (NBC) Family Welfare Centre Diagnostic center Veterinary Hospital for pets and animals Dispensary for pet animals and birds Anganwadi - Housing area/cluster	LS LS LS LS LS LS LS LS LS LS	4 6 10 12 9 9 8 100 250 600 65 65 75 30 30 30			
	Pre primary, nursery school Primary school Senior secondary school Integrated school (with hostel facility) School for physically challenged School for mentally challenged Intermediate Hospital (Category B) Intermediate Hospital (Category A) Multi-Specialty Hospital (NBC) Family Welfare Centre Diagnostic center Veterinary Hospital for pets and animals Dispensary for pet animals and birds Anganwadi - Housing area/cluster Community halls	LS LS LS LS LS LS LS LS LS LS	4 6 10 12 9 9 8 100 250 600 65 65 65 75 30 30 30 5 8			



Social Infrastructure					
	Meditation and spiritual Centre	LS	8		
	Recreational Club	LS	8		
	Old age home	LS	10		
	Parks	Per Sq. Meter	0.0007		
	Play grounds	Per Sq. Meter	0.0005		

17.8.1 Capital Investment Plan

Based on the above key requirements in the social infrastructure sector, the capital investment plan for sociocultural infrastructure is presented in the below table.

Project	Sub Project	Estimated cost in Rs. Crores
A. Education Sector	1. Development of school infrastructure	10
B. Health Sector	1. Development of hospital infrastructure	5
C. Socio cultural infrastructure	1. Development of socio cultural infrastructure	4
D. Organised green areas	1. Development of organised green areas	20
E. Play grounds	1. Construction of Indoor Stadium	3
Total investment required for 204	1	41
Total investment required for 202	1	21

17.8.2 Project Details

The key projects and project details in social infrastructure is presented in the below table.

Project	Details
A. Education Sector	 Development of school infrastructure for primary, secondary and higher secondary education. Also, the investment includes the renovation component in existing schools.
B. Health Sector	 Development of Dispensaries, Urban health centres, intermediate hospitals, and super speciality hospital within the GMC limits
	 Construction of protection cell for pet animals, stray dogs and birds.

Project	Details
C. Socio cultural infrastructure	 Construction of ward level community centres, meditation and old age homes, libraries as per the URDPFI guidelines.
D. Organised green areas	 Development of parks at neighbourhood and city level as per URDPFI guidelines. The total area for organised green spaces account to 63 hectares.
E. Play grounds in city	 The project involves development of playground at neighbourhood and city scale with necessary installations and ground development.

17.8.3 Phasing of projects

The social infrastructure project components have been divided into various components for implementation purpose. Further, the timeliness been proposed for each component, and the same have been presented in the table below.

Sector/Component		Impleme nting	To tal	2015 -16	2016 -17	2017 -18	2018 -19	2019 -20	2020 -21	2021 -22
		agency	(Rs. In Crores)							
A	Development of school infrastructure	State Govern ment departm ents	4.9	0.0	0.0	0.5	2.0	2.5	0.0	0.0
В	Development of hospital infrastructure	State Govern ment departm ents	2.4	0.0	0.0	0.2	1.0	1.2	0.0	0.0
С	Development of socio cultural infrastructure	UD&HD	2.0	0.0	0.0	0.2	0.8	1.0	0.0	0.0
D	Development of play grounds	UD&HD	10. 0	0.0	0.0	1.0	4.0	5.0	0.0	0.0
Е	Development of play grounds in Gangtok	UD&HD	1.4	0.0	0.0	0.1	0.6	0.7	0.0	0.0
Тс	otal		20. 7	0.0	0.0	2.1	8.3	10.4	0.0	0.0

Table 119: Socio cultural infrastructure – Phasing of projects

17.9 Urban Environment, Disaster Management Sector Plan

The two major interventions identified under urban environment are development of disaster management cell and strengthening of identified roads prone to landslides by creation of embankments.



Table 120: Urban environment sector strategy

Urban Environment				
Sector goals	Development of landslide protection to ghat roads in the city.Establishment of integrated disaster management cell.			
Action Plans Activities				
Construction of rainwater harvesting pits	 Making rain water harvesting compulsory in large establishments such as shopping complexes, cinema halls, and function halls (This is achieved by modifying the Bye laws to necessitate rain water harvesting structures and does not involve capital investment). 			
Disaster Management	Development of control room or city level service centerDevelopment of emergency control responsive system			

17.9.1 Capital Investment Plan

Based on the above key requirements in the urban environment sector, the capital investment plan for urban environment is presented in the below table.

Table 121: Urban environment- Projects identified

Project	Sub project	Estimated cost in Rs. Crores
A. Disaster Management cell	1. Establishment of emergency control service center	2.0
B. Landslide protection structures along Ghat roads	1. Development of embankments along ghat roads	25.0
Total investment required	27.0	
Total investment required for 2021		13.5

17.9.2 Project Details

The key projects and project details in urban environment is presented in the below table.

Table 122:	Urban	environment-	Pro	jects	Details
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Project	Details					
A. Disaster management cell	 Disaster management cell to be established at GMC to act as the nodal point for all emergency related activities in the city. 					
	 Installation of communication devices to facilitate information dissemination on natural disasters. 					
	 The cell shall facilitate communication to sanitary inspectors during heavy floods for quick clearance in landslide areas. 					
B. Landslide protection structures along Ghat roads	 Development of embankments to ghat roads prone to landslides in the city. 					

17.9.3 Phasing of investment

The urban environment project components have been divided into various components for implementation purpose. Further, the timeliness been proposed for each component, and the same have been presented in the table below.

		Implem enting	To tal	201 5-16	201 6-17	201 7-18	201 8-19	201 9-20	202 0-21	202 1-22
Sector/Component agency			(Rs. In Crores)							
Α	Disaster management cell	UD&HD	1.0	0.0	0.1	0.1	0.3	0.3	0.2	0.0
Landslide protection B structures along Ghat roads				0.0	1.3	1.3	3.8	3.8	2.5	0.0
Total				0.0	1.4	1.4	4.1	4.1	2.7	0.0

Table 123: Urban Environment- Phasing of investment

17.10 Local Economic Development Sector Plan

The projects under Local Economy Development have been identified in view of the vision formulated for the city development. As the vision suggests, the city could be developed as a tourism hub by 2041.

Table 124: Local Economic Development sector strategy

Local Economic Development									
Contor goolo	 Development of Export hub for state agricultural products and handcrafts 								
Seciol goals	 Development of infrastructure to facilitate Tourism related economic activities 								
Action Plans Activities									
Redevelopment of markets in the city	 Relocation of markets in congested areas and structural strengthening of old market areas. 								
Development of new markets	 Areas to be identified in the new areas for development of wholesale vegetable and fruit markets. 								
Regularising street vending in line with Protection of Livelihood and Regulation of Street Vending Act, 2014	 Survey and identification of hawkers in the city Development of infrastructure for regularised street vending activity 								

17.10.1 Capital Investment Plan

Based on the above key requirements in the local economic development sector, the capital investment plan for local economic development is presented in the below table.

Table 125: Local Economic Development – Projects

	Project	Estimated cost in Rs. Crores
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Ρ	roject	Estimated cost in Rs. Crores			
A.	City convention cum business center and cultural Hub	10.0			
В.	Development of local municipal market	5.0			
Т	otal investment required till 2041	15.0			
Т	otal investment required for 2021	12.5			

17.10.2 Project Details

The key projects and project details in local economic development is presented in the below table.

	Table 126: Local	Economic Develo	pment – Pro	iect Details
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Project	Details					
A. Development of Trade & Cultural Centre	 The project involves development of indoor exhibition areas, conference halls and accommodation units with services 					
B. Development of municipal markets	 Construction of covered market areas with amenities; Projects may include improved civic facilities such as paving, water supply, toilets, waste disposal facility, lighting, common storage space, specialized carts for specific types of trades, temporary sheds and/or parking facilities 					

17.10.3 Phasing of investment

The local economic development project components have been divided into various components for implementation purpose. Further, the timeliness been proposed for each component, and the same have been presented in the table below.

Sector/Component		Implement ing	Total	2015- 16	2016- 17	2017- 18	2018- 19	2019- 20	2020- 21	2021 -22		
		agency		(Rs. in Crores)								
A	City convention cum business center and cultural Hub	UD&HD	2.5	0.0	0.0	0.3	1.0	1.3	0.0	0.0		
в	B Development of municipal markets GMC		10.0	0.0	0.0	2.0	4.0	4.0	0.0	0.0		
Т	otal	12.5	0.0	0.0	2.3	5.0	5.3	0.0	0.0			

Table 127: Local Economic Development – Phasing of investment

17.11 Tourism Sector Plan

The tourism hub development strategies include development of tourist amenities and accommodation facilities at Gangtok and development of tourist places in the city and surrounding areas. These projects could be taken up by state tourism development. Further, development of tourist information kiosks have been proposed.

Table 128: Tourism Development sector strategy

Tourism Sector								
Sector goals	 Gangtok has emerged into the mainstream travel destination of the Tourism Industry of the state Development of local tourist points in the city 							
	 Development of tourism related infrastructure facilities 							
Action Plans	Activities							
Development of City level tourism infrastructure	 Preparation of information brochures on the tourist spots; Scenic viewpoints developments in and around Gangtok; Provide Audio guide services in identified tourist locations 							
Development of local tourism spots	 Identification and listing of tourist spots within 100 to 200 km distance from the city 							

17.11.1 Capital Investment Plan

Based on the above key requirements in the tourism sector, the capital investment plan is presented in the below table.

Table 129: Tourism Development sector – Project detail

Project	Estimated cost in Rs. Crores
A. Buddhism and nature interpretation centre	50.00
B. Tourist reception cluster	0.63
C. Parking near entrance of MG Road	0.25
D. Shanti view point & parking place	0.25
E. Beautification of Gangtok city	6.75
F. Redevelopment of Rumtek Monestry	0.81
G. Redevelopment of Emchey Monestry	0.81
H. Improvement of Tsomgo lake	66.88
Total investment required till 2041	126.38
Total investment required for 2021	63.19

17.11.2 Project Details

The key projects and project details in tourism sector is presented in the below table.

Table 130: Tourism Development sector – Project detail

Project				Details	5						
A.	Buddhism interpretatio	and n centi	nature re	•	The Hima cent	local alayan re.	culture nature si	including ites and sh	interpretation opping facilities	of are	Buddhism, e part of the



Project	Details
	 A meditation centre with relevant artefacts.
	 A theme park exhibiting the trees related to Buddha's life
B. Tourist reception cluster	 Tourist reception cluster, Landscaping and parking.
C. Parking near entrance of MG Road	 Provision of parking facilities at MG road
D. Shanti view point & parking place	 Development of scenic view point and parking at Shanti location
E. Beautification of Gangtok city	 Develop the urban design components on identified roads and provide the street furniture facilities
F. Redevelopment of Rumtek monestry	 Renovate the Rumtek Monestry and provide the green buffer and parking area
G. Redevelopment of Emchey monestry	 Renovate the Emchey Monestry and provide the green buffer and parking area
H. Improvement of Tsomgo lake	 Conservation of lake with lake front development

17.11.3 Phasing of investment

The tourism sector project components have been divided into various components for implementation purpose. Further, the timeliness been proposed for each component, and the same have been presented in the table below.

Table 131	· Tourism	Developmen	t sector –	Phasing	of investment
	. rounsin	Developmen	1360101 -	Filasing	or investment

		Implementin g agency	Total	201 5-16	2016-17	2017- 18	2018- 19	2019- 20	20 20 -	202 1- 22
S	ector/Component				(R	s. In Cro	re)		21	
А	Buddhism and nature interpretation centre	Tourism Department	25	0	0	2.50	10.00	12.50	0	0
в	Tourist reception cluster	Tourism Department	0	0	0.13	0.19	0	0	0	0
С	Parking near entrance of MG Road	Tourism Department	0	0	0.05	0.08	0	0	0	0
D	Shanti view point & parking place	Tourism Department	0	0	0.05	0.08	0	0	0	0
E	Beautification of Gangtok city	Tourism Department	3	0	1.35	2.03	0	0	0	0
F	Redevelopment of Rumtek monestry	Tourism Department	0	0	0.16	0.24	0	0	0	0
G	Redevelopment of Emchey monestry	Tourism Department	0	0	0.16	0.24	0	0	0	0
Н	Improvement of	Tourism	33	0	13.38	20.06	0	0	0	0

Sector/Component		Implementin g agency	Total	201 5-16	2016-17	2017- 18	2018- 19	2019- 20	20 20 - 21	202 1- 22
	Tsomgo lake	Department								
Total			63	0	15.28	25.41	10.00	12.50	0	0

17.12 Urban Governance

Under Urban Governance, migration to Double Entry Accounting System (DEAS), property tax survey reforms, E – governance reforms, capacity building and training have been considered. The sector plan for urban governance has been provided in the table below:

Table 132: Urb	an governance	sector strategy
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	Urban Governance						
Action Plans	Activities						
Migration to DEAS, accounting reforms and Budgetary reforms	 Implementation of accounting reforms such as DEAS and preparation OBS. Preparation of separate budget for water, sewerage and urban poor. Preparation account and budget codes as per NMAM. Support should be also extended for preparation/templates for performance and outcome based budget. Further, create awareness on the objectives of the budgeting system and share the best practice across the country. 						
Property tax survey and reforms implementation	 Assessment of the property valuation and levy of property tax based on best practices. Trainings to both technical and non-technical staff is required on basic accounting principles, DEAS, GIS and other software modules. Detailed study to be carried on property tax to identify the grey areas and further improve the coverage and collection efficiency 						
E-Governance reforms implementation	 Development of e-governance modules like personal management system, Procurement and monitoring of projects and E – procurement. 						
Capacity building and training	 Preparation of training needs assessment, training curriculum, identification of training institutions. Support is also required in preparation of IEC material on various subjects. Trainings to be imparted for preparation of note sheets, measurements book and various business rules. 						

17.12.1 Capital Investment Plan

Based on the above key requirements in the tourism sector, the capital investment plan is presented in the below table.

Table 133: Urban	Governance sector	- Project detail
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Рі	roject	Estimated cost in Rs. Crores
1.	Migration to DEAS, accounting reforms and Budgetary reforms	5.0
2.	Property tax survey and reforms implementation	5.0



Project	Estimated cost in Rs. Crores
1. E-Governance reforms implementation	2.0
2. Capacity building and training	5.0
Total investment required till 2041	17.0
Total investment required for 2021	8.5

17.12.2 Phasing of investment

Urban Governance		Implementi ng Agency	Tota I	20 15- 16	201 6-17	201 7-18	201 8-19	201 9-20	202 0-21	202 1-22
			(Rs. In Crores)							
1	Migration to DEAS, accounting reforms and Budgetary reforms		2.5	0.0	1.0	1.5	0.0	0.0	0.0	0.0
2	Property tax survey and reforms implementation	GMC	2.5	0.0	0.0	0.5	0.8	0.8	0.5	0.0
3	E-Governance reforms implementation	GMC	1.0	0.0	0.1	0.1	0.3	0.3	0.2	0.0
4	Capacity building and training	GMC	2.5	0.0	0.3	0.3	0.8	0.8	0.5	0.0
	Total		8.5	0.0	1.4	2.4	1.8	1.8	1.2	0.0

Table 134: Urban governance sector – Phasing of investment

17.13 Summary of Capital Investment

The total estimated capital investment required for providing efficient services to the present population and future population of the city by the year 2041 is Rs. 1,710 crore. A total of Rs. 1,058 crore are proposed for investment by 2020-21 to cater to infrastructure requirement. The table below presents the summary of sector-wise total investment need and investments.

Table 135: Summary	of	capital	investment
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Sr.No	Sector	Short Term 2021	Long Term 2021-41	Total investment (Rs. Crores)
		(inv	vestment in Rs. Cro	ore)
1	Water Supply	316	16	331
2	Sewerage & Sanitation	28	27	55
3	Urban Roads, Traffic & Transport	472	375	847
4	Storm Water Drains	43	43	85
5	Housing & basic services for urban poor	10	10	20

initiative of orban Development, dovernment of mara

Sr.No	Sector	Short Term 2021	Long Term 2021-41	Total investment (Rs. Crores)
		(in	vestment in Rs. Cro	ore)
6	Solid Waste Management	72	72	144
7	Urban Environment	21	21	41
8	Social Infrastructure, Heritage and Socio Culture	63	63	126
9	Local Economic Development	13	3	15
10	Tourism Development	14	14	27
11	Urban Governance	9	9	17
	Total Investment Estimated	1,058	652	1,710

About 50% of the investment has been identified towards urban roads, traffic and transportation sector; 19% of the investment is towards water supply services, 8% of the investment has been identified towards basic services for urban poor. Further, 8% of the investment has been identified towards tourism development; 5% of the investment has been identified towards storm water drains; 1% of the investment is towards Solid Waste management. The details of sector-wise projects are presented in Annex-5.

The rest of the investment is towards local economic development and urban governance. The sectorwise breakup of investment identified for 2021 is presented in the graph below.





Source: CRIS Analysis



17.14 Summary of Investment Phasing

The phasing of projects for short term implementation by 2021-22, has been made in consultation with UD&HD and GMC officials. While doing the phasing, the timeline for preparation of detailed project reports and necessary approvals has been considered. The project prioritization and detailed project phasing have been discussed in the table below.

SI.No	Sector	Total invest ment	201 5- 16	2016- 17	2017- 18	2018- 19	2019- 20	2020- 21	2021- 22
					(Figures i	n Rs. Croi	re)		
1	Water Supply	315.6	0	32.2	65.3	65.3	62.8	60	30
2	Sewerage & Sanitation	27.5	0	4.9	9.4	7.9	2.1	2.1	1.1
3	Traffic transportation & street lighting	471.7	0.0	56.4	104.6	124.4	98.5	45.3	42.4
4	Storm Water Drains	42.7	0.1	0.2	4.4	8.5	12.7	12.7	4.2
5	Solid Waste Management	9.9	0	2.2	4.2	3.6	0	0	0
6	Basic service for urban poor	72.1	0	0	14.4	21.6	21.6	14.4	0
7	Social Infrastructure	20.7	0.0	0.0	2.1	8.3	10.4	0.0	0.0
8	Tourism development projects	63.2	0.0	15.3	25.4	10.0	12.5	0.0	0.0
9	Local Economic Development	12.5	0	0	2.3	5	5.3	0	0
10	Urban environment and Disaster management	13.5	0	1.4	1.4	4.1	4.1	2.7	0
11	Urban Governance	8.5	0.0	1.4	2.4	1.8	1.8	1.2	0.0
	Total	1057.9	0.1	114.0	235.8	260.5	231.7	138.4	77.7

Table 136: Summary of investment phasing

Source: CRIS Analysis

17.15 Composition of investment

The following agency would be responsible for implementing the projects identified in the CDP.

1. WS&PHED: WS&PHED would be responsible for design, construction, operation, and maintenance of water supply, sewerage system and SWD. WS&PHED would be the

implementing agency for the projects identified in the above mentioned sectors. In the overall investment, WS&PHED has to contribute **11.6%%** of total investment.

- 2. UD&HD: UD&HD would be responsible all planning and parking related infrastructure facilities provisions in Gangtok. UD&HD would be the implementing agency for the proposed ropeway project in the city. Also, the multilevel car parking and urban poverty projects would be the responsibility of UD&HD. In the overall investment, UD&HD has to contribute 74.2% of the total investment.
- **3. GMC:** The GMC would be responsible for solid waste management and urban governance in the city. In the overall investment, GMC has to contribute 3.6 % of the total investment.
- 4. Sikkim Tourism Development Corporation (STDC): STDC would be responsible for construction, operation and maintenance of tourist points within the state. Hence STDC has been identified as responsible agency for the tourism development projects identified in the CDP. In the overall investment, STDC has to contribute 9.5 % of the total investment.
- 5. Department of Education and health: The state department for education and health would be responsible for development of the education and health facilities identified as per the URDPFI guidelines. In the overall investment, the education department has to contribute 0.7% of the total investment and health department has to contribute 0.4% of the total investment.

		202	:1	2041		
S.No	Name of Agency	Investment Estimated -	%	Investment Estimated - 2041	%	
1	GMC	25.0	2.4%	50.0	2.9%	
2	UDHD	576.6	54.5%	1046.9	61.2%	
3	WS&PHED	385.8	36.5%	471.7	27.6%	
4	Tourism	63.2	6.0%	126.4	7.4%	
5	Department of Education	4.9	0.5%	9.8	0.6%	
6	Department of Health	2.4	0.2%	4.8	0.3%	
	Total	1057.9	100.0%	1709.6	100.0%	

Table 137: Implementing agency wise breakup of investment

Source: CRIS analysis

17.16 GMC investment

The overall the investment required for the year 2041 is Rs 1,710 crore. However, GMC would be responsible to take-up the projects worth Rs 50 crore and the remaining investment to be taken-up by the UD&HD, Parastatals/state government departments. The sector wise breakup of GMC's investment for 2021 and 2041 has been presented in the table below.

Table 138: Sector wise breakup of GMC investment

Sector	2021 (Investment estimated in Rs. Crore	2041 (Investment estimated in Rs. Crore (Total Investment)
Traffic transportation & street lighting	4.1	8.2



Sector	2021 (Investment estimated in Rs. Crore	2041 (Investment estimated in Rs. Crore (Total Investment)
Solid Waste Management	9.9	19.8
Local Economic Development	2.5	5.0
Urban Governance	8.5	17.0
Total investment	25.0	50.0

Source: CRIS analysis

17.17 Priority Projects

Based on the stakeholder consultations and demand and gap assessment, following are the priority projects for Gangtok city.

Table 139: Priority projects

Sector	Projects				
Solid waste management	 Implementation of door-to-door collection system and segregation of waste 				
	 Augmentation of fleet and compaction capacity. Development of transfer stations with recycling facility 				
	Development of landfill site with scientific closure mechanism				
Parking	 Multi-level parking complex on PPP basis 				
Economic opportunities	Local market area development				
e-Governance	 Development of online payment kiosks 				

18. Financial Operating Plan

The investment capacity of GMC is assessed through a financial operating plan (FOP), which gives a multi-year forecast of finances for the medium term. In line with the phasing of identified in the capital investment plan (CIP), the FOP has been generated for the same period for GMC. A salient feature of the FOP is that all outstanding dues, including debt and non-debt liabilities if any, are also taken into account.

18.1 Financial Plan for the City

All the development works and the projects are highly depended on external funding (state or central government and funding agencies, etc.) for financing. UD&HD being the major administrative body in Gangtok, with majority of the services still under it, the budgets required for developmental works are sent through them. Based on the past expenses, the budget is estimated and demand is sent to the Government. There are no specific standards or methods for budget preparation or fund allocation to GMC. As GMC and the para-statals (UD&HD and WS&PHED) work independent of each other, the funds are received by each one of them under Plan (for development work) and Non-plan (for salaries and other establishment cost) heads. The funds received by the para-statals are then distributed to various zones based on the population and area of the zone. The budgets for infrastructural developmental works are prepared by UD&HD and WS&PHED at the state-level and Gangtok specific budget and expenses for the same are unavailable with these departments. However, GMC or the parastatals doesn't have separate budget allocated for urban poor.

18.2 Methodology

For the preparation of FOP for GMC, we have adopted the following methodology as provided in the revised CDP toolkit. The stage wise methodology and the key references has been presented in the below table.

Task	Step	Key Stages	Description	Remarks
Task-1	Step 1	1 Defining Objectives	The key objectives have been defined for following key areas. Revenue enhancement initiatives 	NA
			 Expenditure management initiatives 	
			 Asset management initiatives 	
			 Financial Management initiatives 	
			Further, it has been discussed in the subsequent sections.	

Tahle	140.	Methodology	for City	Financial	Plan
Iable	140.	methodology	IOI City	Fillaliciai	FIAII



Task	Step	Key Stages	Description	Remarks
	Step 1	Data Collection	 The annual accounts have been collected from GMC for the past three years. The recasting and trend analysis of GMC's finances have been carried out and the findings have been presented in the financial assessment chapter. 	Chapter 14 has detailed out the recasting and trend analysis.
Task-2	Step 2	Business-As- Usual scenario CFP Version I	 As a first step in preparation of FOP for the city, we have prepared the Business-As-Usual scenario and provided the overall capacity of GMC to take-up the infrastructure projects. The scenario has been discussed in the section FOP scenario considered 	The sub section 18.6 has provided the details.
	Step 3	Analysis / Interpretation of the results	 Post finalization of Business-As-Usual scenario, we have carried out the analysis on the revenue and expenditure to check the performance of key items. 	
Task-3	Step 1	Identification of areas of improvement / reforms	 Most of the 12th schedule functions have not been 	NA
	Step 2	Select / priorities areas of improvement / reforms	transferred to GMC yet.	
	Step 1	Finalizing basic assumptions for resource mobilization forecast	 Key assumptions for the income and expenditure side have been presented in the key assumptions section. 	The sub section 18.4.1 has provided the details.
Task-4	Step 2	Ascertain investible surplus for ULB / Parastatals / Development authority	 Ascertain investible surplus for GMC has been discussed in the investible surplus section. 	The sub section 18.5 has provided the details.
Task-5	Step 9	Ascertain combined investible surplus	 Not Applicable 	Not Applicable

Task	Step	Key Stages	Description	Remarks
		CFP Version II		
	Step 10	Component-wise allocation of combined investible surplus	 Not Applicable 	Not Applicable
Task-6	Step 11	Listing of Project Proposals – linkage to CDP	 The priority project as identified in the CIP section has been linked with the FOP. Further, GMC investment capacity has been tested on various scenarios. 	Chapter 17 has detailed out the CIP
	Step 12	Priorities Project Investments	 The priority project investment has been finalized in the CIP section further it has been linked with the financial model for the city. 	for GMC.
Task-7	Step 13	Preparation of draft CFP CFP Version III & Financial Plan report (prioritized project investment loaded on combined investible surplus)	 The current chapter has detailed out the overall financial plan for the city under various scenarios. 	Sub section 17.13 has detailed out the CIP for GMC.
Task-8	Step 14	Ascertain source and amount of funding, external borrowing, debt servicing mechanism, etc.	 Under the Improved investment capacity with grant plus debt support, we have tested the capacity of GMC to go for debt and external borrowing. 	 The sub section 17.8 has provided the details.
Task-9	Step 15	CFP Appraisal and Public Verification	We have presented the findings to the stakeholder during the final city level workshop and accordingly based on the suggestions the overall financial plan for the city has been prepared.	 The sub section 16.4 provides the proceedings of workshops.
Task-10	Step 16	Finalization of CFP report	 Subsequent to the completion of final city level workshop, we have discussed with GMC officials and finalized the financial plan for the city 	 The sub section 16.5 provides the proceedings of the meeting
Task-11	Step17	Annual revision of CFP (linkage to	 We have recommended this as part of Review and 	 The details are provided



Task	Step	Key Stages	Description	Remarks
		annual capital investment and improvements achieved)	monitoring framework.	in Section 19.

18.3 Financing Strategies for CIP

The project funding structure comprises grants under the New Urban Development Mission (NUDM)²⁷ (accounting for 70% of the funding as per JNNURM structure has been assumed); internal surplus and debt are considered to meet the balance fund requirement. The level of investment that GMC can sustain is determined by studying the overall surpluses/year-to-year opening balance and debt service coverage ratio (DSCR).

If DSCR (amount of surplus available to pay interest and to repay principal that is due) falls below 1.25 (i.e., less than 25% cushion), then the investments are reduced gradually till DSCR exceeds 1.25 in all the years in the forecast period. The main items of income and expenditure, classified into the revenue account and the capital account, are projected in the FOP under the following categories. Categories of FOP Projections are as follows.

Revenue Account Receipts:

- Toll charges
- Rental Income Rent from Civic Amenities
- Rental Income Rent from Office Buildings
- Fees from licenses/permissions
- Revenue grants
- Others

Revenue Account Expenditure:

- Salaries/Wages
- Operation and maintenance expenditure

Capital Income

- New Urban Renewal Mission Capital Grants
- Regular State or Central Grants
- Debt

Capital Expenditure

In determining a long-term financial strategy, GMC plans to raise resources and fund the CIP through:

- Grants available under the New Urban Renewal Mission framework (as percentage of investment proposed in urban infrastructure sectors – (80% Central Government Grants and 10 % State Governments Grants)
- Available internal resources and improving the same through
 - Solid waste management user charges

²⁷ Based on the past trends, it is assumed the funding structure would remain same as it was in the JNNURM; the revised funding structure is yet to be announced by the ministry.

18.3.1 Financial Projections

Current revenue sources are projected under built-in growth assumptions for income and expenditure items, to assess the impact of each such revenue enhancement measure being suggested. The projections also aim at estimating the surplus that will be available for servicing new debt. Part of the surplus, after meeting the additional O&M expenses on newly created assets and infrastructure, is translated into debt size and project size (grant component plus debt component) based on certain assumptions regarding interest rate, repayment method, and loan-grant mix.

A spread sheet FOP model has been customized to depict the financial position of GMC. The investment sustaining capacity of GMC is assessed based on the FOP assumptions. The model was used to calculate the overall surpluses under various scenarios involving combinations of internal revenue improvement, state support, financing terms, etc.

The standard assumptions under which the projections are carried out and certain expenditure control and revenue augmentation measures proposed in line with the mandatory and optional reforms under the JNNURM framework are presented below.

18.4 Investment Sustenance Capacity

Given the existing financial position of GMC, the revenue and capital accounts of GMC are projected against the growth scenario. The FOP is generated from the sustainable investment point of view in line with the current growth trends against the identified investment. It has been estimated that GMC would require about Rs. 24 ²⁸crore to improve the infrastructure for meeting the current gap and medium-term requirement. In order to check the financial capacity of GMC, following assumptions have been considered.

18.4.1 Key Assumptions

Table 141	: Key	assumptions
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Head	Assumptions							
Guiding factor for assessing the sustaining capacity								
Surplus	 Positive surplus - year-on-year basis 							
DSCR	 Greater than 1.25 							
Project Financing – For Admissible Components under New Urban Development Mission								
Project Costing	 Unit Cost, with 10% price contingency and 7% physical contingency 							
New/Additional O&M	Solid Waste Management 10%							
For projects to be approved under Ne	w Urban Renewal Mission							
Grant from Gol	 80% of sanctioned cost 							
Grant from State Government	 10% of sanctioned cost 							

²⁸ Overall the investment required for the year 2021-22 is Rs 719 crore. However, GMC would be responsible to take-up the projects worth Rs. 24 crore and the remaining investment to be taken-up by the Parastatals/state government departments. Therefore, the financial operating plan has been prepared for GMC with an estimated investment for Rs 24 crore.



Head	Assumptions					
Loan for balance funding	 Repayment in 15 years @11% interest rate 					
Regular capital expenditure	 Rs. 68 crore per annum (growth rate 2% over current expenditure) 					
Revenue Expenditure						
Growth in Expenditure	 Minimum growth rate: 8% 					
	 Maximum growth rate: 10% 					
Pay Commission Revision	 7th Pay Commission revision from 2016 and 2022 					
Assumption for assessment of GM	C's sustainability					
Income Items						
Growth in revenue income	 Minimum growth rate: 8% 					
	 Maximum growth rate: 12% 					

18.5 Investible Surplus

Based on the various assumptions, the investible surplus has been estimated²⁹ for the city in base and improved case scenarios. As per the base case scenario, on an average, GMC will have investible surplus of Rs. 8 crore over the next 10 years. This surplus would be transferred to capital account to take up the capital works.





²⁹ Investible surplus = (Revenue (own sources of income) income + Capital (own sources of income income) - Revenue expenditure. And, excluding the revenue and capital grants received for specific purpose

18.6 Business as Usual Scenario

Business as usual scenario: In this scenario, it is assumed that GMC shall do business as usual and endeavour to implement the capital projects. This scenario will indicate the overall capacity of GMC to take up projects on business as usual basis.

Investment capacity: Rs. 62 crore

The key considerations in this scenario are as follows:

- GMC will not avail with grants from state or central government.
- The income and expenditure growth would follow the past trends.
- The regular capital expenditure would grow at 2% on year-on-year basis.
- GMC should maintain the positive closing balance on regular basis

Fin	ancial Year>	2010-11	2011-12	2012-13	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
	Figures in Rs. Lakhs		Actuals 3 8 1		Estin	mate						Proje	ction					
Su	nmary																	
	Opening Balance	166	335	488	569	677	823	1,018	1,052	1,029	1,103	1,263	1,512	1,938	2,221	2,575	3,083	3,775
1	Revenue Income	320	533	568	653	751	863	993	1,142	1,313	1,510	1,736	1,997	2,296	2,641	3,037	3,493	4,016
2	Revenue Expenditure	178	378	426	472	525	583	739	822	926	1,065	1,241	1,435	1,866	2,128	2,358	2,615	2,902
a	Surplus/Deficit - Revenue Account	142	155	141	181	226	281	254	320	387	445	496	562	430	513	679	877	1,115
b	Operating Ratio	0.56	0.71	0.75	0.72	0.70	0.67	0.74	0.72	0.70	0.71	0.71	0.72	0.81	0.81	0.78	0.75	0.72
с	Debt Servicing Ratio	0.4%	0.0%	0.0%	0.0%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
3	Capital Income	25	47	76	0	0	0	217	449	434	0	0	0	0	0	0	0	0
4	Capital Expenditure	0	69	136	74	79	86	437	791	748	285	246	136	147	159	172	185	200
d	Surplus/Deficit - Capital Account	25	-23	-61	-73	-79	-86	-220	-342	-314	-285	- 246	-136	-147	-159	-171	-185	-200
e	Overall Surplus/Deficit - Municipal Account	167	132	81	108	146	195	34	-22	74	160	249	426	283	354	508	692	914
f	Closing Balance	332	468	569	677	823	1,018	1,052	1,029	1,103	1,263	1,512	1,938	2,221	2,575	3,083	3,775	4,690
	Opening Balance	166	335	488	569	677	823	1,018	1,052	1,029	1,103	1,263	1,512	1,938	2,221	2,575	3,083	3,775

Table 142: FoP- Business as usual scenario

18.7 Scenario – With grants

In this scenario, it is assumed that GMC shall avail with state and central government grants for the approved projects. The regular capital expenditure would grow at 3% on year-on-year basis. GMC should maintain positive closing balance on regular basis.

Table 143: FoP	- Improved ca	se scenario –	Reforms im	plementation
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Fir	nancial Year>	2010-11	2011-12	2012-13	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
	Figures in Rs. Lakhs		Actuals		Estin	nate				•		Proje	ction					
Sw	mmary																	
	Opening Balance	166	335	488	569	677	823	1,018	983	830	787	831	957	1,289	1,442	1,624	1,949	2,445
1	Revenue Income	320	533	568	653	751	863	993	1,142	1,313	1,510	1,736	1,997	2,296	2,641	3,037	3,493	4,016
2	Revenue Expenditure	178	378	426	472	525	583	739	822	932	1,090	1,299	1,528	1,997	2,299	2,541	2,811	3,112
а	a Surplus/Deficit - Revenue Account	142	155	141	181	226	281	254	320	381	420	437	469	299	342	496	681	905
b	b Operating Ratio	0.56	0.71	0.75	0.72	0.70	0.67	0.74	0.72	0.71	0.72	0.75	0.77	0.87	0.87	0.84	0.80	0.77
с	2 Debt Servicing Ratio	0.4%	0.0%	0.0%	0.0%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
3	Capital Income	25	47	76	0	0	0	333	691	668	0	0	0	0	0	0	0	0
4	Capital Expenditure	0	69	136	74	79	86	622	1,163	1,092	376	311	136	147	159	172	185	200
d	d Surplus/Deficit - Capital Account	25	-23	-61	-73	-79	-86	-289	-473	-425	-376	-311	-136	-147	-159	-171	-185	-200
с	e Overall Surplus/Deficit - Municipal Account	167	132	81	108	146	195	-35	-153	-43	44	126	333	152	183	325	496	705
f	Closing Balance	332	468	569	677	823	1,018	983	830	787	831	957	1,289	1,442	1,624	1,949	2,445	3,150
	Opening Balance	166	335	488	569	677	823	1,018	983	830	787	831	957	1,289	1,442	1,624	1,949	2,445

18.7.1 Key Summary

Further, the results of the above scenarios have been presented in the figure below. The overall investment estimated is Rs. 25 crore (on constant prices). However, as per the current prices, the estimated investment would be Rs. 30 crore (which includes the cost escalation and physical



contingencies). It is observed that without any grant support, GMC can implement projects worth Rs. 20 crore only. Based on the availability of grants, GMC can take up priority projects in the area of sewerage and sanitation, solid waste management, and traffic and transportation.

- Business as usual scenario: Rs. 20 crore
- Scenario with grant support: Rs. 30 crore

Figure 57: Financial capacity - Key scenarios



18.8 Key Conclusion

Overall, on short-term basis, GMC requires Rs. 25 crore to improve the municipal services (SWM) in the city. However, as per the business as usual scenario, GMC has the financial capacity about Rs. 20 crore to take up the infrastructure projects. With grant support, GMC would be able to take up SWM, Urban governance and parking related projects.

Following key steps to be taken by GMC to sustain the investment and expand the investment horizon in long run:

- PPP route: GMC should explore the PPP route to implement either the projects or project components.
- Capacity Building: It is very important that GMC should keep on imparting training to the staff on various aspects starting from technical to managerial skills.
- Study Tours: GMC should organise study tours to know the best practices in the sectors and also to understand the challenges faced by others cities in the implementation of projects and reforms.



19. Review and Monitoring framework

The monitoring and evaluation (M&E) framework has been designed to help cities integrate M&E into their city development plan (CDP) from the initial phases. M&E is important to enable cities determine whether their CDP is achieving its vision and goals and realising its intended outcomes or not. It is a tool that shall enable cities to monitor the progress on the plan at regular intervals.

The information generated by M&E can be used to provide information and support for the implementation of CDP. It shall help in strengthening the downstream project implementation, undertaking programme and investment activities, and devising strategies for future planning initiatives. A basic principle of the CDP approach is that the way in which the CDP is developed and the development issues that it addresses, are determined by each city and community to meet their own needs. There is no 'one size fits all' approach to designing and implementation of CDP.

The framework mentioned below clearly lays down the broad principles that need to be fine-tuned based on the city specific needs and inputs from various officials at the city level to develop for each city.



19.1 Framework for Review and monitoring

In the context of the ever changing landscape of the developments in the city, the impacts on the growth of the city will have wide ramifications if it is not factored into the City Development Planning process in a dynamic manner. The CDP should have a fixed time frame for its implementation, and shall be followed by a review to study and analyse the impact of the implementation of the plan, in order to make mid-term course corrections, wherever necessary. A monitoring mechanism should also be established for measuring the identifiable indicators provided in the CDP for each sector and there after implementation of CDP can be measured.

The table below gives a framework for updating and reviewing CDPs; this needs to be followed as per the revised tool kit.

o. Framework for Updating and Reviewing City Development Plan living document							ke it a
Activity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Reviewing CDP Document	\checkmark					\checkmark	
Community and Stakeholder Consultation	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Data Update and Mapping the City	\checkmark				\checkmark		
Capacity Building	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
Planning Building Regulations Reforms	\checkmark				\checkmark		
Property Tax Reforms	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
Institutional Reforms	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
Financial Reforms	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
Sectoral/Ward Development Plans	\checkmark				\checkmark		
Review of Project Priorities	\checkmark		\checkmark		\checkmark		
Financial Operating Plan	\checkmark				\checkmark		
Capital Investment Plan	\checkmark				\checkmark		
	Framework for Updating anActivityReviewing CDP DocumentCommunity and Stakeholder ConsultationData Update and Mapping the CityCapacity BuildingPlanning Building Regulations ReformsProperty Tax ReformsInstitutional ReformsFinancial ReformsSectoral/Ward 	Framework for Updating and Reviewil IlivinActivityImage: Second Seco	Framework for Updating and Reviewing City living docuActivityImage: Second S	Framework for Updating and Reviewing City Develo living documentActivityImage: Colspan="2">Solution of the second documentActivityImage: Colspan="2">Solution of the second documentReviewing CDP DocumentImage: Colspan="2">Image: Colspan="2">Solution of the second documentCommunity and Stakeholder ConsultationImage: Colspan="2">Image: Colspan="2" Image: Colspan="	Framework for Updating and Reviewing City Development living documentActivity $\frac{1}{50}$ $\frac{5}{50}$ $\frac{5}{50}$ $\frac{5}{50}$ Reviewing CDP Document \checkmark \checkmark \checkmark \checkmark Community and Stakeholder Consultation \checkmark \checkmark \checkmark \checkmark Data Update and Mapping the City \checkmark \checkmark \checkmark \checkmark Planning Building \checkmark \checkmark \checkmark \checkmark Planning Building Regulations Reforms \checkmark \checkmark \checkmark Property Tax Reforms \checkmark \checkmark \checkmark Institutional Reforms \checkmark \checkmark \checkmark Sectoral/WardDevelopment Plans \checkmark \checkmark Review of Project Priorities \checkmark \checkmark Inancial Operating Plan \checkmark \checkmark Capital Investment Plan \checkmark \checkmark	Framework for Updating and Reviewing City Development Plan (CE living documentActivityImage: Colspan="4">Image: Colspan="4" Image: Colspan="4" I	Framework for Updating and Reviewing City Development Plan (CDP) to ma living documentActivityImage: Sector Sec

Source: Revised City Development Plan toolkit

19.1.1 Timeline and Periodicity of review

To make CDP as a living document, it is essential to understand that the city landscape, growth source as well as direction keep changing with time. Hence, the CDP should have a fixed time frame for its implementation, and shall be followed by a review to study and analyse the impacts of the implementation in order to make mid-course corrections, wherever necessary. The monitoring mechanism should be on the activities based on the identified indicators in each sectors in the CDP. Some of the identified activities that could be monitored are given below.



19.2 Reviewing of the CDP Document

The foremost thing that comes up is the reviewing of the CDP document. As the city's conditions may change after few years, the CDP needs to be reviewed and evaluated after a particular time before a new development plan is proposed. It is necessary to identify the sectors that are growing and sectors that are lagging, to achieve the vision framed for the city. The CDP is prepared for a long term vision for 30 years and the investment plan is prepared for a time frame for 7 years. Thus it mandatory that review of the City Development Plan is taken up after every five years.

19.2.1 Engaging with Community and Stakeholders' Consultation

CDP focuses on the holistic development and betterment of the city as looked upon by various communities and stakeholders. Therefore, it is very important to keep consulting with them about the process of the work to be undertaken to achieve the framed vision for the city. This could be done by conducting a meeting every alternate year, i.e., once in every two years. The feedback should be incorporated and the shared with citizens through a common platform like website etc.

19.2.2 Data Update and Mapping of the City

In case of any major changes in the city limits/boundaries, a complete data updation exercise should be carried out for effective implementation. Therefore, data updates and mapping of the city become very essential. This should always be done before the preparation of the CDP.

19.2.3 Capacity Building

Capacity building initiatives should focus on understanding the areas where in capacity needs to be built in terms of project implementation, reform implementation etc. The regular assessment of the needs can ensure better capacity building measures to be adopted by city.

19.3 Review and Monitoring of Reforms and Project Implementation

The CDP Technical and Policy Committee should be involved in the monitoring and evaluation of the CDP across various components.

19.3.1 Assessment of Reforms and Project Implementation

- Regular assessment of reform and project implementation is necessary for the city to achieve its vision.
- Reforms should be framed for all the institution responsible for the development process of any city. These reforms are very important for all the institution to work in a synchronized manner for the development of the city. Hence, they must be monitored every year.

19.3.2 Financial Reforms

• Finance being a most important part for any ULB of the city. The funds are to be utilized according to the kind of development approach adopted to achieve the city vision. Therefore, financial reforms must be monitored and evaluated on yearly basis.

19.3.3 Property Tax Reforms

All the properties abiding under the ULB should be carefully mapped and marked, as it is an important source of revenue for a city. Hence it should be prepared before the implementation of the CDP and monitored at frequent intervals.

19.3.4 Sector /Ward Development Plans

Vision of the city could only be implemented at a macro level only if there is prominent change at the micro level like at the ward level or the sectoral block level planning. To make a CDP document comprehensive in approach, the M&E of these micro level plans should be evaluated at the very beginning and impact should be reviewed in the very first year.

19.3.5 Review of the Project Priorities

The project prioritized in the CDP to achieve the vision may have to undergo changes in their priority order once the implementation of the CDP starts. The reason may be due to any practical issues that arise during project implementation or any other complication. Hence, it is very important to monitor and evaluate the projects that are underway and projects that need to be taken up for the development of the city. The updating process should be regular, but M&E should be done every alternate year.

19.4 Monitoring of Financial Operating Plan and Capital Investment Plan

A capital investment plan (CIP) provides a detailed understanding of anticipated investments into tangible capital assets. The assets include basic facilities, services, and installations needed for the functioning of the community, such as bridges, roads, water, and wastewater systems. This helps the ULBs to formalize their priority setting and decision making process. Therefore, the M&E of CIP should be done on regular basis every year.

A financial operating plan (FOP) outlines the revenues and expenses over a period of time. An FOP uses past performances, incomes, and expenses to forecast what to expect in the following years. It then incorporates the past and recent trends into the planning so as to most accurately forecast what is to come. Therefore, for city development plan in a proper way, it is necessary to monitor and evaluate the FOP regularly every year.



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Annexures

Annex-1: Kick off Meeting with MoUD

Meeting Agenda	Kick off Meeting						
Assignment Title	 Preparation and Revision of City Development Plans for 13 Selected Cities Package 1 (13 cities) Preparation and Revision of City Development Plans for 17 Selected Cities Package 2 (17 cities) 						
Name of Client	Ministry of Urban Development						
Date of meeting	8 th August 2013, 4 p.m.						
Place/Location	Ministry of Urban Development, New Delhi						
Participants	 Ministry of Urban Development Ms. Nisha Singh, IAS, Joint Secretary and Mission Director Mr. Prem Narayan, Director (JnNURM) Mr. Sanjay Kumar, Under Secretary (JnNURM) Officials from TCPO, CPWD, CPHEEO CBUD PMU Team CRISIL Risk and Infrastructure Solutions Limited (CRIS) Mr. Ravi Poddar, Director, Urban Practice Mr. Brijgopal Ladda, Urban Planning Expert Mr. Abhay Kantak, Municipal Finance Expert Mr. Tapas Ghatak, GIS Expert Mr. Appeeji Parasher, Associate Director Ms. Monika Bahl, Manager 						
CRISIL Risk & Infras	tructure Solutions Limited (CRIS) has been appointed by Ministry of Urban for the Preparation and Revision of City Development Plans for 13 Selected						

CRISIL Risk & Intrastructure Solutions Limited (CRIS) has been appointed by Ministry of Urban Development (MoUD) for the Preparation and Revision of City Development Plans for 13 Selected Cities under Package 1 and 17 selected cities under Package 2. A kick-off meeting was organized by MoUD to review the work plan and approach for the assignment. The meeting was chaired by Ms. Nisha Singh IAS, Joint Secretary and Project Director and was attended by senior officials from MoUD, PMU from CBUD and officials from TCPO, CPWD.

CRIS Team made a presentation on the following aspects

- Our Experience in Preparation of CDPs
- Details of Assignment Coverage
- Our Approach Revised CDP toolkit
- Proposed Teaming
- Work Plan
- Support from MoUD

Following were the key points suggested by MoUD /CBUD PMU team and other key officials present during the meeting

1. Various recommendations were made by the participants for preparation of CDP. The Mission



Director however suggested that the CDPs shall be prepared in line with the revised tool kit issued by MoUD and also mentioned that MoUD has prepared a comparison of variance between the first generation and 2nd generation CDPs and it shall provide a copy of the same.

- 2. It was also mentioned that an inclusive approach should be adopted as specified in the tool kit and sufficient emphasis should be made on strategies addressing urban poverty issues.
- 3. It was also suggested that cities have prepared other plans like CSP, CMP, disaster management etc. The interventions, projects, costing etc. suggested in this studies should be incorporated in the CDP. MoUD also suggested for sharing information from ISNA study to consultant for CDP such to synchronize the two reports.
- 4. The Mission Director also stressed on to focus on efficiency improvement related aspects while identifying projects in cities.
- 5. It was discussed that the population projection in all the CDPs shall be for a period of 30 years i.e. 2041 whereas the FOPs can be made for a period of 20 years to be realistic. All CDPs should have same time line for projections and should be based on Census 2011.
- 6. Some other aspects discussed were as follows
 - 24x7 Water Supply and implementation of SCADA and other new system to bring in efficiency, 100% metering etc.
 - Linkages with existing Development Plan or Master Plan
 - CDP should also endeavor to mention of suitable technologies based on the geographical condition of the cities.
 - Local Economic Development Enlist the key thrust areas of economic development and broad level strategies
 - Map preparation
 - Smart cities concepts should be explored
- 7. It was suggested that CDPs should be made through rigorous stakeholder consultations and the ownership should be ensured at the city level.
- 8. It was suggested to have the executive summary to the Final CDP in vernacular language.
- 9. The timelines proposed for the assignment were found to be in line with that mentioned in the RFP.

During the presentation CRIS suggested the following points for support from MoUD

- 1. The team would require a letter of Introduction from MoUD to ensure that all the ULBs can assist the team in the following
 - Designate an "Officer-In charge" responsible for management and coordination of consultants
 - Constitute multi-stakeholder City Level Steering Committee and working groups.
 - Nominate officers from relevant sections of ULB to participate in the process of stakeholder consultation and CDP preparation.
 - Provide the consultant with information, maps and relevant data and documents on ULB.
 - Provide the consultant with necessary authorization to procure information from the line departments
- 1. Introducing the consultants to the Urban Local Bodies
- 2. Facilitate and expedite approvals from ULB.

The meeting ended with a vote of thanks to all participants.

Annex-2: Proposed Projects outline in CDP, 2006

SI.No.	Sector	Investment Envisaged (Rs. crore)	Proposed projects - Outline		
1	Water Supply	195.40 (for	Rs. 100 crores		
		both phases up to 2026)	both phases up to 2026)	both phases up to 2026)	 New primary network of 31 km to be laid. This is tentatively assumed to consist of 600 mm diameter DI pipes of class K9 for the purpose of estimation.
			 New secondary and tertiary networks of 38 km to be laid. These are tentatively assumed to consist of 300 mm diameter DI K9 pipes for the purpose of estimation. 		
			 Laying water pipelines along arterial roads for fire fighting services 		
			 Development of zonal reservoirs to cover unreached areas, which are getting urbanized fast 		
			Rs. 95 crores		
			 43 electromagnetic meters for bulk water monitoring 		
			 猀rovision of consumer meters at household level 		
			 UFW assessment and leak reduction programme 		
			 New water treatment plant at Hanuman Tok (Lukshyana) by tapping new source on Gangtok Nathula Road to cater to the Upper Chandmari Area 		
2	Sewerage	108.15 (for both phases up to 2026)	 New 20 MLD STP for new municipal areas, viz., Bhojoghari, Burtuk, Sichey, Lower Sichey, Lingding, Luing, and Rangka 		
			 New sewer network of 41 km primary network and 38 km of secondary network 		
			 Rehabilitation of 13 km of sewer Zone I 		
			 House sewer connections 		
			 Four sewer-cleaning machines 		
3	SWM	6.5	 One thousand 30 L dustbins to be placed at central public places 		
			 Two thousand 25 L household dustbins and 2000 heavy duty PVC bags to be used for segregation of wastes at source (non- biodegradable) 		
			 Two hundred wheelbarrows to be used by sweepers in the central areas of the city 		
			 Twenty community dustbins to be used in areas where bell ringing house-to-house waste collection is not provided 		
			 Three medium duty tipper trucks for waste collection through bell ringing service 		



SI.No.	Sector	Investment Envisaged (Rs. crore)		Proposed projects - Outline
			-	Four dumper placers for lifting the waste collected in mechanized containers Three large tipper trucks coupled with
				augmentation of existing fleet of tipper trucks for carrying waste load from transfer station to landfill sites
			•	Development of transfer station at Indira Bypass with facilities like centralized segregation of wastes, vehicle parking and washing, etc.
				Development of the existing parking space of UD & HD to a complete garage and workshop
			•	1 bulldozer, 1 tipper truck, and 1 JCB for the disposal site and compost plant operations
				Abandon existing disposal site at Marchak in accordance with SWHR once the compost plant at Martam is operational
			•	Development of new disposal site at Martam near the compost plant with appropriate protection measures like leachate collection facility, barrier walls, etc.
			•	Environment assessment (EA) study for the disposal site
			-	Detailed feasibility study for marketability of composts, with the objective of attracting a private sector operator
			•	Implementation of community awareness and consultation campaigns through NGOs, CBOs, schools, women's societies, doctors, and religious leaders
4	Drainage and Landslip Protection	100	•	Scaling and restoration of 47.33 km of jhoras. Cemented jhoras to be cleaned and upgraded, and un-cemented jhoras to be cemented
5	Urban Transport	1000.00	•	Creation of new roads and improvement of old ones that require up gradation
			•	Mass transport system for commuters in the form of multimode transport system (minibus, sky bus, ropeways, LRTS, mono rail).
				Pollution-free vehicles
			•	Pay and use rental, two- and four-wheelers for tourists
			-	Difficult junction's improvements
			-	Development of bus terminals
			-	Development of truck terminals
			•	Development of parking areas for public vehicles.
				Development of parking areas in residential areas for private vehicles Street furniture for pedestrians

SI.No.	Sector	Investment Envisaged (Rs. crore)	Proposed projects - Outline
			 Provision of goods signage and landmarks highlighting systems
6	Traffic and Transport and Street Lighting	368.00	 Parking Bays Multi-storeyed Car Parking Shopping Malls Taxi Stands Improvement of Junctions Laying of Arterial Roads Construction & Development of Bus/Truck Terminals Foot Over Bridges Street Lighting
7 8	Urban Renewal Tourism and	50.00 92.00	 Redevelopment of degraded areas Protective measures in landslide prone areas
	Environment		 Water body conservation
9	Crematoria / Burial grounds	6.00	 Development of embankments Afforestation in Khasmal and Gorucharan
10	Heritage	19.95	 Afforestation for protecting the soil cover
11	Other 60.00	60.00	 Development of botanical gardens in Saramsa and Bhusuk areas
	Development Projects		 Development and exhibition of flowering plants, gardens, picnic spots at Bhusuk Development of adventure sports and infrastructure development for it at Bhusuk
12	Upgradation of Slums - Facility for Urban Poor	62.00	 Construction of community water taps close to cluster of houses Construction of community toilets at all the
13	Social Housing	30.00	notified slum areas
			 Providing child care centres or crèche facilities for small children living in slums
			 Construction of community and marriage halls in slum areas, especially in Tadong (at the SNT Colony complex, where land from the SHDB has been transferred to UD&HD), and Tathangchen
			 Land tenure and social housing has to be encouraged with the involvement of private sector participation.
			 Improvement of the footpaths, street lighting, and drainage system in localities exhibiting slum-like characteristics
			 Training of jhoras in Arithang where there are three slums located should be taken up immediately.
			 Formation of Community-Based Organizations and Self-Help Groups for convergence of



SI.No.	Sector	Investment Envisaged (Rs. crore)	Proposed projects - Outline
			various poverty alleviation programmes
			 CBOs and SHGs to be the conduits for IEC campaigns
			 Reintroduction of Community Small Grants Scheme for community participation
14	Urban Governance and Institutional Strengthening	19.00	 Institutional training, Involvement of NGO, community groups, and social organizations for creating awareness among people
15	Land Acquisition	100.00	 Land acquisition for water supply & sewerage projects
	Total	2217.00	

		Re	evised City I	Development Plan –Ga	ngtok	INFRASTRUCTURE ADVISO
		<u>1st 9</u>	Stakeholde	r Consultation- Interi	m Stage	
Date	:	29 th Ja	nuary, 2015			
Time : 10:30 a.m.						
Venue	:	: Com	fume 1	lour, Election De	olt.	
List o	f Par	ticipan	ts		Contact	
S.No.		Nan	ne	Designation & Organization Name	Number	Signature
1	R.D. Bhulis		Shuliz'	CENDUD	942975050	2
2	Ash	i Sonn	m Choden	TP, UDMO	8101215422/	(h)
3	Ð.	B.S	UBBA	SE, WS SPHE	9434001021	P.C.
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5	An	m 5	ubba	ATD. UMMIN	797297261	1
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7	100	hi De	n Bhutis	ATP, UDSND	9002206177	Int)
8	Pa	rayan	Dixit	Architect, IDEA	9733239918	Bing
9	C	. P	Shakel	Mc. Gmc	943472	2042
10	À	NHO	Roi	SR. ARCHITECT RMAD.	943425872	B Donnte
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			0	Synton		V
Can	acity B	uilding f	or Urban Deve	lopment		Page 1

Annex-3: List of Participants in Interim Stage Workshop


S.No.	Name	Designation & Organization Name	Contact Number	Signature
13	C.S.SINGHI	C. S. SINGHI & ASSOCIATES	94240241	lifighi
14	Karlesh Drahe	KPC.	9735991821	Tuk
15	Samjara Pradhan	Asst. Architect (RMDD)	83483-85806	Span
16	Jore an law	Cu/s.	983268994	me
17	Kega/h fia	AGS	923914392	4 D
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Annex-4: Stakeholders Suggestions

Revised City Development Plan for Gangtok City

Feedback Form – 1stStakeholder Consultation

Participant Name : mlió Designation : aqueer Contact No : 050 Email ID 1 com. Feedback/Suggestions Spots for desuper & treatrul Mone 1. S WM is required with Plante. um at le Zene different is required development 3. hRi towards The rde ga epured For estion of ie, are re



Revised City Development Plan for Gangtok City Feedback Form – 1stStakeholder Consultation

Date: 29th January, 2015

Participant Name SANTOSH SINGH. VICE PRESIDENT, Siklam Chamber & Communice Designation . Contact No : 8900405028. Email ID : San3 391 Rgmail. com Feedback/Suggestions Ley. : It was ed . mformative sersion, The pliowing ingernens are made & Suppry of Water : Study of extraction of Ground Walls and reserve stations to be done 2) Solid Warke Management : Paratisation Old incentives to be guinen for establishing solid warke management amits am by memployed youthe. (3) Trade & Commesce - New Markets. tio de developed avour gaugton burn. ad matterielss. Regarines are must

Feedback Form – 1stStakeholder Consultation

Mr Palden Lamo **Participant Name** : remeral Secretary L. B.T.H. : Designation **Contact No** 9832689911 : Email ID : Feedback/Suggestions Solid Voete plan Sheuld be crefed at last Bayer' bacase Feedback/Suggestions Magalable etc. totwe disposed. can'ly we ere fian el Caretre each plake at lerbour Are to prolice



Participant Name	:	A. B. SUBBA	
Designation	:	S.E. Water Security's PHE	,
Contact No	:	9434001021	
Email ID	:	absusba = 24 C yaboo. com	Λ
Feedback/Suggestions - Softy Gougso	8 -la	Seulerage szessems for Ju - City needs to b	ture e P,

Revised City Development Plan for Gangtok City Feedback Form – 1stStakeholder Consultation

Date: 29thJanuary, 2015

Asti SONAM CHODEN ; **Participant Name** : Designation PLANNER, UDHD TOWN į Contact No 810.121.5422 Email ID : asonam @ gmail.com Feedback/Suggestions · Importance of a Recreational trea for families with young children & joggers park (people of Bangton has morning walkers but no designated parks). A community based project & not tourist based. · Encourage pedootrianisation instead of cars. Prioritize pedestrians over cars. Waste management - Ennovative Edeas. For eg-each house has a limit on the waste amount 2 if it enceeds, the farmily parts some annount as fine or just as exten-pryment for processing the entra garbage. So this encourages people to reduce this garbage while puncharing or re-uning papers, waste; etc.



Feedback Form – 1stStakeholder Consultation

Participant Name	:	Chhatra Singh Singhi.
Designation	:	Architect (Private)
Contact No	:	94340 - 24186
Email ID	:	csoinghigtk@gmail.com
Feedback/Suggestions		
Please inchiele l	60	al talents/professional de
to formulate the inclusions on the is revised so own professiona when furture go prepared. Then you.	e in f	COP and the progressive same as and when it at we can brit our and intelectual capasity ins for the city are.

Feedback Form – 1stStakeholder Consultation

Shulia **Participant Name** : Kunga : Designation ; **Contact No** 3924 3 Email ID So Feedback/Suggestions Baste b a 1. be p 10 Л (I) 5050 δ a 0 w 0 C



Feedback Form – 1stStakeholder Consultation

Date: 29thJanuary, 2015

Participant Name May arach Designation Contact No : pradhan @ hotmail. con Email ID Feedback/Suggestions - The Gorenment seems to resort to PPP for many infrastructure development. hosten with This is that the beal people do met get involved missing their own problems. As a recall we do not grow and explue mon capicity as a qi5/ pro How can opposite minis (hike repeavay transport goten) advantaged to implue local people to create employ and a sense of ononesslip with the project. = If Participative planning is to be followed, than There must be an effort to reach out to as many people as possible. If people are not involve in the planning process of their city, then they will feel a same of ononier ship with the Play and will weater obstacles in implementations To undustand all issues are intertimbed and mi. order to holistically plan, we need to be awave of linkages of different issues Duelopment to be 'PEOPLE' triated more ad Cens proput oriented.

Annex–5: List of Projects proposed under revised CDF
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S.No.	Projects	Amount (Rs.in Crore)
I	Water Supply	331.30
1	Augmentation of Water supply source	18.60
2	Main trunk line development	300.00
3	Treatment capacity and clear water mains	10.70
4	Installation of SCADA system	2.00
П	Sewerage & Sanitation	54.98
5	UGD Network/ Road Length Covered	21.05
6	Sewerage Treatment (water supply)	29.21
7	Sewerage cleaning equipment	4.00
8	Community toilets	0.72
III	Urban Roads, Traffic & Transport	844.76
9	Footpath improvement	2.18
10	New footpath construction	2.00
11	New footpath construction (elevated)	15.60
12	Stairs improvement	0.90
13	New staircases	3.00
14	Junction improvement	2.75
15	New pedestrian foot over bridge	40.00
16	Road network	25.50
17	New road links	3.15
18	Construction of new bridge	1.05
19	Demarcated bus lane, bus shelters and bus bays	15.26
20	Bus terminal	10.00
21	Parking (Below Govt College, Namnang, Sikkim Jewels, JT road)	8.19
22	Rope way	154.50
23	Helipad up gradation	10.00
24	Road accident analysis system and routine maintenance management system	5.00
25	Road network improvement	5.24
26	Conversion of Metal Bailey Suspension Bridges to R.C.C Bridges	2.46
27	Inner Ring Road	34.91
28	Outer Ring Road	51.93
29	Road Connectivity to Greenfield Airport Proposed in Pakyong	39.26
30	Road Connectivity to Proposed Railway Station	90.00
31	Bus Terminals	20.00



S.No.		Projects	Amount (Rs.in Crore)
	32	Freight Terminal (Ranipool, Setipool)	45.00
	33	Parking (Ranipool, Upper Burtuk and lower sichey)	165.38
	34	Freight Terminal (IInd mile, Penlong)	30.00
	35 Parking (MG Road, Chandmari and Tadong)		61.50
IV		Storm Water Drains	85.40
	36	Development of storm water drainage network	54.50
	37	Institutional studies and mapping	0.90
	38	Development of Jhoras	30.00
V		Street Lights	2.30
	39	Tube Light	0.06
	40	Power saving lamps (LED)	2.17
	41	High Mast Lamps	0.07
VI		Solid Waste Management	19.80
	42	Improvement of Primary collection system for Gangtok city for 2041	4.70
	43	Fleet augmentation for Secondary transportation	2.00
	44	Construction of treatment facility	9.00
45		Development of scientific landfill facility	4.10
VII		Basic service for urban poor	144.18
VII	46	Basic service for urban poor Development of affordable Housing and infrastructure development	144.18 91.28
VII	46 47	Basic service for urban poor Development of affordable Housing and infrastructure development Insitu development in identified slums	144.18 91.28 50.00
VII	46 47 48	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slums	144.18 91.28 50.00 2.90
VII	46 47 48	Basic service for urban poor Development of affordable Housing and infrastructure development Insitu development in identified slums Livelihood development in the city slums Social Infrastructure	144.18 91.28 50.00 2.90 41.44
VII	46 47 48 1 49	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slumsSocial InfrastructureSchools	144.18 91.28 50.00 2.90 41.44 9.80
VII	46 47 48 49 50	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slumsSocial InfrastructureSchoolsHealth care	144.18 91.28 50.00 2.90 41.44 9.80 4.76
	46 47 48 49 50 51	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slumsSocial InfrastructureSchoolsHealth careSocio cultural infrastructure	144.18 91.28 50.00 2.90 41.44 9.80 4.76
	46 47 48 49 50 51 52	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slumsSocial InfrastructureSchoolsHealth careSocio cultural infrastructureParks and gardens	144.18 91.28 50.00 2.90 41.44 9.80 4.76 19.99
	46 47 48 49 50 51 52 53	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slumsSocial InfrastructureSchoolsHealth careSocio cultural infrastructureParks and gardensPlaygrounds	144.18 91.28 50.00 2.90 41.44 9.80 4.76 19.99 2.86
	46 47 48 49 50 51 52 53	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slumsSocial InfrastructureSchoolsHealth careSocio cultural infrastructureParks and gardensPlaygroundsTourism development projects	144.18 91.28 50.00 2.90 41.44 9.80 4.76 4.04 19.99 2.86 126.38
	46 47 48 49 50 51 52 53 53	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slumsSocial InfrastructureSchoolsHealth careSocio cultural infrastructureParks and gardensPlaygroundsBuddhism and nature interpretation centre	144.18 91.28 50.00 2.90 41.44 9.80 4.76 19.99 2.86 126.38 50.00
	46 47 48 50 51 52 53 53 53	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slumsSocial InfrastructureSchoolsHealth careSocio cultural infrastructureParks and gardensPlaygroundsBuddhism and nature interpretation centreTourist reception cluster	144.18 91.28 50.00 2.90 41.44 9.80 4.76 4.04 19.99 2.86 126.38 50.00 0.63
	46 47 48 49 50 51 52 53 53 54 55 56	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slumsSocial InfrastructureSchoolsHealth careSocio cultural infrastructureParks and gardensPlaygroundsTourism development projectsBuddhism and nature interpretation centreTourist reception clusterParking near entrance of MG Road	144.18 91.28 50.00 2.90 41.44 9.80 4.76 4.04 19.99 2.86 126.38 50.00 0.63
	46 47 48 50 51 52 53 53 54 55 55 55	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slumsSocial InfrastructureSchoolsHealth careSocio cultural infrastructureParks and gardensPlaygroundsTourism development projectsBuddhism and nature interpretation centreTourist reception clusterParking near entrance of MG RoadShanti view point & parking place	144.18 91.28 50.00 2.90 41.44 9.80 4.76 4.04 19.99 2.86 126.38 50.00 0.63 0.25
	46 47 48 49 50 51 52 53 53 54 55 56 57 58	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slumsSocial InfrastructureSochoolsHealth careSocio cultural infrastructureParks and gardensPlaygroundsTourism development projectsBuddhism and nature interpretation centreTourist reception clusterParking near entrance of MG RoadShanti view point & parking placeBeautification of Gangtok city	144.18 91.28 50.00 2.90 41.44 9.80 4.76 4.04 19.99 2.86 126.38 50.00 0.63 0.25 6.75
	46 47 48 50 51 52 53 53 54 55 55 56 57 58 59	Basic service for urban poorDevelopment of affordable Housing and infrastructure developmentInsitu development in identified slumsLivelihood development in the city slumsSocial InfrastructureSchoolsHealth careSocio cultural infrastructureParks and gardensPlaygroundsTourism development projectsBuddhism and nature interpretation centreTourist reception clusterParking near entrance of MG RoadShanti view point & parking placeBeautification of Gangtok cityRedevelopment of Rumtek monestry	144.18 91.28 50.00 2.90 41.44 9.80 4.76 4.04 19.99 2.86 126.38 50.00 0.63 0.25 6.75 0.81

Ministry of Urban Development, Government of India

S.No.		Projects	Amount (Rs.in Crore)
	61	Improvement of Tsomgo lake	66.88
Х		Local Economic Development	15.00
	62	Development of municipal markets	5.00
	63 Dev of Trade & Cultural Centre		10.00
XI		Disaster Management	27.00
	64	Disaster management cell	2.00
	65	Embankment identified roads	25.00
XII	I Urban Governance		17.00
	66	Capacity building and training	5.00
	67	Migration to DEAS	5.00
	68	E governance and reforms implementation	2.00
	69	Property tax assessment	5.00
		Total Projects Cost	1,709.53



Annex–6: 1st generation CDP and revised CDP Capital Investments

S.No.	Sectors	1st generation CDP (2006) - Capital investment (Rs. in Crore)	Revised CDP (Capital investment Rs. in Crore)
1	Water Supply	195.40	331.28
2	Sewerage & Sanitation	108.15	54.98
3	Solid Waste Management	6.50	19.84
4	Storm Water Drains	100.00	85.40
5	Urban Roads, Traffic & Transport, Street Lighting	1,368.00	847.06
6	Basic service for urban poor	92.00	144.18
7	Social Infrastructure	-	41.44
8	Tourism development projects	111.95	126.38
9	Local Economic Development	-	15.00
10	Urban Environment & Disaster Management	-	27.00
11	Urban Governance	19.00	17.00
12	Others (Land Acquisition, Urban Renewal, Burial Grounds, etc.)	216.00	-
	Total	2,217.00	1,709.53

Note: 1st generation CDP has allocated more than Rs.1000 crore towards LRT project.



Annex–7: Proposed Ropeway under Structure Plan & CMP

Source: Gangtok Structure Plan (2009) and Gangtok COP, 2012



Annex-8: Data gaps in Gangtok CDP

Sr. No	Section	Data gaps as per revised toolkit	Remarks	Criticality of information
1	Physical setting	Wind Direction	The information on wind direction is not available	Low relevance
2	Demography	Age-Sex period	The information on Age- sex period is not available	Low relevance
3	Economic profile of the town	contribution of primary, secondary and tertiary sectors to the GDP	The information on GDP is not available at city level.	Low relevance
4	Physical planning and growth management	Information on unauthorized construction	The information on unauthorized constructions is not available with GMC.	Low relevance
5	Social infrastructure	Social Groups, Institutions and Cultural Centers	The quantified data on social groups, institutions and cultural centers is not available at city level.	Low relevance
6	Baseline Environment: Urban Environment	Air Quality	The latest information on Ambient Air Quality (AAQ) parameters is not available.	Medium relevance. Latest information available for Gangtok is 2011.
	and Disaster Management	Water Quality	The latest information on surface and ground water quality parameters is not available.	Medium relevance. Latest information available for Gangtok is 2011.



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Hyderabad

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About CRISIL Infrastructure Advisory

CRISIL Infrastructure Advisory is a division of CRISIL Risk and Infrastructure Solutions Limited, a 100% subsidiary of CRISIL Limited – India's leading Ratings, Research, Risk and Policy Advisory Company.

CRISIL Infrastructure Advisory is India's premier advisor focusing on policy issues, as well as commercial and contractual issues in the areas of transport, energy and urban infrastructure. We also provide support to international firms planning investments in India. Over a period of time, CRISIL Infrastructure Advisory has built a unique position for itself in these domains and is considered the preferred consultant by governments, multilateral agencies and private-sector clients. We have extended our operations beyond India and are present in other emerging markets in Africa, Middle East and South Asia.

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