

CITY SANITATION PLAN FOR SHIMLA



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Sector Specific Strategies

Municipal Corporation Shimla

Technical Assistance: GIZ ASEM



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ABBREVIATIONS

BOOT	Build, Own, Operate and Transfer
CAA	Constitutional Amendment Act
CBO	Community Based Organisation
CDD Society	Consortium for DEWATS Dissemination Society
CDM	Clean Development Mechanism
CDP	City Development Plan
CPHEEO	Central Public Health and Environmental Engineering Organisation
CSP	City Sanitation Plan
CSTF	City Sanitation Task Force
DPR	Detailed Project Report
DBNS	Decentralised Basic Needs Services
GIS	Geographic Information System
GoHP	Government of Himachal Pradesh
GOI	Government of India
GIZ	German International Cooperation
HP	Himachal Pradesh
HPSPCB	Himachal Pradesh State Pollution Control Board
HRTC	Himachal Road Transport Corporation
I&PH	Irrigation and Public Health
IEC	Information and Education Campaign
IGMC	Indira Gandhi Medical College
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
KL	Kilo Litres
lpcd	Litres per capita day
NH	National Highway
NRW	Non Revenue Water
NUSP	National Urban Sanitation Policy
MC Shimla	Shimla Municipal Corporation
M&E	Monitoring and Evaluation
MLD	Million Litres Per Day
MLSS	Mixed Liquor Suspended Solids
MML	Model Municipal Law
MoUD	Ministry of Urban Development
MT	Million Tonnes
NGO	Non Government Organisation
NUSP	National Urban Sanitation Policy
O&M	Operation and Maintenance
PIU	Project Implementation Unit
PPP	Public Private Partnership
PSP	Public Sector Participation
PWD	Public Works Department
RFQ	Request for Qualification
SDB	Sludge Drying Bed

SEHB	Shimla Environment, Heritage Conservation and Beautification (SEHB) Society
SSR	Sanitation Situation Report
STP	Sewage Treatment Plant
SUDA	State Urban Development Agency
SWM	Solid Waste Management
SWOT	Strengths, Weaknesses, Opportunities, Threats
ToR	Terms of Reference
TPD	Tonnes per day
UASB	Up-flow Anaerobic Sludge Blanket
UFW	Unaccounted For Water
ULB	Urban Local Body
UTRI	Universal Training and Research Centre
WC	Water Closet
WPF	Waste Processing Facility
WSSD	Water Supply and Sewerage Department

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CHAPTER 1. SECTORAL STRATEGY - WASTEWATER MANAGEMENT

1.1 Existing Situation and Gap Assessment

1.1.1 Sewage Generation

1.1.1.1 QUANTITY

As per the Sewerage DPR (May 2009), the estimated population of Shimla as on 2010 is 2.16 lakhs (including permanent and floating population). The estimated sewage generation for 2010 is 27.75 MLD and is projected to be 40.40 MLD for 2025 and 57.99 MLD for 2040¹. However as per the survey conducted by CDD Society in June 2010, the residential population is estimated as 1,98,717 and floating population as 70,000 amounting to sewage generation of 29.02 MLD. The demand supply gap analysis of sewerage system and subsequent recommendations are based on figures as estimated by CDD Society.

Table 1-1: Present Sewage Generation – Zone Level

Sewerage Zone	Population 2010		Sewage Generated (MLD)		Total Sewage Generation (MLD)
	Residential	Floating	Residential	Floating	
Dhalli Zone	10740	3916	1.16	0.42	1.58
Snowdon Zone	6782	1829	0.73	0.20	0.93
Sanjauli-Malyana Zone	42281	10095	4.57	1.09	5.66
Lalpani Zone	89170	38259	9.63	4.13	13.76
Totu Zone	18708	2845	2.02	0.31	2.33
Summer Hill Zone	5681	1177	0.61	0.13	0.74
North Disposal Zone	25355	11879	2.74	1.28	4.02
Total	198717	70000	21.46	7.56	29.02

Table 1-2: Projected Sewage generation – Zone Level

Sewerage Zone	Projected Sewage Generation (MLD)			
	2011	2021	2031	2041
Lalpani	14.68	18.26	23.81	28.33
Summer Hill	1.09	1.43	1.97	2.31
North Disposal	3.97	5.09	6.79	8.23
Dhalli	1.81	2.55	3.95	5.06
Sanjauli Malyana	5.76	7.003	8.85	10.33
Snow Down	1.10	1.46	2.13	2.69
Totu	2.15	2.75	3.72	4.43
Total	30.57	38.54	51.23	61.38

1.1.1.2 INFLUENT QUALITY

Based on the laboratory results, the wastewater concentration entering the STPs varies from zone to zone. It is noted that in some of the zones the organic load i.e. BOD measured is upto 200 mg/l whereas in some zones it is upto 650 mg/l. This may be attributed to the fact that the sewer network in some parts of the city carries only grey water whereas some parts carry grey and black water combined.

¹ Assessment based on projected residential population and fixed floating population of 16,711

1.1.2 Sewage Collection

At present, 68% of the population has access to central sewerage system for wastewater disposal (referred to as offsite system), 29% of the total population discharge their wastewater into septic tanks and / or soak pits (referred to as onsite system), and 3% discharge their wastewater directly into open drains (*refer map 01*). As per the latest information, MC Shimla has provided sewerage connections to 12,131 properties² against a total of 40,000 registered properties within the MC Shimla limits.

Table 1-3: Wastewater collection mechanism – ward wise

Ward No.	Ward Name	Residential Population (2010)	% of Total Population	Wastewater Collection Mechanism		
				Sewerage System %	Open Disposal %	Septic Tank / Soak Pit %
1	BHARARI	6305	3.17	1.42	1.75	
2	RALADUBHATTA	7511	3.78	2.16	1.62	
3	KAITHU	3270	1.65	1.42	0.22	
4	ANNADALE	6210	3.12	3.11	0.01	
5	SUMMER HILL	6801	3.42	2.48	0.94	
6	TOTU	10745	5.41	0.58	4.73	0.09
7	BOILEUGANJ	13763	6.93	2.88	3.79	0.26
8	TUTIKANDI	5252	2.64	1.12	1.34	0.18
9	NABHA	7118	3.58	3.46		0.12
10	PHAGLI	5217	2.63	1.55	1.04	0.04
11	KRISHNA NAGAR	11834	5.96	4.99	0.37	0.59
12	RAM BAZAAR	6540	3.29	3.02		0.28
13	LOWER BAZAAR	3829	1.93	1.87		0.06
14	JAKHOO	7037	3.54	2.80	0.75	
15	BANMORE	5595	2.82	2.51	0.09	0.21
16	ENGINE GHAR	8790	4.42	3.93	0.49	
17	SANJAULI	9193	4.63	3.78	0.84	
18	DHALLI	6991	3.52	0.60	2.91	
19	CHAMYANA	9136	4.60	1.40	2.90	0.30
20	SANGTI(MALYANA)	9405	4.73	3.81	0.89	0.03
21	KASUMPATI	10301	5.18	3.83	1.35	
22	CHOTTA SHIMLA	16542	8.32	7.13	1.11	0.09
23	PATEYOG	5558	2.80	2.42	0.23	0.14
24	KHALINI	9708	4.89	3.23	1.63	0.03
25	KANLOG	6067	3.05	3.01	0.03	0.02
	Total	198717	100	68.52	29.05	2.43

The septic tanks/soak pits are used in some parts of the city because of lack of central sewerage system, difficulty in connecting septic tanks to sewer lines (wherever present) and unwillingness on part of residents to pay for new sewerage connection.

The DPR prepared by MC Shimla proposed providing of approx. 14,000 sewerage connections across eight sewerage zones. Considering the number of existing and proposed sewerage connections the

² Each registered property may have one or multiple dwelling/commercial/institutional unit. The actual number of dwelling/commercial/institutional units covered by each sewerage connection is not known.

total number comes to approx 26,100. This implies the entire city will not be covered by sewerage system even if recommendations given in the DPR are implemented.

At present the extent of households relying on the septic tank for wastewater disposal is not known. MC Shimla has started the process of collecting information on number of toilet seats, mode of wastewater disposal for each of the properties in Shimla City. This will help in ascertaining the number of households connected to sewerage system and correspondingly the sanitation cess to be collected. MC Shimla is conducting this survey in-house and because of limited staff, the progress on the same is very slow.

Interpretation

It is evident that the present central collection system does not serve the entire area; only 76% of the total area of city is served by this system. The number of properties connected to sewerage system and number of functional sewerage connections are unclear. The quantum of wastewater collected through the centralised collection system cannot be assessed. The septic tanks do not fulfill the design requirements as prescribed by CPHEEO.

1.1.3 Sewage Conveyance

The City is divided into Six Sewerage Zones for the purpose of planning and implementation of sewerage system. With the inclusion of Totu and Jutog areas into the present sewerage system, there will be in total eight sewerage zones. Presently Totu and Jutog areas do not have access to sewerage system to dispose wastewater. The City has in total 221 Km of sewer network (covering approximately 76% of the City area). Earlier during the British regime, only sewage was allowed to enter the sewerage system and sullage was discharged open into the drains (permitted only after 1936).

Table 1-4: Existing sewer coverage

Sewerage Zone	Sewer Network (in mtrs)	% Area Covered
Lalpani	91649	50%
Summer Hill	16887	72%
North Disposal	45222	55%
Dhalli	11373	50%
Sanjauli- Malyana	43480	54%
Snowdon	12614	56%
Total	221,225	

Source: Sewerage DPR

The existing sewer network is highly inefficient based on the fact that against an estimated 29.02 MLD wastewater generated, on an average only 3.5-4 MLD wastewater reaches the STPs. The reasons being mainly missing links in different hierarchies of existing sewer network, network in core city area collects only black water, unwillingness of residents to take sewerage connections coupled with ad-hoc planning and inadequate O&M activities.

In areas without sewerage system, the effluent from the septic tanks is discharged into open drains. The effluent from the septic tanks is offensive and its disposal into the open drains results in unsanitary conditions. Based on the survey conducted, it is estimated that roughly 29% of the population discharges their wastewater into the open drains without adequate treatment.

Presently the O&M of conveyance system is by private contractor appointed by MC Shimla. The present mode of maintenance of conveyance system in each of the zone is not effective due to

shortage of staff and appropriate tools. This results in a delayed response to the required maintenance works.

MC Shimla has prepared Detailed Project Report (DPR) in May 2009 for provision of 100% sewer coverage in Shimla City. The implementation of the DPR is proposed to be done in two phases mentioned below:

Phase I	Phase II
<ul style="list-style-type: none"> Rehabilitation of missing links and worn out network in the existing sewerage system Sewer coverage in newly added areas (Totu, Dhalli and Jutog) Construction of additional treatment capacities in Sanjauli-Malyana Sub Zone II Construction of new STP for Totu and Jutog Zone Provision of additional facilities like drying beds, centrifuge filter press, lab equipments, approach road and generator sets at all STPs 	<ul style="list-style-type: none"> Sewerage connections and sewer network within all six sewerage zones. This mainly covers the left out areas after the implementation of DPR - Phase I.

Later MC Shimla realised that the phasing as recommended will not improve situation significantly therefore modified the phasing of activities mentioned as below:

Phase I	Phase II
<ul style="list-style-type: none"> Sewerage coverage in Lalpani Zone Provision of additional facilities like drying beds, centrifuge filter press, lab equipments, approach road and generator sets at Lalpani and Sanjauli-Malyana STP 	<ul style="list-style-type: none"> Sewerage connections and sewer network within all six sewerage zones. This mainly covers the left out areas after the implementation of DPR - Phase I. Construction of new STP for Totu and Jutog Zone Construction of additional treatment capacities in Sanjauli-Malyana Sub Zone II Sewer coverage in newly added areas (Totu, Dhalli and Jutog) Rehabilitation of missing links and worn out network in the existing sewerage system

Interpretation

An insignificant amount of the total wastewater generated (11%) is conveyed through the central conveyance system and reaches the STP for treatment. The rest of the sewage quantity is disposed in open drains / areas resulting in environmental and health hazards.

The phase I of DPR only focus on providing sewerage connections in Lalpani Zone. But for optimum utilization of existing STPs, it is necessary to provide sewerage connections in all the six zones. With respect to strengthening of STPs, the provision of proposed facilities at Lalpani and Sanjauli-Malyana is rational owing to the quantum of wastewater being treated at each of these STPs.

MC Shimla does not have designated department and systems in place for regular O&M of sewer network.

1.1.4 Sewage Treatment and Disposal

TREATMENT CAPACITY

The city is divided into six sewerage zones, each having a STP for wastewater treatment. The total treatment capacity of all STPs combined is 35.63 MLD designed for the population needs for the year 2025 [*refer chapter 3.4.2 of Sanitation Situation Report (SSR)*].

The DPR prepared by MC Shimla proposes new STPs and augmentation of existing STPs for the years 2025 and 2040 (*refer chapter 3.4.2 of SSR for further details*). Based on the existing population (residential and floating) and projections for the years 2025 and 2040, the treatment capacities as required against as planned in DPR are mentioned below:

Table 1-5: Gaps in treatment capacities for 2025 and 2040³

Gap in Treatment Capacity for the year 2025	Gap in Treatment Capacity for the year 2040
<ul style="list-style-type: none"> Lalpani zone - 1.21 MLD 	<ul style="list-style-type: none"> Lalpani zone – 4.27 MLD
<ul style="list-style-type: none"> Dhalli zone - 1.64 MLD 	<ul style="list-style-type: none"> Dhalli zone – 4.43 MLD
<ul style="list-style-type: none"> Sanjauli-Malyana zone – 3.06 MLD 	<ul style="list-style-type: none"> Sanjauli-Malyana zone – 5.18 MLD
<ul style="list-style-type: none"> Totu zone – 0.61 MLD 	<ul style="list-style-type: none"> Totu zone – 1.78 MLD
	<ul style="list-style-type: none"> North Disposal – 1.08 MLD

Interpretation

Although the present installed capacities are grossly underutilized due to poor connectivity problems, the installed capacities are only sufficient enough to cater to the population up to 2021 considering that all the properties in Shimla City are connected to the sewerage system. Beyond 2021, additional capacities needs to be installed.

TREATMENT TECHNOLOGY

The STPs for the all the zones are based on extended aeration – activated sludge process. In addition to this, only Lalpani Zone has been provided with Up-flow Anaerobic Sludge Bed Reactor (UASB). MC Shimla has prepared a DPR for provision of some of the components within the STPs which are missing/ worn out, therefore needs to be provided/ replaced. The DPR also proposes augmentation of existing STPs and provision of new STPs.

All the STPs have functional laboratories for daily analysis (quality and quantity) of raw and treated wastewater. Hourly measurements of wastewater flow are recorded. The wastewater is analysed for pH, Total Suspended Solids, Total Dissolved Solids, Biological Oxygen Demand and Chemical Oxygen Demand. The effluent quality at all the STPs conforms to the requirement as specified by Himachal Pradesh State Pollution Control Board (HPSPCB) as per the wastewater analysis report (*refer section 3.4.2 of SSR for further details*).

MC Shimla has outsourced the day to day operation and maintenance of the STP to the private contractors. The responsibilities of the contractor also include regular wastewater monitoring and reporting to MC Shimla. The STPs are provided with detailed guidelines and manual for O&M. Each of the six STPs are adequately staffed and equipped for regular O&M.

The treated wastewater is discharged into the nearby open drains. The STPs are situated near the valley base, therefore the scope for reuse of treated wastewater for non-potable usages is not envisaged, since it involves laying parallel network for pumping treated wastewater back to the City, which is cost intensive.

³ The gap assessment for Jutog zone is not done since population figures and estimated sewage generation is not known. However in the DPR, it is proposed to provide a STP of 1 MLD capacity to cater the needs of Jutog zone only.

The sludge produced during the treatment process is collected and discharged into the sludge drying bed (SDB) or subjected to centrifuge filter press for separation of solids. At present the sludge treatment and disposal is not effective due to undersized SDBs as well as sub-optimal functioning of filter press resulting in disposal of sludge in the open drains.

Most of the STPs in Shimla are based on extended aeration – activated sludge process, which does not produce bio-gas. The STP at Lalpani has UASB treatment module, which provides opportunity to tap the methane gas. However there is no bio-gas storage facility at the STP, therefore it is disposed in the open.

Interpretation

DPR has considered STP based on FAB Technology for the uncovered areas. However other possible technologies than can be adopted suiting to Shimla context has not been adequately explored.

Currently recycling and reuse of treated wastewater for non-potable uses is not practiced. The possibilities of CDM funding by tapping green house gases have not being explored.

ONSITE WASTEWATER TREATMENT

With respect to on-site treatment systems which is mostly septic tanks/ soak pits, the design and sizing of septic tanks is influenced by space availability rather following the norms of CPHEEO. The septic tanks are not desludged in timely manner (done once in 5-15 years). MC Shimla does not have formalized systems for septage management. Also MC Shimla does not have proper equipments and adequate staff for septage management. The desludging is done manually and the concentrated sludge is collected in containers and transported to nearby convenient place for disposal, which poses a threat for environment and health. At present desludging of septic tanks is an informal activity carried out by the private operators.

Interpretation

The City does not have formalized system for septage management in line with the Manual Scavenging Act. The open discharge from septic tanks results in pollution of land, natural water bodies, and ground water.

1.1.5 Institutional Assessment

1.1.5.1 ORGANISATION STRUCTURE

There are various institutions involved in planning, development, and management of sewerage system within the MC Shimla limits. These include local bodies like Municipal Corporation of Shimla, state government departments and statutory authorities.

Table 1-6: Central/ State/ Local level Institutional Regulatory Framework

Institution	Responsibility
Central Level	
Ministry of Urban Development Ministry of Environment and Forest (MoEF)	Recommendations for amendments in acts and rules/ regulations and Bye laws of the urban local bodies, implementation of centrally sponsored schemes and Inspection and Monitoring.
State Level	
Himachal Pradesh State Environment Protection and Pollution Control Board	Plan a Comprehensive Program for prevention, control and abatement of pollution.
Local level	

Institution	Responsibility
Irrigation & Public Health	Planning, Construction, O&M of trunk sewer lines (in peripheral areas), and sewage treatment plants.
MC Shimla – Water Supply and Sewerage Department	O&M of branches and laterals, domestic & commercial connections, billing and addressing people’s grievances, collection of sanitation related cess
Private Operators	O&M of STPs and trunk sewers, desludging of septic tanks

1.1.5.2 FUNCTIONAL ASSESSMENT

STAFF AND QUALIFICATION

The education qualification, number of personnel required for different positions and number of positions filled against requirement for MC Shimla is mentioned in table below:

Table 1-7: Institutional Framework of water supply and sewerage department - MC Shimla

Sr. No.	Position/ Hierarchy	Required Qualification	No. of positions sanctioned	Qualification exists	No. of positions filled
1	Municipal engineer	M.E. in Environment Engineering	1	Engineer	1
2	Assistant Engineer	Environment Engineer	2	Engineer	2
3	Superintendent	Environment Engineer	2	Engineer	2
4	Junior Engineer	Environment Engineer	5	Engineer	5
5	Technical staff	ITI	60	ITI	59
6	Other staff	Graduation	97	NA	96

Existing employees holding designated position are not having pre-requisite educational qualification because the positions are being filled based on experience/ promotion.

Presently the O&M of the existing infrastructure (STP, trunk sewers) is outsourced to a private operator and IPH is monitoring the functioning of the same. This has reduced the burden of personnel requirement on IPH.

ROLES AND RESPONSIBILITIES

In case of Sewerage System, there are functional overlaps between MC Shimla and IPH department. IPH is responsible for planning, construction and management of trunk sewer lines as well as Sewage Treatment Plants (STP), whereas MC Shimla is responsible for laying of branches and laterals, its maintenance, providing sewerage connections, collection of user charges etc.

INTERPRETATION

Due to functional overlaps between MC Shimla and IPH, the accountability for provision of efficient services is not ensured. The mandate and priorities for both the organizations are different resulting in uncoordinated planning and implementation of sewerage infrastructure.

CAPACITY BUILDING

The MC Shimla lacks capacity building initiatives and do not have a road map for capacity building of decision makers and technical staff for implementation and O&M of sewerage system.

1.1.6 Regulatory and Governance Assessment

As per the 74th Constitutional Amendment Act, the States of India are given legislative and executive powers over provision of water and sanitation services. The Constitution of India (IX-A) allows states to endow ULBs with powers to collect revenues, levy taxes and cess, to enable them to function as institutions of local self-government and implement schemes as envisaged in Schedule 12 of the Constitution.

MC Shimla derives its functional domain from HP Municipal Corporation Act 1994 which lists obligatory and discretionary functions for MC Shimla and functions entrusted by GoHP to MC Shimla as per the 12th Schedule of the 74th Constitution Amendment Act.

KEY ISSUES

Absence of state sanitation policy which can act as a bridge between NUSP and city level sanitation functions including preparation, implementation, and monitoring of the city sanitation plan.

Lack in enforcement of municipal bye-laws, building codes leads to mismanagement of sewerage system practices at the citizens' level.

State lacks comprehensive legal framework specifically for the WSS sector. Non-compliance to CPHEEO Manual on Sewerage and Sewage Treatment with respect to several parameters like collection, conveyance, treatment, and disposal of sewage generated.

1.2 Service Level Benchmark for Sewerage System

Table 1-8 below represents the existing level of service against benchmarks with an objective to increase accountability for efficient service delivery. The indicators represent a set of performance parameters in the process, cost recovery and customer redressal.

Table 1-8: Service level Benchmark for Sewerage System

Performance Indicator	Desired Level of Service	Existing Level of Service	Remarks
Coverage of Sewerage Network	100%	76.68%	Significant coverage in terms of area
Collection efficiency of Sewerage Network	100%	16.43%	Low collection efficiency in spite of extensive coverage
Adequacy of Sewage Treatment Capacity	100%	178.87%	Existing treatment capacities are adequate for the next 10-12 years
Quality of Sewage Treatment	100%	No data	STPs are functional. Some additions required for optimized treatment levels.
Extent of Reuse and Recycling of Sewage	20%	0.00%	Due to topography, the reuse of treated wastewater has not been explored
Extent of cost recovery	100%	0.00%	MC Shimla is planning to introduce sanitation cess.
Efficiency in Collection of Sewage Charges	90%	0.00%	
Efficiency in redressal of customer complaints	80%	100%	The response time to address the complaint has been good

Source: Service benchmark workshop (2009)

1.3 SWOT Analysis

Strength	Weakness
<ul style="list-style-type: none"> • Topography is conducive for collection of wastewater and conveyance to STP through gravity • Adequate infrastructure in place for treatment of wastewater • Higher access to individual toilets • Widely covered and connected sewer system • Govt. funded project (fiscal provision by Govt. for execution of DPR Proposals) 	<ul style="list-style-type: none"> • Weak enforcement of building bye laws resulting in open disposal of wastewater • Overlapping institutional responsibilities resulting in inefficient service delivery • Worn out and missing links in the existing network results in incomplete tapping of wastewater generated • Non collection of grey water and yellow water in some areas by the sewerage system • Underutilized STP capacity • Reuse of treated water not practiced • Core city DPR Phase II not approved • Focus on only centralized wastewater conveyance and treatment solutions
Opportunity	Threat
<ul style="list-style-type: none"> • Part of Sewage DPR approved • Use of decentralized wastewater treatment systems for smaller catchment areas • Public Private Partnership in provision of sanitation services 	<ul style="list-style-type: none"> • Illegal sewerage connections • Environment and health hazard due to mismanagement of septic tanks/ soak pits • Population Growth / Growing tourism • Behavior and practices • Haphazard Peripheral area development • Unplanned development

1.4 Sectoral Vision

MC Shimla shall adopt strategy to establish sustainable, accessible, affordable and efficient sewerage system that shall ensure integrated approach to manage wastewater generated in the city while upholding the paradigm of protecting & sustaining good public health and environmental outcomes within the city limits as well as the immediate neighboring zones.

1.4.1 Goals

- 100% Coverage of the sewerage system including collection, conveyance, treatment and disposal
- 100% connectivity to the sewerage system
- 100% Affordability of the services
- 100% Efficiency – planning, design (simple technology & less capital intensive), operations and maintenance, monitoring and capacity building for the workers/staff, compliant to desired service levels
- 100% Compliant – All pertinent rules and regulations with respect wastewater collection, treatment and disposal
- Promotion of 3R Principle – Reduce, Reuse and Recycle
- Good Public Health and Environmental Outcomes
- Efficient Cost Recovery Mechanism

1.4.2 Framework

In accordance with NUSP, a broad Comprehensive CSP Framework is developed which shall provide guidelines for the planning and design of the sewerage system at a city level in conjunction with the O&M and monitoring elements of the system.

Table 1-9: Guidelines for preparation of strategy for sewerage system

INDICATORS AS PER NUSP	GUIDELINES FOR CSP
Output Related	<ul style="list-style-type: none"> <input type="checkbox"/> Proposals to ensure safe collection of the total human excreta generation <input type="checkbox"/> Proposals to ensure total black water (sewage) generated is treated and safely disposed off <input type="checkbox"/> Proposals to ensure total grey water (sullage) generated is treated and safely disposed off <input type="checkbox"/> Proposals to ensure 20 % of treated waste water is recycled and reused for non-potable applications
Process Related	<ul style="list-style-type: none"> <input type="checkbox"/> Proposals to ensure all sewerage systems in the city are working properly and there is no ex-filtration <input type="checkbox"/> Proposals to ensure septage/sludge is regularly cleaned, safely transported and disposed after treatment, from on-site systems in the city <input type="checkbox"/> Proposals to ensure there is clear assignment of institutional responsibility <input type="checkbox"/> Proposals to ensure competent documentation of the operational and monitoring systems <input type="checkbox"/> Proposals to ensure the formulation of prudent sanctions for deviances /violations of the system both at individual / institutional level and ensure the enactment
Outcome Related	<ul style="list-style-type: none"> <input type="checkbox"/> Proposals to ensure the systems facilitate and sustain good public health and environmental conditions

1.4.3 Time line

The system shall be designed under the broad framework as per the guidelines for a design period of 30 years; however, the planning shall entail the implementation of the design in phases to meet the ultimate goals of the CSP.

The phased approach aims to navigate through the challenges posed by the limitations in investments, institutional capacities, and community engagement in a proficient manner. For the wastewater management sector, the phases and the corresponding timelines are defined as stated below:

Table 1-10: Timeline Indication

PHASE	YEAR
Immediate	<input type="checkbox"/> 2011 - 2013
Short-Term	<input type="checkbox"/> 2011 - 2016
Mid-Term	<input type="checkbox"/> 2011 - 2026
Long-Term	<input type="checkbox"/> 2011 - 2041

1.5 Technology and Service Delivery Options

The technology and service delivery options shall be designed to ensure the wastewater being managed efficiently through the entire cycle of operations originating at the generation of wastewater and culminating in the ultimate disposal. All stages of the complete cycle are carefully planned to extend services to the entire city population cutting across all sections of the society and all levels of the settlements.

The technical options are designed keeping in mind the existing limitations of technical, financial and institutional capacities of MC Shimla. The service delivery options shall enmesh the community participation and NGO involvement to complement the MC Shimla capacities.

The recommendations not only focus on provision of suitable technology options for safe confinement, treatment and disposal of wastewater but shall also bear in mind the requirement for generation of awareness in the community. This approach shall ensure sustainability of the proposed systems.

1.5.1 Design Premises

The recommendations shall be based on the following parameters:

- Projected Populations
- Existing Situation vis-à-vis the Key Issues
- Projected Sewage Generation
- Existing Institutional Capacities
- Existing Financial Capacities

Table 1-11: Sewerage System Design Inputs

Sewerage Zone	Projected Sewage Generation (MLD)			
	2011	2021	2031	2041
Lalpani	14.68	18.26	23.81	28.33
Summer Hill	1.09	1.43	1.97	2.31
North Disposal	3.97	5.09	6.79	8.23
Dhalli	1.81	2.55	3.95	5.06
Sanjauli Malyana	5.76	7.003	8.85	10.33
Snow Down	1.10	1.46	2.13	2.69
Totu	2.15	2.75	3.72	4.43
Total	30.57	38.54	51.23	61.38

Source: Derived from CSP Sanitation Situation Report

1.5.2 Design Components

Within the framework of appropriate sewage management systems, the septic tanks/soak pits are not an appropriate treatment solution. The proposed system and the recommendations shall align along the paradigm of a no-septic tank solution as far as possible. Furthermore steps shall be ensured to phase out the existing septic tanks through innovative and proven methods.

The goal of the proposed system shall be to ensure all properties are connected to either a centralized sewer network or simplified sewer network connecting to a decentralized wastewater treatment system. It is the intent to explore the feasibility of implementing decentralized wastewater treatment systems through pilot demonstration projects.

MC Shimla has prepared a DPR for provision of sewerage network in left out areas, provision of missing links, replacement of worn out network in various zones aiming at providing 100% sewerage access and ensuring 100% collection of generated sewage from all the properties within the MC Shimla limits and its treatment through STPs. The DPR is proposed to be implemented in two phases. An amount of Rs. 53.02 Crores stands sanctioned by MoUD, GOI in January 2010 for Phase I. Phase II of DPR amounting to Rs. 92.81 Crores is under consideration by the GOI (*refer annexure 1*).

1.5.2.1 SEWAGE COLLECTION

1.5.2.1.1 System Requirements

RECOMMENDATIONS:

- Revisit DPR in terms of provision of household sewerage connections (existing 12,000 + 13,872 proposed in DPR, total registered properties are 40,000) for the balance properties
- To ascertain the mode of wastewater disposal for each property it is recommended to conduct a household survey. MC Shimla shall appoint professional consultants to assess the following:
 - Number of Households connected to central sewer system
 - Number of households connected to septic tanks/soak pits, condition of septic tanks and sludge disposal practices
 - Number of households without any system and discharging wastewater into open drains
 - Feasibility of connecting each property to the sewerage system
- It is recommended that the households within the coverage areas in the close proximity to the existing centralised sewerage network shall be connected to the system in zone wise manner in accordance with the sewerage zones in the immediate and short term phases and the remaining households/properties which are not feasible to connect shall adopt appropriate on-site wastewater treatment system
- It is recommended that MC Shimla initiates the tender procedure to facilitate the implementation of the Sewerage DPR. The phasing of activities to be implemented needs to be revisited. The provision of sewer network in all the six sewerage zones should be the priority followed by strengthening of existing STPs to achieve wastewater treatment standards as stipulated by HPSPCB.
- It shall be mandated, through effective policy regulations, that all new developments/constructions in the downstream area of existing centralised STPs and properties not being able to connect to the existing centralised sewerage system shall connect to appropriate on-site or decentralized treatment systems

1.5.2.1.2 Service Delivery

RECOMMENDATIONS:

- MC Shimla should engage a Private Service Provider for implementation of household sewerage connections as proposed in the DPR.
- MC Shimla should have registered plumbers who are authorised to provide household sewerage connection in case households are willing to do the same on their own.
- MC Shimla should institutionalise the system of approval of building layouts with appropriate on-site wastewater treatment systems (in areas where it is not feasible to connect to the centralised treatment system).
- MC Shimla shall develop and institutionalise MIS system to document and regularly update household level sewerage connections (existing connections, properties that migrate from use of septic tank to connecting to sewerage system and new developments in the City). This will benefit in retrieving information about sewer coverage in the city, assessment of sewage generation in each zone and will serve as a base document for collection of sanitation cess.

1.5.2.2 CONVEYANCE

1.5.2.2.1 System Requirements

RECOMMENDATIONS:

- MC Shimla shall initiate in the immediate phase the tendering process for implementation of conveyance network as proposed in the DPR. It is proposed to provide 227 Km of sewer line network (includes replacement of worn out network and provision of new network) to achieve 100% area coverage. The sewerage DPR exhibits a sound approach in the design of the conveyance network involving a well articulated grid of laterals, collectors, sub trunks and trunk sewers.
- It is recommended for MC Shimla to conduct a detailed survey for mapping the existing sewer network and water supply network and identify areas of intersection. MC Shimla shall initiate the process of identifying the consultants, prepare Terms of Reference (ToR) and float expression of interest in the immediate phase.

The minimum horizontal clearance between the sewer and existing or proposed water mains shall be 3 meters and the minimum vertical clearance shall be 500 mm. The sewer shall be located below the water main but in event the sewer should cross over the water main, special precautions like encasing and separation shall be ensured.

1.5.2.2.2 Service Delivery

RECOMMENDATIONS:

- MC Shimla should engage a Private Service Provider for implementation of sewer network in uncovered areas, replacement of worn out sewer lines and providing missing links as proposed in the DPR. Alternatively MC Shimla can also explore the possibility of engaging a Private Partner in PPP project mode for implementation and O&M of complete sewer network as well Sewage Treatment Plants.
- MC Shimla shall adopt proactive measures and institute an O&M Unit within MC Shimla in order to sustain the performance levels of the sewer system. The O&M Unit shall execute regular/periodic inspection in order to mitigate the risk of deterioration, blockages, and collapses. Alternatively the O&M unit will only be responsible for monitoring if a private partner is engaged for O&M activities.

- MC Shimla shall develop a Capacity, Management, Operation and Maintenance (CMOM) program designed to improve maintenance practices, reduce operating costs and raise the level of reliability of collection systems.
- O&M Manuals shall be designed by the service provider in consultation with MC Shimla.
- It is further recommended that MC Shimla in collaboration with specialized experts in the sewerage sector shall put together 'Best Management Practices Manual' which shall act as guidelines for the service providers.
- MC Shimla shall develop and institutionalise the MIS system to document and map the service delivery system. A well implemented MIS shall facilitate the optimisation of the existing maintenance activities to reduce customer complaints, sanitary sewer overflows, time and money spent on sewer blockages, and other reactive maintenance activities.

1.5.2.3 TREATMENT AND DISPOSAL

The technical experts hereby recommend to the authorities that septic tanks shall not be considered as an acceptable mode of treatment and disposal. The solutions designed to meet the challenges in the sewerage sector shall hence uphold the recommendation. The selection of effective treatment technology in response to the prevalent state of affairs shall be a mix of centralized and decentralized approaches with an objective to achieve desired/statutory levels of contaminant removal.

The overall plan shall include phasing out of the septic tanks in an innovative manner, without sustaining heavy financial encumbrances. Each Sewerage Zone may be considered as a planning area and the detailed surveys conducted to ascertain the numbers and location of properties served by septic tanks. A detailed plan may be drawn to devise the best techno-commercial solutions to connect the identified properties to the centralized/decentralized sewer system (based on feasibility studies).

In the intermittent phase, interceptor tanks shall be provided and the septic tanks/soak pits shall be connected to the same for collection of solids and the liquid waste diverted to either the centralized sewer network or decentralized sewer network as the case may be for further appropriate treatment and disposal. The Septic tanks lacking soak pits and draining directly into open drains/nallahs shall be gradually connected to either the centralized/decentralized sewer system.

1.5.2.3.1 System Requirements

RECOMMENDATIONS:

- MC Shimla shall initiate the tendering process for implementation of wastewater treatment interventions as proposed in the sewerage DPR.
- It is recommended that the augmentation of existing STPs and providing new STPs shall be considered for Phase II implementation.
- It is recommended to explore alternative technologies other than extended aeration/FAB for wastewater treatment in the following areas (*refer Map 02*).
 - North Disposal Sub-zone – 0.2 MLD
 - Sanjauli Malyana Sub Zone II – 0.2 MLD
 - Dhalli Sub Zone – 0.2 MLD
 - Totu Zone – 2.5 MLD
 - Jutog Zone – 1 MLD

- Given the topography of Shimla City, decentralised wastewater treatment systems provide good opportunities for treatment of wastewater from smaller catchment areas, areas difficult to connect to the centralised sewerage system and developments with adequate open spaces. This will help in reducing burden on existing sewage infrastructure as well as provide opportunity for local reuse of wastewater treatment by-products.
- It is recommended to conduct a pre-feasibility study for identifying opportunities for implementation of decentralised wastewater treatment systems.
- It is recommended to explore possibilities for reuse of wastewater treatment by-products from the existing STPs. Some of the options are:
 - Bio-gas extraction at Lalpani STP – bio-gas use options could be distribution to nearby households for cooking, fuel for generator or could be flared out
 - Urban reuse – green belt development
 - Recreational reuse – artificial lakes, ponds
 - Agriculture reuse
 - Sludge cake can be used as soil conditioner or sludge slurry can be used as inoculums in composting unit. The digested sludge can also be used for making sludge bricks or bio-cement.
 - Ground water recharge in downstream areas
- For treatment and disposal of septage from septic tanks the following options can be explored
 - Option 1 – disposal of septage from all the septic tanks in Shimla City at Lalpani STP (most favourable because of UASB module)
 - Option 2 – The septage collected from each of the sewerage zones is disposed of at STPs in each zone (feasibility of disposing the anaerobic septage at STPs with aerobic treatment process needs to be explored)
 - Option 3 – A dedicated septage treatment facility to be installed at convenient location, where septage from entire city is treated and disposed off in safe manner.

Base norms, specifications and assumptions for estimation of septage treatment	
Component	Norm
No. of Households (present nos)	15000
Latrine connected to septic tank	1 per household
Desludging frequency	3-5 years
No. of houses served each year (15000/5)	3000
Assuming septic tanks are emptied 250 days in year (no. of septic tanks/no. of working days)	12 tanks per day
Total septage to be cleared per day (no. of tanks*2.5 cu.m)	30 cu.m
No. of septic tanks cleared per vehicle per day	3 tanks per day
No. of vehicles required	4 vehicles
Sludge drying bed	
Area (12m x 12 m)	120 sq.m
Maximum sewage depth	0.3 meters

Base norms, specifications and assumptions for estimation of septage treatment	
Capacity per bed	36 cu.m
Daily requirement of beds	1 nos.
Total SDBs required considering sludge drying cycle of 10 days	10 nos.
Total site area required (area of SDB+10% of bed area+ office area + area for ancillary units)	8592 sq.m

1.5.2.3.2 Service Delivery

RECOMMENDATIONS:

- MC Shimla shall initiate the tender process for additions/repairs in existing STPs, augmentation and provision of new STPs.
- MC Shimla should engage a Private Service Provider for implementation of new STPs or strengthening of existing STPs as proposed in the DPR. Alternatively MC Shimla can also explore the possibility of engaging a Private Partner in PPP project mode for implementation and O&M of STPs along with sewerage network.
- MC Shimla, in collaboration with technical experts, state and local government personnel, shall develop operations and maintenance manual for Sewage Treatment Facility. The O&M Manual shall consist of:
 - Process Control and Maintenance Management Manual
 - Estimating staffing and laboratory needs
 - Operations Manual for decentralised wastewater treatment systems
 - Procedures for evaluating the performance of municipal sewage treatment facility
- MC Shimla in consultation with technical experts shall prepare guidelines for improved septic tank designs for existing and new developments. MC Shimla shall support the property owner for checking the conformance of the septic tank design with the national standards and also support residents to modify the septic tank design.
- MC Shimla should formalise septage management system. This includes appointing designated staff, provision of equipment for desludging, transportation and septage treatment facility. MC Shimla should explore the feasibility of disposing the septage at the existing STPs. If not feasible, alternatively the city can have a dedicated septage treatment unit. A feasibility study has to be conducted for identifying suitable site for installation of these units.
- Regularisation of private operators involved in desludging practices with proper M&E systems put in place
- MC Shimla should make it mandatory through policy intervention that all the new developments in the periphery (where sewerage system is not available) and areas in the downstream of existing STPs (connection to existing STP is cost intensive) to have their own on-site wastewater treatment system
- MC Shimla should develop a Capacity, Management, Operation and Maintenance (CMOM) program designed to improve maintenance practices, reduce operating costs and raise the level of reliability of treatment systems.

- MC Shimla in collaboration with specialized experts in the sewerage sector should put together 'Best Management Practices Manual' which shall act as guidelines for the service providers.
- MC Shimla should maintain asset registry for septage management as part of the MIS system for the sewerage management. The system shall track all maintenance activities in addition to facilitating a central repository of areas of complaints and general maintenance.
- It is recommended to have centralised laboratory for monitoring of wastewater quality, rather than individual laboratories being operational at each of the existing STP. This would reduce the operating costs as well as ensure quality management aspects.

1.5.2.4 RECENT DEVELOPMENT

Update:

In June 2011, MC Shimla published notice inviting Request For Qualification (RFQ) for selection of executing agency to Build, Refurbish, Rehabilitate, Operate & Maintain the Water Supply & Sewerage System of Shimla City for 20 years on Project Mode.

Under the sewerage system, the project focus is on rejuvenation of sewerage network, rehabilitation of missing lines and worn-out sewerage system, providing sewerage system for left out areas in various sewerage zones, up-gradation/rehabilitation of sewage pumping system and STPs, reduction of infiltration & ex-filtration through leakage management in sewage collection system, regularisation of unauthorised sewerage connections, improvement in billing and collection, complete O&M of the system, maintaining effluent standards as per CPHEEO/WHO standards, revenue recovery from the end user including marketing of sludge cake and exploring possibility of hydroelectric generation from the treated effluent in the downstream, integrating the same in the project.

The sewerage project is planned to be implemented in two phases keeping in view the priority of the works on the direction issued by the Hon'ble High Court of Himachal Pradesh vide orders dated 08.07.2009 passed in CWP 441/07 (*refer annexure 1 for project phasing*).

The cost of the total project is estimated at 250-275 Crores out of which 125 Crores will be funded through grants from Government of India, GoHP and MC Shimla and the rest to be mobilised by the private party.

RECOMMENDATIONS:

MC Shimla is in the process of short listing qualified agencies based on the RFQs submitted. Should in case MC Shimla goes ahead with engaging a private partner in building, refurbishing, rehabilitating, operating and maintaining entire sewerage system, then it is recommended that the above mentioned recommendations to form the basis for drafting Terms of References (ToR) for the executing agency.

1.6 Financial Options

1.6.1 Capital Expenditure

Broad cost estimates for capital expenditure are assessed for the key components of the various design sectors discussed in the preceding sections. The broad implementation strategy adopted for the sewerage system envisages that the first six years as the major investment phase (2011-2016), whereas the subsequent years over the plan timeline until the year 2041 predominantly involve incremental procurements for augmentation of the services or replacements.

Table 1-12: Capital Expenditure for implementation DPR - A

Project Component (Zone wise)	Cost (Rs. In Lakhs)
Lalpani Zone	
Provision of additional facilities at STP of 19.35 MLD (sludge drying beds, genset, centrifuge filter press, lab equipments, approach road)	208.54
Sewerage network with household connections	4472.24
Summer Hill	
Provision of additional facilities at STP of 3.93 MLD (sludge drying beds, genset, centrifuge filter press, lab equipments, approach road)	157.75
Sewerage network with household connections	411.50
North Disposal Zone (subzone I)	
Provision of additional facilities at STP of 5.80 MLD (sludge drying beds, genset, centrifuge filter press, lab equipments, approach road, energized tube well power pump)	119.65
Sewerage network with household connections	1618.10
North Disposal Zone (subzone II)	
Provision of new 0.20 MLD STP	138.83
Sewerage network with household connections	266.59
Dhali Zone (sub zone I)	
Extension of STP from 0.76 to 0.96 MLD. Provision of additional facilities at existing STP (sludge drying beds, genset, centrifuge filter press, lab equipments, approach road)	231.70
Sewerage network with household connections	
Dhali Zone (sub zone II)	
Provision of new 0.20 MLD STP	130.61
Sewerage network with household connections	403.35
Sanjauli Malyana Zone (sub zone I)	
Provision of additional facilities at STP of 4.44 MLD (sludge drying beds, genset, centrifuge filter press, lab equipments, approach road)	437.24
Sewerage network with household connections	961.66
Sanjauli Malyana Zone (sub zone II)	
Provision of 0.20 MLD STP	929.66
Sewerage network with household connections	
Snowdon Zone	
Provision of additional facilities at STP of 1.35 MLD (sludge drying beds, genset, centrifuge filter press, lab equipments, approach road)	173.95
Sewerage network with household connections	564.49
Totu Zone	
Provision of new 2 MLD STP	2033.09

Project Component (Zone wise)	Cost (Rs. In Lakhs)
Sewerage network with household connections	
Jutog Zone	
Provision of new 1 MLD STP	830.79
Sewerage network with household connections	
Sub Total	14089.74
Add 3% contingency charges	422.69
Add 0.5% administrative charges	70.45
Total	14582.89

Source: Sewerage DPR

Table 1-13: Capital Expenditure - B

Project Component	Cost (Rs. In Lakhs)
Detailed survey for assessment of household level sanitation facility (no. and type of toilets) and mode of wastewater disposal (sewerage system, septic tanks, open disposal)	50.00
Septage Treatment	
Vehicle mounted vacuum tank (Rs. 9 lakh/vehicle) – 4 vehicles required	36.00
Construction of sludge drying beds (Rs.2200/bed) – 10 drying beds required	26.50
Office and ancillary units (lump sum)	20.00
Total	82.50

1.6.2 Cost Recovery Options

The challenge for MC Shimla is to establish a rate structure that adequately addresses the true cost of services associated with the capital investments, operations, maintenance and regulatory requirements. The recovery of costs incurred in each revenue area shall be through a tax levied upon the property owners within the jurisdiction of the catchment area in addition to the user charges and the CDM revenue. The components of cost recovery could be user charges, tax component as percentage of property tax and CDM revenue.

1.7 Implementation Strategy

Based on the availability of manpower, machinery, requisite resources – technical and financial, the proposed interventions are prioritised over immediate phase, short-term, mid-term, and long-term.

Table 1-14: Phase wise Implementation Plan

PHASE	YEAR	ACTIVITY
Immediate	2011-2013	<p><u>Collection</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> MC Shimla shall conduct detailed survey in-house or through professional consultants to assess properties having sewerage connections/ septic tank & soak pit/no system at all for wastewater disposal. The survey shall also assess the feasibility of connecting each property to the sewerage system. <input type="checkbox"/> Provision of household sewer connection in un-served areas in all six sewerage zones (excluding Totu, Jutog, Sanjauli-Malyana Sub zone II, North Disposal Sub zone I and Dhalli Sub zone II where new sewer system and STP is proposed) <input type="checkbox"/> Introduction of sanitation cess for properties already connected to the centralised sewerage system <p><u>Conveyance</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Rehabilitation of missing links and worn out network in existing sewerage system as proposed in DPR. <input type="checkbox"/> Provision of sewerage network in un-served areas in all six sewerage zones (excluding Totu, Jutog, Sanjauli-Malyana Sub zone II, North Disposal Sub zone I and Dhalli Sub zone II where new sewer system and STP is proposed) <p><u>Treatment</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Survey and recommendations for improvisation of septic tanks in properties, which are not being able to connect to the centralised sewerage system. <input type="checkbox"/> Provision of additional facilities at all the STP as proposed in the DPR <input type="checkbox"/> If septage disposal at existing STPs is not feasible then MC Shimla shall conduct feasibility studies for identifying suitable sites for installation of septage treatment facility and also initiate DPR preparation, tendering and implementation <input type="checkbox"/> Policy formulation for making it mandatory for new developments to have appropriate on-site wastewater treatment system if not possible to connect to the centralised sewerage system
Short-Term	2014 - 2016	<p><u>Collection</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Provision of household sewer connection in un-served areas in all six sewerage zones for remaining households (excluding Totu, Jutog, Sanjauli Malyana Sub zone II, North Disposal Sub zone I and Dhalli Sub zone II where new sewer system and STP is proposed) <p><u>Treatment</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Formalised septage management system to be operational with

PHASE	YEAR	ACTIVITY
		<p>proper O&M and M&E system in place</p> <ul style="list-style-type: none"> <input type="checkbox"/> Augmentation of existing treatment capacities and provision of additional facilities at all the STP <p><u>O&M and M&E</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Establish O&M and M&E systems
Mid-Term	2017 - 2026	<p><u>Conveyance</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Provision of sewerage network in Totu, Jutog, Sanjauli Malyana Sub zone II, North Disposal Sub zone I and Dhalli Sub zone II areas. <p><u>Conveyance</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Extension of sewerage network <input type="checkbox"/> Replacements of components <p><u>Treatment</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Provision of new STPs for uncovered areas (Totu, Jutog, Sanjauli Malyana Sub zone II, North Disposal Sub zone I and Dhalli Sub zone II) <input type="checkbox"/> Augmentation of STP capacity <p><u>O&M and M&E</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Regular O&M and M&E of entire sewerage system
Long-Term	2026 - 2041	<p><u>Conveyance</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Provision of sewerage network in newly extended areas <p><u>Treatment</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Augmentation of STP capacity <input type="checkbox"/> Replacements of components <p><u>O&M and M&E</u></p> <p>Regular O&M and M&E of entire sewerage system</p>

CHAPTER 2. SECTORAL STRATEGY - ACCESS TO TOILETS

2.1 Existing Situation and Gap Assessment

2.1.1 Access to toilets

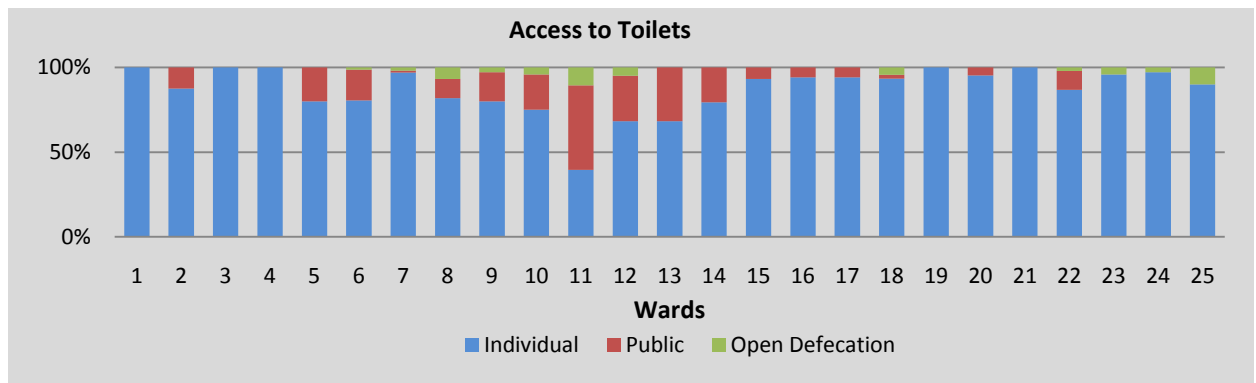
The residential and floating population [tourists, commuters who are coming from the periphery areas for work as well as daily visitors who come for other activities (e.g. hospital visits, visits to government institutions, etc.)] in Shimla rely on individual toilets, public toilets or practice open defecation. The city has neither community toilets (operated and managed by residents) nor mobile toilets.

2.1.1.1 INDIVIDUAL TOILETS

A rapid survey conducted by CDD Society (June 2010) reveals that 85% of the residential and floating population have access to individual toilets, 13% of the population relies on public toilets and 2% resort to open defecation. Though compared to other cities the percentage of population practising open defecation is insignificant, but considering Shimla being a major tourist destination visited by both Indian and international tourists, the matter is of concern and needs attention.

Ward nos. 1, 3, 4, 19, 21, have 100% access to individual toilets whereas ward nos. 7, 16, 17, 18, 20 have more than 90% access to individual toilets. Ward numbers 5, 6, 9, 10, 11, 12, 13, 14 shows more dependence on public toilets as compared to other wards.

Figure 2-1: Access to toilets in residential category – ward wise



Source: Land use survey, June 2010

With a total coverage of 85%, access to individual toilets is quite high. The reasons for the city not being entirely covered with individual toilets are space and fund constraints as well as unwillingness on part of communities to pay for construction of individual toilet. As Shimla is built on undulating terrain, space is a major constraint for the construction of a toilet as well as for septic tank in areas un-served by the centralised sewerage system. Also it has been observed that in some areas (especially Totu), the houses are not provided with individual toilets, and people living are dependent on shared toilets. During peak periods, people are more dependent on public toilets and if public toilets are not available then resort to open defecation.

The wastewater from individual toilets is collected either through central sewer system or septic tank/soak pits. In many areas even though network is present to collect wastewater, communities have not taken sewerage connection and continue to use septic tanks. There is no formal system for maintenance of septic tanks and mostly the overflow from septic tanks is discharged directly into road side/ natural drains.

Interpretation

Space and fund constraints as well as a lack of awareness and willingness seem to be the major obstacles for 100% access to toilets.

2.1.1.2 PUBLIC TOILETS

Currently, there are 130 public toilets present in Shimla out of which 14 are public urinals for men mainly situated along the major arterial roads. The remaining 116 facilities serve both men and women but with higher seat numbers for men in total (*refer Table 2-1*). Core city wards like Phagli, Krishna Nagar, and Ram Bazaar have a larger share of total urinals and toilet seats while peripheral areas like Boileaugunj, Tutikandi, Malyana, Kasumpati, Totu, Dhalli and Summer Hill have very few public toilets.

Table 2-1: Ward wise distribution of Urinals and WCs

Sr. No.	Ward Name	Urinals (Numbers)			WCs (Numbers)		
		Men	Women	Total	Men	Women	Total
1	Bharari	1	0	1	5	7	12
2	Raladubhatta	12	0	12	14	18	32
3	Kaithu	4	0	4	10	4	14
4	Annadale	4	0	4	12	9	21
5	Summer Hill	4	0	4	4	4	8
6	Totu	3	1	4	3	1	4
7	Boileaugunj	7	0	7	23	17	40
8	Tutikandi	2	1	3	6	5	11
9	Nabha	0	0	0	4	4	8
10	Phagli	9	0	9	13	10	23
11	Krishna Nagar	7	0	7	37	35	72
12	Ram Bazaar	42	1	43	50	25	75
13	Lower Bazaar	43	2	45	25	30	55
14	Jakhoo	16	0	16	14	18	32
15	Banmore	0	0	0	2	2	4
16	Engine Ghar	8	3	11	13	12	25
17	Sanjauli	3	0	3	14	11	25
18	Dhali	3	2	5	3	4	7
19	Chamyana	2	0	2	0	2	2
20	Sangti (Malyana)	0	0	0	0	0	0
21	Kasumpati	8	0	8	9	8	17
22	Chota Shimla	6	0	6	7	4	11
23	Pateyog	0	0	0	2	1	3
24	Khalini	2	0	2	4	3	7
25	Kanlog	4	0	4	10	9	19
	Total	190	10	200	284	243	527

12% of Shimla's residential population is dependent on public toilets. Low income households are the ones most dependent on public sanitation facilities especially in the core city area. Out of approx. 40,000 people being dependent on public toilets, ca. 10500 are working floating population

and ca. 29200 resident population. Reliance on public toilets for the residential population is high in the core city area [Bazaar areas, Krishna Nagar and in some other areas (parts of Totu, Summer Hill, Nabha, Phagli, Jakhoo etc)]. The residential population dependent on public toilets have not shown interest in managing the facilities (community managed sanitation model) themselves. The bazaar areas and tourist places in the periphery of the city does not have public toilets in convenient locations for use by visitors and tourists.

Based on the situation analysis, Shimla approximately lacks 665 toilet seats (fulfilling a 1/35 seat/user ratio in complete residential areas, 1/50 in mixed landuse areas and 1/100 in core city commercial areas) for both residents and floating population, who do not have access to individual toilets and are depend on public sanitation facility (*refer SSR, section 5.2.2*)

OPERATION AND MAINTENANCE

All the public toilets are owned by MC Shimla except for two which are owned by the Himachal Road Transport Corporation. However, until recently O&M of 50 public toilets is done by private service providers such as Sulabh International and Sunny Sudhar Sabha and the rest are managed by MC Shimla.

Based on the rapid survey conducted by CDD Society with respect to working conditions of public toilets, it reveals that most of the public conveniences lack hand-wash facilities and lacks adequate water storage structures for regular cleaning of the facility. Moreover erratic water supply compounds the issue. Overall the public toilets are in a rather bad condition which is highly correlated to the absence of a caretaker. Wherever caretakers were present, cleanliness and hygienic conditions were perceived to be far better than in facilities without a caretaker. The public toilets under MC Shimla are maintained by street sweepers. Due to multiplicity of responsibilities for a street sweeper the facilities are not properly maintained. Especially in the core city where public toilets were maintained by MC Shimla, people were dissatisfied with the cleanliness and hence resort to open urination/ defecation.

The other reasons that can be attributed to the unsanitary conditions of public toilets are inadequate manpower with MC Shimla for regular O&M, non-committal attitude of the community and absence of community engagement. The reasons for the communities not using the facility can be attributed to deficient gender-sensitive design of the facility, absence of infrastructure facilitating access to handicapped and elderly users and long walking distances to use the facility.

The public toilets are either connected to the central sewer network or discharge the wastewater into septic tanks. The city lacks formalised septage management system. Desludging of septic tanks is not done as per the requirement and overflow from the tanks is directly discharged into the open drains.

Recent Development

Considering the deteriorating state of public sanitation, MC Shimla recently (July 2011) has outsourced the O&M of 102 public toilets to Sulabh International whereas MC Shimla is in charge of the remaining 28 public toilets. This is to ensure that public sanitation facilities are well maintained and used optimally.

According the agreement, MC Shimla will hand over the facilities to Sulabh International on as and where is basis. The operator is mandated to make the facility usable by conducting required repairs. The expenses for maintenance of all the facilities (electricity, water, cleaning material, staff salary) will be borne by the operator.

Interpretation

Although Shimla lacks 665 toilet seats, O&M of the existing infrastructure evidently is the major problem. Lack of hand wash and water storage facilities and irregular cleaning arrangements hamper the provision of hygienic conditions. For residents the major issue is the accessibility of the facilities due to inconvenient location on the main roads which are not within comfortable reach for them.

2.1.1.3 OPEN DEFECATION

In Shimla City, approximately 2% of the residential and floating population resort to open defecation. The survey findings show instances of open defecation in wards like Totu, Boileaugunj, Tutikandi, Nabha, Phagli, Krishna Nagar, Ram Bazaar, Dhalli, Chota Shimla, Pateyog, Khalini and Kanlog.

In some areas, there are clusters of migrant workers involved in construction activities and are staying in unauthorised settlements. These settlements are without appropriate water and sanitation facilities. Presently these families resort to open defecation in nearby open areas. Such a scenario is common in Phagli, Boileaugunj, Totu, Kasumpati, Summer Hill, and other areas where city is witnessing new construction activities. Based on the survey, there are 24 pockets identified where open defecation is practiced (*Refer Map 5*). Also as most of the public toilets are located on the main city roads, the residential population living in adjacent upstream and downstream areas find it difficult to access the facility due to hilly terrain. Hence some of them opt for open defecation.

Most of the open defecation spots in Shimla have a sanitation facility within the vicinity. This strengthens the assumption that poor O&M of the facilities discourages people to use the existing public conveniences.

Interpretation

The City lacks adequate public sanitation facilities. Also cases of open defecation in vicinity of a public toilet strengthen the assumption that the toilets are not in a usable condition due to lack of adequate O&M.

2.1.2 Institutional Assessment

2.1.2.1 ORGANISATIONAL STRUCTURE

There is no dedicated unit to handle the design, construction, and O&M of the public toilets. The Water Supply & Sewerage Department (WSSD) is involved in the planning & design, and wastewater management of the public conveniences, Tourism Department is only involved in the planning of public conveniences in tourist circuits and the Health Department is involved in O&M of 28 facilities. Presently the private operator appointed by MC Shimla is responsible for O&M of 80% of the public conveniences.

2.1.2.2 FUNCTIONAL ASSESSMENT

INADEQUACY OF QUALIFIED STAFF

The Public Health Department of MC Shimla lacks adequate support staff for O&M of the existing public sanitation facilities in the city. The Health Department lacks staff in the critical positions. The department has one Chief Sanitary Inspector against the requirement of two, five out of the nine sanctioned posts of Health Inspector are vacant, and post of Superintendent is vacant.

Additionally, the system suffers owing to the lack of experienced and specialized staff with in-depth knowledge of the appropriate operation and maintenance techniques.

Interpretation

Inadequate qualified staff to design and maintain the public sanitation infrastructure.

ABSENCE OF MONITORING AND EVALUATION SYSTEMS

It is observed that largely decisions taken in this sector are on ad-hoc basis and are not followed by any appraisal mechanisms. Furthermore MC Shimla has not developed any regular maintenance schedules and O&M manuals thereby lacking the initiative to strategize good practices both preventive and operative for the efficient and sustained functioning of the toilet facilities.

There is clear deficit of MIS to document the procedures, O&M activities. The monitoring systems adopted by MC Shimla are not very elaborate and additionally do not achieve the desired results due to deficiency of required supervisory staff.

Interpretation

Systematic approaches towards the management of the sector are weak and hence tracking of problems and subsequent strategic improvement approaches are absent.

OVERLAP OF RESPONSIBILITIES

As there is no dedicated single unit solely responsible for design, planning, construction and operation & maintenance of public/community toilets, the accountability in service delivery is not ensured due to sharing of responsibilities.

LIMITED COMMUNITY ENGAGEMENT

The city population lacks awareness towards hygiene and sanitation matters and is not willing to participate in the management of community toilets.

Interpretation

Public outreach and education programs are deficient resulting in continuation of poor hygiene practices.

2.1.3 Regulatory and Governance

2.1.3.1 NON-COMPLIANCE

At household level and public toilet, sewerage and septage management systems are not in compliance with the set regulations. Many of the individual toilets and few public toilets are connected to the septic tanks for wastewater disposal. In some cases, the black water is discharged directly into the adjacent storm water drains/nallahs/open areas. The septic tanks are not constructed and maintained as per the design requirements. In absence of soak pits, the overflow from septic tanks finds its way into adjacent storm water drains/nallahs/open areas/water bodies. This creates unhygienic environment resulting in foul smell and breeding of mosquitoes.

Since Shimla has no clearly delineated slum areas it becomes difficult to assess the sanitation requirements of urban poor. No systematic inclusive approach is being followed at the moment by MC Shimla.

2.1.4 Service Level Benchmark

Table 2-2: Existing level of service wrt to access to sanitation

COMPONENT	NORM / SPECIFICATION / ASSUMPTION	EXISTING LEVEL OF SERVICE	REMARKS
Household Sanitation			
Coverage	100%	85%	
Toilet Connected to	1 per household	Criteria Not	Most of the households in

COMPONENT	NORM / SPECIFICATION / ASSUMPTION	EXISTING LEVEL OF SERVICE	REMARKS
Sewer / Septic Tank		<i>satisfied</i>	<i>urban poor locations, discharge the black water directly into the drains / nallahs / open areas</i>
Community Toilets			
Accessibility	24X7	NA	
Toilet Seats, if not used in the night	1 seat per 50 users	<i>Inadequate 1/80</i>	<i>This is the seat user ratio for areas where either commercial establishments are not expected to have individual facilities or there is a mix of residential and commercial use</i>
Toilet Seats, if used round the clock	1 seat per 35 users	<i>Inadequate 1/190</i>	<i>This is the seat user ratio for areas where primarily residential population is dependent on non-individual sanitation and the existing public facilities should be community toilets</i>
Urinals	1 unit per 200-300 users	NA	
Public Toilets			
Toilet Seats	1 seat per 100 users	<i>Adequate 1/77</i>	<i>In the two main commercial areas Ram Bazaar and Lower Bazaar, the number of toilet seats is adequate</i>
Urinal Units, not used in the night	1 unit per 200-300 users	<i>Adequate</i>	<i>In the two main commercial areas Ram Bazaar and Lower Bazaar, the number of urinals is adequate</i>
Urinal Units, if used 24/7	1 unit per 300-500 users	<i>Adequate</i>	<i>In the two main commercial areas Ram Bazaar and Lower Bazaar, the number of urinals is adequate</i>

2.2 SWOT Analysis

Strength	Weakness
<ul style="list-style-type: none"> • Extensive existing public sanitation infrastructure in the core city • High proportion of population with access to individual toilets • Sulabh International's contribution 	<ul style="list-style-type: none"> • Lack of dedicated unit • Inadequate Operation & Maintenance System • Inadequate number of toilet seats • Accessibility of public sanitation facilities in residential areas • Lack of monitoring and evaluation system • Lack of appropriate toilet design standards • Absence of community awareness programmes • Weak institutional framework and Grievance Redressal Mechanism • Erratic water supply hinders proper operation and maintenance • Dearth of appropriate sanitation technologies
Opportunity	Threat
<ul style="list-style-type: none"> • NGOs that are willing to contribute • Civil societies that are willing to engage 	<ul style="list-style-type: none"> • Rising population in peripheral areas • Unwillingness of community to participate • Unwillingness to pay for using public toilets • Space constraints for individual toilets • Space constraints for public/community toilets • Erratic water supply

2.3 Sectoral Vision

MC Shimla shall adopt a strategy to establish sustainable, accessible, affordable and efficient Toilet Development & Management Systems that shall ensure an integrated approach to construct toilets, operate and maintain the facilities in the city while upholding the paradigm of protecting & sustaining good public health and environmental outcomes within the city limits as well as the immediate neighbouring zones.

2.3.1 Goals

- 100% open defecation free Shimla
- 100% access to sanitation
- 100% access to individual toilets for residents
- 100% access to clean and adequate public sanitation for floating population
- 100% affordability of the services
- Affordability of construction of individual household toilets

- Affordability of use of public sanitation infrastructure for floating population and low income households
- Proper O&M systems in place to ensure clean and hygienic conditions
- 100 % Efficiency – planning, design (simple technology & less capital intensive), operations and maintenance, monitoring and capacity building for the workers/staff, compliant to desired service levels, promotion of Occupational Safety and Health practices
- 100 % Compliant – All pertinent rules and regulations
- Good Public Health and Environmental Outcomes
- Efficient Cost Recovery Mechanism

2.3.2 Framework

Following the National Urban Sanitation Policy, a framework for the development of a sectoral strategy for access to sanitation has been developed. This framework shall point the way to a comprehensive strategy at the city level.

Table 2-3: Guidelines for preparation of strategy for access to sanitation

INDICATORS AS PER NUSP	GUIDELINES FOR CSP
Output Related	<ul style="list-style-type: none"> <input type="checkbox"/> Proposals to ensure the elimination of open defecation in the city <input type="checkbox"/> Proposal to ensure access and use of toilets by urban poor and other un-served households <input type="checkbox"/> Proposals to ensure access and use of toilets for floating and institutional populations <input type="checkbox"/> Proposals to ensure proportion of total human excreta generation that is safely collected
Process Related	<ul style="list-style-type: none"> <input type="checkbox"/> Proposals to ensure ongoing provision of clean and hygienic public sanitation infrastructure. <input type="checkbox"/> Proposals to ensure clear distribution of responsibilities for construction, operation and maintenance of public sanitation facilities <input type="checkbox"/> Proposals to ensure regular review and reassessment of sanitation situation <input type="checkbox"/> Proposals to ensure competent documentation of the operational and monitoring systems <input type="checkbox"/> Proposals to ensure the formulation of prudent sanctions for deviances / violations of the system both at individual / institutional level and ensure the enactment
Outcome Related	<ul style="list-style-type: none"> <input type="checkbox"/> Proposals to ensure the systems facilitate and sustain good public health and environmental conditions

2.3.3 Time line

Recommendations for the access to sanitation sector encompass 30 years but are divided in phases. A phased approach helps to prioritise the actions that need to be taken in order to achieve the set goals taking institutional and financial as well as communal restrictions into account. The time line for the access to sanitation strategy is as follows:

Table 2-4: Timeline Indication

PHASE	YEAR
Immediate	<input type="checkbox"/> 2011 - 2013
Short-Term	<input type="checkbox"/> 2011 – 2016
Mid-Term	<input type="checkbox"/> 2011 - 2026
Long-Term	<input type="checkbox"/> 2011 - 2041

2.4 Technology and Service Delivery Options

The technology and service delivery options shall be designed to ensure that technically appropriate, socio-culturally acceptable and economically affordable toilets are provided to the population in the city and the system is managed efficiently through the entire cycle of operations. Steps are warranted to extend services to the entire city population cutting across all sections of the society and all levels of the settlements.

The several options are designed keeping in mind the existing limitations of technical, financial and social capacities of MC Shimla. The service delivery options shall enmesh the community participation and NGO involvement to complement the MC Shimla capacities.

2.4.1 Design Premises

The proposal shall be based on the following premises:

- Population Density
- Existing population numbers
- Existing condition of infrastructure vis-à-vis key issues
- Existing financial capacities
- Existing institutional capacities

Public toilet infrastructure may vary in size and number of toilet seats provided according to the prevalent needs. For community toilets, a standard of 15 toilet seats, 6 bathing units and 5 urinals should be adopted for every complex. The design principles and O&M requirements as mentioned in [Annexure 2](#) should be followed for provision of toilet infrastructure.

2.4.2 Design Components

The rapid survey has revealed that the O&M of public sanitation facilities is a matter of concern. Shimla has already infrastructure in place but owing to poor O&M, the facilities are not used optimally and people resort to open defecation. Hence, the strategy adopted for Shimla City to achieve 100% sanitation access is to focus on the rehabilitation and appropriate O&M of existing

infrastructure followed by provision of additional infrastructure wherever required and to create awareness amongst the citizens with respect to safe sanitation practices.

The technical team is of the opinion that 100% access to toilets (individual and community level) will be rather difficult to achieve because of the following reasons:

- The provision of an individual toilet for every household will not be feasible due to space and fund constraints.
- The population dependent on the community toilets are not willing to manage the facility and in absence of adequate O&M measures may opt for open defecation.

2.4.2.1 INDIVIDUAL TOILETS

2.4.2.1.1 System Requirements

The ultimate goal for access to sanitation at the city level should be the access to an individual toilet for every citizen. Space and fund constraints are the two major obstacles for the provision of households with an individual toilet.

RECOMMENDATIONS:

- It is recommended that over a long term every household dependent on public toilets or resorting to open defecation should have access to individual toilets. Based on the survey, it is estimated that 8000 households to be provided with individual toilets (*refer Map 5 for areas dependent on public toilets and practising open defecation*)
- Wherever the construction of an individual household toilet is not feasible because of space constraints, the provision of shared toilets should be taken into consideration. With respect to wastewater disposal, if it is not feasible to connect to the existing centralised sewerage system, then alternate arrangements for on-site wastewater treatment should be explored.
- It is recommended that a pre-feasibility study to be conducted to ascertain the number of households that can be provided with an individual toilet or alternatively a shared toilet.

2.4.2.1.2 Service Delivery

RECOMMENDATIONS:

- It is recommended that MC Shimla should establish a dedicated Public Sanitation Cell under MC Shimla. The cell will have a Technical Unit and an O&M unit. The technical unit will provide expertise with respect to planning, design and implementation of public sanitation infrastructure whereas O&M unit will be responsible for day to day operations and monitoring of public facilities. The technical unit will provide support to individuals in construction and operation of an individual toilet at household level.
- The Public Sanitation Cell should engage a consultancy firm to conduct the feasibility studies for provision of individual toilets in households dependent on public sanitation facilities. Based on the findings an action plan should be prepared to provide 100% sanitation access in the City.
- The construction of individual household toilets shall be rewarded with incentives or subsidised by MC Shimla.

2.4.2.2 PUBLIC TOILETS

2.4.2.2.1 System Requirements

It is recommended that the public conveniences should be renovated and augmented in case they are inadequate and not catering to the demand in terms of hygiene standards and seat numbers. Shimla City lacks approximately 665 toilet seats (based on the norm for provision of 1 toilet seat per 35 users for residential population and 1 seat for 50 users for floating population) to meet the current demand of both residential and floating population. Due to space constraints it will be a demanding task to provide as well as to operate and maintain such a high number. Therefore the strategy is to provide new infrastructure to a certain extent coupled with rejuvenation/rehabilitation of existing infrastructure to ensure that it will be used by the population.

RECOMMENDATIONS:

- It is recommended that infrastructure in the form of 354 new toilet seats should be provided for people relying on public toilets (*refer Map 6 for recommendations*). This includes provision of new toilet complex at some places whereas addition of seats in existing complex in some areas. The design principles as discussed in *Annexure 2* shall be considered while designing of sanitation facilities.
- It is recommended that
- The following catchment zones should be provided with Community Toilet Complexes: 1, 2, 7, 13, 14, 15, 16, 18, 22, 32, 34 (*refer Map 7*)
- In the following catchment zones augmentation of the existing infrastructure is recommended: 1, 16, 17, 26, 35
- In the following zones existing infrastructure should be rehabilitated immediately: 1, 9, 16, 17, 18, 19, 20, 22, 26
- Areas experiencing greater movement of people (intra and inter city movement), it is recommended to provide additional urinals for the male population. This includes provision of 4 new urinal complex with 4 ports each (*refer Map 6*)
- It is also recommended that the existing infrastructure should be reviewed against the design considerations as specified in *Annexure 2* and rehabilitated accordingly. The goal of this intervention is to ensure efficient usage of existing resources before MC Shimla invests in new infrastructure.
- It is recommended that MC Shimla engages a private consultancy firm to conduct detailed ward level survey to ascertain the following. Accordingly a detailed project report (DPR) for public sanitation should be initiated.
- Total number of public facilities and population dependent on the same;
- Number of Facilities in operative/inoperative status and reasons if facility is inoperative;
- Number of users accessing individual/community/public sanitation facility, in order to derive the requirement of toilets in each of these category;
- Assessment of each facility with respect to wastewater disposal – connected to centralised sewerage system or septic tank.

2.4.2.2.2 Service Delivery**RECOMMENDATIONS:**

- It is recommended that MC Shimla should outsource the O&M of public sanitation utilities to private party. MC Shimla has already engaged Sulabh International for O&M of 102 public toilets whereas 28 complexes to be maintained by MC Shimla. It is recommended that eventually MC Shimla should outsource all the complexes to private operators for O&M activities.
- MC Shimla should institutionalise appropriate monitoring systems. The O&M unit should monitor the performance of the private operators on regular basis. The recommendation is to adopt a tri partite system of monitoring the maintenance of the public toilets.

Who	Mode	Frequency	Remarks
Users	User Report Card (URC)	Weekly	The operator shall have to maintain the URC for at least 1% of the users.
Operator	Cleaning schedule	Daily	They will have to maintain a log and should be able to produce when asked for.
MC Shimla	Flying checks	Bi- monthly	They shall verify the URC and the operator's log.

2.4.2.3 MOBILE TOILETS

The elimination of open defecation is foremost important in achieving 100% sanitation goal. Although in Shimla the proportion of population practicing open defecation is insignificant as compared to other cities with similar setting, the pockets with population resorting to open defecation require remedial action in the immediate phase. Places where the demand for sanitation is high coupled with space constraints, or sanitation facilities to be provided for temporary settlements or unauthorized slums (where permanent infrastructure cannot be provided), provision of mobile sanitation facility can be considered.

A portable or mobile toilet is one of the solutions for providing sanitation access. The unit is easy to handle and install. The wastewater collection is either through central sewerage system, or wherever not present the outlet can be connected to on-site wastewater treatment system.

2.4.2.3.1 System Requirements**RECOMMENDATIONS:**

- The pockets with instances of open defecation where a public toilet is not reachable within walking distance and space constraints doesn't allow for new public sanitation complex, should be provided with a mobile toilet on an immediate basis.
- Based on the demand supply gap, it is recommended to provide sanitation infrastructure in the form of 33 mobile toilet seats to ensure communities to have access to toilet within appropriate walking distance. It is recommended to provide mobile toilets in the following catchment zones (*refer Map 7*).

✚ Catchment zones: 10, 11, 12, 20, 21, 22

- Apart from the above mentioned zones, the following areas should be reviewed in terms of feasibility for provision of mobile toilets (*refer Map 7*).

✚ Catchment zones: 6, 8, 9, 13, 14, 17, 24, 29, 31, 32, 33

- MC Shimla should mobilise funds for provision of mobile toilets and float tender for procurement in the immediate phase.

2.4.2.3.2 Service Delivery

RECOMMENDATIONS:

- It is recommended that the service provider responsible for management of public toilets is also awarded the component of O&M of mobile toilets or alternatively the private party supplying the mobile units enter into a service agreement with MC Shimla for regular O&M.

2.5 Financial Options

2.5.1 Capital Expenditure

Broad cost estimates for capital expenditure are assessed for public toilet complexes and mobile toilets with appropriate wastewater treatment systems.

It is recommended that MC Shimla shall provide mobile toilets on a service basis as this is financially more viable and sustainable than purchasing the infrastructure.

Table 2-5: Unit costs for construction of public toilet complex

Component	Rate (INR in Lakhs)*	Source
Sanitation complex by the roadside (4 seats with bathing unit)	3.5 – 4.0	MC Shimla
Sanitation complex on difficult terrain (4 seats with bathing unit)	4.5 – 5.0	MC Shimla
Public Urinal (4 ports)	1.4 – 2.0	MC Shimla

Construction costs for public toilets and urinals in Shimla vary significantly according to the terrain. Furthermore, the capital costs vary considerably according to the accessories and quality of sanitary fittings installed.

The table above presents capital expenditure currently spent by MC Shimla for the construction of public conveniences in Shimla. This approximately translates into Rs. 0.8 - 1.00 lakh for construction of one toilet seat. The construction expenditures for urinals translate into Rs. 0.35 – 0.50 lakh per urinal port.

The costs for the rehabilitation of public toilets are approximately 60% of the capital costs for the construction of a public toilet.

Table 2-6: Unit costs for provision of mobile toilet with additional equipment

	Standalone Unit (requiring suction vehicle) (Rs. In Lakhs)	Unit connected to on-site treatment system
Capital Costs per single unit	1.75 – 1.83	1.25 – 1.33
Capital Costs per complex of 4 units	7.0 – 7.32	5.0 – 5.32
Capital costs per 30 units	52.5 – 55	37.5– 40.0

Note: One DEWATS unit caters to a complex of 4 mobile toilet units. Therefore for 30 units approximately 7 DEWATS units are required. In case of suction vehicle, one vehicle is sufficient to cater to all the mobile toilet units.

Table 2-7: Capital expenditure for public sanitation

Item	Total Cost (Rs. In Lakhs)
Provision of 360 toilet seats (public sanitation complex)	288 - 360
Provision of 33 mobile toilets <i>With suction vehicle</i>	52.5 – 60.49

Item	Total Cost (Rs. In Lakhs)
Connected to DEWATS	41.25 – 43.99
Provision of 16 urinals distributed across 4 sanitation complex	5.6 – 14.4
Total Capital Cost	387.35 – 478.88

It is estimated that MC Shimla has to mobilise funds in the range of Rs.3.8 to 4.8 Crores approximately for achieving 100% sanitation access for the communities in Shimla City.

2.5.2 O&M Expenditure

Usually the annual O&M expenditures are 5-10% of the capital cost in case of a public toilet. The O&M costs vary depending upon the infrastructure provided at each facility and extent of use of the facility.

MC Shimla can outsource the O&M of the new infrastructure to a private operator as in the case of existing 102 public toilets which currently is being managed by Sulabh International. Under the agreement between MC Shimla and Sulabh International, MC Shimla has handed over the existing public toilets to Sulabh on as and where is basis. The operator is supposed to conduct minor repairs and painting of the premise to make it usable. Also the operator is responsible for paying charges for electricity, water and cleaning materials. In turn operator will collect user charges for urinals and WCs. Also a certain space at each sanitation complex can be used by the private operator for advertisement. The revenue generated by this belongs to the operator.

Similarly the O&M agreement for the newly added infrastructure can be signed with Sulabh International or any other agency as deemed fit for the job.

2.6 Implementation Strategy

Intervention phasing zone wise

Places where open defecation is practised have to be dealt immediately, followed by areas where public facility is difficult to access and finally areas where the population has access but inadequate toilet seats.

Intervention Phase	Immediate (Areas where open defecation is present)	Short term (Facilities difficult to access)	Mid-term (People have access but inadequate toilet seats)
Catchment Zone	1,8,9,10,11,12,13,16,17,18,19,20,21,22,24, 26, 31,32	2,3,4,6,15,23,25,33	5,7,14,27,29,30,34,35
Wards affected	Totu, Tutikandi, Boileaugunj, Nabha, Krishna Nagar, Kanlog, Ram Bazaar, Pateyog, Dhalli, Chota Shimla, Phagli, Khalini	Totu, Summer Hill, Phagli, Dhalli, Lower Bazaar, Malyana	Summer Hill, Boileaugunj, Phagli, Jakhoo, Bharari, Raladubhatta, Sanjauli

Table 2-8: Phase wise Implementation Plan

PHASE	YEAR	ACTIVITY
Immediate	2011-2013	<ul style="list-style-type: none"> <input type="checkbox"/> Review condition of existing facilities against design considerations through a detailed ward level survey <input type="checkbox"/> Rehabilitate all facilities which do not comply to the design considerations (repairs and up-gradation of public toilets) <input type="checkbox"/> Initiate preparation of Public Sanitation DPR <input type="checkbox"/> Identify possible construction sites for new infrastructure <input type="checkbox"/> Construction of new facilities (toilet seats as well as urinals) mainly focussing on core city area <input type="checkbox"/> Institutionalise O&M and M&E procedures <input type="checkbox"/> Conduct awareness generation campaign on health and hygiene aspects of public sanitation <input type="checkbox"/> Provision of mobile toilets at open defecation spots for immediate remediation until permanent infrastructure can be provided, and at places under temporary sanitation stress during festivals and other events <input type="checkbox"/> Promotion of individual household toilets through subsidies/incentives
Short-Term	2014 - 2016	<ul style="list-style-type: none"> <input type="checkbox"/> Construction of new facilities in core city (balance) and peripheral areas <input type="checkbox"/> Promotion of individual household toilets through subsidies/incentives
Mid-Term	2017 - 2026	<ul style="list-style-type: none"> <input type="checkbox"/> Augment existing infrastructure as per the demand <input type="checkbox"/> Endure provision of 1/35 seat/user ratio for residential areas and 1/100 for tourist areas <input type="checkbox"/> Promotion of individual household toilets through subsidies/incentives
Long-Term	2026 - 2041	<ul style="list-style-type: none"> <input type="checkbox"/> Augment existing infrastructure as per the demand <input type="checkbox"/> Endure provision of 1/35 seat/user ratio for residential areas and 1/100 for tourist areas

CHAPTER 3. SECTORAL STRATEGY – SOLID WASTE MANAGEMENT

3.1 Existing Situation and Gap Assessment

3.1.1 Quantity of waste

As per the survey (June 2010) conducted by CDD Society and information provided by MC Shimla, the City generates approximately 90 MT of solid waste per day. This translates into average waste generation of 330 gms/capita/day (calculated based on residential and floating population estimated by CDD Society). The biomedical waste generated in the city is approximately 0.3 MT per day.

3.1.2 Quality of waste

Segregation of waste at source as well as at the secondary storage level (community bin system) is lacking hence the municipal solid waste is collected in mixed state. However, there is predominance of paper, inert material, glass, rubber, leather, synthetics and compostable (including packaging material, vegetables, fish / meat, leaves, fruits etc).

3.1.3 Collection of waste

3.1.3.1 PRIMARY COLLECTION

At the time of conducting the survey in June 2010, approx. 57% of the residential population was covered under door to door waste collection system, followed by 35% population dependent on the community bins for waste disposal. The rest of the population either dumps the waste in open or burns the waste. The remaining waste gets piled up for collection and some part of it finds its way into natural drains, storm water drains, hill slopes and open areas.

Table 3-1: Solid Waste Disposal Mechanism

Waste Disposal Mechanism	% (Residential population)	% (Non Residential population)
Door to door	56.81	49.48
Municipal Bin	35.28	44.43
Burnt	4.64	3.76
Open Dumping	3.27	2.32

Source: Solid Waste Disposal Estimations by CDD (as per survey conducted in 2010)

The ward wise solid waste disposal mechanism based on the survey conducted in June 2010 is mentioned in Table 3-2.

Table 3-2: Ward wise solid waste disposal mechanism

Ward No.	Ward Name	Total Population (2010)	% of Total population	Solid Waste Disposal Mechanism			
				Door-to-door (%)	Municipal Bin (%)	Burning Waste (%)	Open Dumping (%)
1	BHARARI	6305	3.17	2.49	0.68		
2	RALADUBHATTA	7511	3.78	3.05	0.18		0.54
3	KAITHU	3270	1.65	1.44	0.21		
4	ANNADALE	6210	3.12	3.12			
5	SUMMER HILL	6801	3.42	2.47	0.53	0.41	
6	TOTU	10745	5.41	2.24	2.72	0.25	0.19
7	BOILEUGANJ	13763	6.93	3.01	2.62	0.78	0.48
8	TUTIKANDI	5252	2.64	1.13	0.69	0.49	0.33
9	NABHA	7118	3.58	1.18	2.40		

Ward No.	Ward Name	Total Population (2010)	% of Total population	Solid Waste Disposal Mechanism			
				Door-to-door (%)	Municipal Bin (%)	Burning Waste (%)	Open Dumping (%)
10	PHAGLI	5217	2.63	1.60	0.90	0.11	0.01
11	KRISHNA NAGAR	11834	5.96	1.19	4.40		
12	BANMORE	5595	2.82	2.51	0.10	0.21	
12	RAM BAZAAR	6540	3.29	2.00	1.29		
13	LOWER BAZAAR	3829	1.93	1.16	0.77		
14	JAKHOO	7037	3.54	2.22	0.88		0.44
16	ENGINE GHAR	8790	4.42	4.42			
17	SANJAULI	9193	4.63	3.10	1.25	0.28	
18	DHALLI	6991	3.52	0.69	2.30		0.53
19	CHAMYANA	9136	4.60	1.86	2.74		
20	SANGTI(MALYANA)	9405	4.73	1.59	2.40	0.69	0.07
21	KASUMPATI	10301	5.18	1.92	3.05	0.21	
22	CHOTTA SHIMLA	16542	8.32	4.43	3.73		0.16
23	PATEYOG	5558	2.80	1.86	0.62		0.32
24	KHALINI	9708	4.89	2.92	0.60	1.19	0.18
25	KANLOG	6067	3.05	2.97	0.08		
	Total	198717	100.00	56.58	35.13	4.62	3.26

Source: Solid Waste Disposal Estimations by CDD (as per survey conducted in 2010)

Street Sweeping

Street sweeping in MC Shimla area is carried out through 455 sanitation workers. The road length covered per sweeper is about 350m as against the national average of 1-1.5 km. The waste is collected through suphli and baskets and transportation of street sweepings to nearest community bin is carried out using nylon bags. Sweeping is also carried out through private sweepers on Sundays and holidays in the heart of the city i.e. Mall Road, Lower Bazaar, Sabji Mandi, Lakkar Bazaar etc. MC Shimla has recently purchased a mechanical sweeper for clearing waste along major roads.

MC Shimla is very proactive in solid waste management and are in the process of targeting 100% population to be covered under door to door waste collection system and street sweeping.

Present Situation – July 2011

MC Shimla has constituted a Shimla Environment, Heritage Conservation and Beautification (SEHB) Society for door to door waste collection in the City. The Society engages workers on daily wages who do the task under the leadership of each ward councilor.

As per most recent information provided by Health Department, MC Shimla, door to door waste collection system is operational in approx. 34,500 houses out of a total 40,000 households in Shimla. This accounts for around 85% of the total households. In remaining 15% of the area, the residents dispose the waste into the nearest concrete dustbins or dumper placer bins provided by MC Shimla, or alternatively throw the waste in the open or burn the waste especially in downstream areas where waste collection is difficult due to topographic constraints.

As per the recent information from MC Shimla, out of the 90 MT of solid waste generated daily, approximately 70 MT is collected and transported to the processing unit. From the balance, 10MT of waste is recycled and the rest 10 MT adds on to the quantum of waste to be collected the next day.

MC Shimla has fixed monthly user charges for door to door waste collection for different categories of establishment like residence, commercial shops (big, small), institutions (schools, hospitals, and government offices), hotels, restaurants etc. These user charges will be collected on monthly basis by the SEHB representative against a proper receipt.

The person violating provisions of the Municipal Corporation Shimla Door to Door Collection Bye-laws, 2006 shall be, in addition to the penalties as provided under the Himachal Pradesh Municipal Corporation Act, 1994, liable for disconnection of water, electricity and other civic amenities etc.

In order to ensure 100% street sweeping coverage, MC Shimla is in the process of outsourcing this activities to external agencies apart from optimizing its own operations. Recently out of 25 wards, MC Shimla has outsourced street sweeping operations in 5 wards to SEHB Society.

Interpretation

The SWM system is not in accordance with the MSW Rules 2000. Waste segregation at source is not being practiced due to lack of awareness, lack of systems with MC Shimla to transport wet and dry wastes separately. The door to door collection in downstream areas is a concern owing to topographic constraints. Sanitary workers/Safai karmacharis are exposed to unhealthy working conditions.

3.1.3.2 SECONDARY COLLECTION

Community bin system comprising of 209 no. of concrete dust bins and 93 no. of small dust bins are placed for disposal of waste by residents in Shimla. Dumper placer containers are 142 in numbers. The frequency of clearing of these bins varies from daily, alternate day, twice a week or even once a week depending on the area. The location of concrete bins and dumper containers is not convenient at many locations for the communities to access and dispose their waste in appropriate manner. MC Shimla has recently purchased 2 compactors for optimising waste collection from secondary waste storage depots.

Interpretation

Inadequate frequency of clearing of bins, broken dumper containers, and inconvenient location of bins/containers results in littering of waste.

3.1.4 Transportation of waste

For transportation of waste from different sources of generation to existing compost plant, dumper placers (for lifting dumper placer containers) are used. There are 32 numbers of different types of vehicles used for transportation of solid waste to processing unit out of which 29 are covered vehicles. There are 148 numbers of containers of 4.5 cum capacity and 54 numbers of 3.0 cum capacity. One JCB loader is used at the compost plant in Darni ka Bagicha for processing of waste.

As per most recent information provided by Health Department, MC Shimla has purchased 20 hydraulically operated pick up vehicles and 5 ordinary pick up vehicles for door to door collection and transportation of waste to the processing unit. The scattering of waste is observed while transporting of waste because of broken dumper containers.

As mentioned earlier the solid waste generated in the City is not being cleared on daily basis, and 11-12% of the waste is not transported to the processing unit. This results in accumulation of waste and an increase in quantum of waste that needs to be cleared.

Interpretation

Inappropriate infrastructure is resulting in waste scattering during transportation of waste. Also MC Shimla does not have adequate man power for operation of vehicles to clear waste on daily basis.

3.1.5 Treatment

MC Shimla is in the process of relocating the waste processing unit from Darni ka Bagicha (100 MT capacity) to Bhariāl. The Public Private Partnership (PPP) Operator for setting up of processing and treatment system has already been appointed. The facility is being implemented under BOT model and is expected to be operational by September 2011.

M/s Hanger Biotech Energies Pvt. Ltd, a Mumbai based firm has been awarded this project. The scope of work under this project includes design, development, construction, operation and maintenance of municipal solid waste processing facility with aerobic In-vessel compost plant along with material recovery facility, and leachate management system (sourced from Concession Agreement dated 27-07-2010). The concession agreement signed between MC Shimla and M/s Hanger is for a period of 20 years.

Interpretation

Ineffective composting process at the existing treatment facility due to mixing of dry and wet waste. Non compliance of compost quality with the prescribed standards is an issue.

3.1.6 Disposal

The City does not have landfill facility for disposal of rejects from the waste processing unit. The rejects from processing unit and other non biodegradable waste along with construction waste is directly dumped in valley near the compost plant at Darni ka Bagicha.

Once the compost plant is shifted to Bhariāl, in the absence of a landfill facility the rejects will be continued to be disposed in the nearby valley.

MC Shimla has recently prepared a DPR for implementation of scientifically engineered landfill facility at Bhariāl. A Gurgaon based consultancy firm M/s. Voyants Solutions Pvt. Ltd has prepared the DPR. The DPR has been approved by the council and forwarded to State Government for fund acquisition.

Interpretation

The waste disposal systems are not in compliance with the MSW Rules 2000. Storm water drains and natural drains get choked due to random disposal of the solid waste and causes adverse impacts in downstream areas.

3.1.7 Institutional Assessment

3.1.7.1 ORGANIZATION STRUCTURE

Solid Waste Management system is managed at three different levels (Central, State and ULB). Lack of co-ordination and follow up between these institutions at various levels is a matter of concern.

Table 3-3: Central/ State/ Local level Institutional regulatory framework

Level / Institution	Responsibility
Central Level	
Ministry of Urban Development (MoUD) Ministry of Environment and Forest (MoEF)	Recommendations for amendments in acts and rules / regulations and Bye laws of the urban local bodies, implementation of centrally sponsored schemes and Inspection and Monitoring.
State Level	
Department of Urban Development Himachal Pradesh State Environment Protection and Pollution Control Board	Plan a Comprehensive Program for prevention, control and abatement of pollution.

Level / Institution	Responsibility
(HPSPCB)	
Local level	
MC Shimla – Health Department	Collection, transportation, treatment and disposal of domestic waste
Private Operators (SEHB Society and Hanger Biotech)	Door to door Solid Waste Collection and Waste Processing Unit

3.1.7.2 FUNCTIONAL ASSESSMENT

SWM STAFF AND QUALIFICATION

The department of solid waste management is under the administrative control of Health Officer who is assisted by Chief Sanitary Inspector, Project Coordinator, Sanitary Inspectors, Sanitary Dafedars and Safai Karmacharis. Total 592 employees including permanent, daily wagers and contract workers are engaged in providing SWM services. Shimla is divided into six sanitary wards and the market area for providing the SWM services. Each sanitary ward is divided into beats for street sweeping and is supervised by sanitary inspectors.

Table 3-4: Present Staff

Sr. No.	Position	Qualification	No. of seats presents
1	Corporation Health Officer	Post Graduate in Public Health, MBBS	1
2	Veterinary Public Health Officer	Bachelor in Veterinary Sciences	1
3	Project coordinator	Doctorate	1
4	Chief Sanitary Inspector	Sanitary Inspector Course & Matriculation	1
5	Sanitary Inspector	Matriculation	6
6	Dafedars	No qualification required	26
7	Safai Karmachari	No qualification required	470

Interpretation

Health Officers (medical professionals) are placed in charge of the SWM department and generally lack the technical background and knowledge of engineering and environmental aspects of SWM. The field staffs consisting of sanitary inspectors and supervisors have limited technical capabilities for efficient service delivery.

ROLES AND RESPONSIBILITIES

The health department is responsible for solid waste management, public toilets and public health.

3.1.7.3 CAPACITY BUILDING

MC Shimla lacks capacity building in terms of training programs to orient decision maker and technical staff towards best practices in Municipal Solid Waste Management including appropriate practices for collection, storage, transport, treatment & disposal of waste and general code of conduct.

Interpretation

MC Shimla has not implemented Management Information System (MIS) to document the procedures, O&M activities in absence of which MC Shimla is not able to retrieve required

information for internal and external users. Lack of enforcement of municipal by-laws is responsible for mismanagement of SWM practices. Low cost recovery against service delivery. Lack of community engagement and incentive based approach for motivating staff and communities for efficient service delivery.

3.1.8 Regulatory and Governance Framework

Interpretation

- 1. Legal Framework:** Presently, there is a multiplicity of overlapping laws, authorities and jurisdictions, and ambiguities and gaps in state laws.
- 2. Governance Framework:** At the local government level there is need for a clear demarcation between the roles of government and the service provider. At the service provider level, there is a need to strengthen professionalism and accountability.
- 3. State Ownership:** The state, the legal framework lacks provisions for:
 - Clear assignation of powers for fixing, levying and collecting tariffs based on economic principles such as cost-to-serve, return on investment, etc.;
 - Dealing effectively with sub-standard service, default in payment, theft, willful damage, or other actions which can adversely affect service providers or customers.
- 4. Multiple Institutions.** The state, different aspects of the solid waste management sector are handled by different departments or ministries, MOEF, Pollution Control Board, Urban Development and Public Health.
- 5. Absence of state level sanitation Strategy/policy /program:** No intermediary policy or program at state level which can act as bridge between national level sanitation policy and city level (ULB level)sanitary functions including preparation, implementation and monitoring of the city sanitation plan.

3.1.9 Service Level Benchmark for Solid Waste Management System

Table 3-5: Existing level of service

INDICATORS	DESIRED LEVEL OF SERVICE	EXISTING LEVEL OF SERVICE	REMARKS
PROCESSES			
Area with Door to Door Collection (DTDC) service	100%	85%	Significant area under DTDC
Area under DTDC through motorized vehicles	60%	60%	MC Shimla requires investment to improve
Area with Community Bins for collection of waste	100%	27.44%	Underutilized Community Bins due to topography
No. of Containers (3.0 / cum capacity)	2.5 per 1000 HHs	1.35 per 1000 HHs	The containers are not utilized efficiently
No of Containers (4.5 cum capacity)	1.5 per 1000 HHs	3.7 per 1000 HHs	MC Shimla is efficiently using containers capacity
Area under street sweeping	100%	100%	MC Shimla has demonstrated 100% of success
No. of Handcarts in use for collection of Street Sweepings	2.4 / km of road	Nil	MC Shimla is planning to evolve system as per MSW System
No of Covered Containers	100%	100%	As per MSW Rules
No of covered transportation vehicles	100%	91%	Not complete but significant follow of MSW Rules
Daily waste quantity collection from all sources	100%	80%	Attempts to lift waste daily from all storage points underway

INDICATORS	DESIRED LEVEL OF SERVICE	EXISTING LEVEL OF SERVICE	REMARKS
Extent of municipal solid waste recovered/recycled	80%	15%	<i>MC Shimla is limited in capacity to initiate the process</i>
Waste receiving Treatment	25%	25%	
Safe Disposal in Sanitary Landfill	100%	Nil	<i>Disposal Site available and in operation but in an unscientific unregulated manner</i>
Waste dumped in open environment	0%	2.65%	<i>Less % of total waste is currently dumped into open environment endangering public health and environment</i>
COST RECOVERY			
Households paying User Charges	70%	44.4%	<i>MC Shimla has initiated mechanism to levy and collect charges, collection is low</i>
CUSTOMER SERVICE			
Efficiency in redressal of customer complaints	80%	74.1%	<i>The response time for complaints has been fairly good</i>

Source: MC Shimla

3.1.10 SWOT Analysis

Strength	Weakness
<ul style="list-style-type: none"> • Door- to-door system, municipal bins are in place • Govt. funded project (fiscal provision by central/state government for execution of DPR proposals) • Committed officials 	<ul style="list-style-type: none"> • Segregation of waste not practiced at source. • Inadequacy of staff for segregation and door to door waste collection • Blockage of storm water drains and natural drains due to random disposal of solid waste • Inadequate & broken dumper bins • Inadequate clearance frequency of bins & dumper container • Inadequate transport infrastructure for transferring waste to processing site • Non compliance of compost quality with prescribed standard • Open land filling and non-compliance with MSW Rules,2000 • Unplanned developments • Multiplicity of agency with overlapping and fragmented functions • Lack of MIS • Inadequate capacity in terms of infrastructure, finance and human resource • Lack of Capacity building among MC Shimla staff • Absence of state level sanitation policy /program
Opportunity	Threat
<ul style="list-style-type: none"> • Willingness to pay for user charges • Approved DPR • PPP projects • NGO Participation • Technical support from bilateral agencies • Projects on PPP/PSP • Willingness of community/NGOs/Civil Societies to participate in waste management programs 	<ul style="list-style-type: none"> • Growing floating population • Behavior and practices • No Sanitary Landfill site present in Shimla (DPR for proposed Sanitary Landfill Site is not yet approved)

3.2 Sectoral Vision

Establish sustainable, accessible, affordable and efficient MSW systems that shall ensure integrated approach to manage solid waste generated in the city while upholding the paradigm of protecting & sustaining good public health and environmental outcomes within the city limits as well as the immediate neighbouring zones.

3.2.1 Goals

- 100 % Coverage of the services – segregation, collection, storage, transportation, treatment and disposal
- 100 % Accessibility to the services

- 100 % Affordability of the services
- 100% Efficiency – planning, design – less technology & capital intensive, operations, management, monitoring and capacity building for the workers / staff, compliant to desired service levels
- 100 % Compliant – All pertinent rules and regulations
- Promotion of 3R Principle – Reduce, Reuse and Recycle
- Good Public Health and Environmental Outcomes
- Efficient Cost Recovery Mechanism

3.2.2 Framework

In accordance with National Urban Sanitation Policy (NUSP), a broad Comprehensive City Sanitation Planning Framework is developed which shall provide guidelines for the planning and design of the system at a city level in conjunction with the operation & maintenance and monitoring elements of the system.

Table 3-6: Guidelines for preparation of strategy for municipal solid waste management system

INDICATORS AS PER NUSP	GUIDELINES FOR CSP
Output Related	<ul style="list-style-type: none"> <input type="checkbox"/> Proposals to ensure regular collection of the entire solid waste generated in the city (100% collection) <input type="checkbox"/> Proposals to ensure treatment and safe disposal of the entire solid waste generated in the city <input type="checkbox"/> Proposals to ensure the solid waste generated in the city causes no adverse impacts on surrounding areas outside the city limits
Process Related	<ul style="list-style-type: none"> <input type="checkbox"/> Proposals to ensure the efficient design of the collection and treatment system in conformity with MSW rules 2000 <input type="checkbox"/> Proposals to ensure clear devolution of responsibility and accountability in the institutional system <input type="checkbox"/> Proposals to ensure competent documentation of the operational and monitoring systems <input type="checkbox"/> Proposals to ensure the formulation of prudent sanctions for deviances / violations of the system both at individual / institutional level and ensure the enactment
Outcome Related	<ul style="list-style-type: none"> <input type="checkbox"/> Proposals to ensure the systems facilitate and sustain good public health and environmental conditions

3.2.3 Time line

The system shall be designed under the broad framework as per the guidelines for a design period of 30 years, however, the planning shall entail the implementation of the design in phases to meet the ultimate goals of the CSP.

The phased approach aims to navigate through the challenges posed by the limitations in investments, institutional capacities, and community engagement in a proficient manner. For the

solid waste management sector, the phases and the corresponding timelines are defined as stated below –

Table 3-7: Timeline Indication

PHASE	YEAR
Short-Term	☐ 2011 – 2016
Mid-Term	☐ 2011 – 2026
Long-Term	☐ 2011 - 2041

3.3 Technology and Service Delivery Options

The technology and service delivery options shall be designed to ensure the municipal solid waste is managed efficiently through the entire cycle of operations originating at the generation of waste and culminating in the ultimate disposal. All stages of the complete cycle are carefully planned to extend services to the entire city population cutting across all sections of the society and all levels of the settlements.

The several options are designed keeping in mind the existing limitations of technical, financial and social capacities of MC Shimla. The service delivery options shall enmesh the community participation and NGO involvement to complement the MC Shimla capacities.

The recommendations not only focus on provision of suitable technology options for safe collection, storage, treatment and disposal of solid waste but shall also bear in mind the requirement for generation of awareness in the community alongside the provision for educating these masses. This approach shall ensure sustainability of the proposed systems.

3.3.1 Design Premises

The proposals shall be based on the following parameters –

- ☐ Projected Populations
- ☐ Projected Solid Waste Generation
- ☐ Existing Situation vis-à-vis the Key Issues
- ☐ Existing Institutional Capacities
- ☐ Existing Financial Capacities

Table 3-8: MSW System Design Inputs

YEAR	POPULATION	FLOATING POPULATION	MSW*(MT/d)
2011	2,07,063	76000	99.07
2012	211576	78115	101.39
2016	230632	87178	111.23
2017	235658	89604	113.84
2021	256883	100000	124.91
2027	308929	114326	148.13
2031	349360	125000	166.03
2041	418295	150000	198.90

Source: Derived from CSP Situation Analysis Report

*Per Capita per day generation rate – 350 g/capita/d as per CPHEEO Manual

3.3.2 Design Components / Recommendations

3.3.2.1 PRIMARY STORAGE

MC Shimla has distributed bins (two bin system for storage of bio-degradable and non bio-degradable waste) to households for practising waste segregation at source. MC Shimla shall ensure households to follow the norms and give segregated waste to the person coming for door to door waste collection.

3.3.2.2 PRIMARY COLLECTION

The primary waste collection system in residential areas shall be a mix of motorized door to door collection, manual waste collection in areas inaccessible by vehicles and individual disposal at the community waste bins. The commercial establishments including hotels and restaurants should be covered by door to door collection and through waste storage depots provided in vicinity. The vegetable and meat waste to be collected separately through door to door collection whereas the non-biodegradable waste to be disposed in dumper container placed nearby.

Recommendations are as follows.

- ❑ MC Shimla should plan and support SEHB Society for initiation of door to door waste collection in the remaining 15% households (5650 households). For this activity, MC Shimla should procure 11300 bins (2 bins for each household) for distribution to households.
- ❑ It is recommended to procure appropriate equipments for effective street sweeping. DPR recommends procuring 810 brooms, spade and other elements for road sweeping and drain cleaning.
- ❑ MC Shimla shall take adequate measures to enhance the safety and dignity of sanitary workers. As per the DPR, it is recommended to procure 810 safety kits for sanitary workers engaged with MC Shimla. Correspondingly awareness on using the kits and its advantages to be generated.
- ❑ Awareness generation & waste segregation at source shall be carried by MC Shimla.
- ❑ MC Shimla should strictly enforce penalising defaulters who do not follow the system and pay user charges in time.

3.3.2.3 SECONDARY STORAGE

The areas unserved by door to door collection system are equipped with community bins to allow for individual disposal of the solid waste generated at the household level as well as store the solid waste collected through the door to door collection system prior to its transport to the treatment facility or the intermediate transfer stations/recycling centres. Residential and non-residential areas shall have different strategies for the establishment of the community waste depots both in terms of location of bins and the quantity of bins deployed.

Recommendations are as follows:

- ❑ Procurement of 160 bins (proposed in SWM DPR) to be placed in market, institutional and tourist areas to provide easy access to communities for waste disposal and to avoid littering. The placement of bins to be finalised based on the daily work experience of sanitary workers in the field.
- ❑ Waste from litter bins / community bins / containers placed in market areas, hotels, restaurants area, institutional areas, and commercial complexes shall be lifted every day and transported to the waste processing unit to avoid flooding of bins or containers.

3.3.2.4 TRANSPORT

The transport System shall be designed to convey the waste either directly from the last collection point (less than 20 kms from the treatment facility or disposal point) through small four-wheelers, which are deployed for secondary collection to the final disposal point. Or it involves the lifting of waste from community waste depots/bins and transporting it to the treatment and disposal facility directly.

Recommendations are as follows:

- Transport fleets like, dumpers, tippers, loaders to be procured as proposed in the SWM DPR

Table 3-9: Transportation fleet required for waste disposal

TYPE OF VEHICLES REQUIRED	Nos.
Dumper placer	5
Twin dumper placer	3
Backhoe Loader	3
Inspection Vehicles	2

- The waste has to be transported to the waste processing and disposal facility by closed vehicles to avoid littering and the route shall be optimised as far as possible.
- Waste from community bins/containers placed in market areas, hotels, restaurants area, institutional areas, and commercial complexes should be lifted every day and transported to the waste storage depot to avoid flooding of bins/containers which otherwise results in scattering of waste.

3.3.2.5 TREATMENT

Recommendations are as follows:

- MC Shimla shall ensure the completion of new waste processing unit at Bharial (100 MT capacity) and put into operation at the earliest as per the concession agreement signed with M/s Hanger Biotech Energies Pvt. Ltd. under the public private partnership project mode.
- MC Shimla should promote appropriate techniques for composting of bio-degradable waste at source especially for institutions, hotels where space availability for composting unit is not an issue. This will help reducing the burden on city machinery for waste collection on day to day basis.

3.3.2.6 DISPOSAL

The site for a land fill facility has been identified and a Detailed Project Report (DPR) for construction of the same has been prepared by a Gurgaon based consultancy firm M/s Voyants Solutions Pvt. Ltd. The DPR has been approved by the council and is forwarded to the State Government for acquiring funds for implementation.

Recommendations are as follows:

- MC Shimla shall mobilise funds and identify a suitable agency at the earliest for implementation of land fill facility since the treatment plant at Bharial will be operational by September 2011. Once the unit is functional, the rejects and construction debris needs to be appropriately disposed as per the MSW Rules 2000.

3.4 Financial Options

3.4.1 Capital Expenditure

Broad cost estimates for capital expenditure are assessed for the key components of the various design sectors discussed in the preceding sections. The broad implementation strategy adopted for the solid waste management system envisages that the first six years as the major investment phase (2011-2016), whereas the subsequent years over the plan timeline until the year 2041 predominantly involve incremental procurements for augmentation of the services or replacements.

The assessments are based on the costs mentioned in the DPR for augmentation, replacement and construction of SWM infrastructure, scheduled rates of construction (State of Himachal Pradesh) for activities outside the purview of DPR. The following tables represent the major capex estimates for the various design stages as mentioned in the SWM DPR.

Table 3-10: Cost estimates for different components of SWM

Sr. No.	Tool/Equipment	No. of units required	Rate Per Unit	Total cost (Rs. In Lakhs)	Remarks
A. Storage at Source					
1	Bins for storage	80,000	30.5		Procured
B. Primary waste collection					
➤ Collection					
1	Ruck sack & Trays (Hard Plastic)	810	600		Procured
2	Pick up van with Hydraulic lifting*	5	639000	31.95	Procured 20 out of 25
➤ Street Sweeping					
1	Litter Bins	160	4000	6.40	
2	Brooms, spade and other implements for roads sweeping and drain cleaning	405	500	2.02	
3	Safety kit for sanitary Workers for MC Shimla	810	500	4.05	
4	Mechanical sweeper	1	2500000	25.00	
5	Mop up Van	5	639000	31.95	
➤ Construction of chute system (Avg. length of the individual chute system – 200m & Width – 1.5m)					
1	Civil construction for chute system, waste storage cabin (3mx4mx3m)approximately	20	550000	110.00	
2	CGI sheet, Hoppers	20	450000	90.00	
C. Intermediate Storage (construction & maintenance of cement platforms where dumper placer containers shall be placed)					
1	Civil construction (retaining wall, platform), hill cutting	60	25000	15.00	
D. Transportation					
1	Dumper placer	5	1200000	60.00	
2	Twin dumper placer	3	1700000	51.00	
3	Backhoe Loader	3	1975000	59.25	
4	Inspection Vehicles	2	480305	9.61	
E. Waste Transfer Station					
1	Compactor	2	7600000	152.00	
2	Hopper	2	550000	11.00	
3	Hook lift system (20T)	2	1316250	26.32	

Sr. No.	Tool/Equipment	No. of units required	Rate Per Unit	Total cost (Rs. In Lakhs)	Remarks
4	Transfer Containers (20m ³)	4	750000	30.00	
5	Truck Chassis	2	1000000	20.00	
6	Civil construction			20.00	
F. Sanitary Landfill					
1	Construction of Sanitary Landfill and other items	1		2324.94	
	Grand Total			3080.50	

Source: SWM DPR, Landfill DPR and updated information on procurement by MC Shimla

Note:

- Cost of waste processing facility (WPF) is not estimated as designing, financing, construction concessioning management O&M of WPF on BOT basis is given to M/s Hanjer Biotech Energies Pvt. Ltd. Company.
- MC Shimla has already procured 20 pickup vans (out of total 25) as proposed in the SWM DPR.
- MC Shimla is considering to make Shimla a dumper free City
- MC Shimla is in the process of procurement of equipments mentioned under street sweeping head above
- The grand cost mentioned in the table is based on the SWM DPR. The cost excludes the miscellaneous cost, contingency cost and taxes. The cost may vary at the time of procurement/implementation.

3.4.2 Operations and Maintenance Expenditure

The O&M costs for SWM in Shimla City mainly consists of door to door waste collection cost, street sweeping cost, waste transportation cost, waste processing cost and waste disposal costs. Under each of the mentioned activity the cost head mainly includes administration cost (salary and administrative expenses), maintenance cost (fuel, repairs and replacements, chemicals, electricity etc.). The O&M cost for the above mentioned activities as per present waste generation is mentioned in Table 3-11.

Table 3-11: O&M Costs

Cost Head	Costs (Rs. In Lakhs)	Remarks
Door to door collection		Cost arrived based on actual expenditure
<ul style="list-style-type: none"> • Man power (salary) 	160.00	The cost is incurred for the present coverage of 85% and cost recovery of 60-65%. Presently the cost of D2D waste collection is borne by SEHB.
Street Sweeping		Cost arrived based on actual expenditure
<ul style="list-style-type: none"> • Man power (salary) 	563.00	
<ul style="list-style-type: none"> • Equipment maintenance cost 	7.80	
Waste Transportation		Cost arrived based on actual expenditure
<ul style="list-style-type: none"> • Man power (salary) 	27.00	
<ul style="list-style-type: none"> • Fuel 	32.85	
<ul style="list-style-type: none"> • Vehicle maintenance (includes depreciation costs) 	31.60	
Waste processing		Cost calculated based on concession agreement

Cost Head	Costs (Rs. In Lakhs)	Remarks
<ul style="list-style-type: none"> Tipping fees 	49.27	Calculated for 90MT of waste received at processing unit @ Rs.150/MT. The quantity and tipping fees will vary as per quantum of waste generated year on year.
Waste disposal		Cost calculated based on estimation by Project Implementation Unit, MC Shimla
<ul style="list-style-type: none"> Land filling cost 	16.62	considering 15-20% rejects of present 90MT daily waste generation, landfilling cost Rs.253/MT
Present total O&M cost per annum	888.14	

Source: MC Shimla

Note: The administrative cost of MC Shimla has not been considered.

Based on the above figures, once complete solid waste management system is put in place, MC Shimla will have to spend approximately **Rs.2700/MT** of solid waste as O&M costs. As per the experiences in other Indian cities, this cost seems to be on the higher side.

3.4.3 Cost Recovery Options

The challenge for MC Shimla is to establish a rate structure that adequately addresses the true cost of services associated with the capital investments, operations, maintenance and regulatory requirements. The recovery of costs incurred in each revenue area shall be through a tax levied upon the property owners within the jurisdiction of the catchment area in addition to the user charges. The components of cost recovery could be user charges and tax component as percentage of property tax.

MC Shimla has already in place, a user charge structure for different land use categories. As MC Shimla is providing better facilities in terms of waste collection, treatment and disposal, the recovery in the form of either property tax, or user charge or combination of both needs to be explored to meet the expenses of the entire cycle of services.

3.5 Implementation Strategy

Based on the availability of manpower, machinery, requisite resources – technical and financial, the proposed interventions are prioritised. Table 3-12 presents the phase-wise implementation action plan for the City of Shimla.

Table 3-12: Phase-Wise Implementation Plan

PHASE	YEAR	Actions
Short Term	2011-2016	<ul style="list-style-type: none"> <input type="checkbox"/> Initiate primary segregation , storage and door to door collection system (for remaining 15% population) <input type="checkbox"/> Procurement of gears/equipments for street sweeping, waste transportation as per the SWM DPR <input type="checkbox"/> Construct and operationalize the transfer station <input type="checkbox"/> Operationalisation of waste processing unit at Bharial <input type="checkbox"/> MC Shimla should mobilise funds and implement landfill facility at Bharial <input type="checkbox"/> Promote decentralised solid waste management practices <input type="checkbox"/> MC Shimla should take necessary measures for 100% collection of user charges <input type="checkbox"/> MC Shimla should strengthen the existing M&E system <input type="checkbox"/> Enforcement of application of Polluter pays Principle/penalty for littering as per MSW Rules 2000 <input type="checkbox"/> Initiate measures to enhance the safety and dignity of sanitary workers
Mid-Term	2017 – 2026	<ul style="list-style-type: none"> <input type="checkbox"/> Augmentation of SWM system to meet the demands of growing population <input type="checkbox"/> Regular O&M involving in entire system of SWM <input type="checkbox"/> Replacements of components as per the maintenance plan <input type="checkbox"/> Regular M&E of entire SWM system
Long-Term	2027 - 2041	<ul style="list-style-type: none"> <input type="checkbox"/> Augmentation of SWM system to meet the demands of growing population <input type="checkbox"/> Regular O & M involving in entire system of SWM <input type="checkbox"/> Replacements of components as per the maintenance plan

CHAPTER 4. SECTORAL STRATEGY - STORM WATER MANAGEMENT

4.1 Existing Situation and Gap Assessment

Shimla has been blessed with a natural hilly terrain and drains where storm water easily finds its way into the valleys. The Kufri-Dhali-Sanjauli-Ridge-Tutu spine is the water shed running through the city from where the storm water drains south into River Yamuna and in the north draining into River Sutlej. Natural drains also called as Nallahs are the major carriers of storm water finally disposing the storm water into the rivulets and rivers downstream.

4.1.1 Collection and conveyance

In Shimla, there are not many initiatives present to collect storm water apart from some minimal efforts of the residents for rainwater harvesting.

The drainage system in Shimla consists of natural drainages and 67 storm water drainages. The natural system takes care of the majority of the run-off and in the plain areas where this natural system is not sufficient, storm water drainages have been built on the hill side of the roads where the storm water does not find its way to the valleys on its own. The man-made hill side drainages direct the water from the rocks and water springs via cross culverts to the downstream areas where the run-off is discharged into the natural drains and finally discharges into the natural water bodies.

The total length of the drainage network is 42.33 km, translating into coverage of 29.43% (total road length - 143 kms).

The majority of the nallahs are lined with half round earthenware tiles. The embankments are made up of stone masonry plastered with cement mortar. The breadth of these nallahs within the city varies between 0.75 meter to 1.00 meter and depth varies between 0.6 - 0.9 meters. Some of the nallahs are covered on top. The total length of nallahs within MC Shimla is approximately 20 kms.

KEY ISSUES

- Problems associated with other sectors like solid waste management and sewerage management impacts functioning of storm water drainage system. Drainages are clogged by solid waste or discharge of black/grey water leads to pollution of receiving water bodies (*refer map 8*)
- The overflow from septic tanks and soak pits finds its way into natural drains leading to siltation and the wastewater flow in the drains causes unpleasant odour.
- Storm water drains are being used for the laying of water pipelines; this may result in blockages and the mixing of wastewater with drinking water.
- Higher velocity due to steep gradients and narrow cross section leads to scouring of surface lining and erosion of embankments resulting in overflowing drains causing local flooding in the nearby areas.
- Solid waste openly dumped along the road sides, eventually finds its way into the drains. Subsequently the flow of wastewater/storm water in the drains is blocked and flooding occurs mostly during rainy periods affecting the surrounding neighbourhoods.

Interpretation

Poor management of sewerage and solid waste management system adversely affects the storm water drains ultimately leading to pollution of storm water. Encroachment of the drains, unscientific design and implementation of storm water drains lead to occasional flooding in some parts of the city areas.

4.1.2 Disposal

Under the current system, the storm water eventually discharges into the downstream natural water bodies. As the drains do not only carry storm water but also wastewater and solid waste the downstream water bodies inevitably are being polluted.

Interpretation

The existing storm water management system is inadequate to prevent pollution of natural water bodies in the downstream areas.

4.1.3 Institutional Assessment

4.1.3.1 ORGANISATION STRUCTURE

The department responsible for the design, planning, construction and physical maintenance of the storm water infrastructure is the Roads & Buildings Department. The Health Department of MC Shimla is responsible for cleaning of the drains from solid waste.

Interpretation

Shimla lacks a dedicated unit that is solely responsible for all matters concerning the storm water drainages.

4.1.3.2 FUNCTIONAL ASSESSMENT

In case of storm water drainage system, there are functional overlaps between R&B and Health Department, MC Shimla. Weak coordination between departments results in non-accountability thereby hindering O&M of storm water drainage system. Also in absence of proper devolution of responsibilities, the functioning of the system is greatly hindered.

Currently the Health Department, who is responsible for cleaning of drains, lacks adequate support staff for regular O&M of road side drains in the city.

Additionally, the system suffers owing to the lack of experienced and specialized staff with in-depth knowledge of the storm water management system and lack of formal training in the sector also greatly hinders proper planning and design of drainage system.

The residents lack awareness towards water conservation matters and use of storm water drainages. MC Shimla has not established mechanisms to integrate the community and foster participation towards strengthening the Storm Water Management service levels.

Interpretation

Public outreach and education are deficient and foster the continuation of encroachment of the storm water drains.

4.1.4 Regulatory and Governance Assessment

The Storm water management system in Shimla reflects large non-compliance to CPHEEO Manual on Sewerage and Sewage Treatment with respect to several parameters like estimation of peak flows & design of storm water drainage system, collection, conveyance, and disposal of storm water run-off generated, in addition to parameters like pollution prevention, and water-quality monitoring.

There is no stringent zoning regulation that encourages the implementation of the source control efforts.

4.2 Service Level Benchmark for Storm Water Management

Table 4-1 below represents the existing level of service against benchmarks with an objective to increase accountability for efficient service delivery. The indicators represent a set of performance parameters in the process, cost recovery and customer redressal.

Table 4-1: Service level Benchmark for Sewerage System

Performance Indicator	Desired Level of Service	Existing Level of Service	Remarks
Coverage of storm water drainage network	100%	29.43%	Total length of drainage system
Incidence of water-logging / flooding	0	NA	No reliable data available
Length of storm water drain	143.83 km	42.33km	Total length of drainage system

Source: Service Level Benchmark Workshop (2009)

4.3 SWOT Analysis

Strength	Weakness
<ul style="list-style-type: none"> Natural slopes provide excellent conditions for storm water discharge 	<ul style="list-style-type: none"> Inadequate storm water management system During dry periods storm water does not reach downstream areas in quantities that allow for treatment measures
Opportunity	Threat
<ul style="list-style-type: none"> Willingness of NGO's to participate Willingness of Civil Societies to participate IEC Campaign Awareness generation may affect blockage of drains positively 	<ul style="list-style-type: none"> Regular cleaning of drainages might not be feasible/ will not be followed Inadequate solid waste management and sewerage management systems Lack of community engagement in source control measures

4.4 Sectoral Vision

MC Shimla shall adopt a strategy to establish sustainable, accessible, and efficient Storm Water Drainage Development & Management Systems that shall ensure an integrated approach to construct storm water drains, operate and maintain the infrastructure in the city while upholding the paradigm of protecting & sustaining good public health and environmental outcomes within the city limits as well as the immediate neighboring zones. The ultimate goal shall be the "provision of a long lasting clean natural and road side drain system.

4.4.1 Goals

- 100 % Coverage of the services
- 100 % Efficiency – planning, design, operations and maintenance, monitoring and capacity building for the workers/staff, compliant to desired service levels
- 100 % Compliant – All pertinent rules and regulations
- Good Public Health and Environmental Outcomes

4.4.2 Framework

In accordance with NUSP, a broad Comprehensive CSP Framework is developed which shall provide guidelines for the planning and design of the system at a city level in conjunction with the operation & maintenance and monitoring elements of the system.

Table 4-2: Guidelines for preparation of sectoral strategy for Storm Water Management

INDICATORS AS PER NUSP	GUIDELINES FOR CSP
Output Related	<input type="checkbox"/> Proposals to ensure 100 % of storm-water and drainage is efficiently and safely managed.
Process Related	<input type="checkbox"/> Proposals to ensure Underground and surface drainage systems are functioning and are well maintained <input type="checkbox"/> Proposals to ensure there is clear assignment of institutional responsibility <input type="checkbox"/> Proposals to ensure competent documentation of the operational and monitoring systems <input type="checkbox"/> Proposals to ensure the formulation of prudent sanctions for deviances / violations of the system both at individual / institutional level and ensure the enactment
Outcome Related	<input type="checkbox"/> Proposals to ensure the systems facilitate and sustain good public health and environmental conditions

4.4.3 Time line

The system shall be designed under the broad framework as per the guidelines for a design period of 30 years; however, the planning shall entail the implementation of the design in phases to meet the ultimate goals of the CSP.

The phased approach aims to navigate through the challenges posed by the limitations in investments, institutional capacities, and community engagement in a proficient manner. For the Storm Water Management sector, the phases and the corresponding timelines are defined as stated below:

Table 4-3: Timeline Indication

PHASE	YEAR
Immediate	<input type="checkbox"/> 2011 - 2013
Short-Term	<input type="checkbox"/> 2011 – 2016
Mid-Term	<input type="checkbox"/> 2011 – 2026
Long-Term	<input type="checkbox"/> 2011 - 2041

4.5 Technology and Service Delivery Options

The technology and service delivery options shall be designed to ensure the efficient management of the entire storm water drainage system through the entire cycle of operations. Steps are warranted

to extend services to the entire city population cutting across all sections of the society and all levels of the settlements.

The several options are designed keeping in mind the existing limitations of technical, financial and social capacities of MC Shimla. The service delivery options shall enmesh the community participation and NGO involvement to complement the MC Shimla capacities.

4.5.1 Design Premises

The recommendations shall be based on the following parameters:

- The Population Densities
- Development Pattern of the City – Present & Future Land-Use
- Total hierarchy of the roads
- Pervious & Impervious Areas – Rationale for Design Run-Off Coefficient
- Catchment Area & Disposal Points
- Important meteorological parameters like intensity, duration and return period of rainfall
- Existing Institutional Capacities
- Existing Financial Capacities
- Existing Situation vis-à-vis the Key Issues at Ward Level

4.5.2 Design Components

4.5.2.1 REPAIRS AND UPGRADATION

Under this category of service, the goal of MC Shimla shall be to repair and upgrade the drain lengths that are in need of repairs and which have inadequate capacity and design to handle the expected run-offs in the area. The areas which experience / expect flooding due to the low capacity, weakened condition of the drains shall be addressed.

The old draining nallahs, some of which are more than 100 years old require immediate intervention by means of protecting of banks from erosion, providing adequate width and depth for smooth flow of water during rainy periods.

MC Shimla has conducted detailed survey of the nallahs and has prepared a DPR for repair and up gradation of 67 nallahs present in different parts of the City. The DPR proposes model which suggests division of longitudinal height of each nallah every 15 meters and introducing stepped toe wall having number of steps varying as per the requirement. The proposal is to increase the width of nallahs to 0.75, 1.00 and 1.50 meters at different intervals.

The nallah banks to be protected through provision of multilayers of material which is durable, longer lasting and does not require frequent repairs. The bank walls height to be increased and stone pitching on both sides is proposed (*refer annexure 3 for further details*)

RECOMMENDATIONS:

It is recommended that MC Shimla should initiate the process of getting approval for implementation of DPR at the earliest.

4.5.2.2 STORM WATER DRAINAGE SYSTEM

4.5.2.2.1 Collection

Source Control

Besides the centralised storm water drainage system, a decentralised approach shall be adopted to reduce the stress on the current centralised system. Decentralised options include measures like source control and collection techniques and aim at reducing the storm water flow into the centralised system.

Table 4-4: Source Control Strategies

BUILDINGS AND LOTS
Performance Standards for New Development
Performance Standards for Existing Buildings
Low- and medium-density residential controls
RIGHT OF WAY
Road reconstruction design standards
Sidewalk design standards
Right of way build out
OPEN SPACE
Green Infrastructure - green streets, rain gardens and swales

Table 4-5: Source Control Initiatives

STRATEGY	DESCRIPTION	EFFECT
Blue Roof 2-in / 1-in Detention	Install roof top detention systems	Cost Effective method to detain water
Green Roof	Install a green roof on at least 50 percent of a roof	Cost-effective storage or removal of runoff from new rooftops
Rain Water Harvesting	Methodologies to capture run-off	Cost-effective storage or removal of runoff from impervious surfaces
Side walk Bio-filtration	Vegetated Controls	Reduction in annual run-off from catchment area
Green Street	New zoning amendment requires street tree plantings	Cost effective infiltration of street stormwater

RECOMMENDATIONS

- MC Shimla shall conduct a detailed survey to assess wherever source control and water conservation systems are feasible and shall augment the existing centralised system with decentralised options accordingly. A municipal bye-law shall be geared to promote rain water harvesting at household level.

4.5.2.2.2 Conveyance

Only 29.43% of the city is covered by the storm water drainage system and appropriate conveyance of the run-off is not ensured.

RECOMMENDATIONS

MC Shimla shall initiate preparation of DPR for covering 100% city area by storm water drains. Some of the aspects to be considered during design are

- New storm water drains should have conduits for all other infrastructure to ensure separation of drinking water, sewerage and storm water and avoids blockage through encroachment.
- All existing drainage needs to be cleared of the encroachments and it further shall be ensured that no further encroachment takes place.
- Adequate culverts should be placed in strategic places to effectively direct the storm water to the downstream areas and grates shall be installed within the drains at regular intervals to simplify solid waste collection.

4.5.2.2.3 Disposal

The untreated wastewater from septic tanks entering into storm water drains coupled with solid waste dumping into open drains, cause pollution of water bodies in the down stream areas. At present there are no measures to treat storm water before it enters into the natural water bodies.

RECOMMENDATIONS

It is recommended that appropriate wastewater treatment measures to be implemented in downstream areas to avoid contamination of surface and ground water sources. This should be a short-term measure till other services like solid waste management and wastewater management are not managed appropriately.

MC Shimla should conduct a detailed survey to assess the feasibility of construction sites for treatment measures of contaminated storm water so that the storm water discharged into the natural water bodies does not pose an environmental hazard.

4.6 Financial Options

4.6.1 Capital Expenditure

MC Shimla has prepared a detailed project report for rejuvenation of existing nallahs in the City amounting to Rs. 32 Crores. The works to be executed under this DPR is mentioned in detail in [Annexure 3](#).

4.7 Implementation Strategy Plan

Based on the availability of manpower, machinery, requisite resources – technical and financial, the proposed interventions are prioritised over immediate phase, short term, mid term, and long term. Manifestly, high-priority interventions, less capital intensive technical interventions are addressed in the immediate and short-term phase, while capital intensive and O&M exacting technical interventions shall be spread over a longer timeline and addressed in the long –term phase.

Table 4-6: Phase wise Implementation Plan

PHASE	YEAR	ACTIONS
Immediate	2011-2013	<ul style="list-style-type: none"> □ Installation of grating points for collection of solid waste entering into storm water drains □ Conduct feasibility study for treatment measures □ Cleaning of drainage system – removal of silt and solid waste □ Database management – detailed mapping of natural and built storm water drains

PHASE	YEAR	ACTIONS
Short-Term	2014 – 2016	<input type="checkbox"/> Source control strategies - Construction of rain water harvesting structures <input type="checkbox"/> Removal of unauthorised structures and encroachments on natural drains <input type="checkbox"/> Construction of road side drains as per the drainage designs <input type="checkbox"/> O&M and M&E systems <input type="checkbox"/> Technical and O&M Manual
Mid-Term	2017 – 2026	<input type="checkbox"/> Ensure 100% coverage by storm water drainage system <input type="checkbox"/> Augmentation of storm water drainage system
Long-Term	2027 - 2041	<input type="checkbox"/> Augmentation of storm water drainage system

CHAPTER 5. SECTORAL STRATEGY - INSTITUTIONAL STRENGTHENING

5.1 Issues

5.1.1 Overlapping roles and responsibilities

There are no dedicated departments and staff for effective discharge of sanitation services. More often there are multiple department/ agencies involved due to which the accountability (overlapping and fragmented responsibilities) for provision of better services is not ensured. The table below mention different sanitation services and departments involved.

Sanitation Service	Planning & Design	Construction	O&M
Sewerage System	I&PH, MC Shimla	I&PH, MC Shimla	I&PH (STP) MC Shimla (Sewer Network)
Solid Waste Management	MC Shimla	MC Shimla	MC Shimla
Public Sanitation	MC Shimla, Tourism Dept	MC Shimla	MC Shimla, NGO
Storm Water Drainage	R&B	R&B	MC Shimla

5.1.2 Lack of qualified staff

MC Shimla does not have required personnel for designated positions across different departments. Since 1994, there has been no recruitment of staff for the sanctioned posts. For example, all the post above the rank of Junior Engineer in Water Supply and Sewerage Department of MC Shimla has been filled by officers from I&PH department.

Existing employees holding designated positions are not having pre-requisite educational qualification but are occupied due to experience or promotions. However the outsourcing of some of the key activities like O&M of sewer network and STPs have reduced the burden of MC Shimla staff.

The transfer of personnel in key positions adversely affects the continuity of services and accountability.

5.1.3 Absence of Monitoring and Evaluation Systems

The decisions taken in across different sanitation services are largely on ad hoc basis and are not followed by any appraisal mechanisms. Furthermore MC Shimla has not developed any regular maintenance schedules and O&M manuals thereby lacking the initiative to strategize good practices both preventive and operative for the efficient and sustained functioning of the sanitation services.

There is clear deficit of MIS to document the procedures, O&M activities. The monitoring systems adopted by MC Shimla are not very elaborate.

5.1.4 Lack of capacity building initiatives

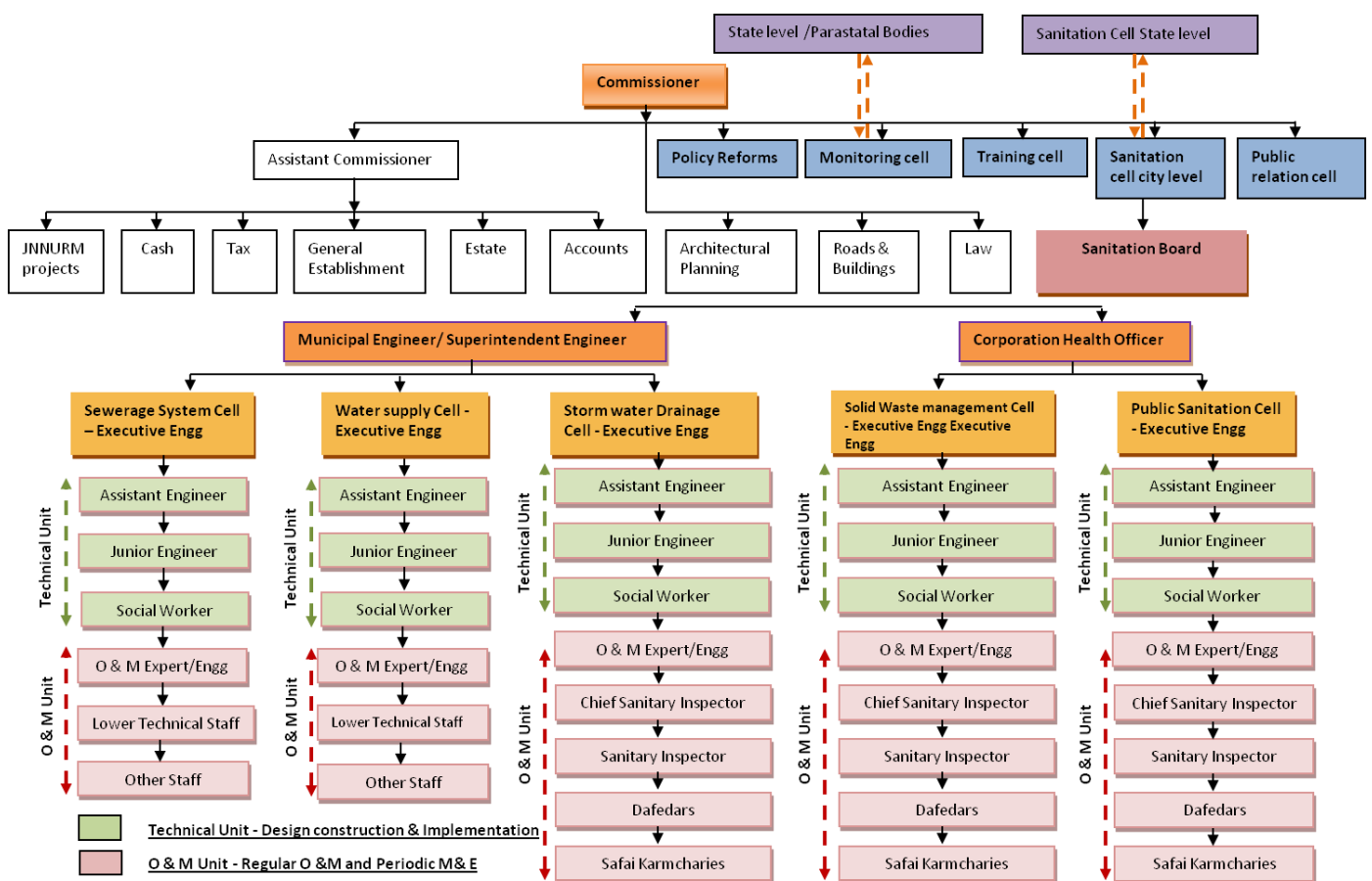
MC Shimla lacks capacity building initiatives in terms of training programs to orient decision maker and technical staff towards best practices. MC Shimla lacks an incentive based approach for motivating staff and communities for efficient service delivery.

5.2 Institutional Strengthening

5.2.1 Formation of Sanitation Cells

It is recommended that within MC Shimla, separate cells to be formed for delivering services pertaining to water supply, sewerage system, public sanitation, solid waste management and storm water drainage system.

Each cell would have a Technical and an O&M unit. The technical unit of each cell will be solely responsible for all matters pertaining to planning, design and construction whereas the O&M unit will be responsible for day to day operations and maintenance (refer recommended institutional framework as below)



5.2.2 Public relation cell

A Public Relations cell shall be introduced in MC Shimla in order to conduct awareness campaigns to educate the residents with respect to the benefits of good hygiene practices. With respect to sewerage system it will highlight the advantages of taking sewerage connections whereas in areas in which centralised system is not possible, the focus will be on safe septage management practices and different approaches for wastewater treatment.

With respect to public sanitation, the focus will be to educate the residents about benefits of good hygiene practices and the use of toilets. It shall also conduct information sessions to familiarise the residents with the use of the different toilet models and appropriate personal hygiene. This will help in eliminating the practice of open defecation in the City.

With respect to solid waste management, the Public Relations cell shall conduct awareness campaigns to educate the residents/solid waste generators with respect to the benefits of the adoption of appropriate storage mechanisms, decentralized treatment mechanisms in terms of economy, public health and environment. It shall also conduct information sessions to familiarize the residents / solid waste generators with the segregation of solid waste at source, decentralized treatment system that shall be instituted.

With respect to storm water drainage system, the residents will be made aware about benefits of the adoption of appropriate storm water management mechanisms in terms of economy, public health and environment. It shall educate the residents regards the drawbacks of the indiscriminate dumping of solid waste, sewage, and septage into the storm water drains and encroachment of the natural water bodies.

Public Relations cell shall engage a help-line to continuously assist the residents with all their queries and technical & operational difficulties for basic sanitation services.

5.2.3 Participatory Monitoring Cell

MC Shimla shall strategize to engage the qualified services of the officials from various other departments in the City of Shimla in the institutionalising of monitoring and evaluation system on a rotational basis. This move shall aim to complement the strengths of the implementing and monitoring departments.

The improved feedback generated through this initiative, shall enable MC Shimla to achieve the desired service levels across the city at least cost. MC Shimla shall also devise a participatory system / mechanism which shall incorporate the service of Community Based Organisations in the planning, implementation, monitoring, evaluation, and improvement efforts.

5.2.4 City level Urban Sanitation Cell

A City level Sanitation Cell shall be formed at the MC Shimla. The cell shall be responsible for preparation, implementation and monitoring of the city sanitation plan.

Commissioner shall be the head of the cell and he/she may appoint a suitable officer as the officer-in-charge. Commissioner may also nominate other suitable officers as members of the Cell.

5.2.5 State level Urban Sanitation Cell

Providing technical support to the ULBs, facilitating interdepartmental coordination for preparing City Sanitation Plan and implementation of sanitation infrastructure, etc. shall be the core responsibilities of the cell.

The Commissioner, Urban Development Department shall be the head, Project Director shall be the Controller. Chief Engineer, Urban Development Department shall be the technical Advisor of this cell at the state level.

5.2.6 State's Reform Facilitation Cell (Team) for PSP

At the State level, the State's Reform Facilitation cell (Team) and / or the economic regulator (when it is established) would complement local capacity to manage the public-private relationship while also continuing to implement sector reforms at the state-level.

The independent state regulator could make its own assessment and decision on necessary action if the private partner is unable to meet performance obligations and bankruptcy or failed contract procedures are invoked.

5.2.7 PSP/ Technical and operational support

City level Sanitation Cell initially shall be staffed with competent technical professionals by the private partner completing the existing staff of MC Shimla to fulfil the total requirements in strength, who shall in turn train the existing staff and eventually MC Shimla shall build its own staff over the long term in phases.

5.2.8 PSP/ Service Delivery

The Private Service Provider / Private Partner in the PPP mode of service delivery who shall be awarded the project of design, build, operate and maintenance of the sewerage system shall also be awarded this component to be included in the overall scheme of wastewater management services.

5.2.9 Prize Distribution / Incentives

The prize money and incentive encourages the participating ULBs to perform better. The best performing ULBs shall be given an award by the state government. The best performing ULBs shall also be nominated for the national awards. The MC Shimla may also develop an award scheme for wards so that the local communities are also encouraged to participate and perform better. The state sanitation cell shall facilitate the ULBs in applying for various incentive and award schemes.

5.2.10 Facilitation and Advocacy Framework

To make the NUSP at national level, IUSP at state level and at city level CSP a community centred programme, effective leadership and motivation is necessary. Additionally, to achieve qualitative outputs and effective operation and maintenance, regular monitoring, reviews at various levels are necessary. To enable effective facilitation and advocacy at various levels, state level, district level and city level committees as given below will be formed:

- State level Coordination and Monitoring Committee
- District level Urban Sanitation Committee
- City level Sanitation Committee

5.2.10.1 STATE LEVEL COORDINATION AND MONITORING COMMITTEE

This committee shall review, monitor and evaluate the programme from time to time. The committee shall also provide feedback and strategic direction to improve the quality of the programme implementation. Principal Secretary, Urban Development Department shall be the chairman and the committee shall consist of Principal Secretaries/Secretaries of various departments as its members. The Composition of committee shall be as follows:

Principal Secretary , Urban Administration and Development Department	Chairperson
Principal Secretary / Secretary - Finance	Member
Principal Secretary / Secretary - Planning, Economics and Statistics	Member
Principal Secretary / Secretary - Education	Member
Principal Secretary / Secretary - Health	Member
Principal Secretary / Secretary – Women and Child welfare	Member
Commissioner, Urban Administration and Development Department	Member
State Programme officer, Urban Sanitation Programme	Member
Project Director	Member Secretary

5.2.10.2 DISTRICT LEVEL URBAN SANITATION COMMITTEE

A District level Urban Sanitation Committee with Collector as its chairman shall be formed at the district level. This committee shall be empowered to approve the City Sanitation Plans, review the

progress of sanitation activities, provide guidance and issue necessary guidelines and instructions to meet the targets set under the programme. The committee shall also have representatives from NGOs. Nomination of the NGOs shall be based on the guidelines issued separately in this regard. The composition of committee shall be as follows:

District level Urban Sanitation Committee Collector	Chairperson
Commissioner / CMO of the ULBs	Member
Mayor/ President of the ULBs	Member
NGO Representatives	Member
Representatives of Professional / Business Associations	Member
Project Officer, DUDA	Member Secretary

5.2.10.3 CITY LEVEL SANITATION COMMITTEE

Mayor, Municipal Corporation or President, Nagar Palika/ Panchayat shall be the chairman of this committee and, the committee shall directly support and facilitate preparation and implementation of the City Sanitation Plan. This committee shall also have representation from NGOs, business associations, association of sanitary workers, subject experts, etc. Nomination of the NGOs shall be done as per the guidelines issued in this regard by the department. The composition of committee shall be as follows:

Mayor/ President of the ULBs	Chairperson
Members of MIC/PIC	Member
Women ward member nominated by Mayor/ President	Member
Representative of Business Associations	Member
Representative of sanitary workers Associations	Member
NGO representatives	Member
Officers from various departments associated with sanitation	Member
Subject Expert – with permission from the Chairperson	Member
Commissioner/ CMO of the ULB	Member Secretary

5.3 Capacity Building

5.3.1 Training Cell

5.3.1.1 TRAINING OF OFFICIALS / CORPORATORS

Orientation and Sensitisation Programs for Councillors as well as for officials/technical staff to increase their technical capacities for effective discharge of the sanitation functions and creating awareness about the sanitation issues, working with various partners in service delivery, technical knowledge and monitoring. Orientation programs will focus on the following areas of discussion -

- Best management Practices for the various sanitation components;
- Project Finance
- Risk Mitigation;
- Stakeholder Identification and Assessment;
- Community Engagement; - Participatory Means

The strategy shall define the organization of exposure visits to those cities which may reflect the successful sustenance of the above parameters or organization of educational programs like workshops / seminars / lecture series which will disseminate the required information.

5.3.1.2 TRAINING OF STAFF / COMMUNITY

There is greater need for orienting the support staff and community with a focus on the following subject matters –

- Best management Practices for the various sanitation components;
- Occupational Safety and Health Training
- Benefits of the best system – economy, public health and environment

The strategy shall define the organization of exposure visits to those cities which may reflect the successful sustenance of the above parameters or organization of educational programs like workshops / seminars / lecture series which will disseminate the required information.

5.3.1.3 SYSTEM OPERATING PROCEDURES

MC Shimla's training cell shall establish suitable training goals for the O&M personnel and in accordance with the same shall develop policies, procedures, protocols and schedules. Periodic review and appropriate revisions of the program shall be undertaken.

5.3.1.4 TRAINING OF OTHER PARTNERS AND STAKEHOLDERS IN CSP

These include local NGOs, CBOs and other partners in CSP implementation and their roles, responsibilities and powers with respect to CSP implementation.

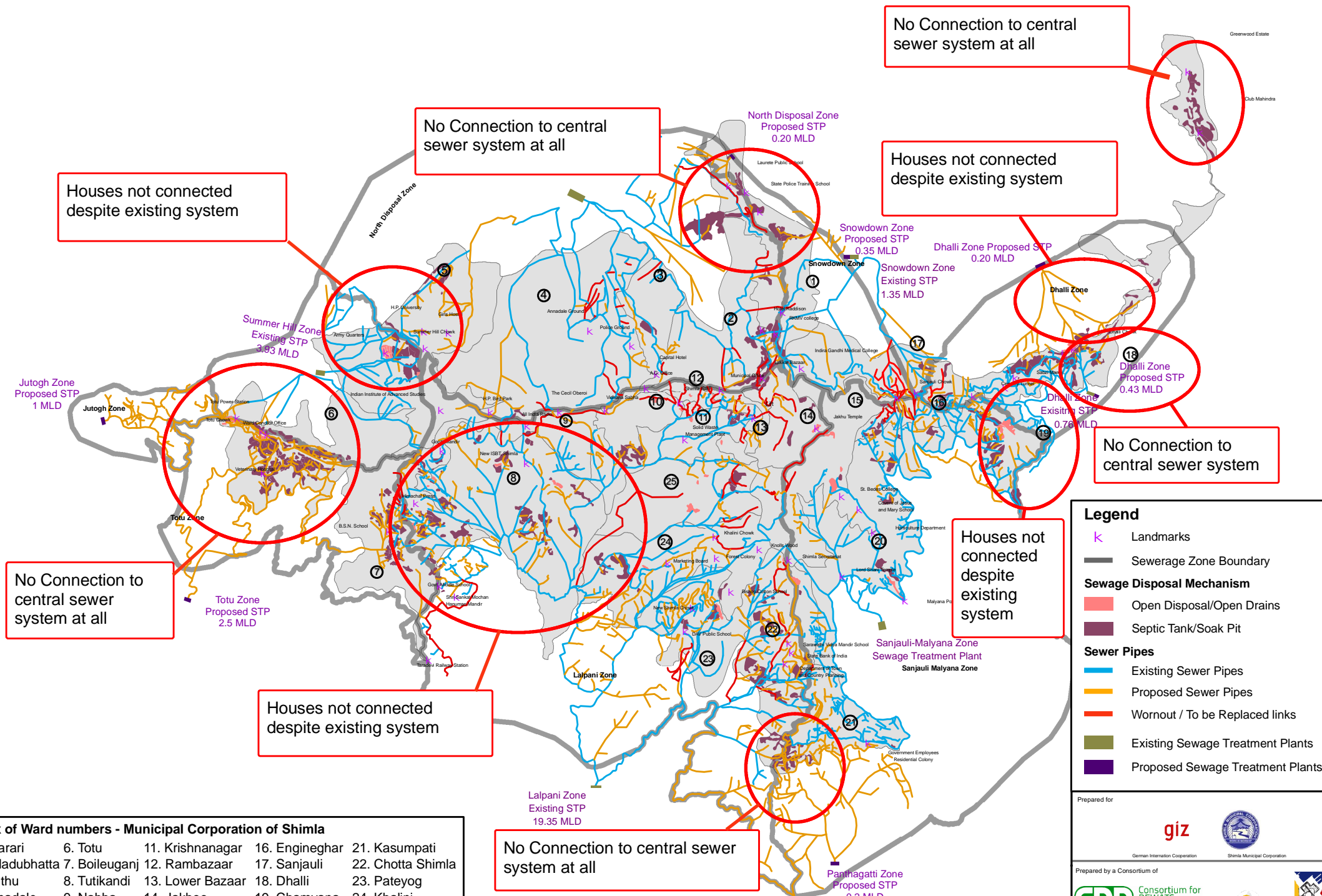
5.3.1.5 TRAINING STRATEGY AND CALENDAR

A comprehensive training strategy incorporating training objectives, methods and delivery within the project period, needs to be developed by the ULB and milestones defined, at CSP Detailed Project Report stage. A calendar of training activities also needs to be prepared. All training activities / programs, including awareness generation programs need to be completed in a time-bound manner, from the date of finalization of the training strategy.

5.3.1.6 CITIZEN REPORT CARDS

Report Cards with citizen perception surveys can be prepared by independent research organizations/NGOs commissioned by the State. The Report Cards could serve as the basis for awards and incentives to ULBs that perform better in CSP implementation.

MAPS



Houses not connected despite existing system

No Connection to central sewer system at all

No Connection to central sewer system at all

Houses not connected despite existing system

No Connection to central sewer system

Houses not connected despite existing system

No Connection to central sewer system at all

Houses not connected despite existing system

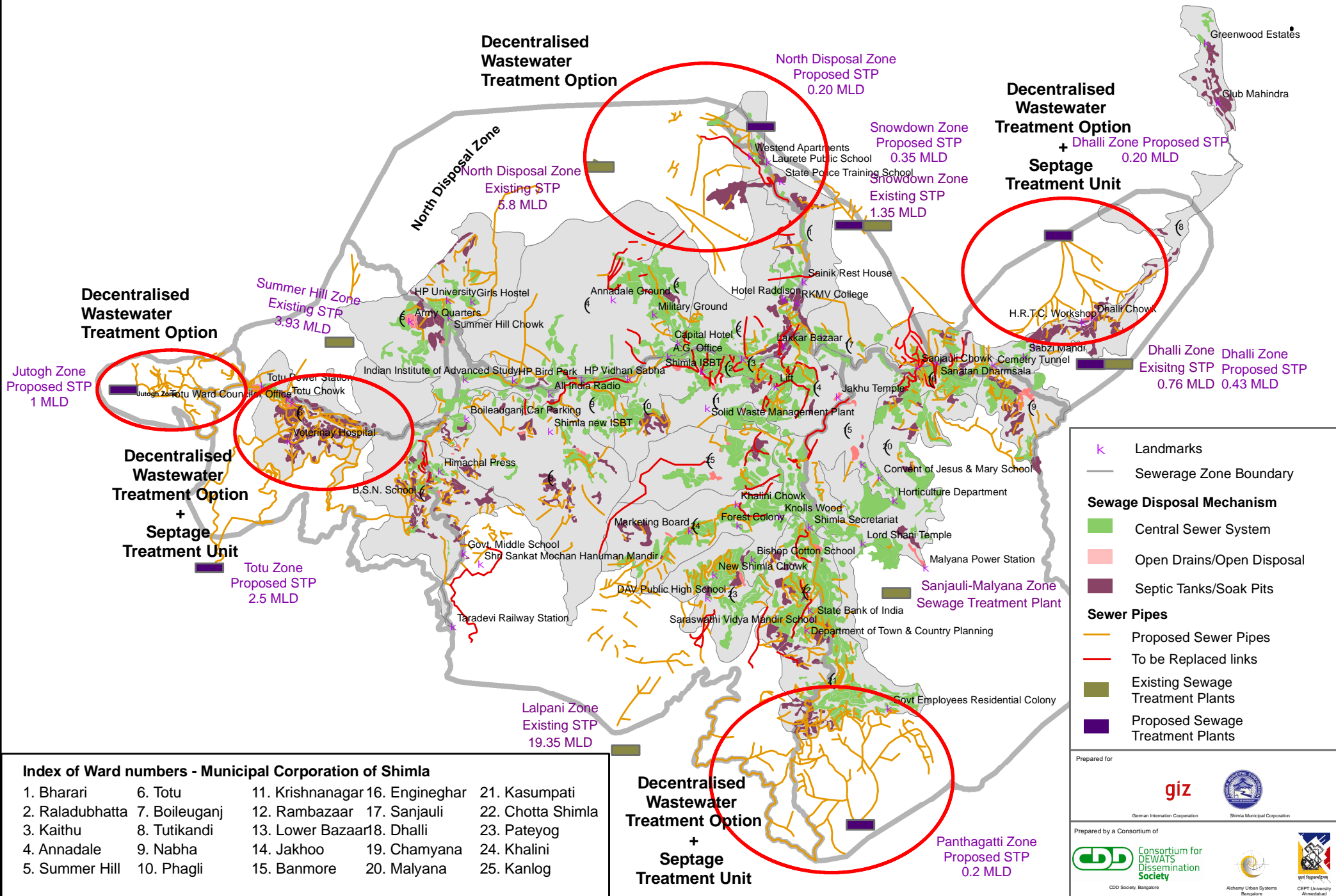
No Connection to central sewer system at all

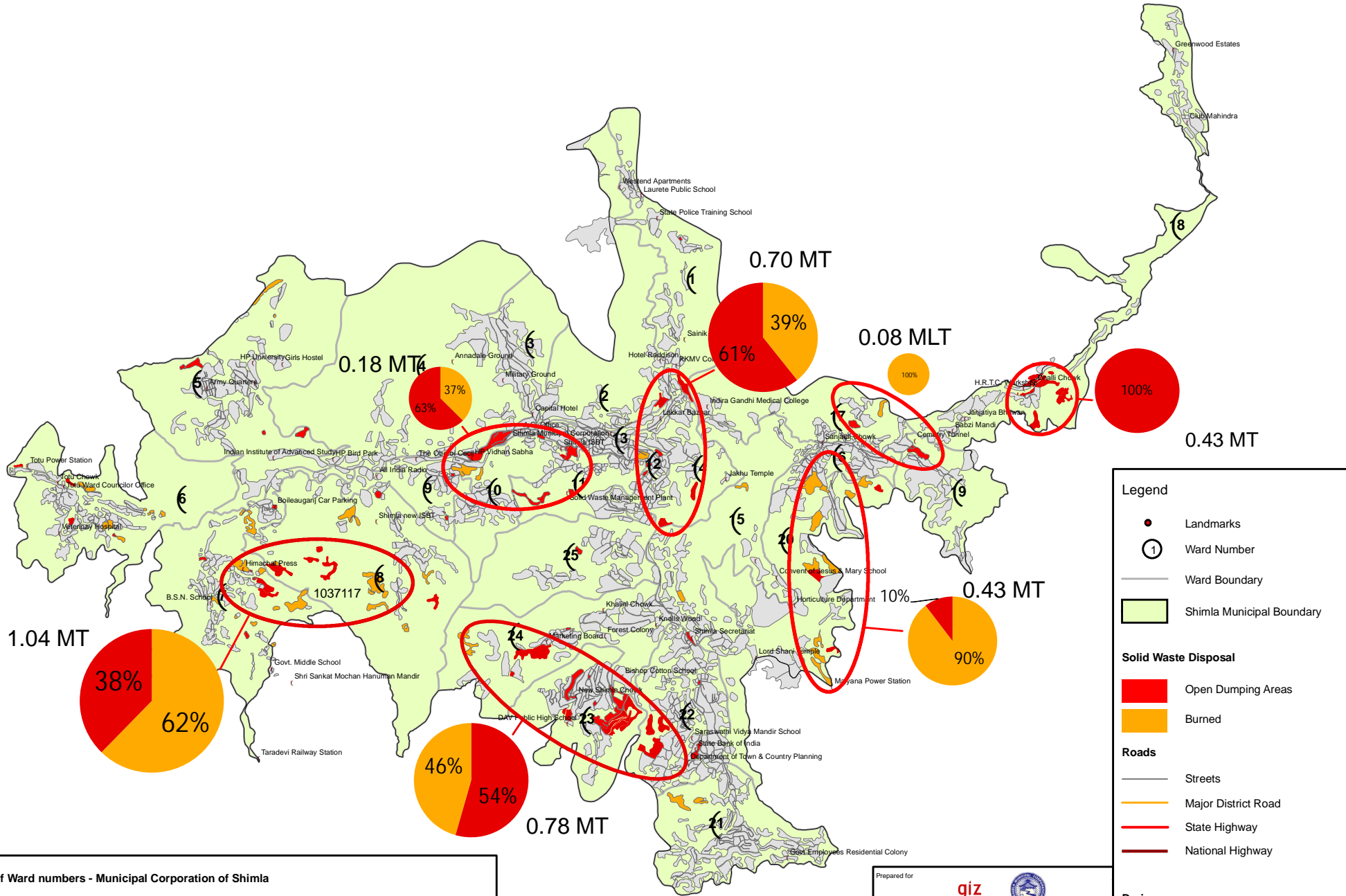
Legend

- K Landmarks
- Sewerage Zone Boundary
- Sewage Disposal Mechanism**
- Open Disposal/Open Drains
- Septic Tank/Soak Pit
- Sewer Pipes**
- Existing Sewer Pipes
- Proposed Sewer Pipes
- Wornout / To be Replaced links
- Existing Sewage Treatment Plants
- Proposed Sewage Treatment Plants

Index of Ward numbers - Municipal Corporation of Shimla

1. Bharari	6. Totu	11. Krishnanagar	16. Engineghar	21. Kasumpati
2. Raladubhatta	7. Boileuganj	12. Rambazaar	17. Sanjauli	22. Chotta Shimla
3. Kaithu	8. Tutikandi	13. Lower Bazaar	18. Dhalli	23. Pateyog
4. Annadale	9. Nabha	14. Jakhoo	19. Chamyana	24. Khalini
5. Summer Hill	10. Phagli	15. Banmore	20. Malyana	25. Kanlog





Legend

- Landmarks
- ① Ward Number
- Ward Boundary
- Shimla Municipal Boundary

Solid Waste Disposal

- Open Dumping Areas
- Burned

Roads

- Streets
- Major District Road
- State Highway
- National Highway

Drainage

- Nallah
- Drainage

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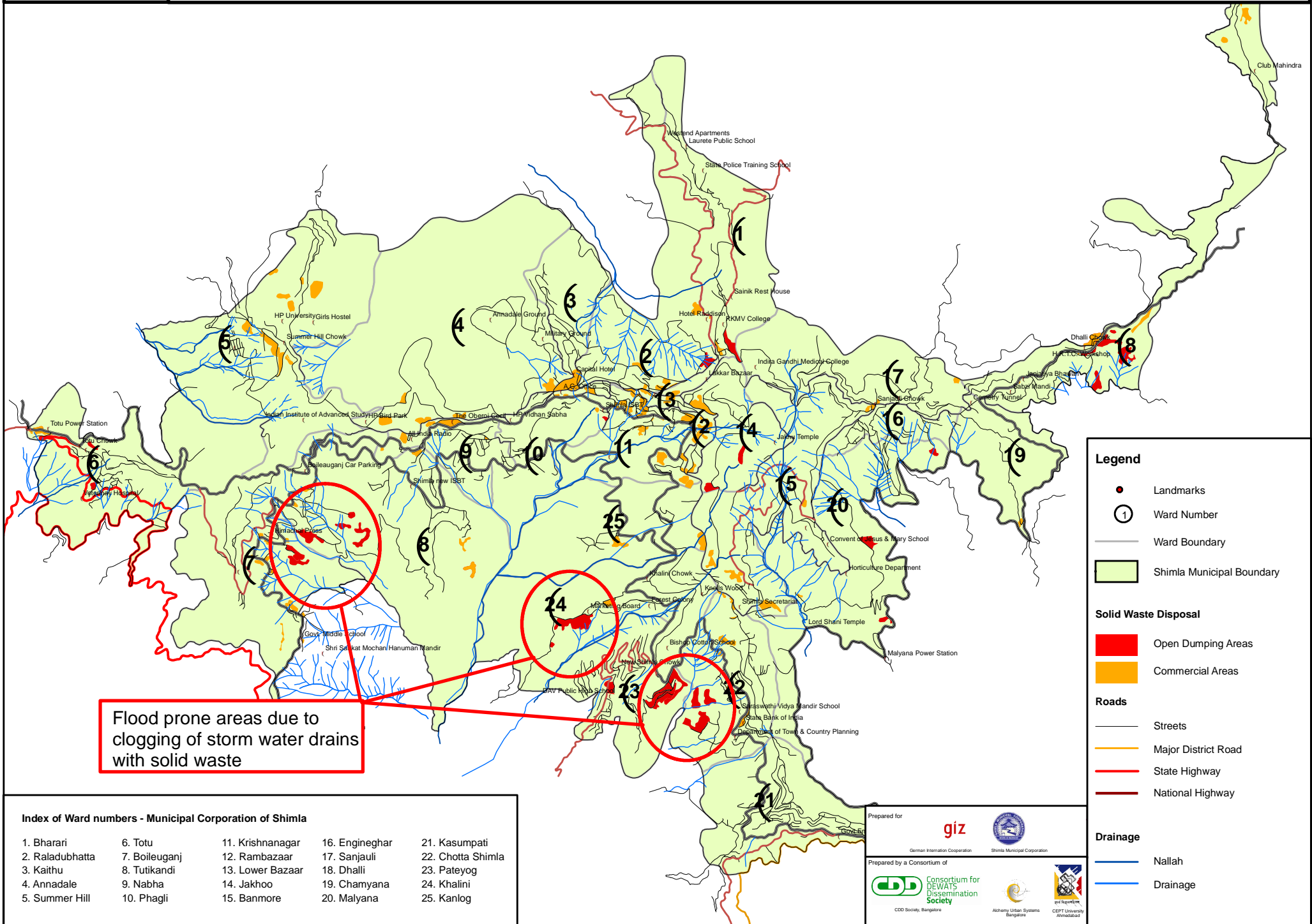
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 CDD Society, Bangalore

AI Alchemy Urban Systems Bangalore

CIET CIET University Anandabad



Flood prone areas due to clogging of storm water drains with solid waste

- Legend**
- Landmarks
 - ① Ward Number
 - Ward Boundary
 - Shimla Municipal Boundary

- Solid Waste Disposal**
- Open Dumping Areas
 - Commercial Areas

- Roads**
- Streets
 - Major District Road
 - State Highway
 - National Highway

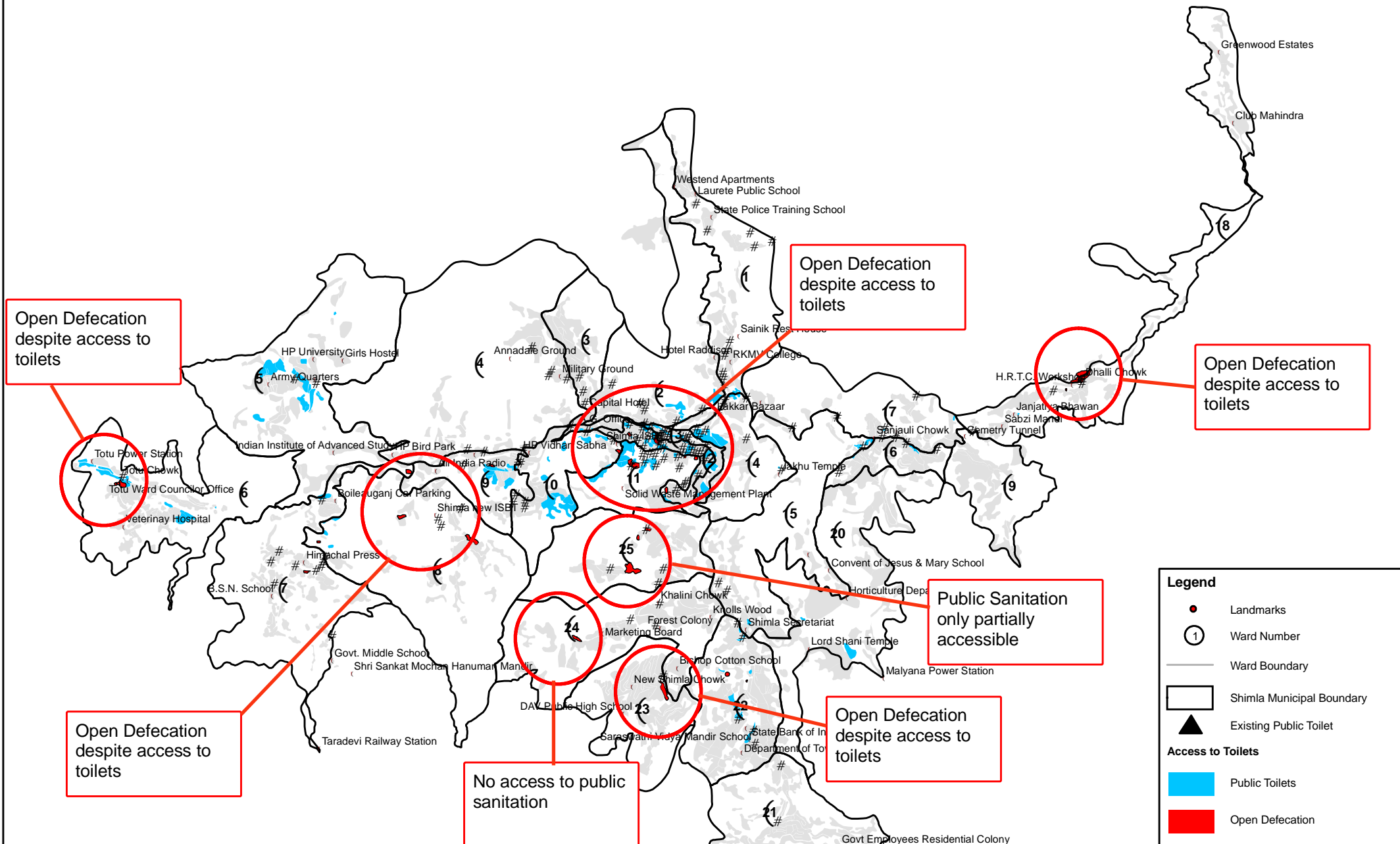
- Drainage**
- Nallah
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Legend

- Landmarks
- ① Ward Number
- Ward Boundary
- ▭ Shimla Municipal Boundary
- ▲ Existing Public Toilet

Access to Toilets

- Public Toilets
- Open Defecation

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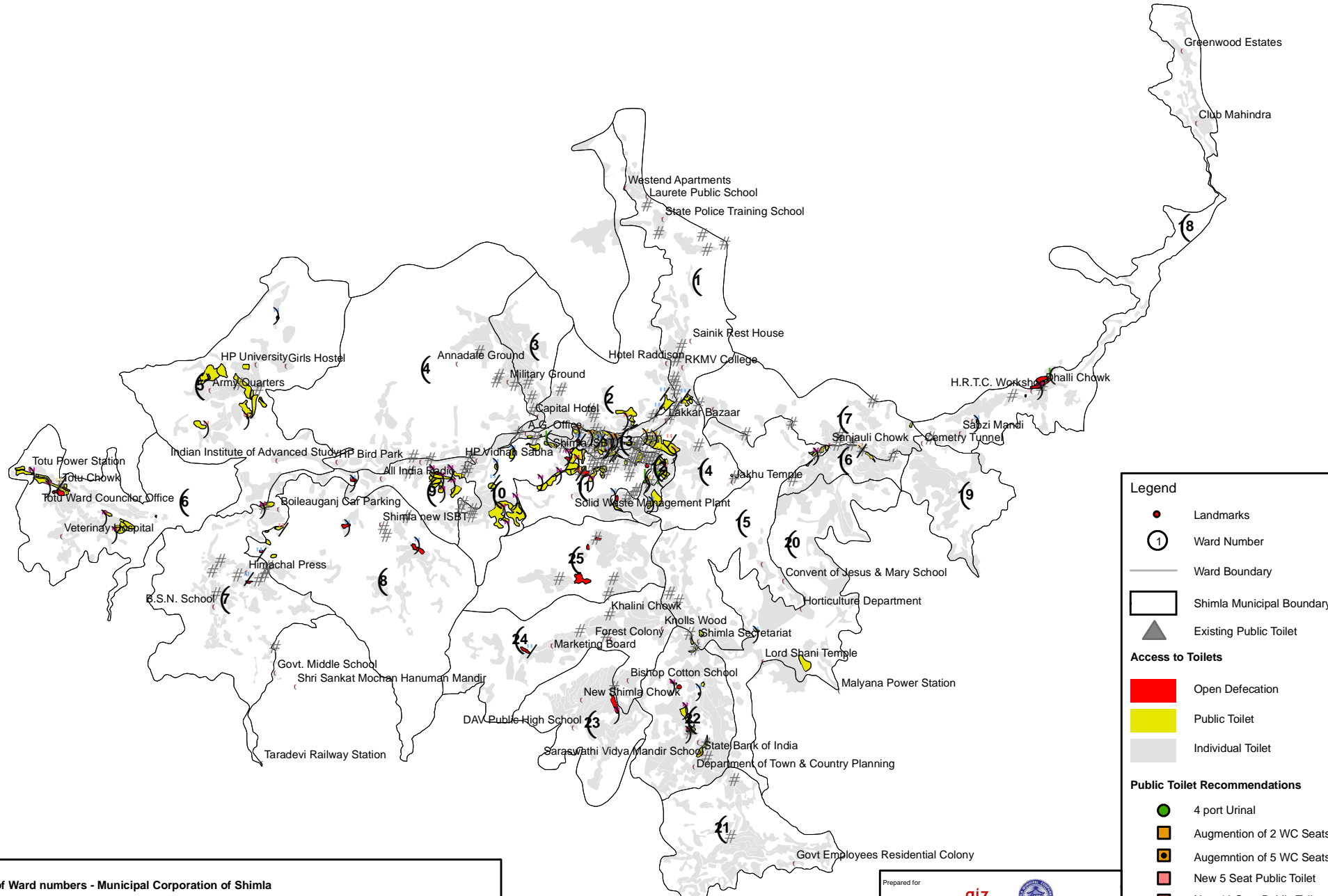
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CDSD Society, Bangalore

ACE Acharya Urban Systems Bangalore

CEPT CEPT University Ahmedabad



Legend

- Landmarks
- 1 Ward Number
- Ward Boundary
- Shimla Municipal Boundary
- ▲ Existing Public Toilet

Access to Toilets

- Open Defecation
- Public Toilet
- Individual Toilet

Public Toilet Recommendations

- 4 port Urinal
- Augmentation of 2 WC Seats
- Augemntion of 5 WC Seats
- New 5 Seat Public Toilet
- New 10 Seat Public Toilet
- Community Sanitation Complex
- Single Mobile Toilet
- Double Mobile Toilet

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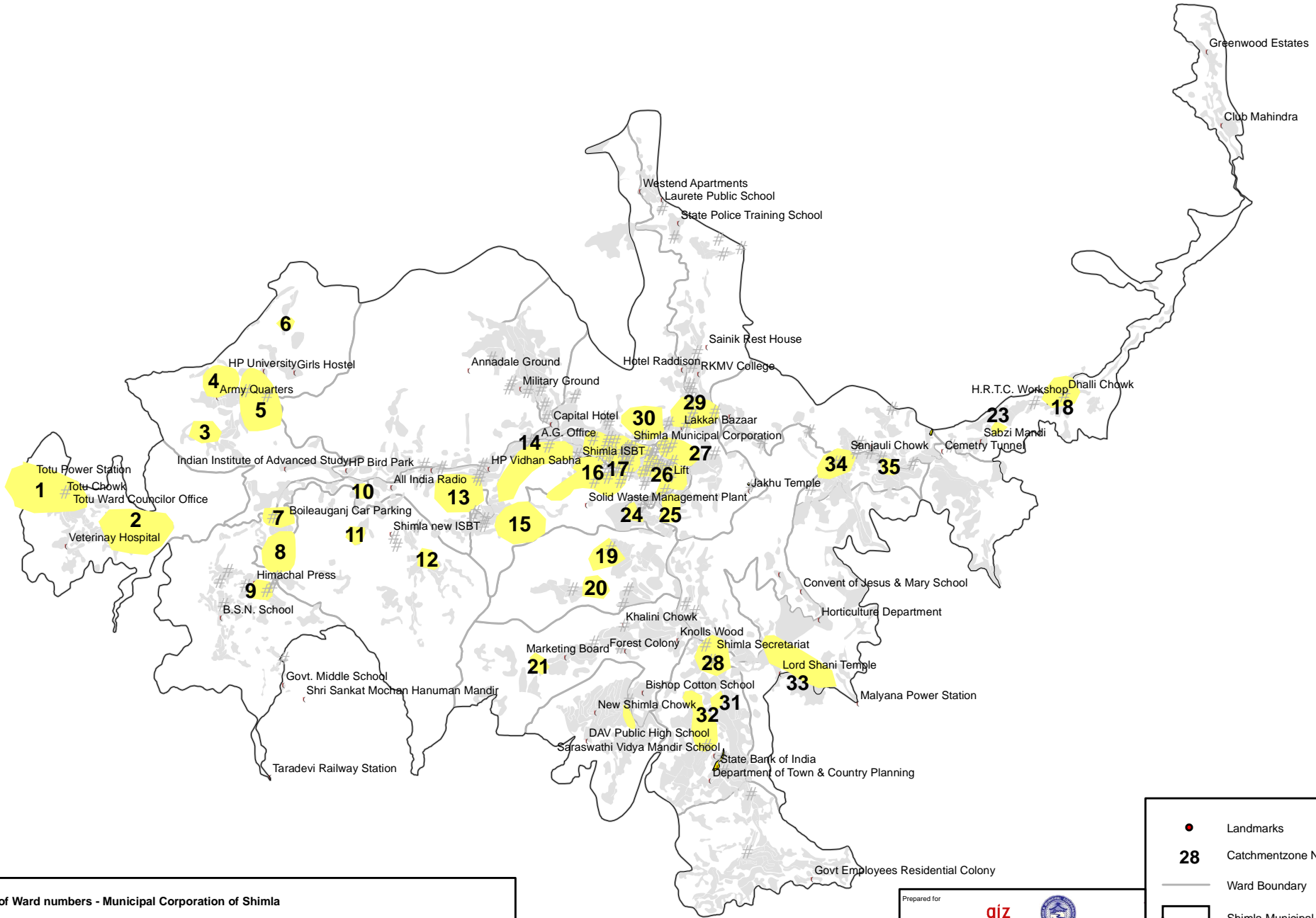
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- Landmarks
- 28** Catchmentzone Number
- Ward Boundary
- ▭ Shimla Municipal Boundary
- ▲ Existing Public Toilet
- Catchmentzone

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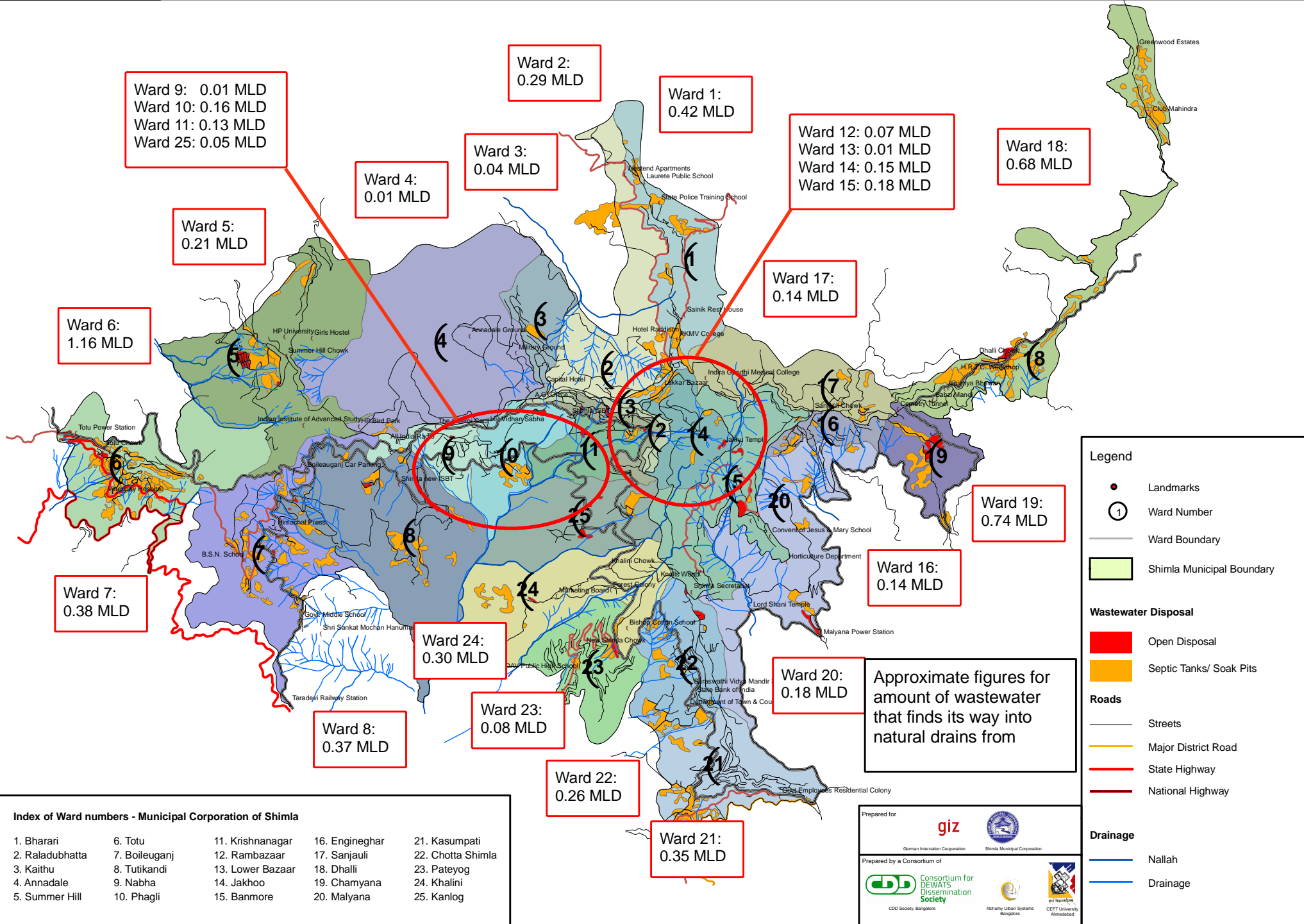
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Legend

- Landmarks
- ① Ward Number
- Ward Boundary
- Shimla Municipal Boundary

Wastewater Disposal

- Open Disposal
- Septic Tanks/ Soak Pits

Roads

- Streets
- Major District Road
- State Highway
- National Highway

Drainage

- Nallah
- Drainage

ANNEXURES

Annexure 1: Phasing of activities proposed in Sewerage DPR*Project Components of Phase I*

S.No.	Name of Zone	Work proposed to be executed	Cost in Lakhs
1	Lalpani (Zone-1)	(i) Construction of drying beds for existing STP of 19.35 MLD (UASB followed by extended aeration) (ii) Centrifuge filter press. (iii) Rehabilitation of existing UASB (iv) Gen Set of 100 KVA (v) Construction of metalled road, lab equipments	208.54
2	Summer Hill (Zone-2)	(i) Construction of drying beds for existing STP of 3.93 MLD (extended aeration) (ii) Centrifuge filter press. (iii) Gen Set of 100 KVA (iv) Construction of metalled Road, lab equipments, and energised tubewell power pump etc. (v) Gravity pipe 1500 m etc.	157.75
3	North Disposal (Zone-3) Subzone-I	(i) Construction of drying beds for existing STP of 5.80 MLD. (ii) Centrifuge filter press (Extended aeration). (iii) Gen Set of 100 KVA (iv) Construction of metalled Road, lab equipments and energised tubewell power pump etc.	119.65
4	Dhalli Zone-4 Subzone-I	(i) Extension of STP from 0.76 to 0.96 MLD. (ii) Centrifuge filter press. (iii) Gen Set of 100 KVA (iv) Lab equipments and energised tubewell power pump etc (v) Gravity Main 1000m (vi) Acquisition of Land etc. (vii) Sewerage network 150mm 1817 Mtrs (viii) House connections-400 No.	231.70
5	Sanjauli-Malyana Zone-5 (Sub zone-I)	(i) Construction of drying beds for existing STP of 4.44 MLD (Extended aeration). (ii) Centrifuge filter press. (iii) Gen Set of 100 KVA (iv) Lab equipments and energised tubewell power pump etc (v) Gravity pipe 7000 m etc. (vi) Construction of metalled road.	437.24
	Sub-zone-II	(i) 0.20 MLD STP (FAB Technology) (ii) Lab & tubewell power pump. (iii) Gen Set 60 KVA (iv) Pump Chamber & Staff Quarter. (v) Acquisition of land etc. (vi) Network of 17123 Mtrs (vii) House connection – 200 Nos.	929.66
	Snowdon Zone-6	(i) Construction of drying beds for existing STP of 1.35 MLD. (Extended aeration) (ii) Centrifuge filter press. (iii) Gen Set of 100 KVA (iv) Lab equipments and energised tubewell power pump etc (v) Gravity Main of 700 Mtrs (vi) Acquisition of land and construction of road.	173.95

S.No.	Name of Zone	Work proposed to be executed	Cost in Lakhs
	Totu Zone-7	(i) 2.00 MLD STP (FAB Technology) (ii) Lab & tubewell power pump. (iii) Gen Set 100 KVA (iv) Pump Chamber & Staff Quarter. (v) Acquisition of land etc. (vi) Construction of road (vii) Network of 25710 Mtrs (viii) House connections – 2417 Nos.	2033.09
	Jutog Zone -8	(i) 1.00 MLD STP (FAB Technology) (ii) Lab & tubewell power pump. (iii) Gen Set 60 KVA (iv) Pump Chamber & Staff Quarter. (v) Acquisition of land etc. (vi) Construction of road (vii) Network of 9018 Mtrs (viii) House connections – 922 Nos.	830.79
Sub total			5122.37
Add 3% contingency charges			153.67
Add 0.5% administrative charges			25.61
Total			5301.66

Project Components of Phase II

Name of Zone	Work proposed to be executed	Cost in Lakhs
Lalpani (Zone-1)	Sewerage network (90667 meters), House connection (4550 No.)	4472.24
Summer Hill (Zone-2)	Sewerage network (6655 meters), House connection (1235 No.)	411.50
North Disposal (Zone-3) Sub zone-I	Sewerage network (31020 meters), House connection (2620 No.)	1618.10
Sub zone-II	0.20 MLD STP (FAB Technology), Lab & tube well power pump, Gen Set 60 KVA, Pump Chamber & Staff Quarter, Acquisition of land etc., Construction of road, Network of 5460 meters, house connections (150 No.)	138.83 266.59
Dhalli Zone-4 sub zone-II	0.20 MLD STP (FAB Technology), Lab & tube well power pump, Gen Set 60 KVA, Pump Chamber & Staff Quarter, Acquisition of land, Construction of roads, Network of 8590 meters, house connections (150 No.)	130.61 403.35
Sanjauli-Malyana Zone-5 (Sub zone-I)	Sewerage network (20278 meters), House connection (745 No.)	961.66
Snowdon Zone-6	Sewerage network (11700 meters), House connection (483 No.)	564.49
Sub total		8967.37
Add 3% contingency charges		269.02
Add 0.5% administrative charges		44.84
Total		9281.23

Revised Phasing of DPR Activities for change in priority of works to be executed based on the directions issued by the Hon'ble High Court of Himachal Pradesh vide orders dated 08.07.2009 passed in CWP 441/07

Project Components of Phase I

Name of Zone	Work proposed to be executed	Cost in Lakhs
Lalpani (Zone-1)	Sewerage network (90667 meters), House connection (4550 No.)	4472.24
Lalpani (Zone I)	(vi) Construction of drying beds for existing STP of 19.35 MLD (UASB followed by extended aeration) (vii) Centrifuge filter press. (viii) Rehabilitation of existing UASB (ix) Gen Set of 100 KVA Construction of metalled road, lab equipments	208.54
	(i) Construction of drying beds for existing STP of 4.44 MLD (Extended aeration). (ii) Centrifuge filter press. (iii) Gen Set of 100 KVA (iv) Lab equipments and energised tubewell power pump etc (v) Gravity pipe 7000 m etc. Construction of metalled road	437.24
	Sub total	5118.02
	Add 3% contingency charges	153.54
	Add 0.5% administrative charges	30.00 (say)
	Total	5302.00

Annexure 2: Design principles and considerations for provision of public toilets

Design principles
Mobile Toilets
<p><u>Infrastructure provision</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Directional signs are indicating way to toilet and respective complex part <input type="checkbox"/> Pour flush toilets to avoid wastage of water in high demand areas <input type="checkbox"/> Provision of water storage facilities <input type="checkbox"/> Provision of sufficient water for self-cleansing <input type="checkbox"/> Provision of hand wash facilities with soap <input type="checkbox"/> Provision of dust bins in common areas <p><u>Gender sensitive design</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Located in safe high visibility place to ensure safety for women and children <input type="checkbox"/> Entrances for ladies and gentlemen at opposite sides of complex <input type="checkbox"/> Non-visibility of interior from the outside (for example through maze style entry) <input type="checkbox"/> Sufficient physical distance between respective gender blocks <input type="checkbox"/> Provision of sanitary disposal mechanism in each cubicle to ensure proper disposal of sanitary napkins and prevent blockage of toilets and sewers <input type="checkbox"/> Lighting in each cubicle so women are able to use toilets at night <input type="checkbox"/> Cubicles are equipped with hooks for ladies' dupattas and personal belongings <p><u>Environmentally friendly design</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Low energy light fittings <input type="checkbox"/> Grey water flushing <input type="checkbox"/> Recycling of storm water
Public Toilet in Commercial/ Tourist Area
<p><u>Location</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Near sewerage lines <input type="checkbox"/> Located in safe high visibility place to ensure safety for women and children and people are able to find the locality <p><u>Infrastructure</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Connection to sewer system or DEWATS to ensure proper collection and conveyance of wastewater <input type="checkbox"/> Directional signs are indicating way to toilet and respective complex part <input type="checkbox"/> Lobby for entry into toilet block and to seat caretaker <input type="checkbox"/> Storage room for keeping cleaning materials <input type="checkbox"/> Pour flush toilets to avoid wastage of water in high demand areas <input type="checkbox"/> Provision of sufficient water for self-cleansing <input type="checkbox"/> Provision of hand wash facilities with soap

Design principles

- Provision of dust bins in common areas

Gender sensitive design

- Entrances for ladies and gentlemen at opposite sides of complex
- Non-visibility of interior from the outside (for example through maze style entry)
- Sufficient physical distance between respective gender blocks
- Provision of sanitary disposal mechanism in each cubicle to ensure proper disposal of sanitary napkins and prevent blockage of toilets and sewers
- Greater horizontal distance between squat hole and back wall for female toilets
- Lighting in common areas and each cubicle so women are able to use toilets at night
- Cubicles are equipped with hooks for ladies' dupattas and personal belongings

Special Needs

- Accessibly design for physically challenged:
 - Ramps for each section to facilitate access to complex
 - 1 spacious cubicle for each gender block to ensure convenient access to cubicle
 - Provision of hand rail in next to toilet pan
 - A pipe to be attached to tap in order to facilitate one-handed self-cleansing

Environmentally friendly design

- High degree of natural lighting
- Low energy light fittings
- Use of solar power
- Passive ventilation
- Recycled, recyclable, renewable and locally sourced source materials
- Grey water flushing
- Recycling of storm water

Public Toilet in Residential Area/ Community Sanitation Complex

All of the above mentioned for public toilets in commercial and tourist places applies if not negated otherwise

Location

- Proximity to settlements

Community

- Design in accordance with community (Has the community approved the current design? Are there barriers for them to use the facility? Are women able to use the facilities conveniently at all times?)

Infrastructure

- Flush toilets
- 2 bathing units per gender block

Special Needs

Design principles

- Children's section to facilitate access:
 - Provision of open cubicles with smaller toilet pans
 - Provision of child friendly hand wash facilities

School SanitationLocation

- High visible place within hearing distance to attract attention in case of emergency

Infrastructure

- Separate facilities for teachers and students
- Provision of pour flush toilets to avoid wastage of water
- Minimum of 1 toilet and 4 urinals for each boys and girls
- Hand wash facilities with soap and provision of sufficient water for self-cleaning
- Provision of dust bins in common areas
- Connection to sewer system or DEWATS to ensure proper collection and conveyance of wastewater

Gender sensitive design

- Separate toilets for boys and girls with separate entries, preferably opposite of the complex
- Disposal mechanism for menstrual hygiene products in each cubicle of the girls' complex
- Cubicles are equipped with hooks for girls' dupattas and personal belongings

Child friendly design

- Provision of infrastructure that suits to the different needs of varying body heights including height of wash basins, height of urinals, width of toilet pans and distance between footrests, and height of door handles, etc.

Environmentally friendly design

- High degree of natural lighting
- Low energy light fittings
- Use of solar power
- Passive ventilation
- Recycled, recyclable, renewable and locally sourced source materials

Operations and Maintenance Considerations**O&M principles****Mobile Toilets**

- Hourly cleaning (spot cleaning)
- Daily ground cleaning of the entire unit
- Daily desludging

O&M principles	
Public Toilet in Commercial/ Tourist Area	<input type="checkbox"/> Hourly cleaning (spot cleaning) <input type="checkbox"/> Daily thoroughly cleaning of the entire complex <input type="checkbox"/> Weekly schedule cleaning <input type="checkbox"/> Monthly check up for minor repairs
Public Toilet in Residential Area/ Community Sanitation Complex	<input type="checkbox"/> Hourly cleaning (spot cleaning) <input type="checkbox"/> Daily thoroughly cleaning of the entire complex <input type="checkbox"/> Weekly schedule cleaning <input type="checkbox"/> Monthly check up for minor repairs
School Sanitation	<input type="checkbox"/> Daily thoroughly cleaning

Annexure 3: DPR recommendations for up gradation of existing nallahs

S. No.	Name of Nallah	Total Length (mtr)	0.75 mtr wide	1.00 mtr wide	1.50 mtr wide	No. of stepped Toe Wall
1	Nallah from Govt. Dispensary to Housing Board Colony, Sanjauli	263.21		100.00	163.21	25
2	Nallah from Masjid to Housing Board Colony at Sanjauli	177.44	50.00	50.00	77.44	18
3	Nallah from Old Police Chowki to Bypass Road upto M.C. limit	286.59	50.00	50.00	186.59	22
4	Nallah from Children Park to Housing Board Colony / Bypass upto M.C. limit	191.04		91.00	100.04	18
5	Nallah from Sidharth Enclave to Housing Board Colony Block-12 A	209.30		100.00	109.30	14
6	Nallah from Shivam Traders to Bypass upto M.C. limit	207.76		100.00	107.76	16
7	Nallah from Chopra House to Hill Groove Public School Bypass road	413.88		100.00	313.88	28
8	Nallah from Doctor Qtrs. Lakkar Bazaar to Cart Road	161.05		161.05		13
9	Nallah from Takka Bench to Cart Road Via Sat Sang Bhawan	126.51		126.51		17
10	Nallah from Dream Land Hotel Lakkar Bazaar to Cart Road	131.00		131.00		18
11	Nallah from Roshan Villa Jakhu to Cart Road near IGMC	444.28			444.28	43
12	Nallah from Jakhu to MC parking Cart Road Near IGMC	262.23			262.23	13
13	Nallah from circular road lift to bypass road	764.18			764.18	35
14	Nallah from Cidar Wood Hotel Jakhoo to Cart Road via Jodha niwas	254.12			254.12	20
15	Nallah from Jakhu to Lift via Amar Bhawan	643.28	200.00	200.00	243.28	38
16	Nallah from Oak over to Cart Road Via Cliff end Estate	649.38	250.00	200.00	199.38	46
17	Nallah from Palika Bhawan to Main Stream	388.78			388.78	22
18	Nallah from Jangal House to Cart Road Via Chudel Boudi	410.16			410.16	26
19	Nallah from Mall Road via Dayanand School to Cart Road	158.10		158.10		25
20	Nallah from Mall Road via Command to Cart Road	255.12		255.12		12
21	Nallah from State Bank to Cart Road	103.62		103.62		11
22	Nallah from Ram Bazaar to D.D.U. hospital upto cart road	170.23		170.23		10
23	Nallah from Arya Samaj to Ram Mandir	105.08		105.08		7
24	Nallah from Lift to Cart Road	179.87			179.87	28
25	Nallah from Mall Road to Cart Road via High Court	126.94			126.94	11
26	Nallah from Subzi Mandi to Cart Road	75.06		75.06		6
27	Nallah from chudel boudi to Flower Dail Malyana Bridges	1340.45			1340.45	68
28	Nallah from Naresh Singha's house (Navbahar) to Sant Ram,s house,Dhobighat	425.28		425.28		22
29	Nallah from Kunwar Niwas to NH 22 near Housing Board Colony	522.30		250.00	272.30	26

S. No.	Name of Nallah	Total Length (mtr)	0.75 mtr wide	1.00 mtr wide	1.50 mtr wide	No. of stepped Toe Wall
30	Nallah from Hem Lata Gupta's house to NH 22 near Housing Board Colony	695.75		300.00	395.75	34
31	Nallah from Dhalli to Churat Road	111.33		111.33		11
	KAITHU :-					
32	Nallah from Cart Road near Diwanamall building to Dhingle Estate Via Sunny side	343.28	50.00	100.00	193.28	24
33	Nallah from cart road to Lal Bagh	64.09	64.09			4
	CHOTTA SHIMLA					
34	Nallah from Mall Road to bye-pass via Knollswood.	377.20			377.20	16
35	Nallah from Mall Road to bye-pass via police headquarter	420.22			420.22	44
36	Nallah from Chota Shimla M.C. office to Bypass	387.48		150.00	237.48	44
37	Nallah from Stocks Place to Cart Road Via Palika Bhawan	328.00	100.00	100.00	128.00	17
38	Nallah from HP Tribunal to Bypass road via Sadhna Ghatti	262.11			262.11	17
39	Nallah from motorworld Navbahar to dhobighat -1	476.69			476.69	13
40	Nallah from motorworld Navbahar to dhobighat-2	277.84			277.84	5
41	Nallah from Lakker Bazaar to Rulthubhatta	135.00	45.00		90.00	38
	KRISHNA NAGAR :-					
42	Nallah from Local Bus Stand to Krishna Nagar	242.70		242.70		28
43	Nallah from Rama Coal Company Cart Road to main stream Krishna Nagar	129.61		129.61		10
44	Nallah near Vet. Hospital Cart Road to Krishna Nagar	142.97		142.97		11
45	Nallah near Govt. High School Krishna Nagar	121.63		121.63		9
	TUTIKANDI :-					
46	Nallah from Bypass towards main Nallah near Bangali Bagicha at Tutikandi in ward no. 8	209.05		209.05		23
47	Nallah from Tutikandi Bypass towards the house of Sh.Sainu Ram Gupta via Shiv Temple at Village Panjari in ward no. 8 Tutikandi	251.55			251.55	32
48	Nallah from Tara Cottage Cart road towards Malhotra Niwas on Bypass	132.47			132.47	11
49	Nallah from Boileaugunj Chakkar road to NH 22 at Boileaugunj in ward no. 7	250.00			250.00	21
	NEW SHIMLA :-					
50	Nallah from NH 22 to Reeta Niwas at Devnagar Shimla	272.94			272.94	17
51	Nallah adjacent to bus stand at sector-II New Shimla	133.31			133.31	14
52	Nallah from main road to IPH division office at BCS New Shimla	82.19			82.19	5
53	Nallah from Hateshwari temple to Patyog New Shimla below Sanjay Gandhi School	126.05			126.05	10
	SUMMER HILL :-					
54	Nallah from HPU stadium to village Gahan upto Nirmal Niwas at Summer Hill	354.40		154.40	200.00	75

S. No.	Name of Nallah	Total Length (mtr)	0.75 mtr wide	1.00 mtr wide	1.50 mtr wide	No. of stepped Toe Wall
55	Nallah from HPU model school Summer Hill to Village Bhagog upto M.C. limit	380.62	180.62		200.00	30
56	Nallah from Gahan road to M.C. limit at Summer Hill	133.26			133.26	19
57	Nallah from Summer Hill - Boileaugunj road near Shanti Niwas to M I room via Jutogh View at Summer Hill	255.16		255.16		22
58	Nallah from Boileaugunj Mall road to Shimla Kalka road near HP Tourism information centre at Boileaugunj	94.00		94.00		15
	TOTU :-					
59	Nallah from Tara Chauhan's Cottage to Lower Airport Road	238.15		100.00	138.15	10
60	Nallah from Garg House to Nalagarh Road	442.55		200.00	242.55	19
	Total	20277	989	5732	13554	1433