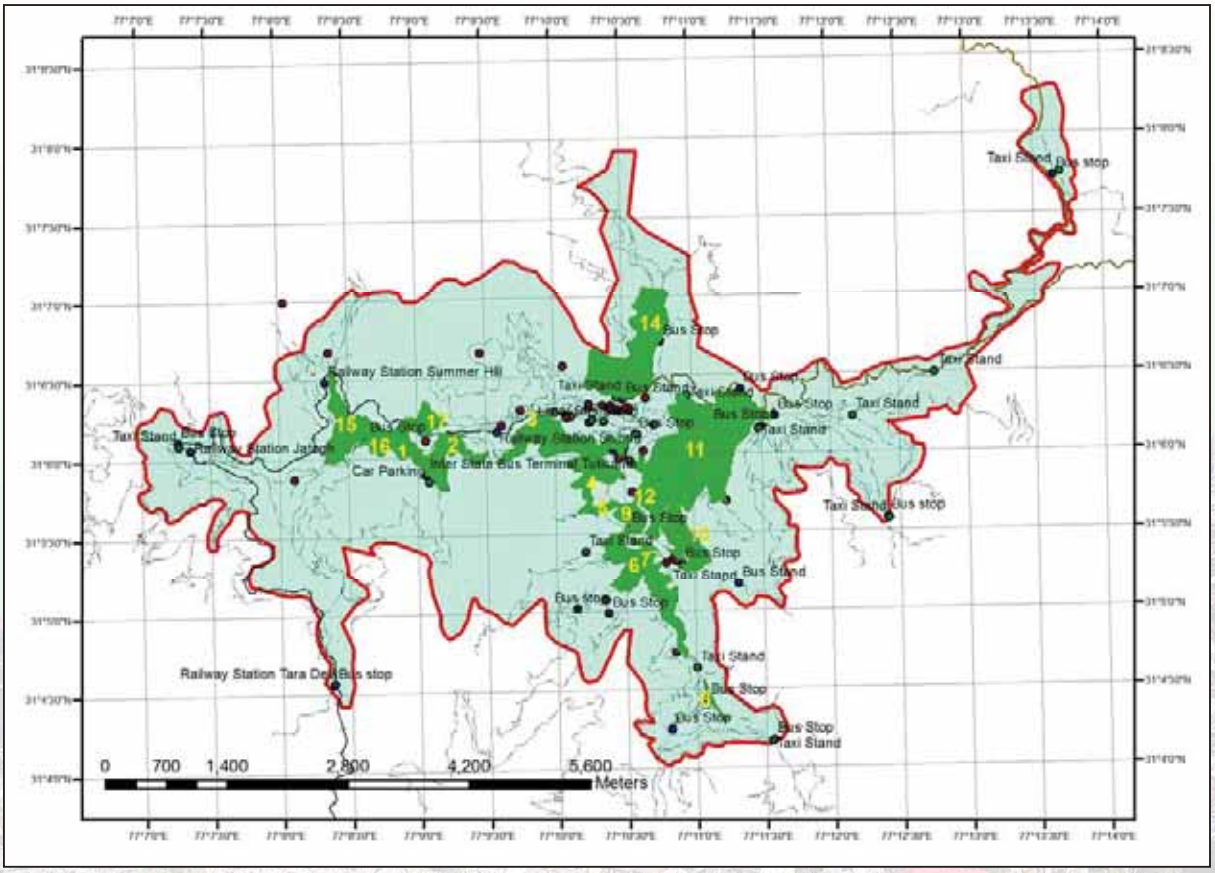
Environment Impact Assessment Report

17 Green Areas in Shimla Planning Area

Year-2013



Prepared by:

Society for Environment Protection & Sustainable Development

A special purpose vehicle under Department of Environment, Science & Technology
Government of Himachal Pradesh
Narayan Villa, Chotta Shimla -171002

Table of Contents

Chapter 1 - Introduction

1.1 Background

Society of Environment Protection and Sustainable Development (SEPSD) has undertaken the task of conducting Environment Impact Assessment Study for allowing construction in 17 Green pockets of Shimla town with an objective to assess the impacts of construction in these pockets. This Environment Impact Assessment study has been entrusted by Town & Country Planning Department, Himachal Pradesh based upon Terms of Reference (TOR) for the study by SEPSD.

The present report is termed as Environment Impact Assessment Study for assessing environmental status in 17 Green pockets in Shimla town. This report covers delineation of project area i.e. 17 green pockets, methodology, base line environmental status i.e. secondary data collection during the period of study. In addition, this study report also covers field surveys carried out in study area.

1.2 Brief Description Area

The Shimla town, is the head quarter of the district and summer capital of India during British regime, is situated on a range of entirely mountainous Mid-Himalayas which forms the last traverse spur of the Central Himalayas, south of the River Satluj. Geographically, Shimla lies at 30° 6' North latitude and 77° 11' East longitude, and its mean elevation is 2397.59 meters above mean sea level. The existing town resembles an irregular crescent with 9.2 km extension from one end to the other, covering a total area of 19.55 km^2. Shimla town is situated in a seismic belt (Seismic Zone IV) as per IS-1893.

The eastern portion of the town is Chotta Shimla while the extreme western side is called Boileauganj. An outlying northern spur running at right angles to the main ridge is Elysium Hill. Five and half kilometers from the western end of the station are outlying hills of Jutogh.

This town is spread over seven hill spurs. The average elevation above mean sea level and the name of the spurs are given below:

Hill Spurs & Their Mean Elevation

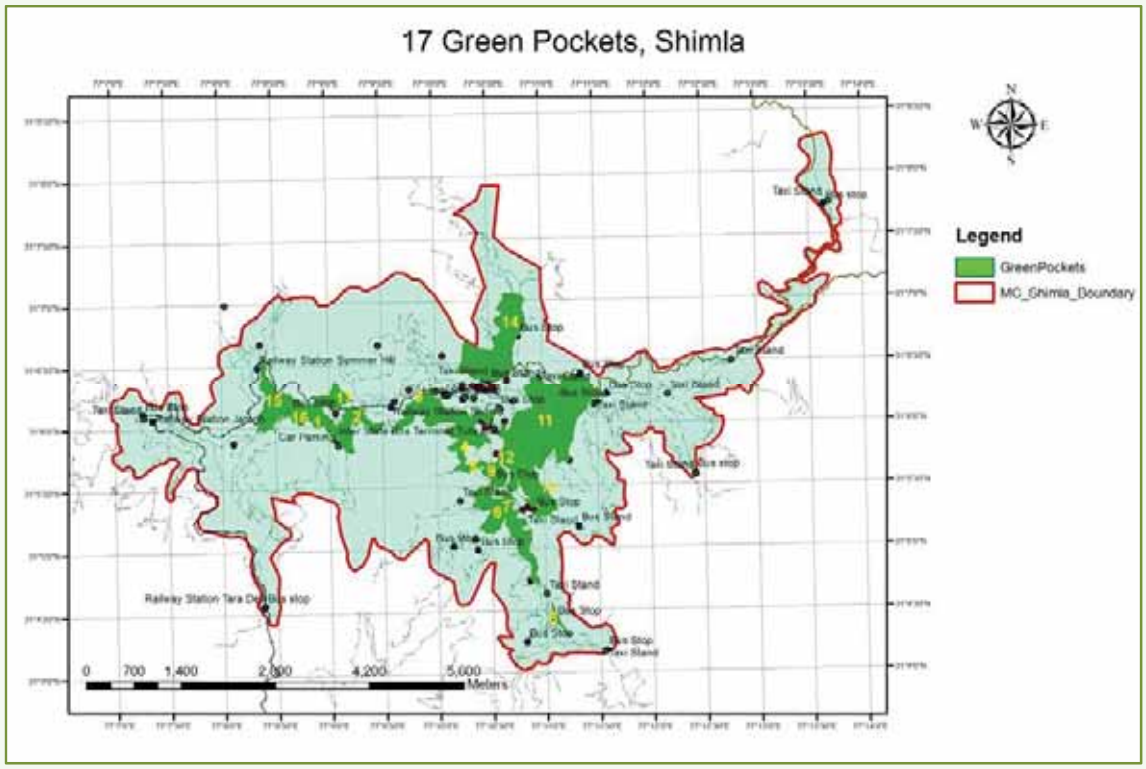
Hill Spur.	Elevation (m.)
Jakhoo Hill	2454
Elysium Hill	2257
Museum Hill	2201
Prospect Hill	2177
Observatory Hill	2150
Summer Hill	2104
Potters Hill	2073

These spurs are interconnected by roads. The important character of the road network circumscribing these hills is that it is connected to the Mall road from Boileauganj to Chotta Shimla.

Shimla is a multifunctional city with dominance in tourism, administration and institutional activities. Apart from being the administrative center and capital of Himachal Pradesh, Shimla is also the nerve center for all social, cultural, educational and tourism activities. The multifunctional activities are putting heavy stress on development activities leading to unregulated development and congestion in the core area.

As per Notification No. HIM/TP-RW-AZR/2000-III dated 11.8.2000, of TCP Department of Govt. of Himachal Pradesh besides delineation of Core and Restricted Areas, all areas possessing substantial green cover, but not classified as forest, whether in public or private ownership were designated as Green Belts and only reconstruction on old lines, allowed therein.

The 17 green belts identified and notified vide notification No. HIM/ TP- RW-AZR/2000-III dated 7.12.2000 included Tutikandi Forest bounded by Bye-pass and Cart road, Nabha Forest, Phagli-Lalpani Forest, Bemloe Forest, Himland Forest, Khalini- Chhota Shimla Forest, Chhota Shimla Forest above Cart road, Kasumpti Forest, Charlie Villa Forest, Forest between Himfed Petrol Pump and Secretariat, Jakhoo Forest (3 portions), Bharari-Shankli-Ruldu Bhatta Forest, Summer Hill Forest and Area in between Boileauganj-Chaura Maidan known as Elysium Hill.



Presently, as per revenue records, the identified green belts in Shimla Planning Area spread over 414 hectares, out of which 78% area is either under forests or open area. Out of the remaining 22% area, 13% is built up and 9% under roads & paths. About 42% of the total

green area is under forest cover and 36% (150 hectare) is open area occupied by shrubs, bushes and grasslands. Out of this 150 hectares open area, 124 hectares is under Government ownership and just 26 hectares is in private ownership. Town & Country Planning Department prior to allowing construction in said area took a decision to carry out Environmental Impact Assessment of the green areas.

1.3 Objectives

Environmental Impact Assessment (EIA) is an assessment of the possible impacts that a proposed activity may have on the environment, consisting of the environmental, social and economic aspects.

The purpose of the assessment is to ensure that decision makers consider the environmental impacts when deciding whether or not to proceed with an activity. "The International Association for Impact Assessment (IAIA) defines an environmental impact assessment as the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made." EIAs are unique in that they do not require adherence to a predetermined environmental outcome, but rather they require decision makers to account for environmental values in their decisions and to justify those decisions in light of detailed environmental studies and public perception on the potential environmental impacts.

Presently, study for assessment and evaluation of environment impacts and accordingly prepare for mitigation with objective to:

- Establish and assess baseline environmental-social ground truth of each green pockets.
- Identify and evaluate environmental and social impacts proposed activity (construction etc.).
- Suggest possible methods for mitigation for sustainability of ecology of likely affected areas due to development of 17 green pockets.
- Make clear cut recommendations for future road map for 17 green areas.

Chapter 2 - Scope of the Study

2.1 General

Based on objectives the scope of work consists of preparation of EIA for 17 green pockets in Shimla Himachal Pradesh. This includes data collection and necessary studies for Environment Impact Assessment (EIA) and look about possible mitigation plan. To know the present status of environment in the area, baseline data with respect to environmental components i.e. air, water, noise, soil, land and biodiversity (flora and fauna), wildlife, socio-economic status etc. is required to be collected within desirable radius of each green pocket.

EIA would act as guiding tool for providing strategic direction with respect to all encompassing environmental issues in and around the development area. A unique means for present engagement between Town & Country Planning Department, and society a Special purpose vehicle of environment department is to prepare on environment priority issues of local concern; development with community interests and interested stakeholders; and effective tool to maintain environmental performance and have effective mitigation road map.

The scope of work to achieve the above stated objectives would involve the following:

- Identification issues with specific environmental attributes of development area;
- Water and air quality analysis;
- Analysis of environment degradation;
- Analyze anticipated impacts;
- Analyze mitigation measures;
- Muck disposal issues and sites;
- Status of plantation and restoration in the affected sites; and
- Environmental standards of all kinds;

2.2 Methodology

Various steps involved in Environmental Impact Assessment study for the proposed activity in green area are divided in different phases:

- Identification of significant environmental attributes/ parameters which makes area specialized in nature to study the existing status within the impact zone with respect to air, water, noise, soil and socioeconomic components of the environment.
- Mapping of various aspects like slope, land use, built-up area, Digital Elevation Models (DEMs), roads etc.
- Identification/ prediction of impacts for identified activities and to study levels of impact on various environmental components.

- Evaluation of impacts after superimposing the predicted impact over the baseline quality.
- Recommendations.

To adopt this methodology following explanation is quite important for developing understanding on this kind of assessment study.

To start with once elements of the future development are understood, inventorying community natural resources, their quality and current use is an important next step in determining what impact a proposed development may have on the community's environment. Moreover, an environmental inventory can provide citizens with a better understanding of local natural resources, economic opportunities for resource use, factors that might constrain development and problems that might result from resource use or new development. The inventory of current use and quality of natural resources in the community can either be specific to the future development or may include a comprehensive assessment of the community's natural resources.

There are many aspects to consider in preparing an inventory. For example, a community may choose to protect a resource that is currently "useful" or "high quality" from even the most minimal impacts. Other sources may lend themselves to a variety of functions without noticeably degrading the local environment. It is important to keep in mind that each resource may be affected by certain types of development pressures, but not by others. Finally, the inventory should include not only existing resources, but also threats to those resources (e.g., loss of prime agricultural land or open space) and citizen concerns about the quality of those resources (e.g., quality of drinking water supply). Development may also affect a community's environment by impacting the aesthetic quality of a community; therefore the socio-economic analysis is also important.

Similar to fiscal, social and economic impacts, development impacts on the environment vary significantly by activity type, size, location, and the environmental conditions of said area. As such, the first phase of environmental impact assessment involves becoming familiar with the characteristics of the future development. The better understanding one has about the activity, the more accurate will be the assessment of environmental impacts. In designing the environmental impact assessment, it is important to consider the following unique characteristics about development in future:

- **Size and nature of the development.** A small, low density residential subdivision, for example, may have a much different impact on the environment than would a large regional shopping mall. This refers to impacts during development/construction as well as impacts from the operation of the facility itself.
- **Location of the future development.** Is the site of the proposed development located in a semi-urban area. Completely in tree canopy etc, if the proposed development is located in an urban or suburban area having base tree canopy, it will be appropriate to assess potential impacts such as urban runoff from impervious surfaces, increased pollutant loadings, and decreases in available water supply, degradation in soil quality etc.

- **Character of the natural environment being impacted.** The ability of the natural environment to support or sustain certain land uses will vary according to such factors as soil type, bedrock conditions, drainage patterns, vegetative cover, whether the development is built on a floodplain or bluff.
- **Spill-over effects of environmental impacts.** Although the purpose of an environmental impact assessment is primarily to inform system, it must be recognized that environmental impacts may affect resources far from the system in time and/or space. The type and magnitude of off-site and out-of-system impacts may influence who needs to become involved in the process.

Methods for Evaluating Cumulative Effects

The method for assessing potential cumulative impacts of development that continues to gain popularity among communities faced with development challenges is the use of a geographic information system (GIS). In general, GIS is a powerful tool for carrying out spatial analysis of cumulative environmental change. The capability of GIS in layering different types of data (e.g., land use, water resources, and infrastructure) and providing a graphic display of alternative development scenarios makes it an excellent planning tool for any system to use.

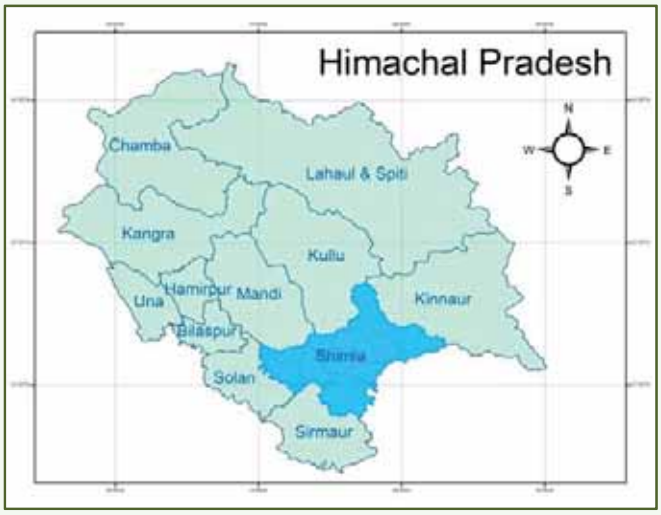
- We have tried to use Geographic Information System analysis to assesses the spatial relationship between activities and potential environmental effects and to explore development alternatives.
- Gather information about the range of possible developments and possibility of natural resources potentially impacted by such development.
- Identified potential cumulative effects by providing a list of common or likely effects and actions which may cause the effects.
- Quantifying cause-effect relationships which result in cumulative effects.
- Analysis of the status of a resource or system over time and changes in the occurrence or intensity of stressors over the same time period.
- We have tried to work up checklists that can be a useful tool for identifying and documenting anticipated impacts e.g.

    - Subsurface Conditions (soils, groundwater)
    - Hydrology (drainage, storm-water, water quality, supply)
    - Landforms (topography, related water quality)
    - Wildlife and Vegetation (vegetation, species, parklands, conservation areas, ecologically critical areas)
    - Land Use (existing zoning, land use, tree canopy/ tree cover
    - Natural Hazards (seismic, other)
    - Cultural Resources (historic concerns, architecturally sensitive archaeologically sensitive)
    - Utilities/services (energy, solid waste disposal, water supply, sewer system and drainage)
    - Transportation (public transit system, traffic circulation, parking)
    - Other (ambient air, ambient noise, controversy) etc.

Chapter 3 - Baseline Settings of Study Area

3.1 Shimla District

Shimla district forms a part of southern Himachal Pradesh. The district lies between the longitudes $77^0 0'$ and $78^0 19'$ east and latitudes $30^0 45'$ and $31^0 44'$ north and is bounded by Mandi and Kullu district in the north, Kinnaur in the east, the state of Uttarakhand and Sirmaur district in the south and by Solan district in the west. The shape of the district is somewhat rectangular with slight bulges on the western side intruding towards Solan district and on the northern side towards Kullu district. The topography of the district is characterised by high mountains, deep and narrow valleys and river basins. The elevation of the district ranges from 300-6,000 metres. The district has a number of peaks such as Jakhoo in Shimla Town, Siah near Chail, Churdhar in tehsil Chaupal, Chansal in Rohru tehsil, Hattoo in Kumarsain tehsil and Shali in Seoni tehsil. Mostly the terrain is raugh. The prevalence of inter-locking spurs, narrow and steep sided valleys with high peaks and thick forest of deodar and kail throughout the district adds to the youthfulness of its topography. The district has an area of 5,131 Sq. kms. out of total area of 55,673 Sq. kms. of Himachal Pradesh according to the Surveyor General of India. The land of district as a whole is very useful for the production of fruits, vegetables such as apple, cherry, almond (badam), Apricot (khumani), cabbage, cauliflower, peas, potato etc. Almost the district is entirely mountainous except small flat patches of land which are used for cultivation also. The soils are young and thin which get heavier and comparatively acidic with the increase in altitude.



3.2 Shimla Town

3.2.1 Historical background

Shimla is the Capital Town of Himachal Pradesh. It was formerly the summer capital during the British Rule. The town of Shimla is built over several hills and connecting ridges. The important hills are Jakhoo (8050 ft.), Prospect Hill (7140 ft.), Observatory Hill (7050 ft.), Elysium Hill (7400 ft.), and Summer Hill (6900 ft.). There is a great controversy over the origin of the name Shimla. The name Shimla was derived from 'Shyamalaya' meaning blue house said to be the name of house built of blue slate by a faqir on Jakhoo. According to one version Shimla takes its name from 'Shamla' meaning a blue female another name for Goddess Kali. The place was on the Jakhoo Hillside, there was a temple of Goddess Kali. During the British period the image of the Goddess was shifted to a new place, now famous

Kali Bari Temple. Shimla remained unnoticed during the Gurkha War. It was only in 1819 A.D. that the then Assistant Political Agent of hill states Lt. Ross set up first British residence, a mere wood cottage. His successor Lt. Charles Patt Kennedy' erected the first pucca house in 1822 named after Lt. Kennedy as 'Kennedy House'.

The construction of Hindustan Tibet road was started in 1850-51 commencing from Kalka and first lap was upto Shimla. The Road upto Shimla came to be used for wheeled traffic by 1860. A 560 feet long tunnel was constructed beyond Sanjauli.

In 1864 Shimla was declared as the summer capital of India. After Independence, Shimla became the capital of Punjab and was later named the capital of Himachal Pradesh. During British era in 1903 a rail line was constructed between Kalka and Shimla.

Shimla is blessed with all the natural bounties, one can think of. Dwelling on a panoramic location, the hilly town is surrounded by green pastures and snow-capped peaks. The spectacular cool hills accompanied by the structures made during the colonial era create an aura, which is very different from other hill stations. Bulging at its seams with unprecedented expansion, Shimla retains its colonial heritage, with grand old buildings, among them are the stately Viceregal Lodge, Charming iron lamp posts and Anglo-Saxon names. The Mall, packed with shops and eateries, is the centre of attraction of the town, and Scandal Point, associated with the former Maharaja of Patiala's escapades, offers a view of distant snow clad peaks. In 1946 leaders of the Indian nationalist movement came to Shimla for a crucial conference that paved the way to Independence. Shimla's legacy of British control has left in somewhat of Aesthetic anomaly: an Indian town, a state capital, no less that looks and feels like a village in Northern England.

Having almost 160 years of history of Municipal Corporation Shimla the autonomous existence starts with the passing of the Himachal Pradesh Municipal Corporation Act, 1994 (H.P. Municipal Corporation Act, 1994) government revised the delimitation of wards into 21. With 5 retention policies now the city is having 25 wards. The details are as under:

List of Wards in MC Shimla

Sr. No.	Ward Name	Sr.No	Ward Name
1.	Bharari	14.	Jakhoo
2.	Ruldu Bhatta	15.	Banmore
3.	Kaithu	16.	Engine Ghar, Sanjauli
4.	Annadale	17.	Dhalli
5.	Summer Hill	18.	Sanjauli Chowk
6.	Tutu	19.	Sanjauli
7.	Boileauganj	20.	Maliyana
8.	TutiKandi	21.	Kasumpati
9.	Nabha	22.	Chotta Shimla
10.	Phagli	23.	Patiyog
11.	Krishna Nagar	24.	Khalini
12.	Ram Bazar	25.	Kanlog
13.	Lower Bazar		

3.2.2 Description of the identified 17 green belts/ pockets

Area details of Govt./Private/Forest land in 17 notified Greenbelt of Shimla Planning Area is given as under:

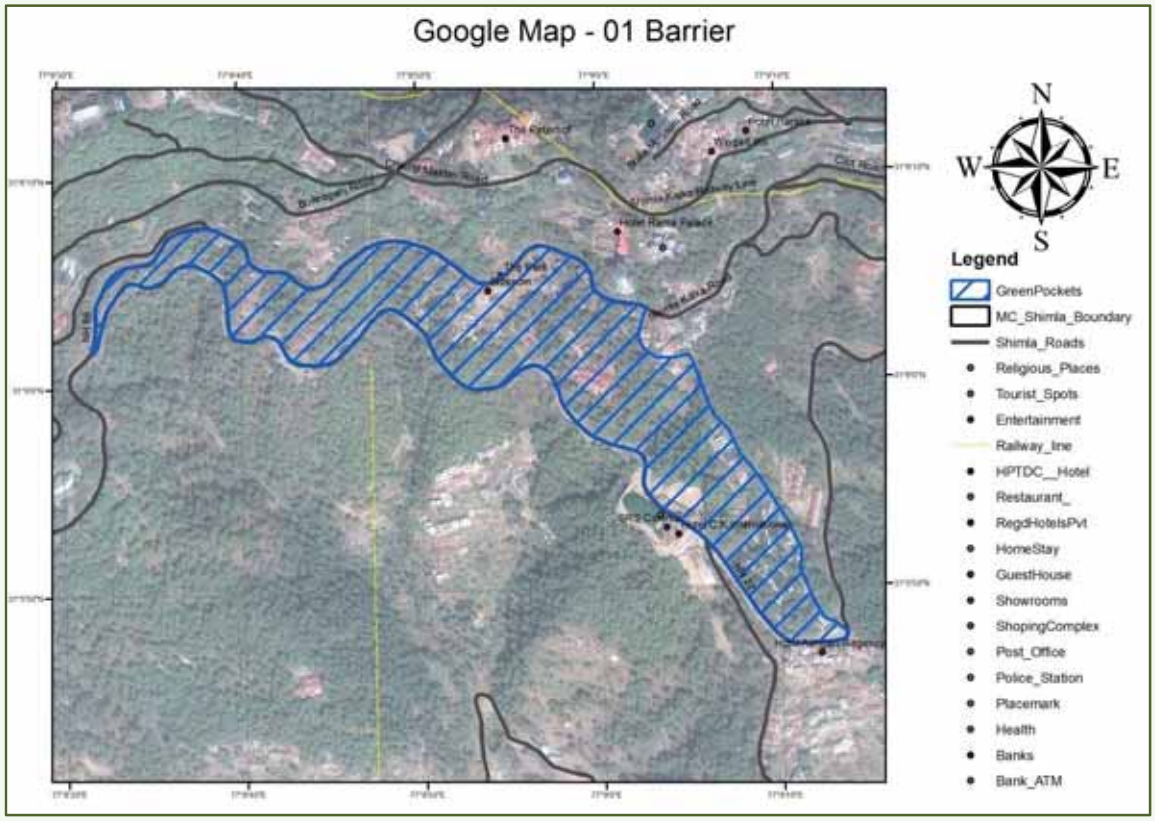
S. No.	Name of Green belt	Area Details in hectare		
		Area under Govt. Land	Area under Pvt. Land/Properties	Total Area
1	Barrier	11.88	3.45	15.33
2	Nabha	12.62	0.44	13.06
3	Phagli-Lalpani	32.07	1.81	33.88
4	Bemloe	13	7.5	20.5
5	Himland	4.32	0.88	5.2
6	Khalini-Chotta Shimla	23.36	16.15	39.51
7	Chotta Shimla	1.39	0.76	2.15
8	Kasumpti	3.83	0.8	4.63
9	Charlie Villa	9.54	2.82	12.27
10	Tribunal-ICAR Complex	2.89	7.07	9.96
11	Jakhoo	84.49	33.03	117.52
12	Ram Chandera Chowk	5.17	6.83	12
13	Snowdon	12.19	1.83	14.02
14	Bharari-Shankali	53.19	13.57	66.76
15	Summer-Hill	26.87	0.8	27.17
16	Boileauganj	4.68	1.53	6.21
17	Musium Hill	12.82	1.37	14.19
	Total	**314.22**	**100.14**	**414.36**
	%age	**75.83**	**24.17**	**100**

The total area under green blocks is 414.36 ha. The details are given as under:

S. No.	Description	Area (ha)			%age w.r.t. total Greenbelt area of 414 hectare		
		Govt.	Pvt.	Total	Govt.	Pvt.	Total
1	Built up Area	23	32	55	5.56	7.73	**13.29**
2	Area under path/ road	35	1	36	8.45	0.25	**8.70**
3	Open Area	124	26	150	29.95	6.28	**36.23**
4	Forest Area	132	41	173	31.88	9.90	**41.78**
	Total	314	100	414	75.84	24.16	100.00

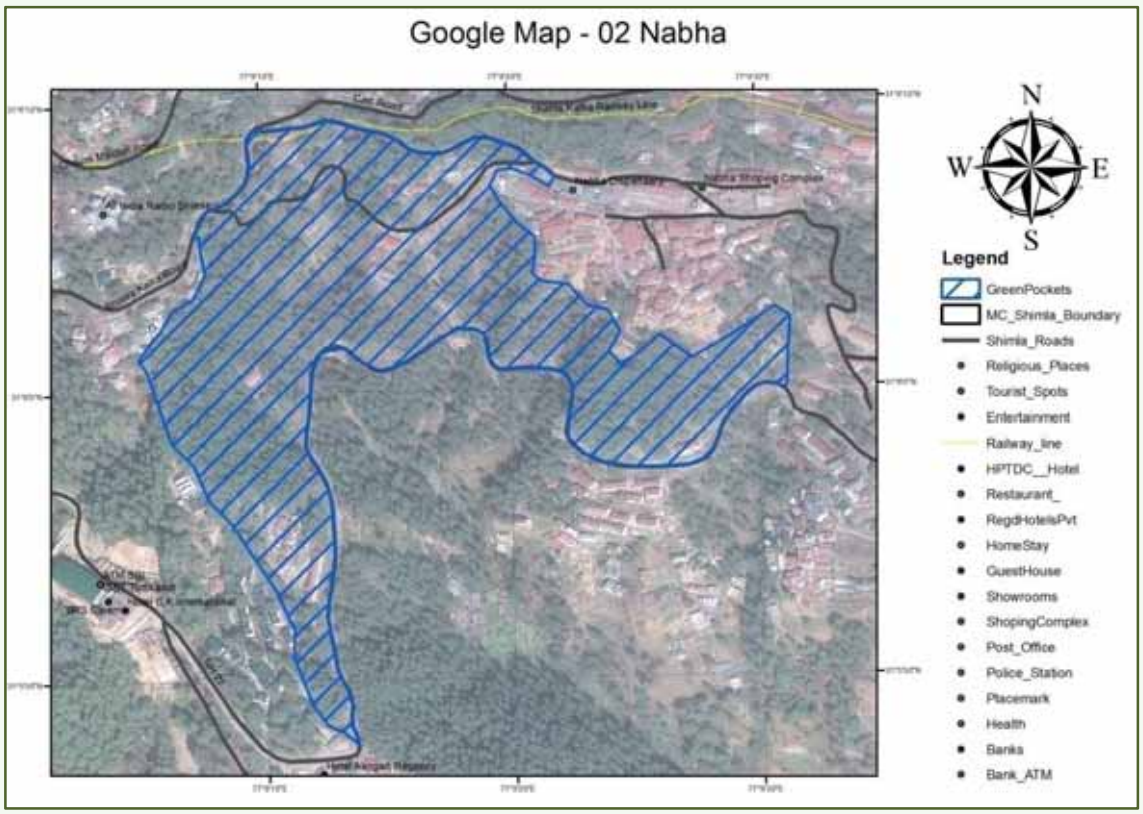
I Barrier

The Forest Area bounded by bye-pass and cart road starting from junction of barrier following the cart road to Parivahan Bhawan Nallah near Government Press then along with houses of Shri Yog Raj Sharma, J.N. Kaushal, Government Press Welfare Department to Tutikandi following the path meeting at bye-pass road near Government High School, then following the bye-pass and back to the junction of Barrier.



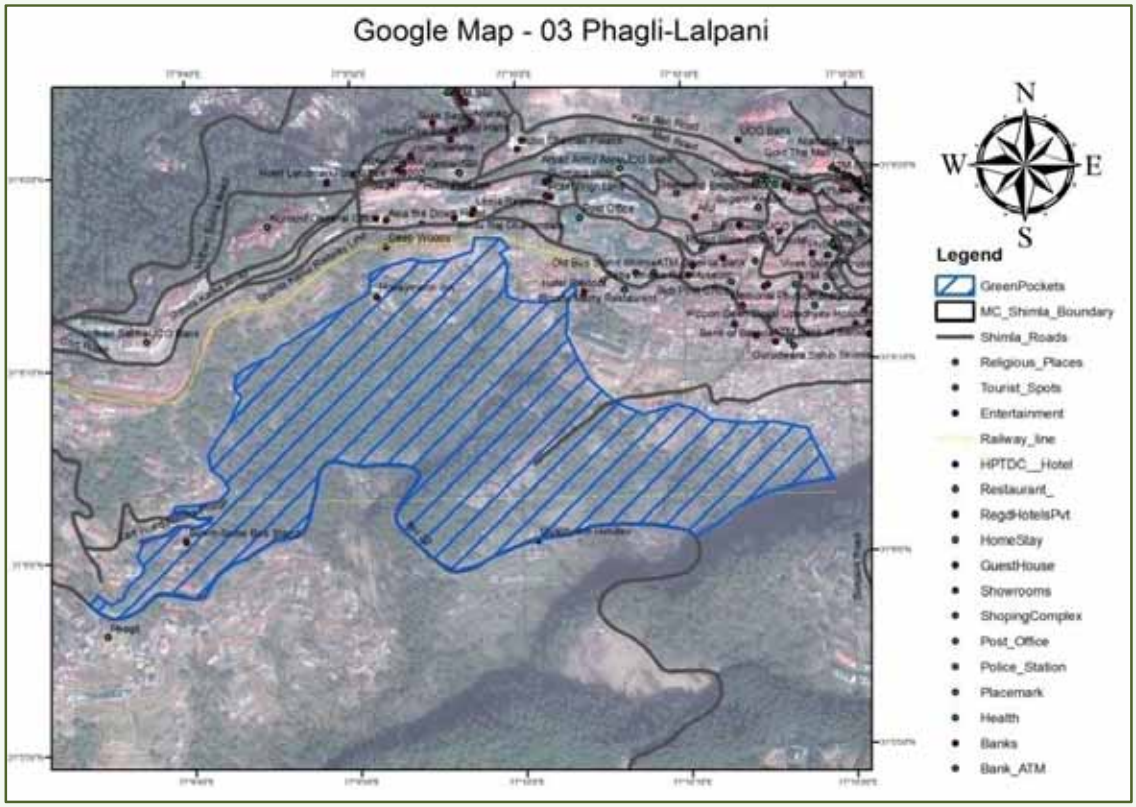
II Nabha

Nabha Forest bounded by bye-pas and cart road from Tutikandi near Government High School following the path to cart road to Nabha road and following down along with HPPWD Godown Block No.28, Hostel I.T.I Block No.2S-A. Block No. 23, Block-D, Block No.21, Block L-II/84 and Block-II/83 along nallah meeting at bye-pass road and back to Tuti Kandi near Government High school.



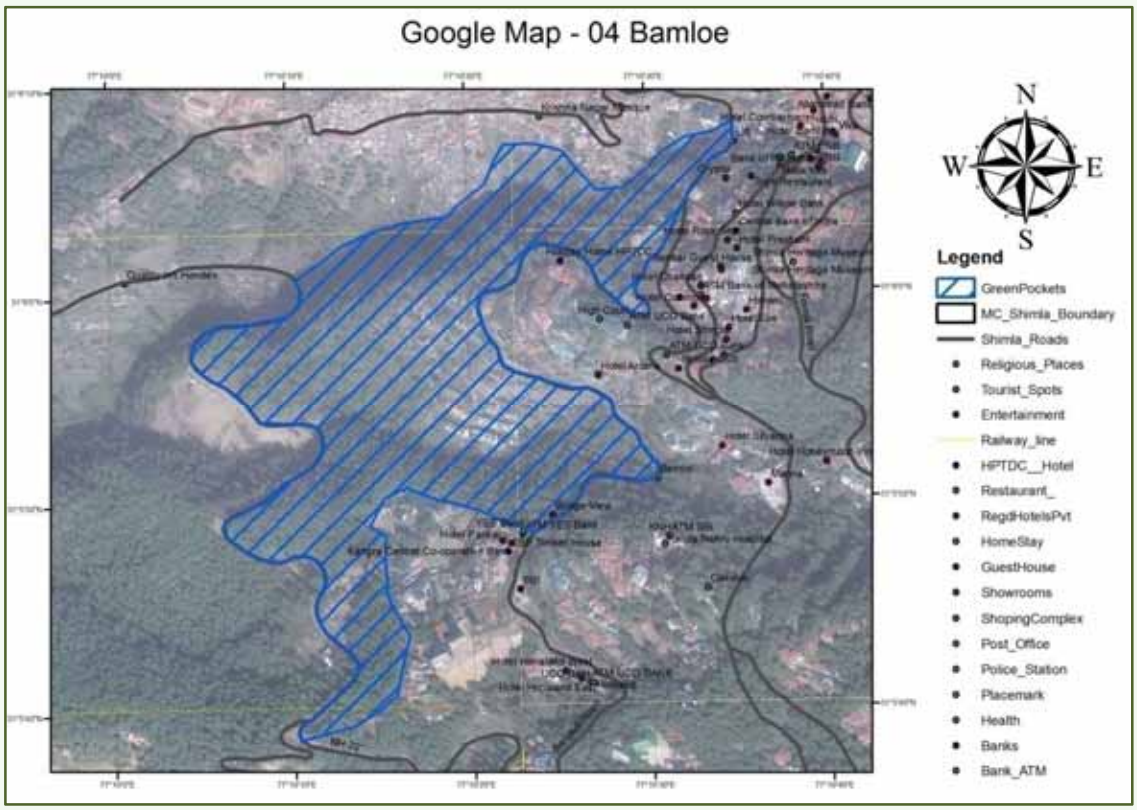
III Phagli & Lalpani

Phagli and Lal Pani forest bounded by Cart road and bye-pass starting from Phagli path from the bye-pass to railway parking to cart road and then along with railway quarter Block No.62, house of Sh. Gopal Singh, Shiv Rajan, Directorate Education Office to Municipal Corporation Quarter to Sr. Sec. School Lalpani then along with, Ladakhi Mohalla path up to house of Smt. Janki Devi, Sunder Singh and Naresh then following the Nallah meeting at bye-pass road and back to the Phagl path.



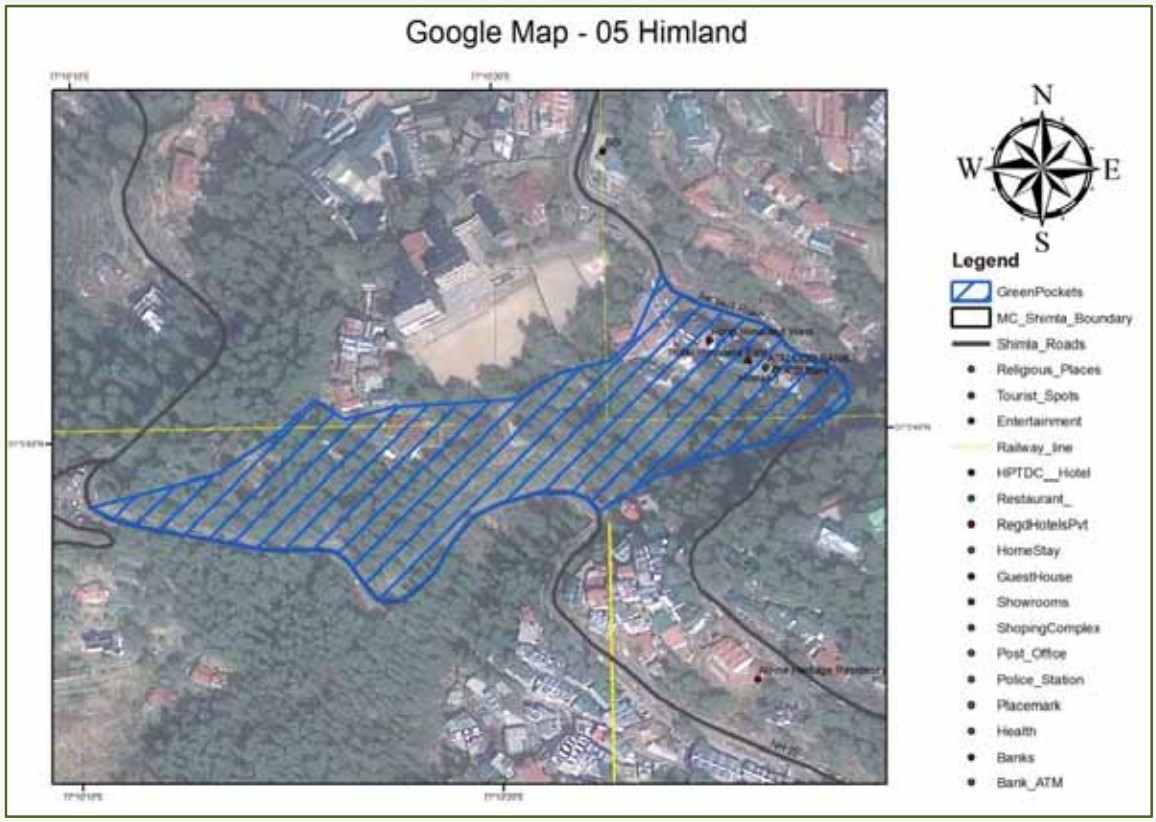
IV Bamloe

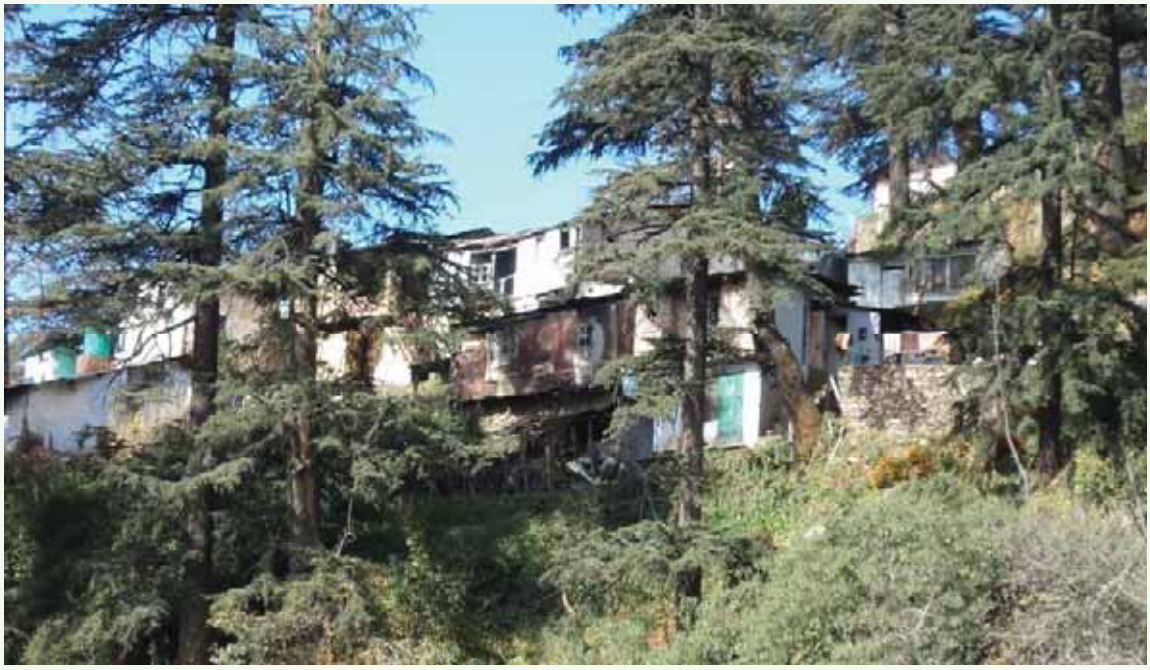
Bemloe Forest bounded by Cart road and bye-pass starting from lift nallah moving along cart road then following down the path near Government quarters meeting at junction on Cart road to Bamloe road along with post office building C.P.R.I. Complex, house of Shri Sumer Chand, I.D. Garg, Tripta Devi, Uma Devi, Sawam Lata, Block D & C to Bamloe road & bye-pass and following back the bye-pass up to the lift Nallah.



V Himland

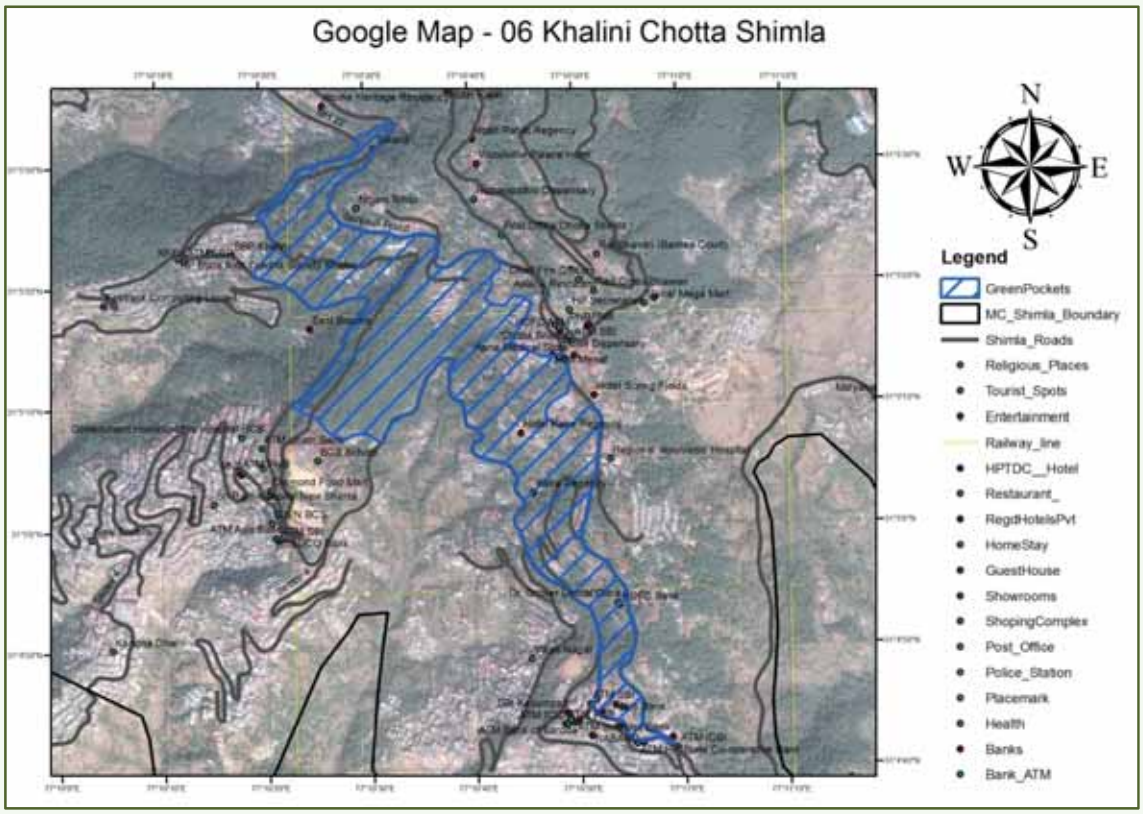
Himland Forest starting from CPRI Complex, on Bamloe road to house of Shri Ram Dhan Lal, Darshan Lal, Joginder Pal, D.P. Sharma to Cart road, then following the Cart Road to Himland Nallah meeting at bye-pass to Bamloe road and back to CPRI Complex.





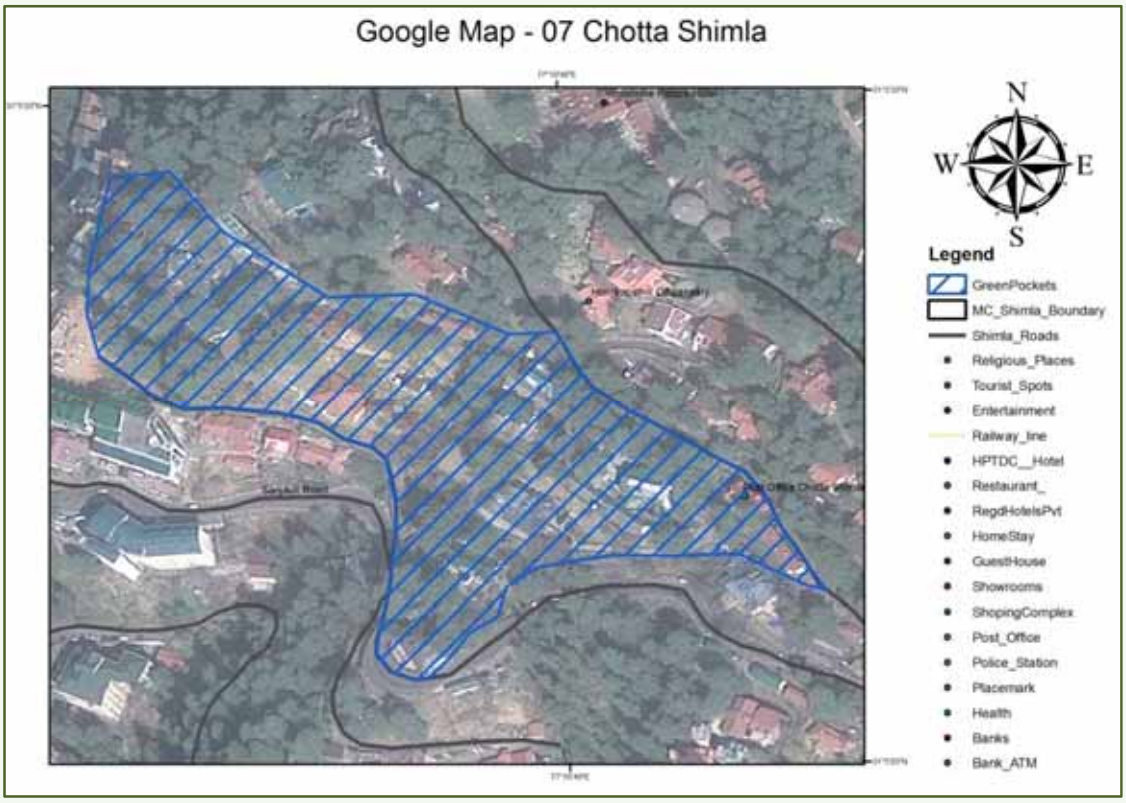
VI Khalini & Chotta Shimla

Khalini & Chotta Shimla Forest Area bounded by Cart Road starling from the Nallah near Palika Bhawan then following the NalIah to Bye-Pass road then to B.C.S. Road via Khalini Chowk to the house of Shri. Prithvi Sen, Telecom Office, house of B.S. Chauhan, Hukmi Devi, H.T. Upadhya, Savitri Niwas & Suman Niwas meeting bye-pass and following bye-pass to B.C.S, Dhobighat, Servant Quarters, Hospital, School Gate, Linlithgo Cottage, Gate Cottage, Pine Cottage, Jr. School of B.C.S. meeting Bye-Pass then along with Bye-pass upto the junction of S.D.A. road to Kasumpti Junga Road along with SDA Blocks to Tibetian School to house of Shri Vinod Sood, O.C. Bali, Parshotam Dass, M.M.Gulati, Brij Lal Gupta, K.S. Dhaluta, M.R. Sood, Balbir Singh, Joginder Lal, Varsha Vohra, Sarita Jaidk, Sant Kumar, R.R. Jain, B.L. Pandit, P.S. Negi, Bhupinder Obraia, T.L. Sharma, L.D Gupta, Sudershan Mahajan, Penajit Singh, Army Servant Quarter then along with Cart road up to Palika Bhawan Nallah.



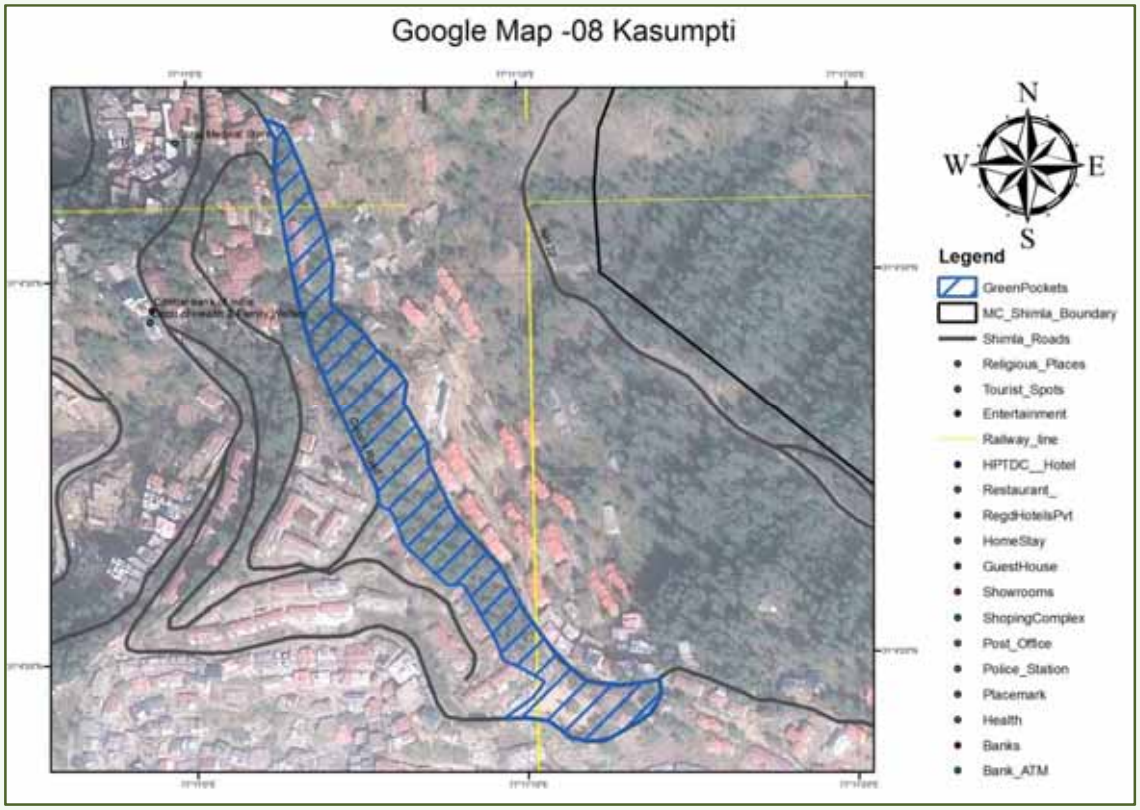
VII Chotta Shimla

Chhota Shimla rarest Area above card road starting from Eastern path near Military quarter to Mall Road to Western path meeting at Cart Road.



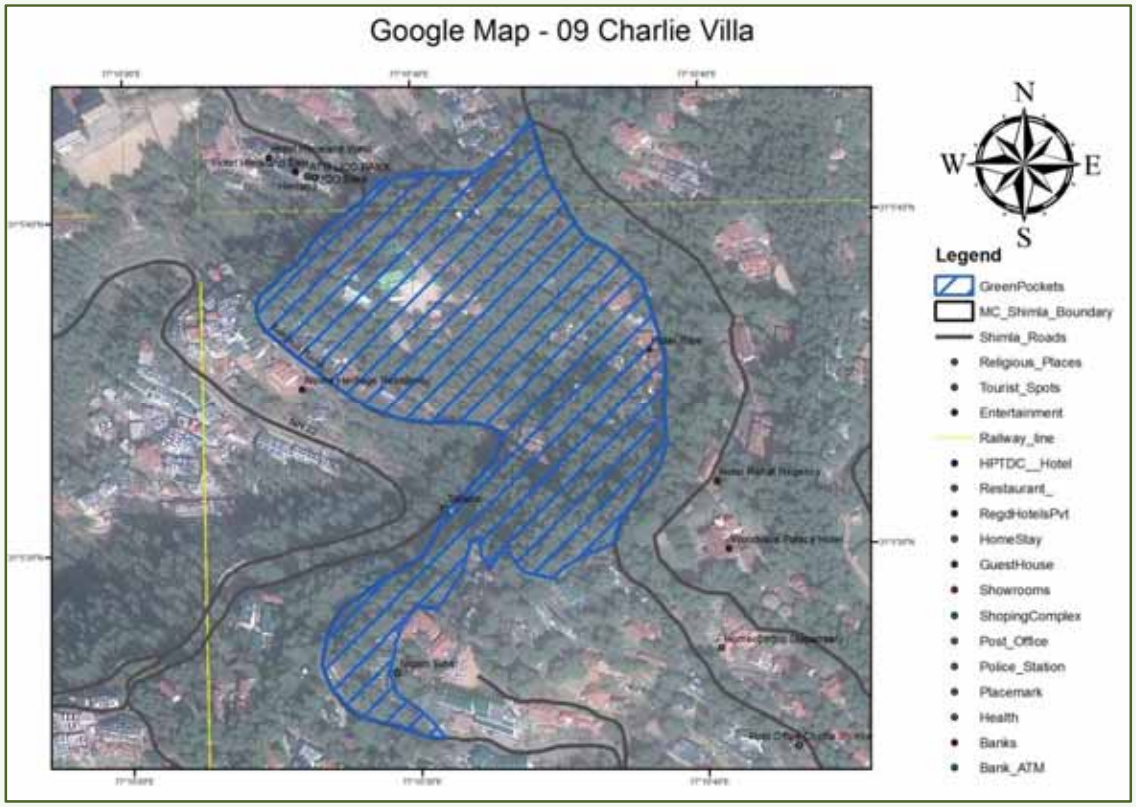
VIII Kasumpti

Kasumpti Forest Area starting from the junction of Kasumpti Mehli Path and Police Colony Road near HPPWD enquiry office then following Mehli Kasumpti path up to Geeta Mandir along Jammu Castle Road up to junction.



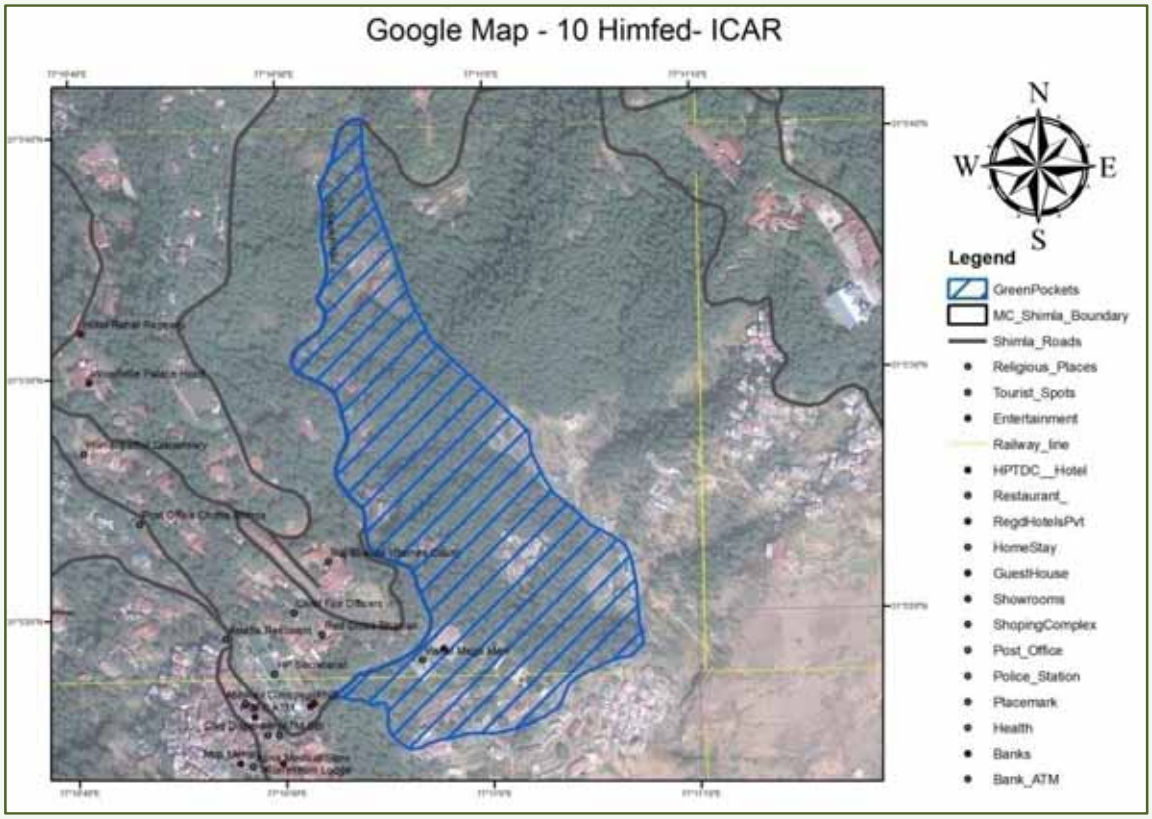
IX Charlie Villa

Charlie Villa Forest Area. Starting from Himachal Pradesh Public Service Commission. Building along with Himachal Pradesh Housing Board Building, houses of Shri Joginder Singh Kanwar, Manta Niwas, Sanjeev Sharma, Urvashi Sharma, Dr. Amba Charan, B.R. Malhotra. Mahinder Singh, O,P. Gupta, Army building, Fakir Chand Tada to Mall Road to C.M. residence then following the nallah near the house or Shri Satish Kumar Goel meeting at Cart Road.



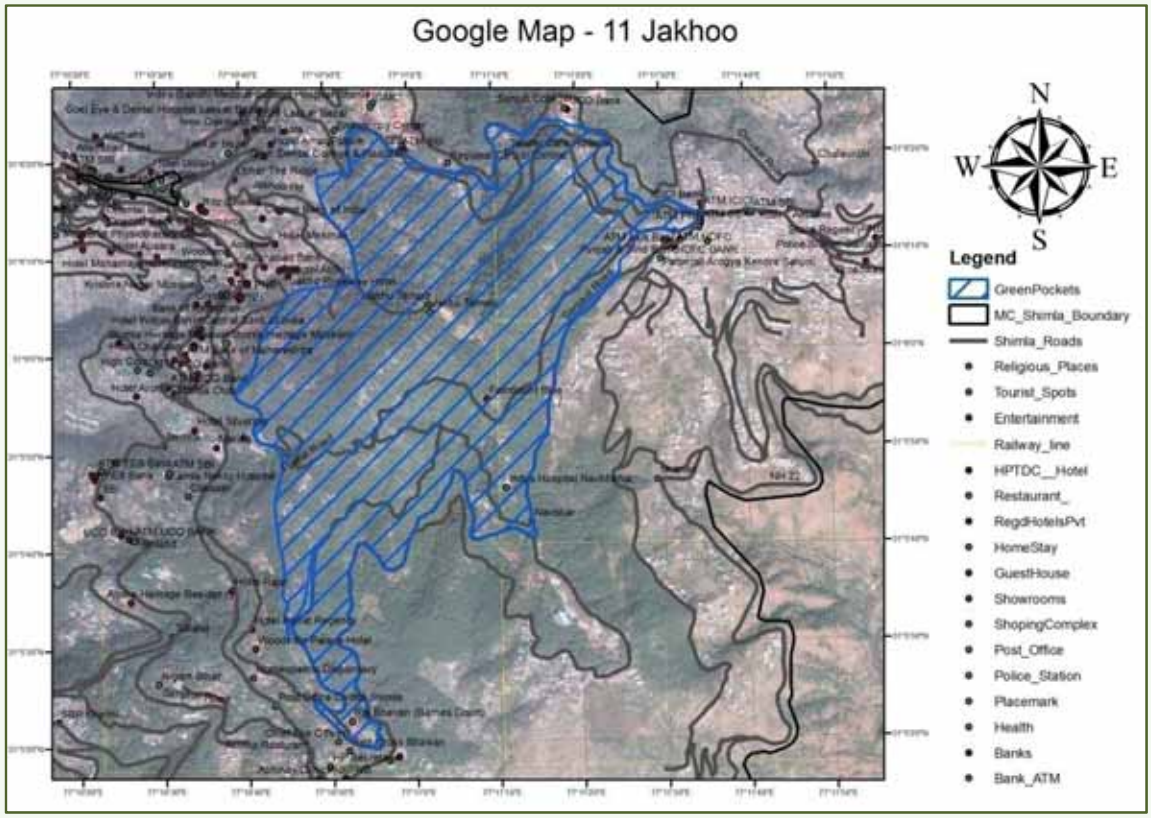
X Himfed-ICAR

Forest Area starting from the nallah near Himfed Petrol Pump following the nallah up to the junction of path and Nallah then following the path to the Himachal Pradesh Secretariat Building and following the Cart Road up to Himfed Petrol Pump.



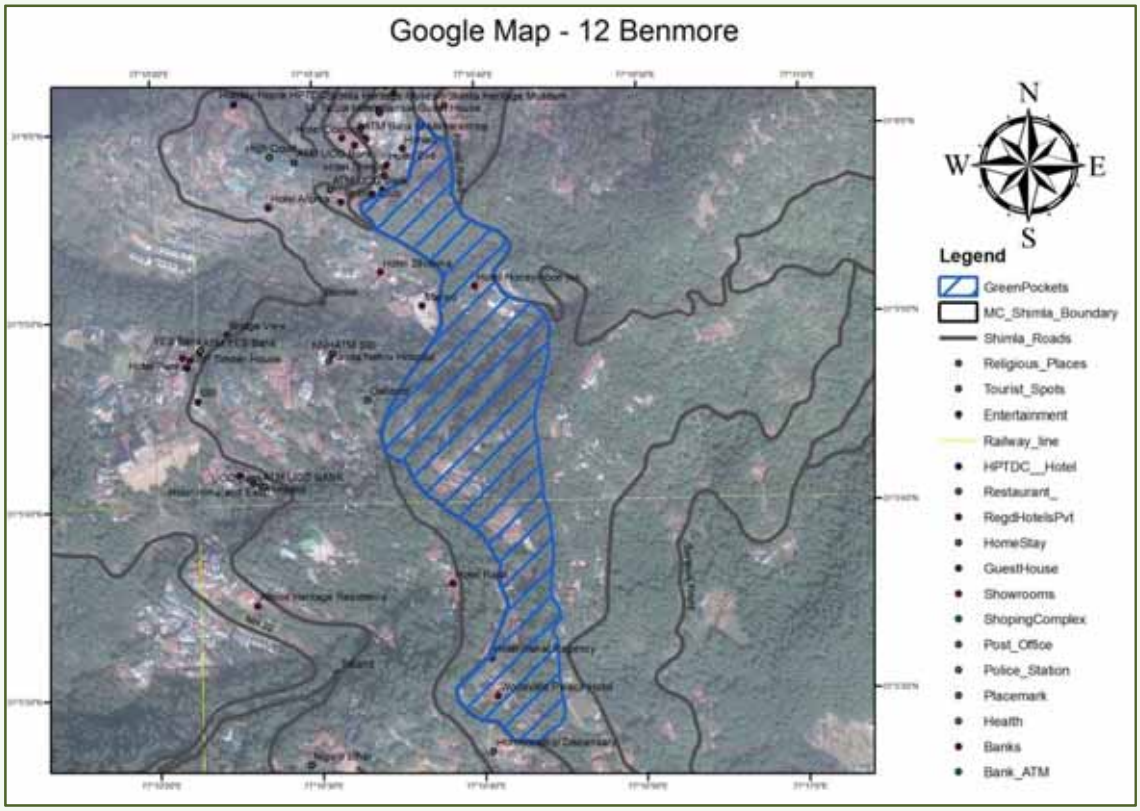
XI Jakhoo

Jakhoo Forest starling from the junction of Raj Bhawan Road and Cart Road to Radha Swami Bhawanalong U.S. Club Road to Lift Nallah to Titla Hotel following the road to Oak Wood through Northern road then following the Nallah down ward to Snowdon Pump House via Snowdon Road to house of Shri T.D. Gupta, Sukhvinder Singh, M.C. Commissioner residence, Corner House (M.C. Qrt) Nehar Singh Thakur and Govt. Sec. School Sanjauli to Cart Road then following Cart Road up to the junction of Raj Bhawan Road and Cart Road.



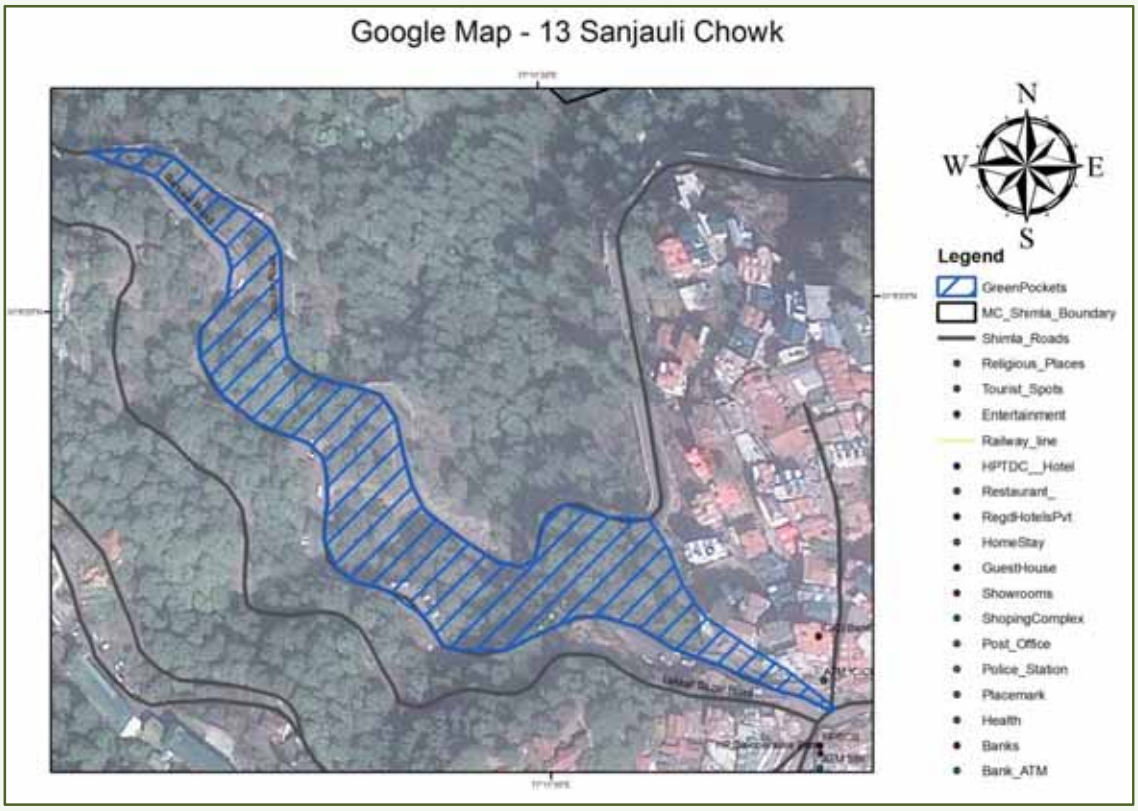
XII Benmore

Starting from Ram Chandra Chowk to Chief Minister residence via Raj Bhawan Road and Mall Road to Challet Day School then along U.S. Club Road to Ram Chandra Chowk.



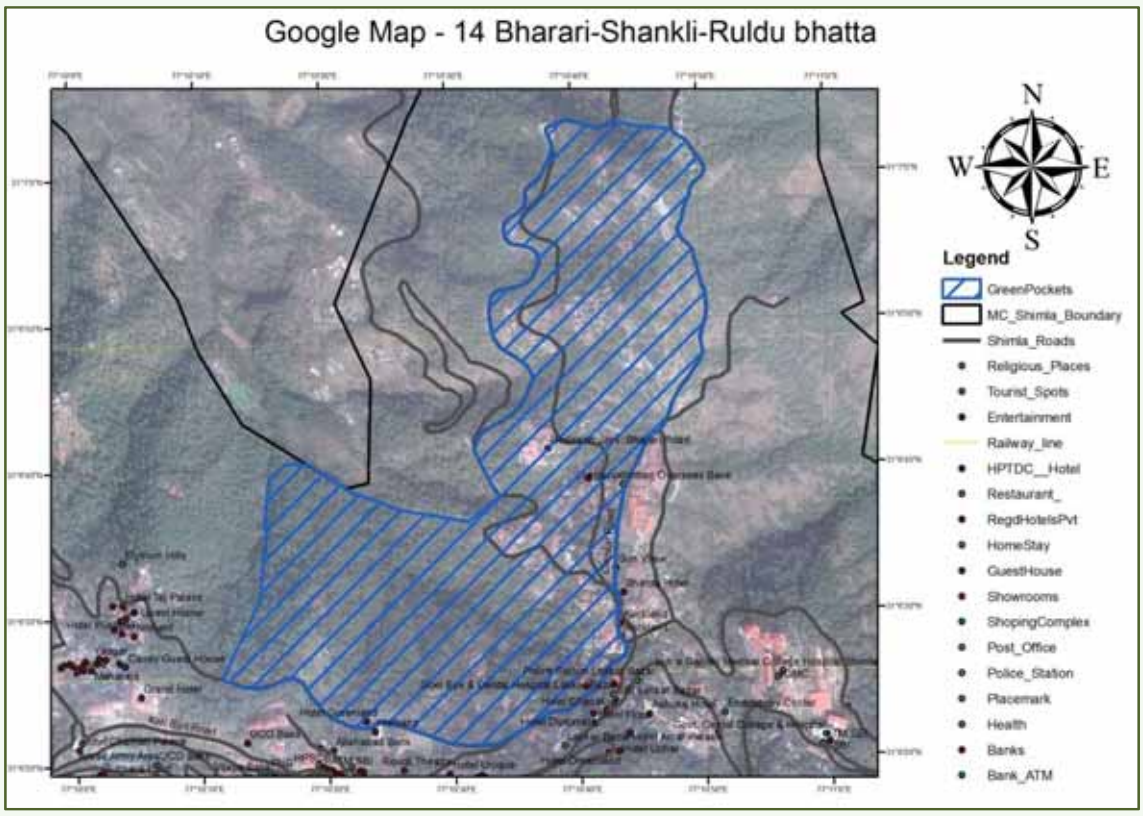
XIII Sanjauli

Forest Area bounded by Carl Road and Snowdon Road starting from Sanjauli Chowk to Snowdon Hospital.



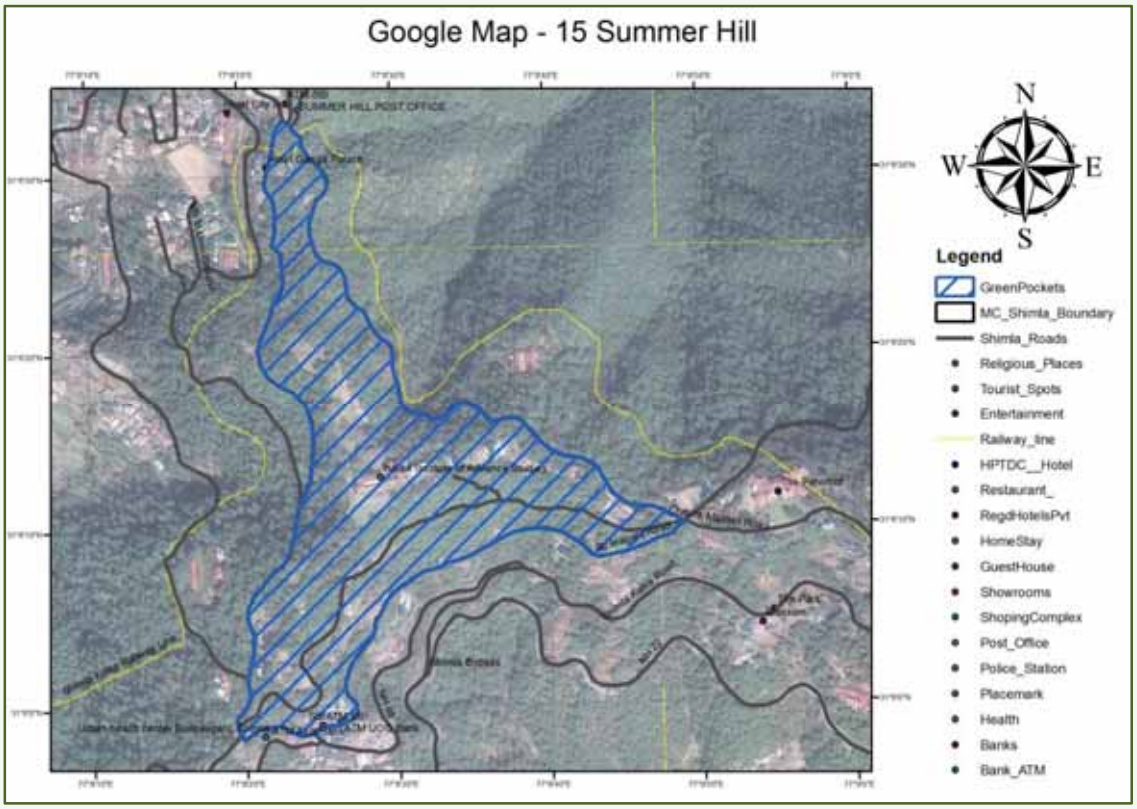
XIV Bharari, Shankli & Ruldu Bhatta

Bharari, Shankli and Ruldhu Bhatta Forest Area starting from RKMV College along Keleston Road to Harvington to Lower Bharari road to Sewerage line path along with house to Shri M.L. Sharma (Geeta Bhawan), Prern Bhawan house of Shri. Desh Raj to Cart Road along Nallah then following Cart Road up to R.K.M.V. College.



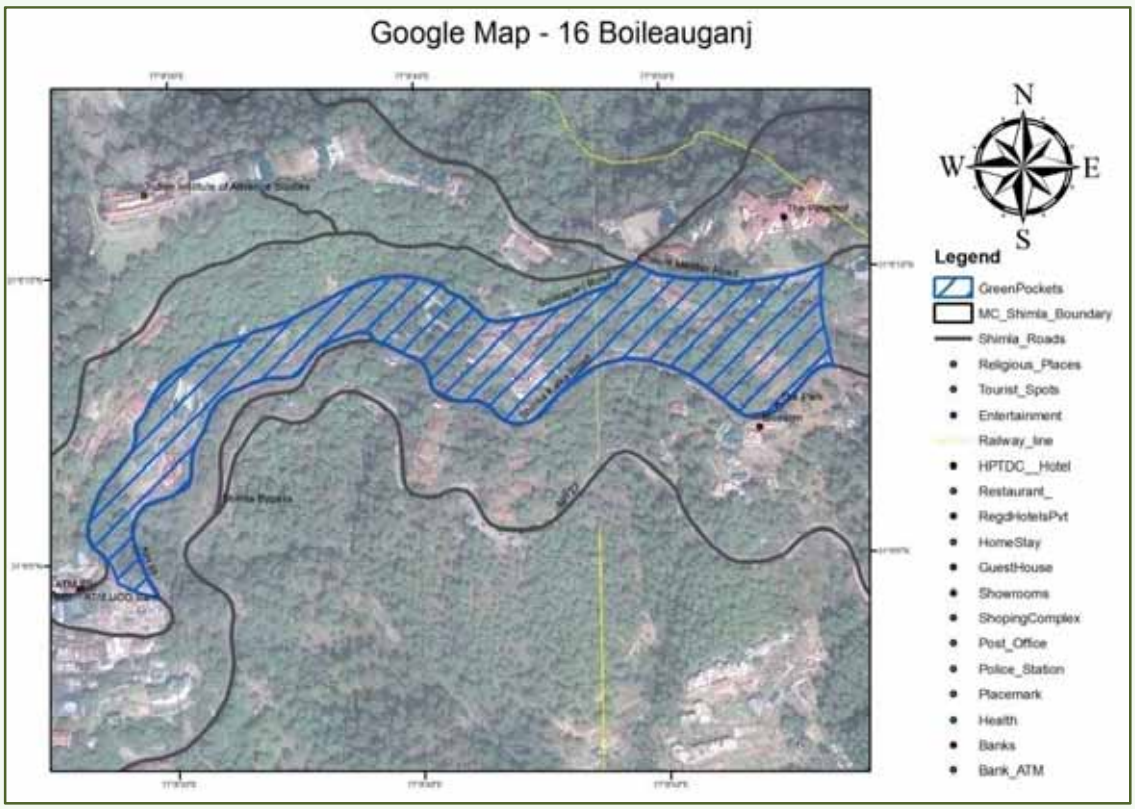
XV Summer Hill

Summer Hill Forest area starting from the Boileauganj Chowk to Summer Hill Post Office along with Summer Hill road, then following ITI road up to the gate of Advance Studies via Chaura Maidan road up to Police Station Boileauganj encircling the Hillock.



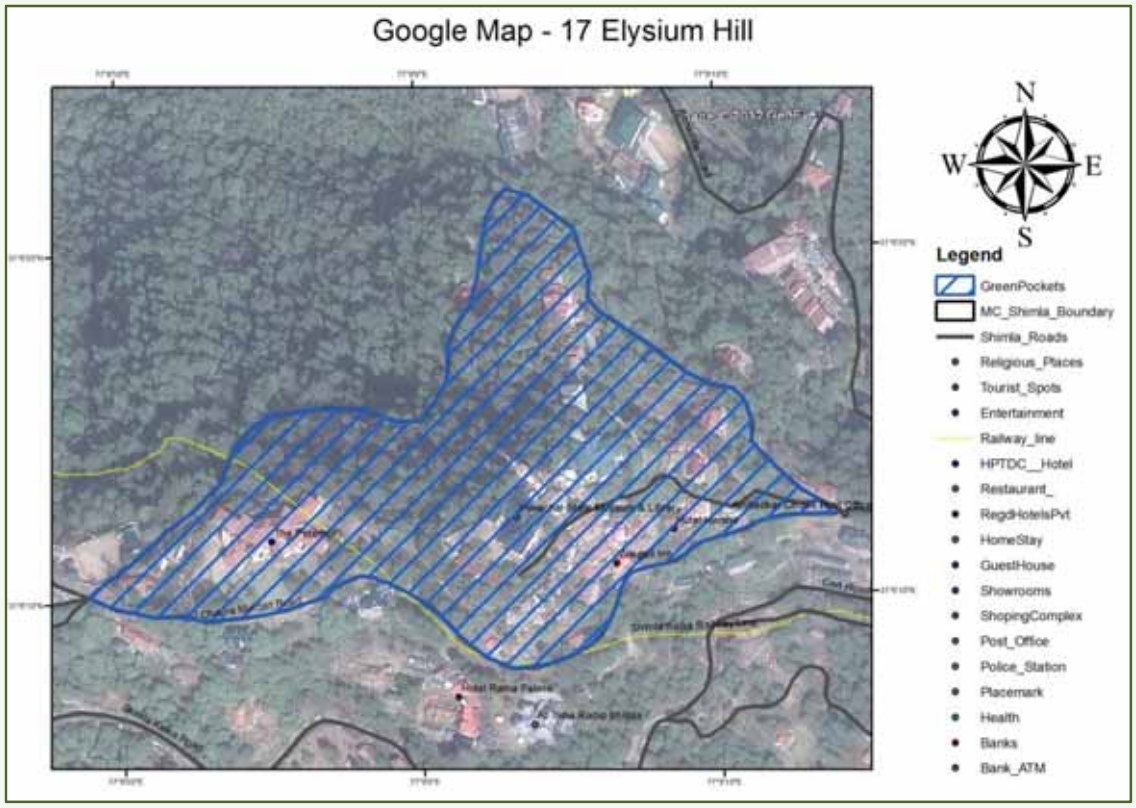
XVI Boileauganj

Starting from the junction of Boileauganj and NH-22 near C.M.P. post to Boileauganj ground Wakaf Board Building Shop No. 32 and Wakaf Board building Shop No.34 along with Chaura Maidan road up to nallah near Press Building and down the nal1ah meeting at Cart Road.



XVII Elysium Hill

Starting from the gate of Advance Studies along Elysium Hill road to Ambedkar Chowk encircling Elysium Hill via Chaura Maidan Road up to gate of Advance Studies.

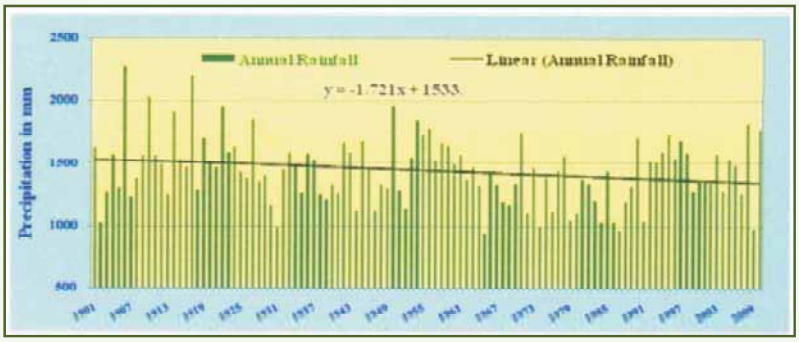


3.2.3 Climate Patterns

Chilly winds from the upper Himalayas make winters in Shimla town cold. Around Christmas or last week of December Shimla town gets snowfall. Temperature varies from 15 ~20ºC in summers and in winters it's in the range 0~13ºC. The average annual rainfall in the region is 900-1600 mm. The climatic condition is varying according to the elevation of the area due to topographical variations. However, there are four broad seasons. Winter normally starts from mid November and continues till middle of March. December, January and February are severe cold months when the winter season is at its peak. The upper reaches have snow while the rains are frequent in the lower areas. Snow may fall as early as the beginning of October but usually the areas have snow fall from the later part of December and continue till middle of March. The higher peaks experience heavier snowfall and it starts melting from March. The snow is not experienced below 800 metres. From middle of March to mid May the climate remailsat its bloom. The climate is comparatively hot from mid May to July but still pleasant.

Climate data for Shimla													
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Record high °C (°F)	17.2 (63.0)	19.4 (66.9)	23.9 (75.0)	28.3 (82.9)	30.0 (86.0)	30.6 (87.1)	27.8 (82.0)	25.6 (78.1)	24.4 (75.9)	23.9 (75.0)	19.4 (66.9)	20.0 (68.0)	30.6 (87.1)
Average high °C (°F)	8.3 (46.9)	8.9 (48.0)	13.9 (57.0)	18.3 (64.9)	22.2 (72.0)	22.8 (73.0)	20.6 (69.1)	19.4 (66.9)	19.4 (66.9)	17.2 (63.0)	13.9 (57.0)	10.6 (51.1)	16.3 (61.3)
Average low °C (°F)	2.2 (36.0)	2.8 (37.0)	6.7 (44.1)	11.1 (52.0)	14.4 (57.9)	16.1 (61.0)	15.6 (60.1)	15.0 (59.0)	13.9 (57.0)	10.6 (51.1)	7.2 (45.0)	4.4 (39.9)	10.0 (50.0)
Record low °C (°F)	−9.4 (15.1)	−7.7 (18.1)	−5.6 (21.9)	0.0 (32.0)	4.4 (39.9)	7.8 (46.0)	10.0 (50.0)	11.1 (52.0)	5.0 (41.0)	3.9 (39.0)	0.0 (32.0)	−6.1 (21.0)	−9.4 (15.1)
Precipitation mm (inches	61 (2.4)	69 (2.72)	61 (2.4)	53 (2.09)	66 (2.6)	175 (6.89)	424 (16.69)	434 (17.09)	160 (6.3)	33 (1.3)	13 (0.51)	28 (1.1)	1,577 (62.09)

110 Years Annual Rainfall Pattern in Shimla



As per IMD analysis for a period on 100 years annual rainfall pattern in Shimla has declined significantly and has been shown erratic flow.

Chapter 4 - Description of the Environment

4.1 General

In general environment facets to be considered in relation to the development of townships and area development etc are: (a) land (b) air (c) noise (d) water (e) biological (f) socio-economic and (g) solid waste management. Hence it is necessary to ascertain the baseline data of these environmental facets.

4.2 Study Area

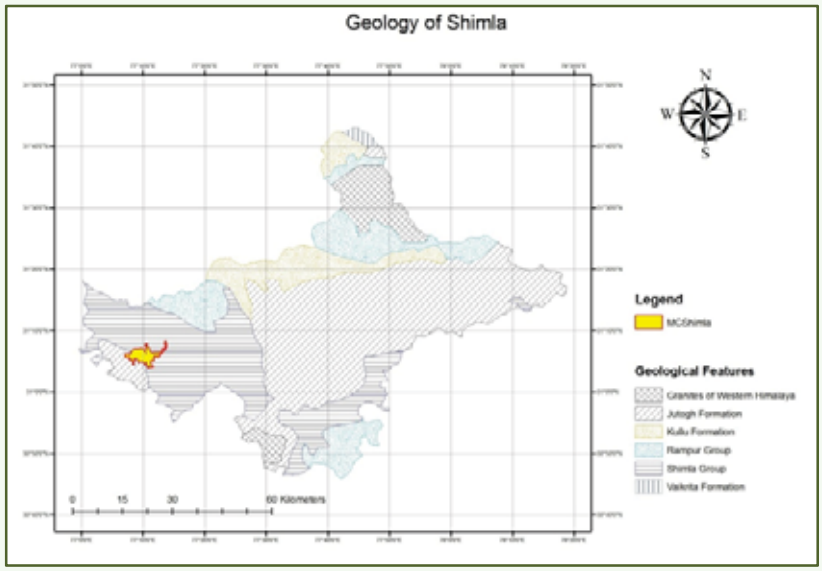
In the case of such studies, EIA guidelines also specifically given under EIA regime of Ministry of Environment & Forests, Govt. of India. The following details has been analyzed.

1. 17 Green Area pockets of Shimla town.
2. Area with angular distance of 2 kms. and surrounding the site.

The baseline data has been collected from primary and secondary sources and field monitoring studies has been done. The period of study for collecting data in just one month season which is other than the monsoon season.

4.3 Land Environment

Existing status of baseline conditions of land use has been determined by studying the changes in the land use pattern in the past 10 yrs by collecting data from secondary sources such as census records, agricultural census and land records. The land use pattern covering built up area, open area, area under path, forest land, agriculture etc. are calculated and given in maps.

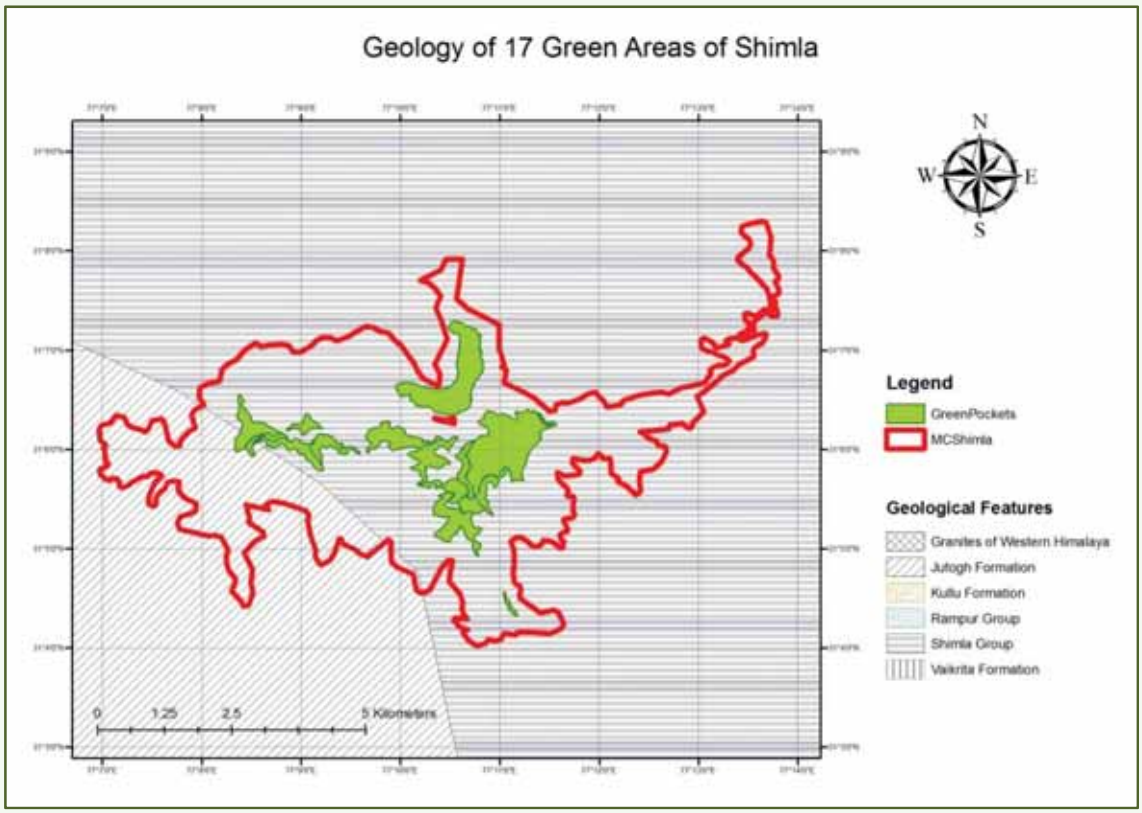


4.3.1 Physical Features & Geology

In Shimla the sediment eroded from the Himalayas 30 million years ago and deposited by ancient rivers. Shimla town is situated on the rocks of Jutogh Group and Shimla Group. Jutogh group occupies main Shimla area and extends from Annadale-Chura Bazaar-Prospect Hill-Jakhoo-US Club and highland area. Shimla Group comprising of earlier Chail Formation and Shimla Series represented by shale, slate, quartzite greywacke and local conglomerate is well exposed in Sanjauli-Dhalli area.

Generalized Geological Succession

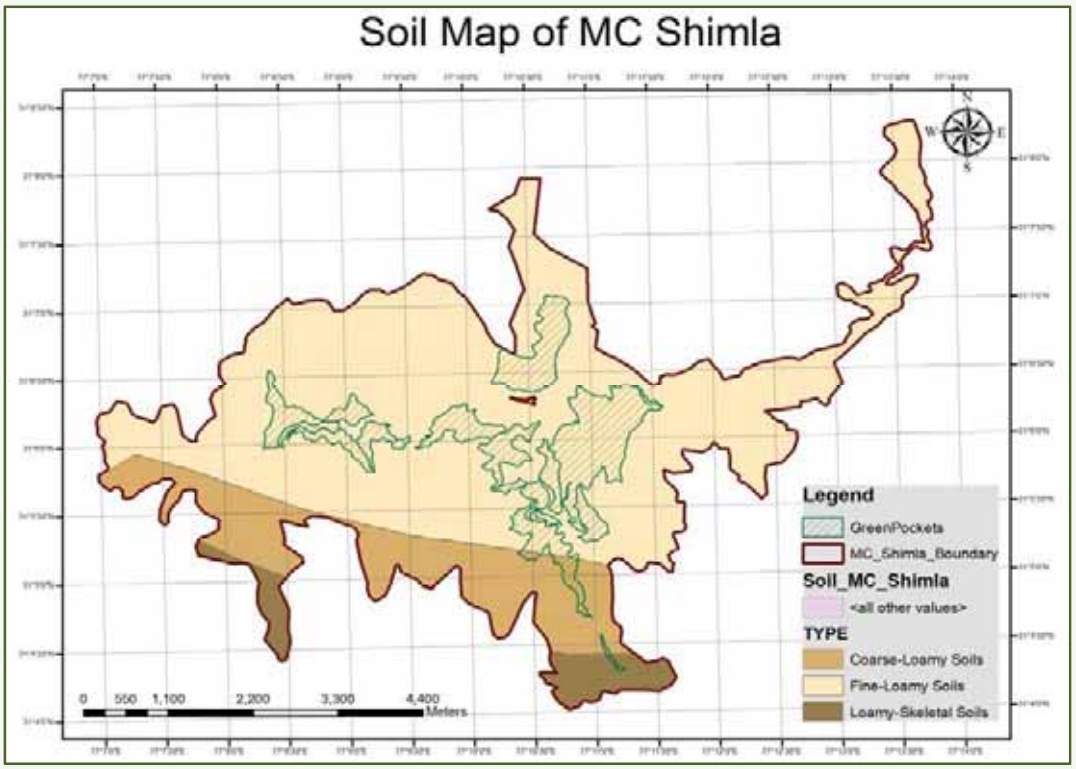
Era	Period	Formation	Lithology
Proterozoic	Neoproterozoic	Simla group	Siltstone, greywacke, sandstone, quartzite, conglomerate, Shale, slate, Phyllite, dolomite and meta-volcanics
		Jutogh	Shale, phyllite, schist, staurolite quartzite, dolomite, Limestone, and amphibolite



4.3.2 Soil Analysis

Soil formation is influenced mainly by climate, geology, relief and other biotic interactions. The soil characteristics in the said area which would affect the agricultural and afforestation potential of the surrounding area has been studied. Soil porosity and water holding capacity are important and has been assessed for all locations.

On the basis of macro analysis the soil map of MC Shimla area shows that most of the identified green pocket falls in fine loamy soil type and very few part of green pocket falls in Coarse loamy soil and Loamy skeletal soil type area.



The samples has been collected and analyzed as per CPCB norms Annexure 1. The hydraulic conductivities in soil are important for building construction activities and the rating chart for the soil test values for primary nutrients is given in Annexure 2. The physical and chemical properties of soil presented as given in following tables.

Physical & Chemical Properties of Soil

Location	S-1	S-2	S-3	S-4
Conductivity, µmho/cm	92.22	827.5	130.0	82.39
pH	7.80	7.36	7.54	6.39
Calcium, mg/100g	152.34	208.41	104.2	96.19
Magnesium, mg/100g	34.1	9.74	7.3	4.87
Sodium, mg/100g	4.8	9.5	3.6	6.2
Potassium as K, mg/100g	15.0	39.0	20.1	12.3
HCO3, mg/100g	61.0	122.0	61.0	61.0
Chloride, mg/100g	7.5	40.0	10.0	5.0
Available Nitrogen, mg/100g	0.12	0.02	0.01	0.004
Total Phosphorus, mg/100g	7.3	11.9	6.3	12.2
Ortho-phosphorus, mg/100g	2.4	2.18	2.26	1.50
Organic Content, %	2..84	2.84	3.83	1.84
Aluminum, mg/l	0.12	ND	ND	ND
Texture	LS	L	LS	LCS
Water Holding Capacity %	3.50	2.98	2.19	2.56
Porosity %	0.53	0.67	0.46	0.36
Sand %	73.28	75.28	69.28	57.28
Buld Density (Gm/cc)	1.98	1.78	1.67	1.99
Silt %	14.33	12.45	15.34	26.98

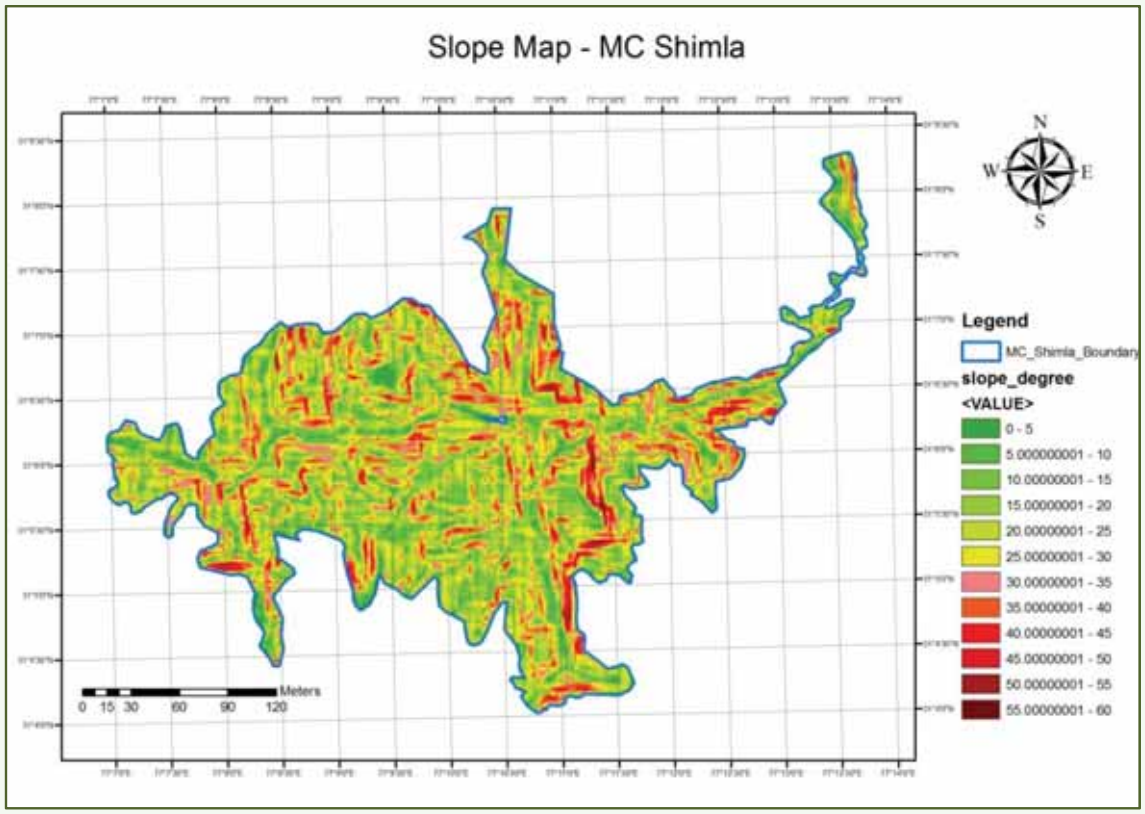
S-17	S-16	S-15	S-14	S-13	S-12	S-11	S-10	S-9	S-8	S-7	S-6	S-5	Location
126.7	49.7	55.54	34.36	59.72	169.9	822.8	67.76	153.6	101.2	159.3	60.9	632.5	**Conductivity, µmho/cm**
6.50	7.70	7.51	7.60	6.70	7.76	5.33	5.90	6.90	7.71	6.63	6.59	6.84	**pH**
831.68	184.36	224.44	200.4	180.36	276.55	156.31	176.35	188.37	208.41	236.47	164.32	212.42	**Calcium, mg/100g**
34.11	21.93	17.05	4.87	21.18	2.43	21.93	12.18	17.05	9.74	21.92	7.30	21.92	**Magnesium, mg/100g**
14.5	13.8	14.8	14.6	13.0	13.5	23.7	13.4	13.7	10.0	7.4	3.6	13.8	**Sodium, mg/100g**
13.3	7.4	4.2	5.7	13.8	6.2	4.3	8.0	7.0	10.2	24.0	25.4	67.0	**Potassium as K, mg/100g**
91.5	122	122	122	61.0	91.5	61.0	61.0	61.0	61.0	61.0	61.0	91.5	**HCO3, mg/100g**
12.5	25.0	12.5	12.5	12.5	10.0	22.5	7.5	17.5	5.0	7.5	10.0	20.0	**Chloride, mg/100g**
0.02	0.03	0.02	0.02	0.02	0.03	0.04	0.03	0.02	0.02	0.03	0.02	0.01	**Available Nitrogen, mg/100g**
5.1	8.0	6.1	4.1	3.6	4.6	6.2	5.8	7.3	3.4	2.4	3.1	7.5	**Total Phosphorus, mg/100g**
1.96	0.88	0.80	1.0	1.10	0.98	0.72	0.72	0.80	1.00	0.88	0.76	1.80	**Ortho-phosphorus, mg/100g**
2.84	1.26	1.26	1.84	1.84	1.56	1.13	1.41	1.41	1.70	4.11	1.26	2.84	**Organic Content, %**
ND	0.15	ND	0.12	ND	ND	ND	0.13	0.16	0.11	ND	0.10	0.14	**Aluminum, mg/l**
LSS	L	LS	LCS	LCS	LCS	LCS	LCS	L	SL	LCS	L	L	**Texture**
2.78	2.89	1.99	1.89	2.34	2.56	2.14	2.19	3.15	2.12	3.29	3.45	3.13	**Water Holding Capacity %**
0.52	0.49	0.51	0.56	0.67	0.42	0.41	0.39	0.45	0.28	0.39	0.51	0.54	**Porosity %**
72.0	61.0	59.32	56.12	41.89	62.87	52.70	66.72	66.67	67.0	65.28	71.25	70.0	**Sand %**
1.91	1.86	1.99	1.98	1.73	1.56	1.48	1.65	1.67	1.92	1.76	1.79	1.87	**Buld Density (Gm/cc)**
16.80	25.0	22.35	28.0	36.56	28.12	31.0	20.0	19.99	21.70	23.22	17.11	11.22	**Silt %**

4.3.3 Slope Analysis

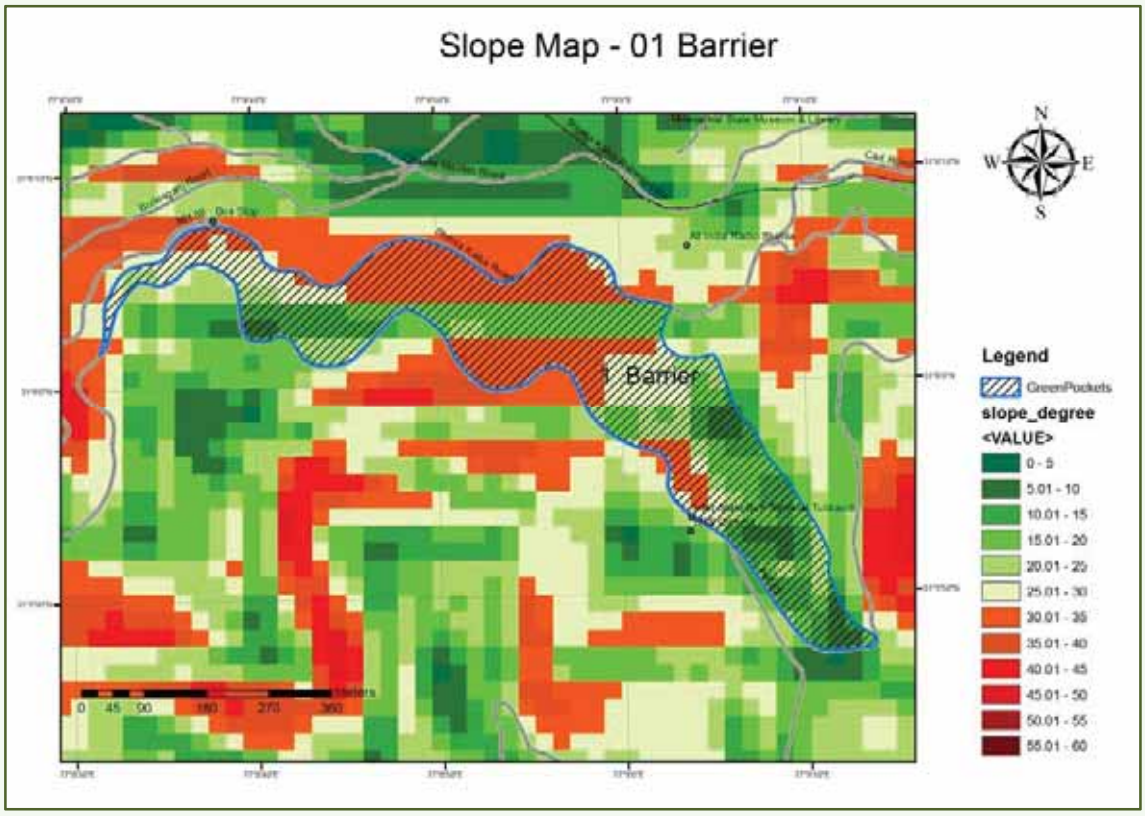
Development on hillsides and/or areas defined as steep slopes poses a high risk of erosion and an increased risk of landslides both during and after construction. Sedimentation resulting from erosion can be particularly detrimental to stream water quality and wildlife, since the upper reaches of streams (if accessible) are important spawning and rearing areas for fish and an important source of clean water. Many local development codes do not adequately regulate development on steep slopes, thus resulting in degradation of water quality and endangerment of public safety through the increased likelihood of landslides.

Slopes are naturally unstable. Gravity, wind, water or disturbance, either natural or man-made, can cause mass movement, erosion, slippage or slide. The characteristics that influence the stability of slope include geology, slope drainage, slope topography (shape and steepness), soil type and changes to the slope (placing soil or removing soil from the slope).

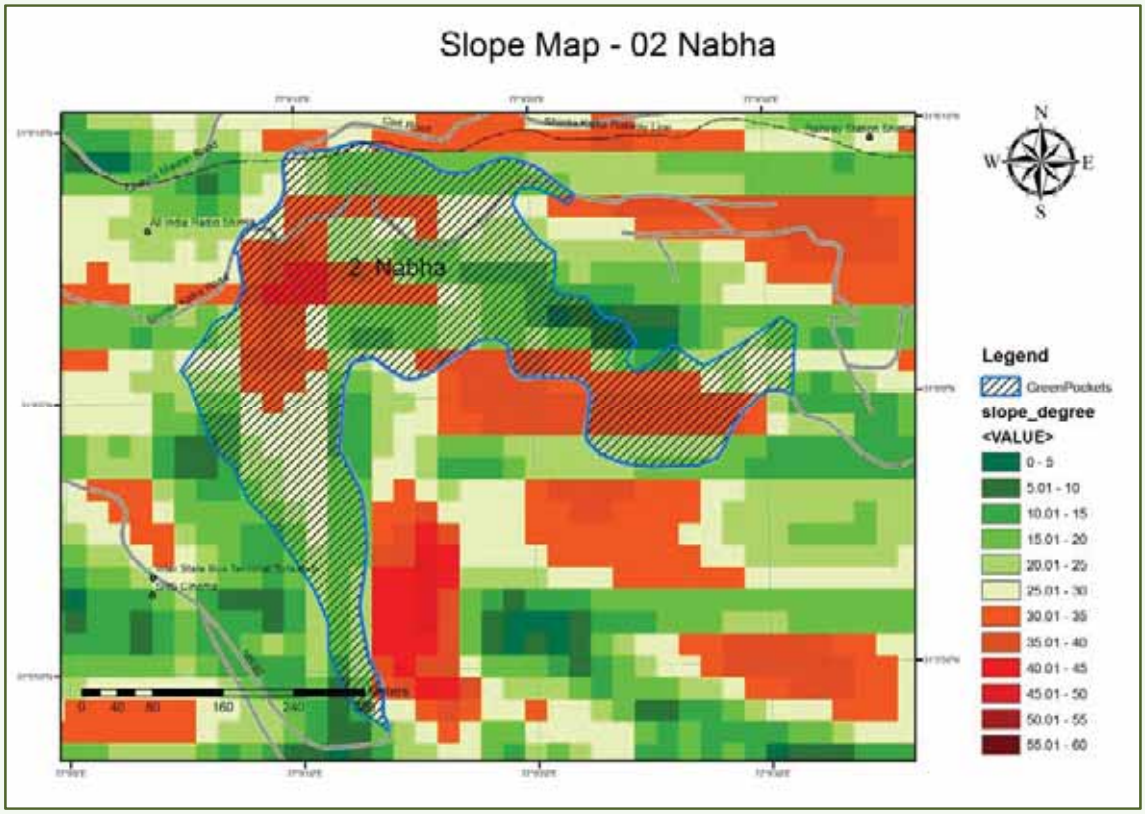
In view of these facts slop analysis of Municipal Corporation area has also been carried out and slope map for all the 17 green areas have been prepared.



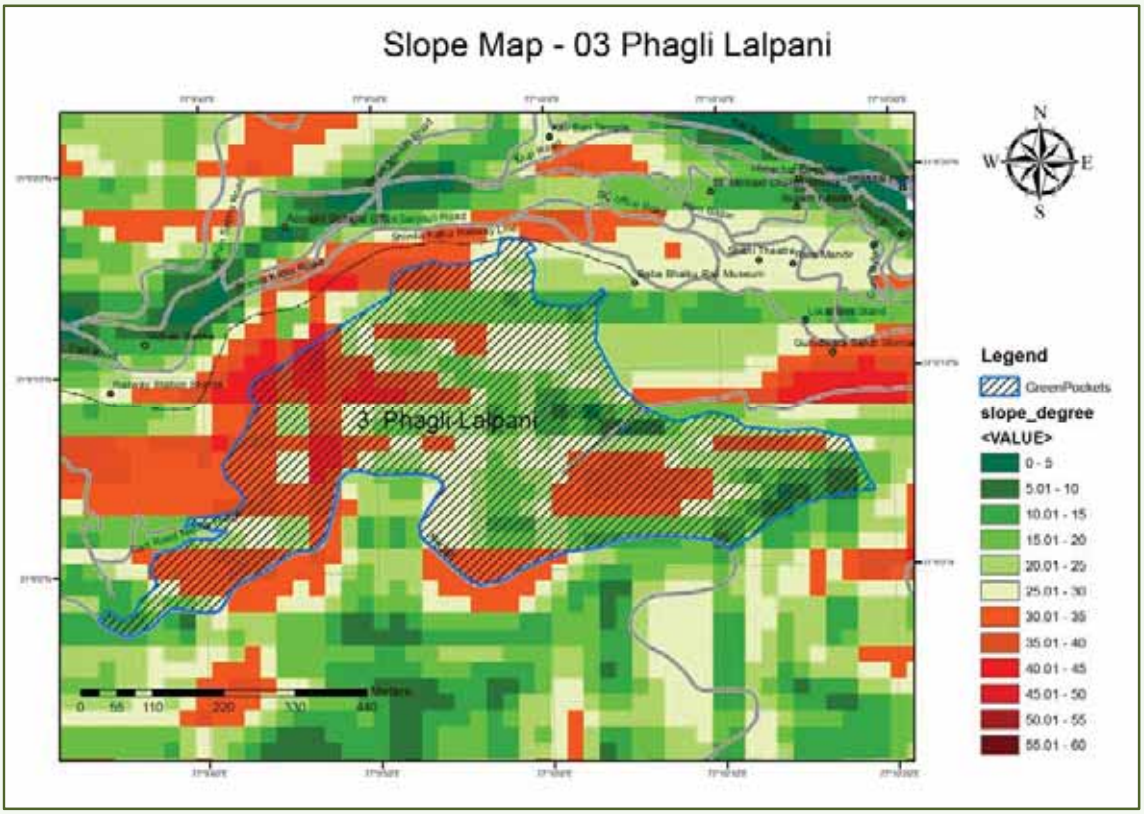
Slope Map - 01 Barrier



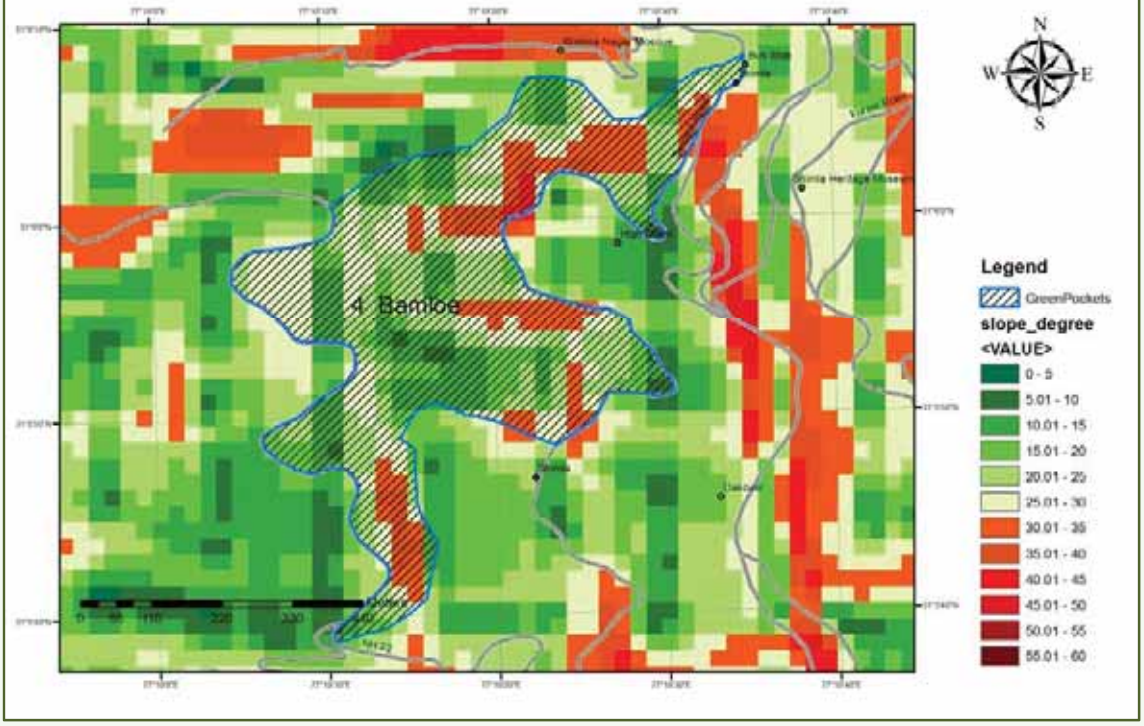
Slope Map - 02 Nabha



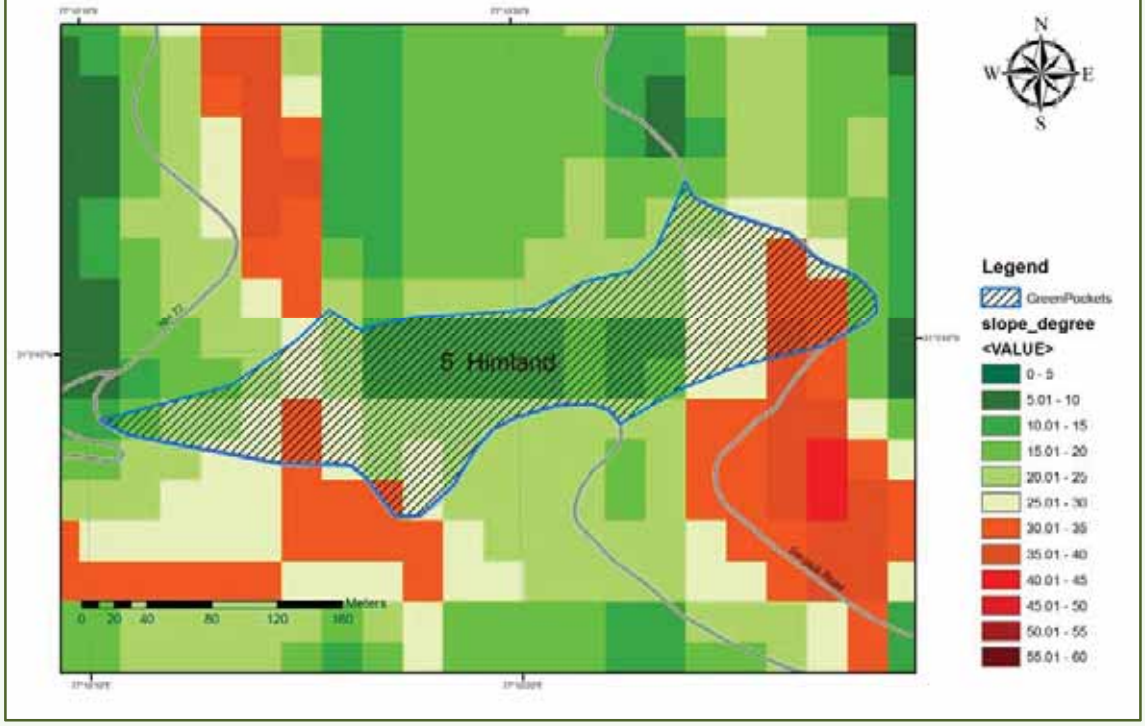
Slope Map - 03 Phagli Lalpani



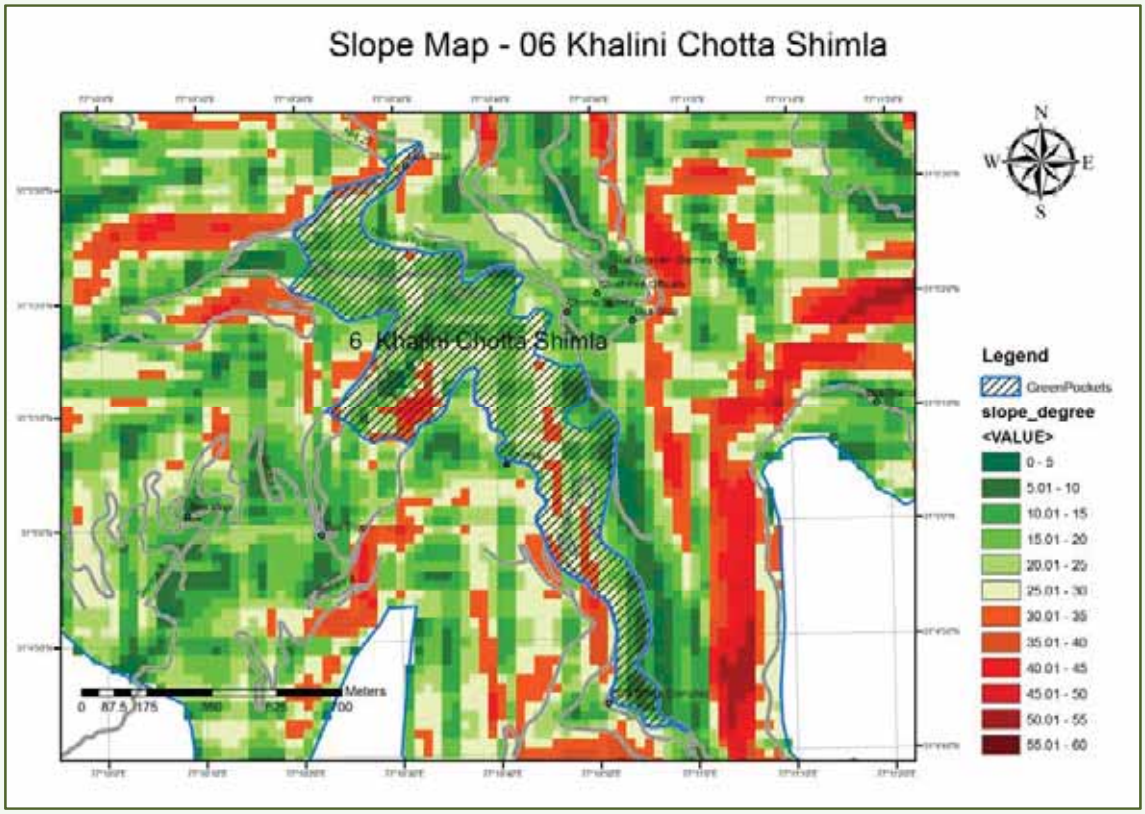
Slope Map - 04 Bamloe



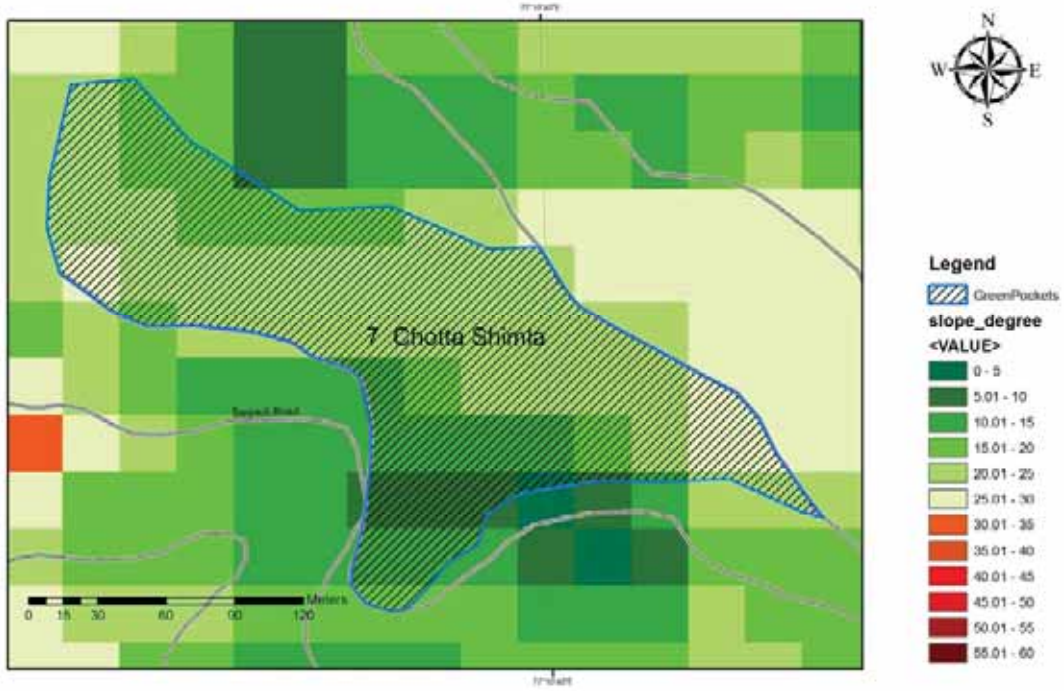
Slope Map - 05 Himland



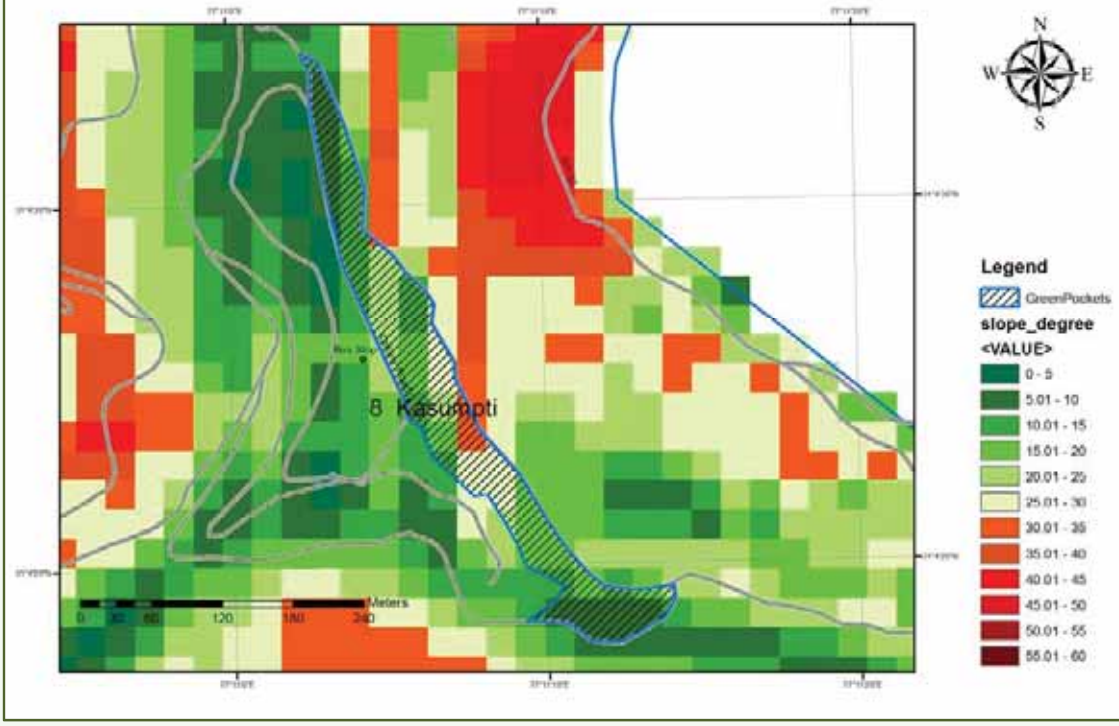
Slope Map - 06 Khalini Chotta Shimla



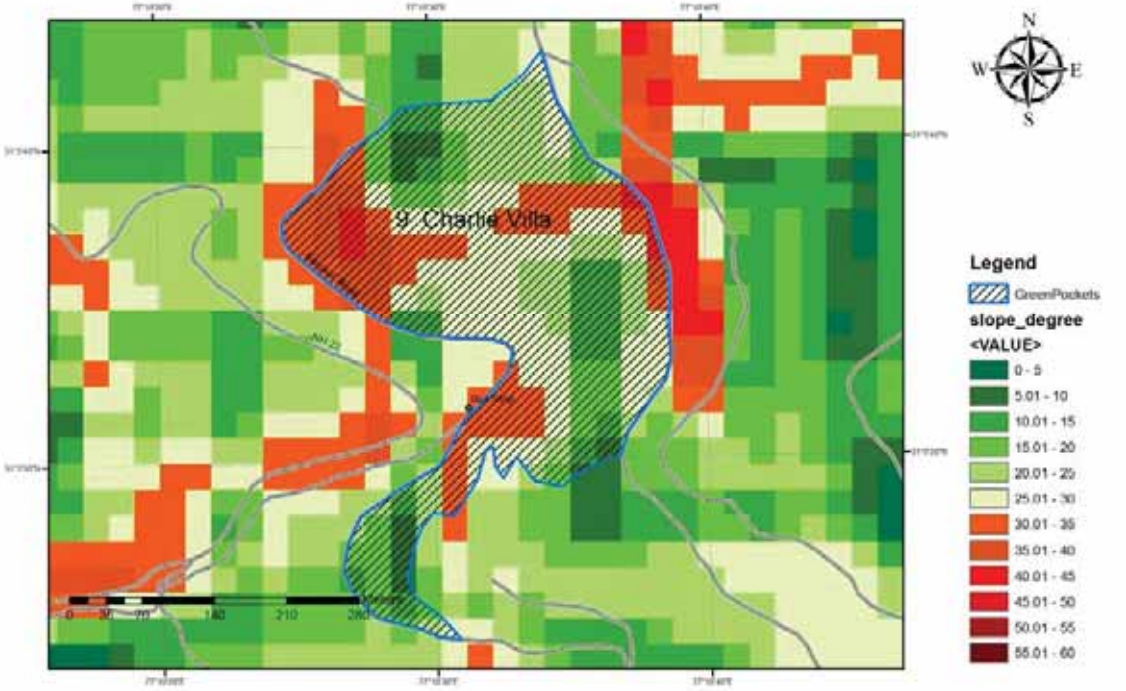
Slope Map - 07 Chotta Shimla



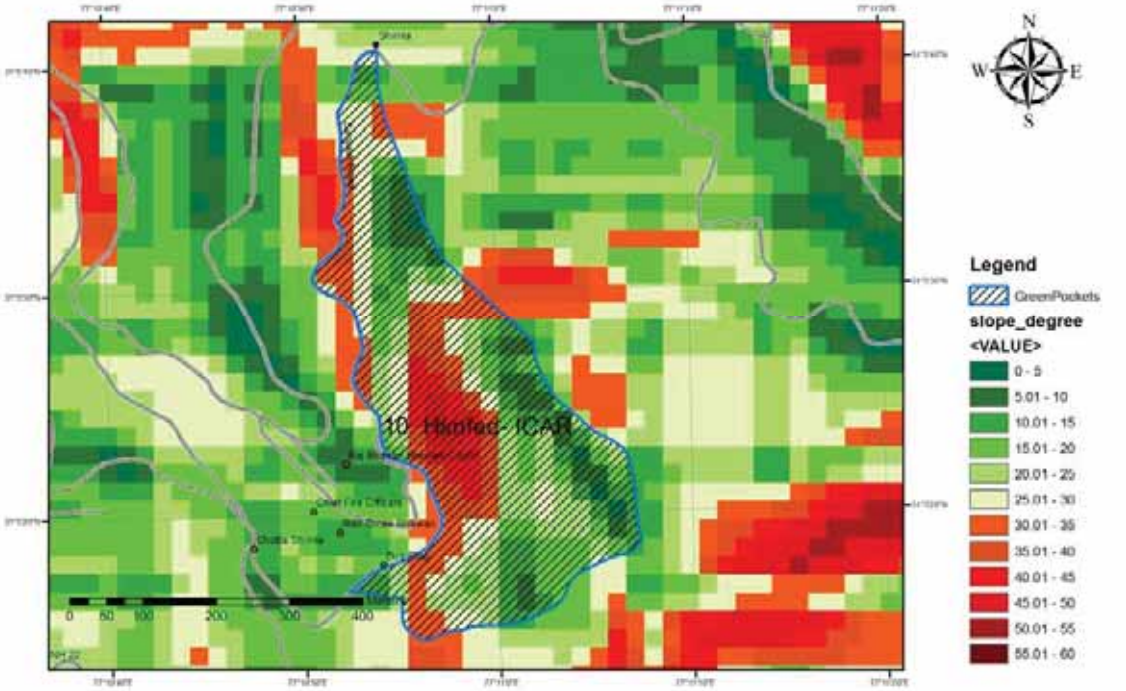
Slope Map - 08 Kasumpti

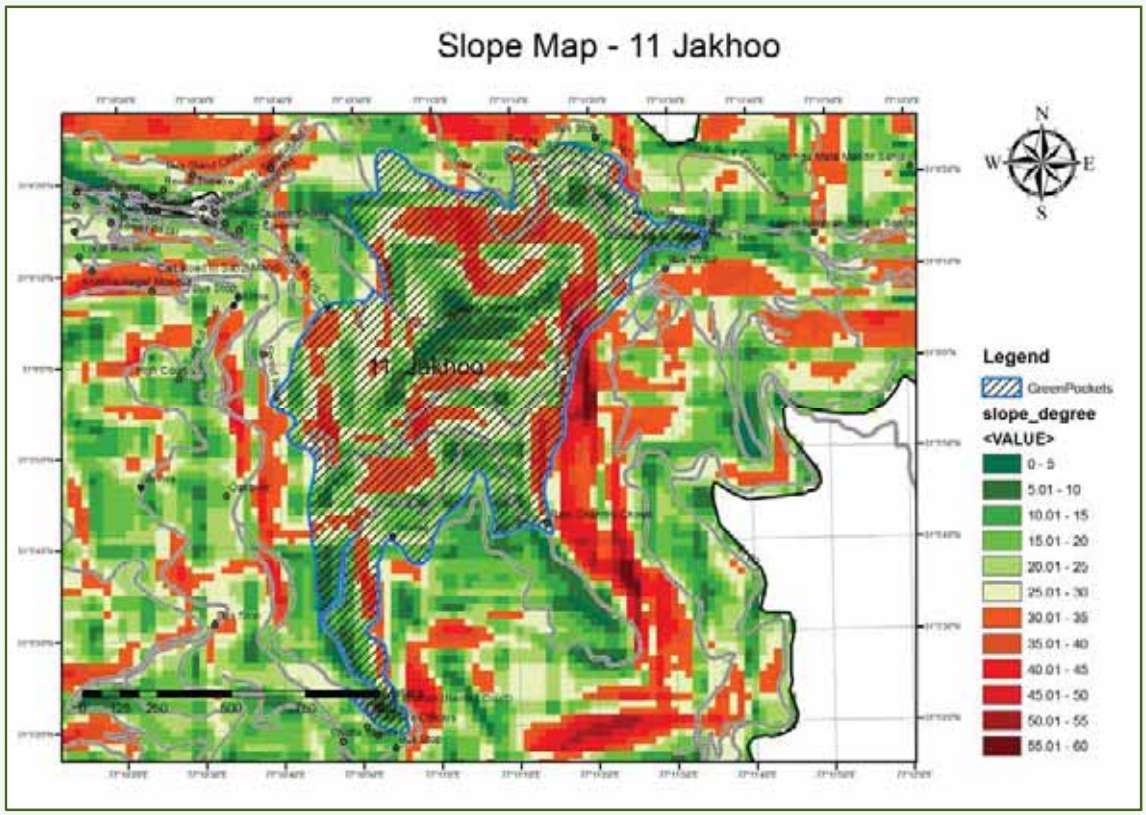


Slope Map - 09 Charlie Villa



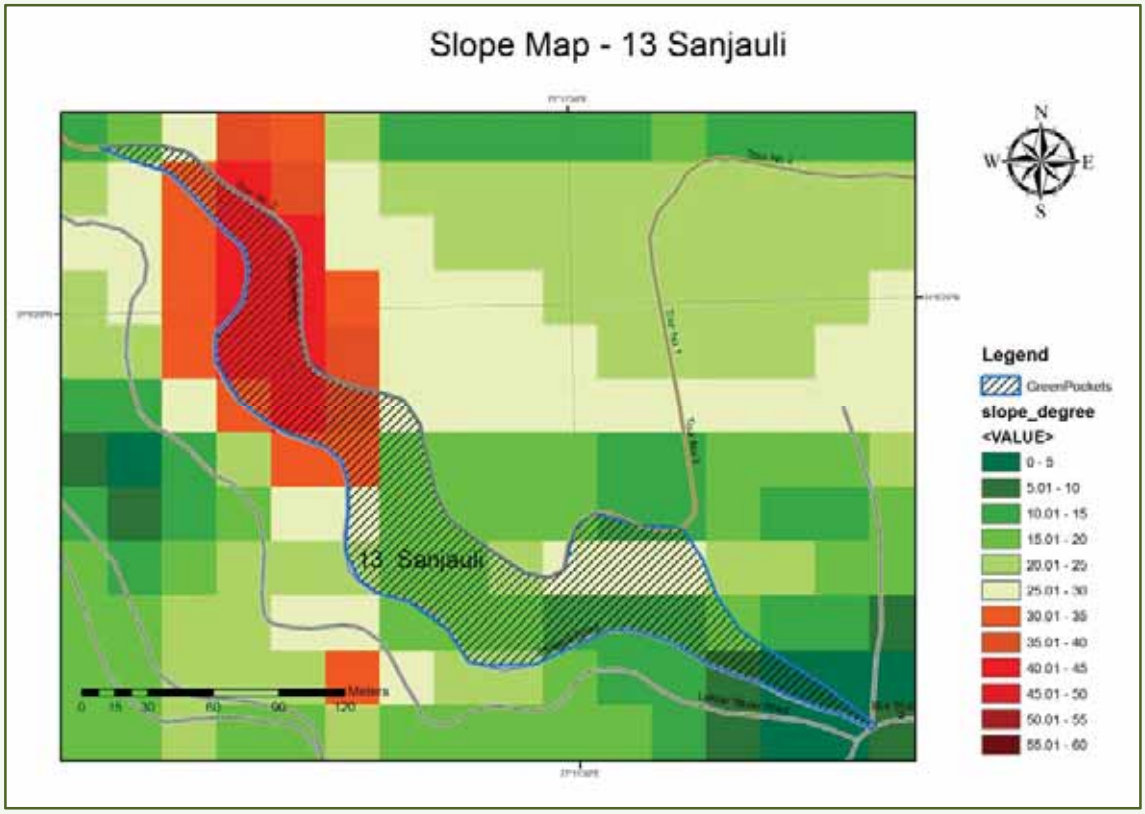
Slope Map - 10 Himfed ICAR



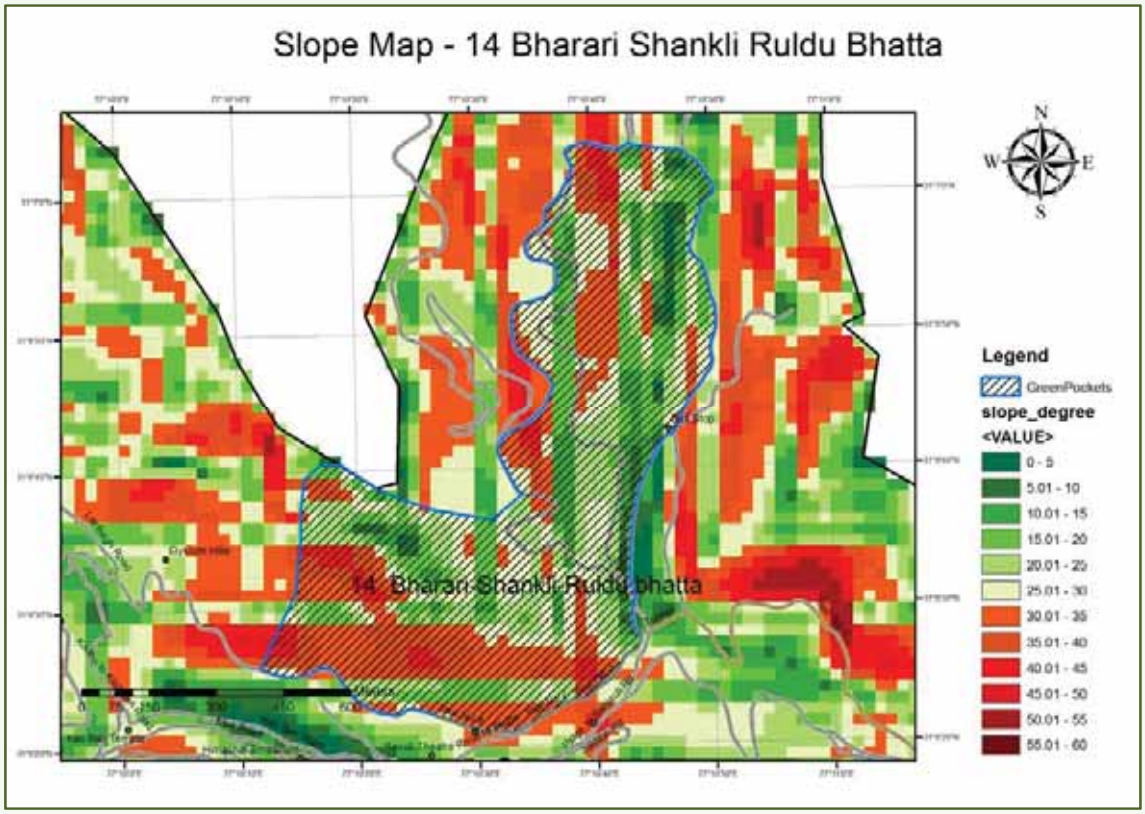

Slope Map - 11 Jakhoo
11 Jakhoo
N
W
E
S
Legend
GreenPockets
slope_degree
<VALUE>
0 - 5
5.01 - 10
10.01 - 15
15.01 - 20
20.01 - 25
25.01 - 30
30.01 - 35
35.01 - 40
40.01 - 45
45.01 - 50
50.01 - 55
55.01 - 60


Slope Map - 12 Benmore
12 Benmore
N
W
E
S
Legend
GreenPockets
slope_degree
<VALUE>
0 - 5
5.01 - 10
10.01 - 15
15.01 - 20
20.01 - 25
25.01 - 30
30.01 - 35
35.01 - 40
40.01 - 45
45.01 - 50
50.01 - 55
55.01 - 60

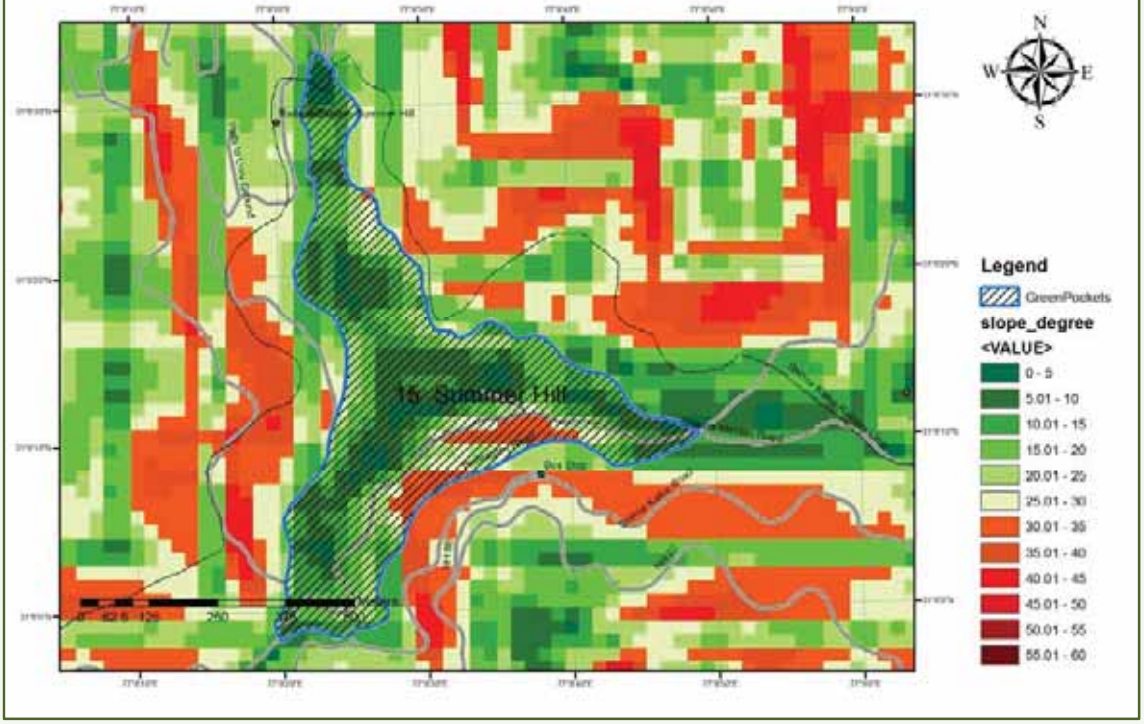
Slope Map - 13 Sanjauli



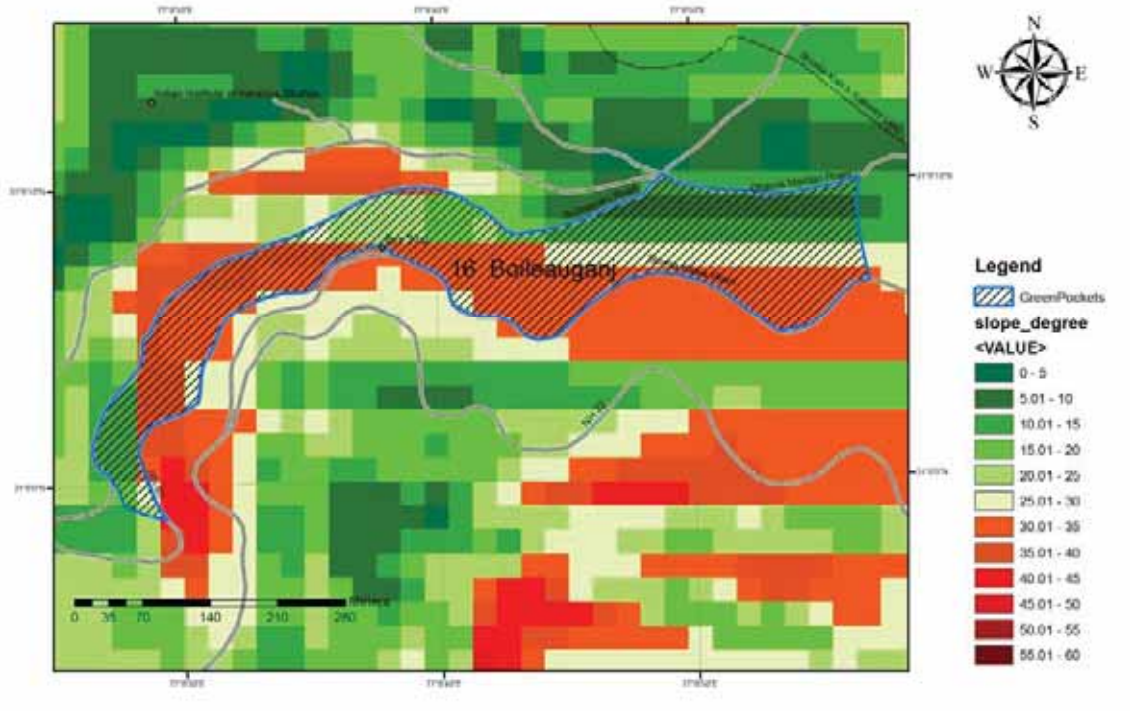
Slope Map - 14 Bharari Shankli Ruldu Bhatta

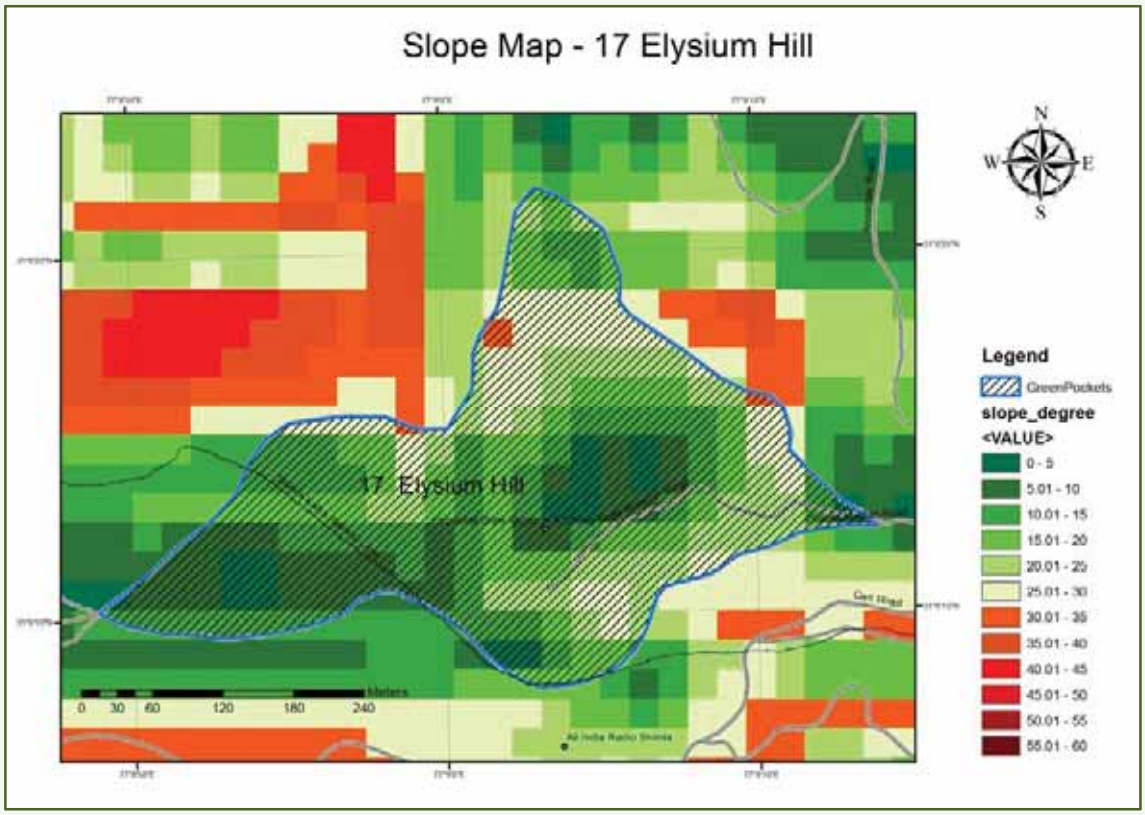


Slope Map - 15 Summer Hill



Slope Map - 16 Boileauganj





4.3.4 Land Use Patterns

Of the total area of 9950 hectares of Shimla Planning Area (SPA), about 1475 hectares which accounts for 15% of the total SPA is under urban use. The existing land use of urban area is given below:

Sr. No	Land Use	Area (in Hectares)	% of Urban Area	% of Planning Area
1	Residential	903.13	61.19	9.07
2	Commercial	25.22	1.71	0.25
3	Industrial	9.00	0.62	0.09
4	Tourism	21.70	1.47	0.22
5	Public & semi- public	138.78	9.40	1.39
6	Parks & open spaces	6.00	0.41	0.06
7	Traffic and Transportation	371.93	25.20	3.75
	Sub total	**1475.76**	**100.00**	
8	Agriculture	2174.75		21.85
9	Forest	6080.15		61.12
10	Water bodies and undevelopable land	219.34		2.20
	Grand Total	**9950.00**		**100.00**

Land use pattern of Shimla Urban and SPA (Source: CDP, MC website)

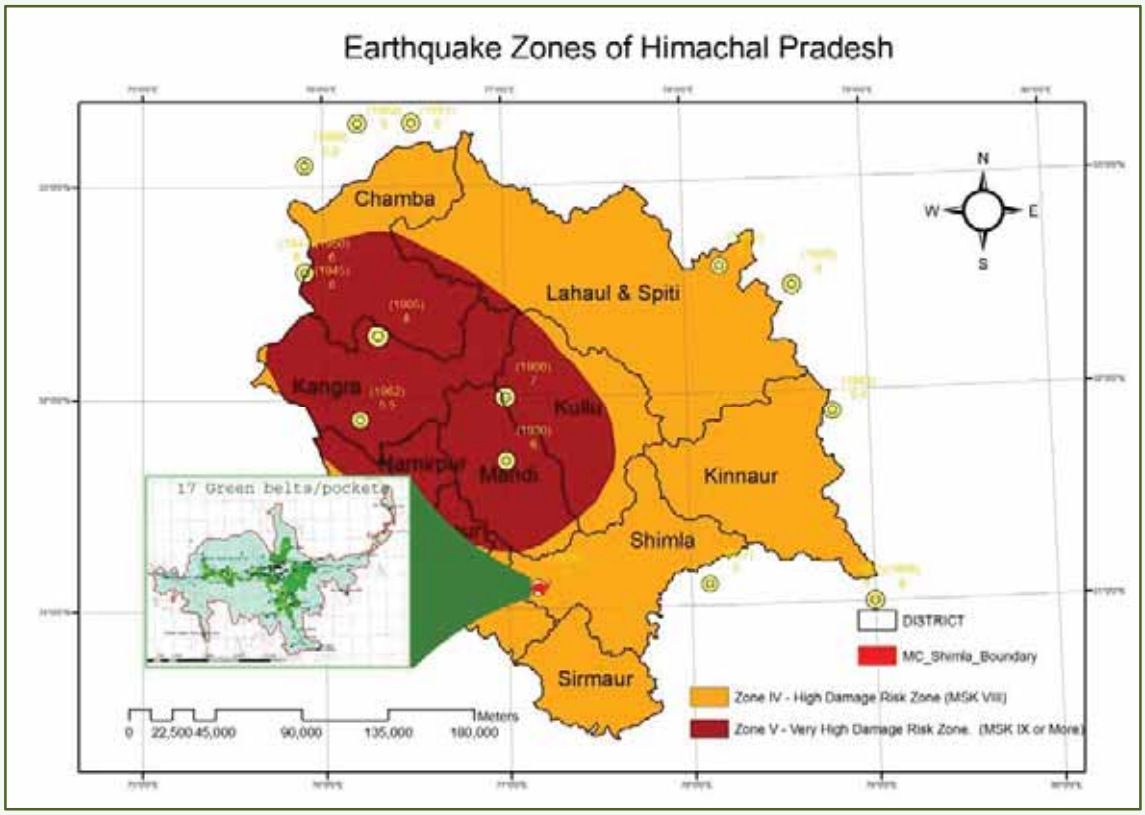
The current land use plan of the Shimla reflects that there are hardly any open spaces are available in the city. For better response to any emergency situation open spaces help to prevent, organising community shelters, organising health and rationing camps, etc. In congested geographical location it is difficult to provide efficient response in any emergency situation.

4.3.5 Hazard-Risk Analysis of Shimla

Shimla city is exposed to multiple Natural and Human induced hazards. It may include Earthquake, Landslide, unexpected tree felling, Land Sinking, Hailstorm, Severe Storms, including lightning and high winds (Thunderstorms), Flash Flood/cloud Burst, Heavy Snow Falls as natural hazards and Accidents, Monkey Menace, Traffic Jams, Fires etc. as non-natural hazards.

4.3.5.1 Earthquake/ Seismic Analysis

The North-Western fringe of the Himalayas is bounded by two major thrusts namely Main Central Thrust and Main Boundary Fault running parallel to the axis. Himachal State falls in most active seismic zones-IV and V. Shimla being capital and most important city of the State has multifaceted functions, there is a mounting pressure of urbanization forces, whereby the city is susceptible to various hazards like earthquakes, landslides, cloudbursts and fire. In order to ensure safety and preparedness for these hazards, it is imperative and emergent need to devise a pre-disaster mitigation plan for the Shimla city.



4.3.6 Over development in MC Shimla around/ including Green Areas

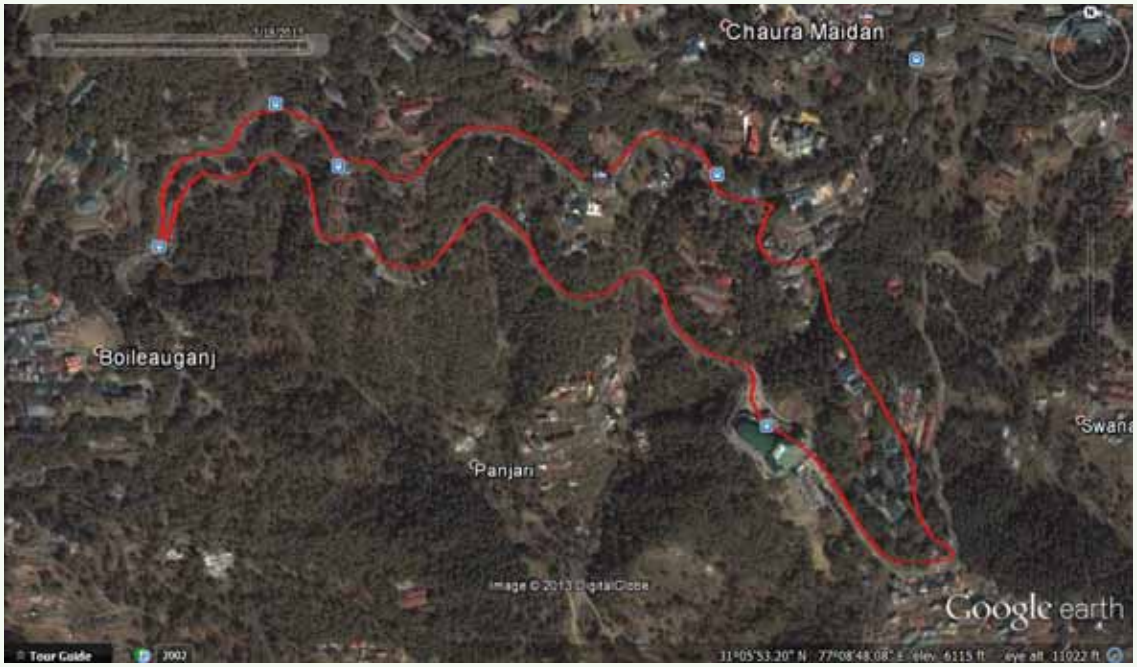
Once known as the Queen of hills, Shimla is fast becoming an urban nightmare, because of haphazard construction. The spurt in construction has gobbled up vast stretches of lush green belt in and around the capital town and now, the concrete jungle is spreading its reach beyond the peripheral areas.

We can compare development in and outside of the green belt of Shimla town it is evident that inside the identified 17 green belt development is controlled may be because of complete ban on new building construction in these areas. To support this fact we have analyzed images of all the 17 identified green belt areas for the year 2002 and 2013.

But, outside these green belts there is a drastic change in land use. This fact can be seen from the images taken in the year 2002 and 2013. Over the last ten years, a large number of structures have come up in these areas. These areas are Sanjauli, Dhali, New Shimla, Khalini, Kaithu, Chakkar & Gora Chawki area, which as aggregated the environmental pressure on entire eco-system of Shimla Hill region.

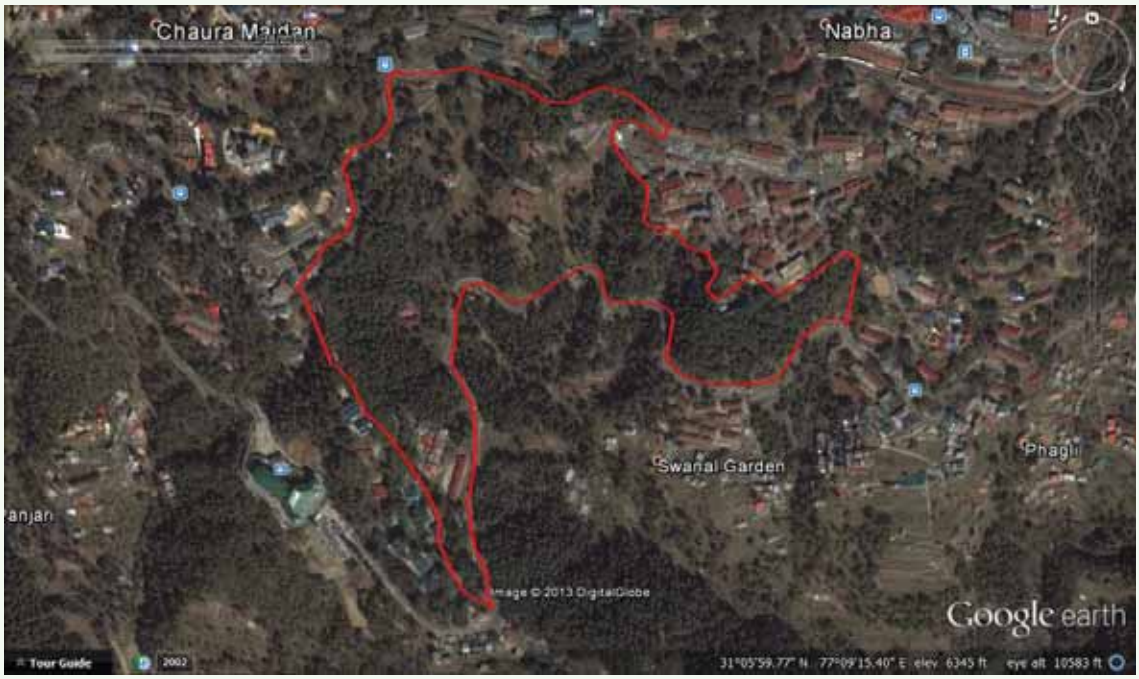
Comparative Images
for the year 2002 & 2013 of 17 Identified Green belts of Shimla Town

Google Image: 01 Barrier : Year 2002



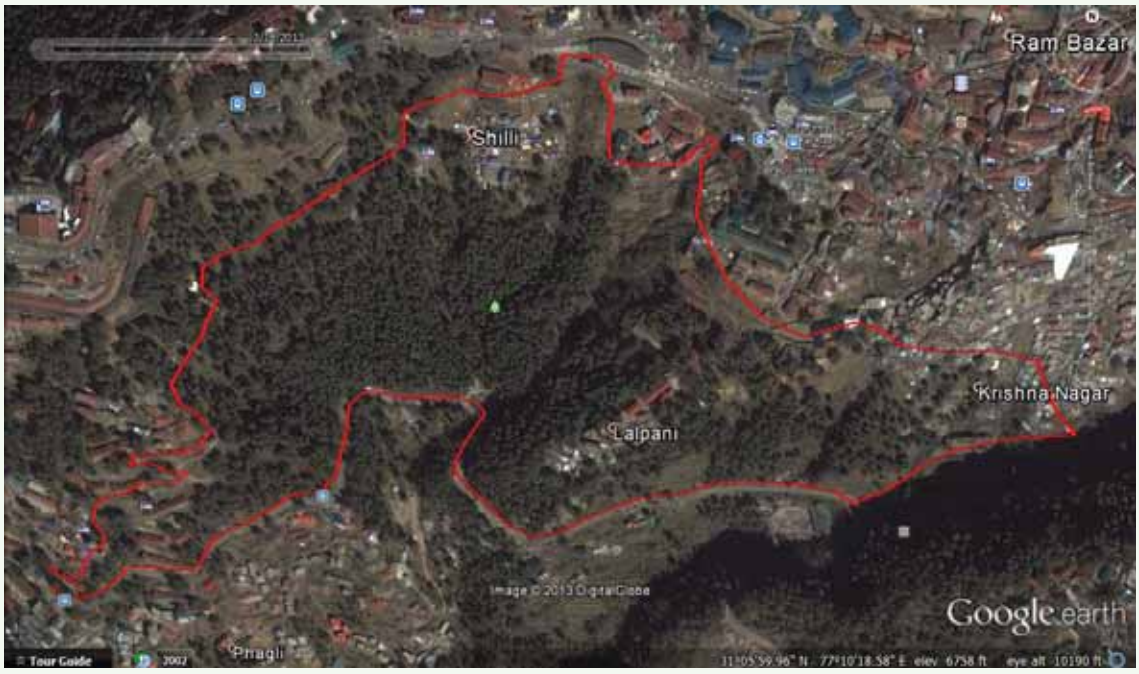
Google Image: 01 Barrier : Year 2013

Google Image: 02 Nabha : Year 2002



Google Image: 02 Nabha : Year 2013

Google Image: 03 Phagli Lalpani : Year 2002

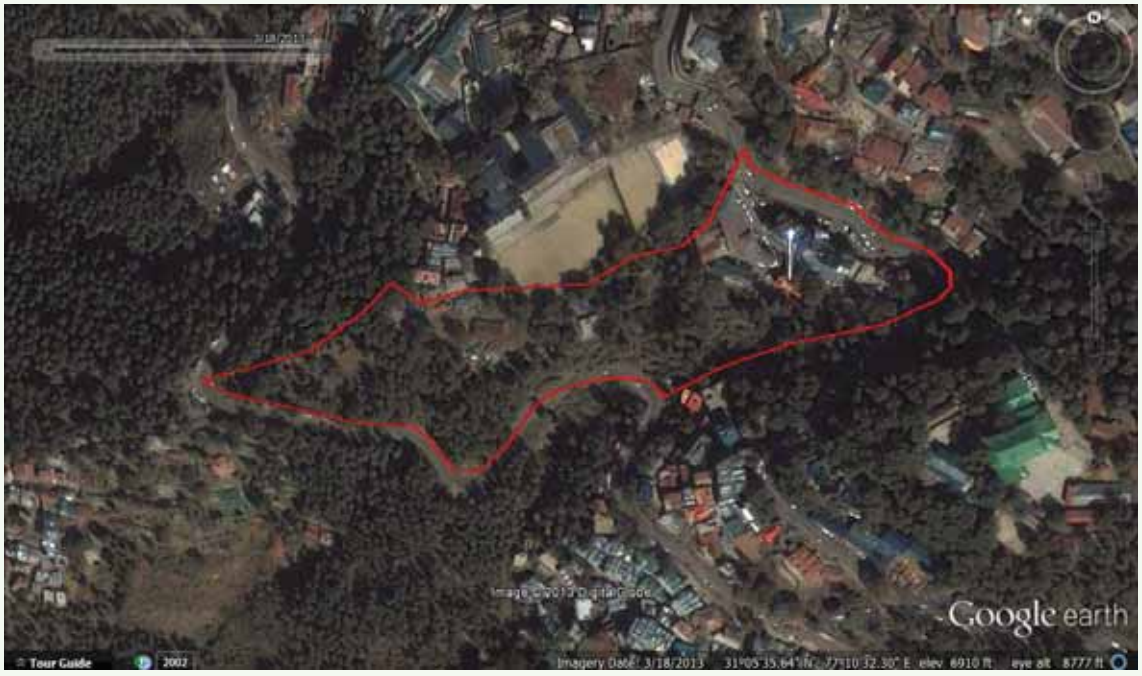


Google Image: 03 Phagli Lalpani : Year 2013

Google Image: 04 Bamloe : Year 2002

Google Image: 04 Bamloe : Year 2013

Google Image: 05 Himland : Year 2002

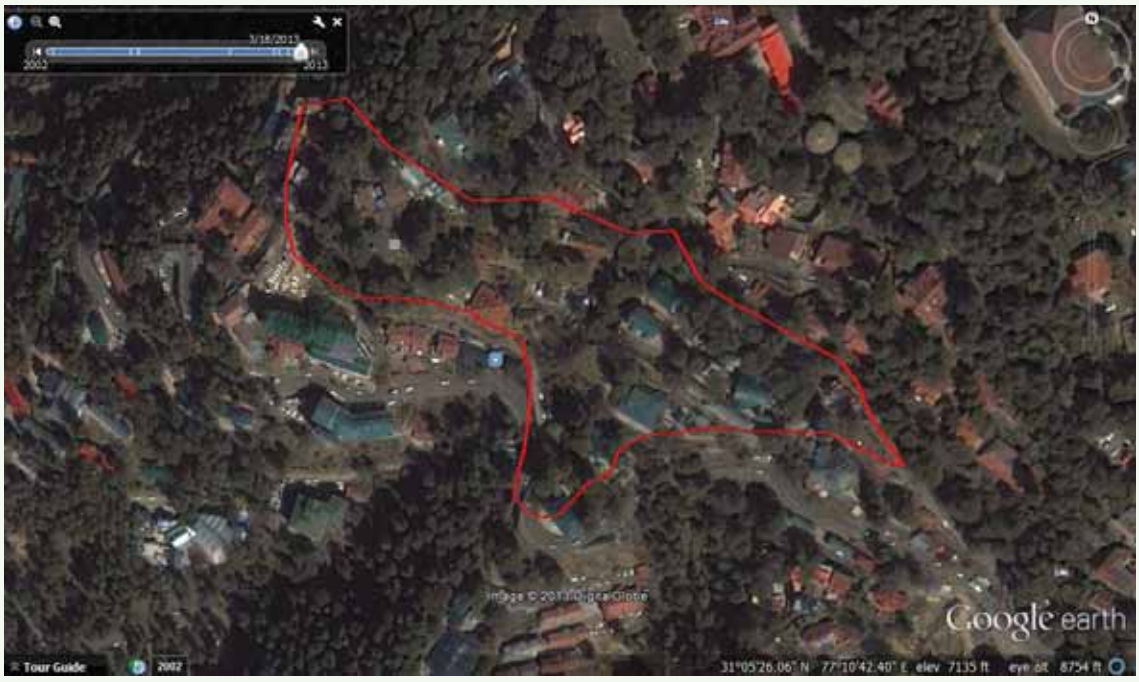


Google Image: 05 Himland : Year 2013

Google Image: 06 Khalini Chotta Shimla : Year 2002

Google Image: 06 Khalini Chotta Shimla : Year 2013

Google Image: 07 Chotta Shimla : Year 2002



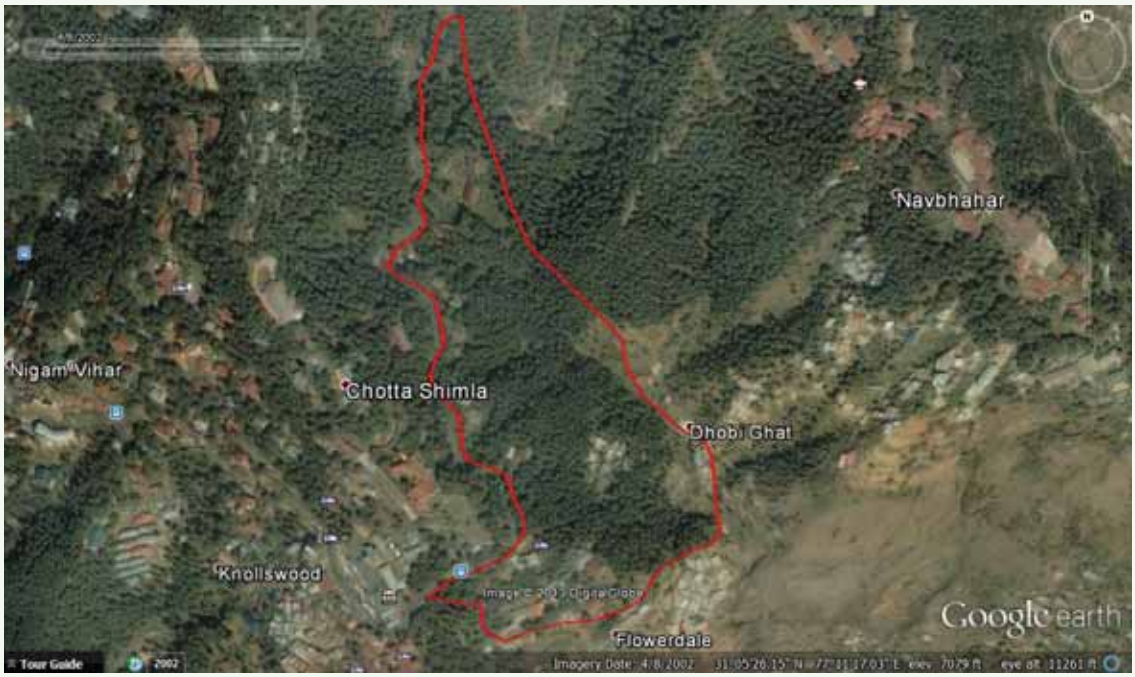
Google Image: 07 Chotta Shimla : Year 2013

Google Image: 08 Kasumpti: Year 2002

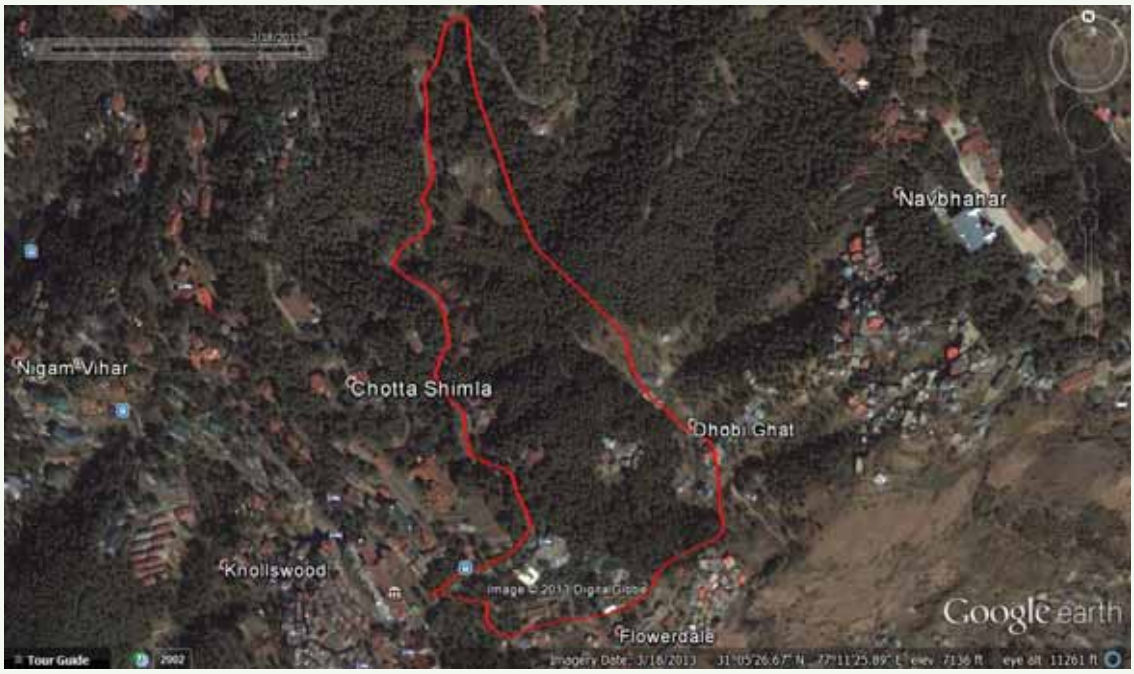
Google Image: 08 Kasumpti: Year 2013

Google Image: 09 Charlie Villa : Year 2002

Google Image: 09 Charlie Villa : Year 2013



Google Image: 10 Himfed-ICAR : Year 2002



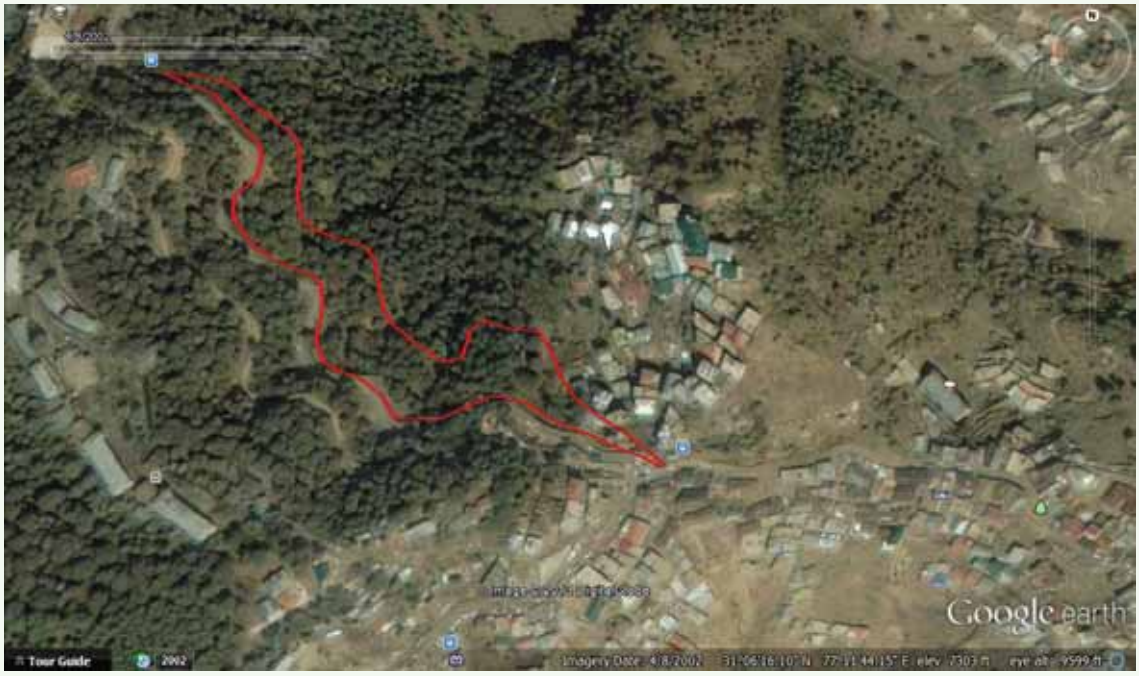
Google Image: 10 Himfed-ICAR : Year 2013

Google Image: 11 Jakhoo : Year 2002

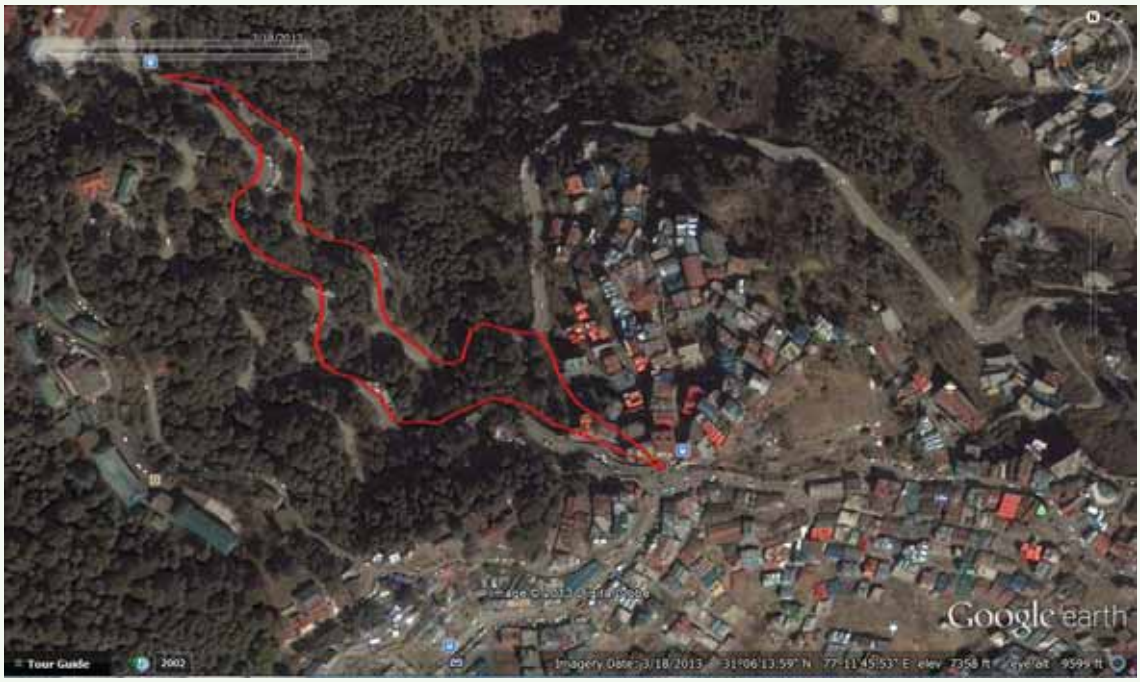
Google Image: 11 Jakhoo : Year 2013

Google Image: 12 Benmore : Year 2002

Google Image: 12 Benmore : Year 2013

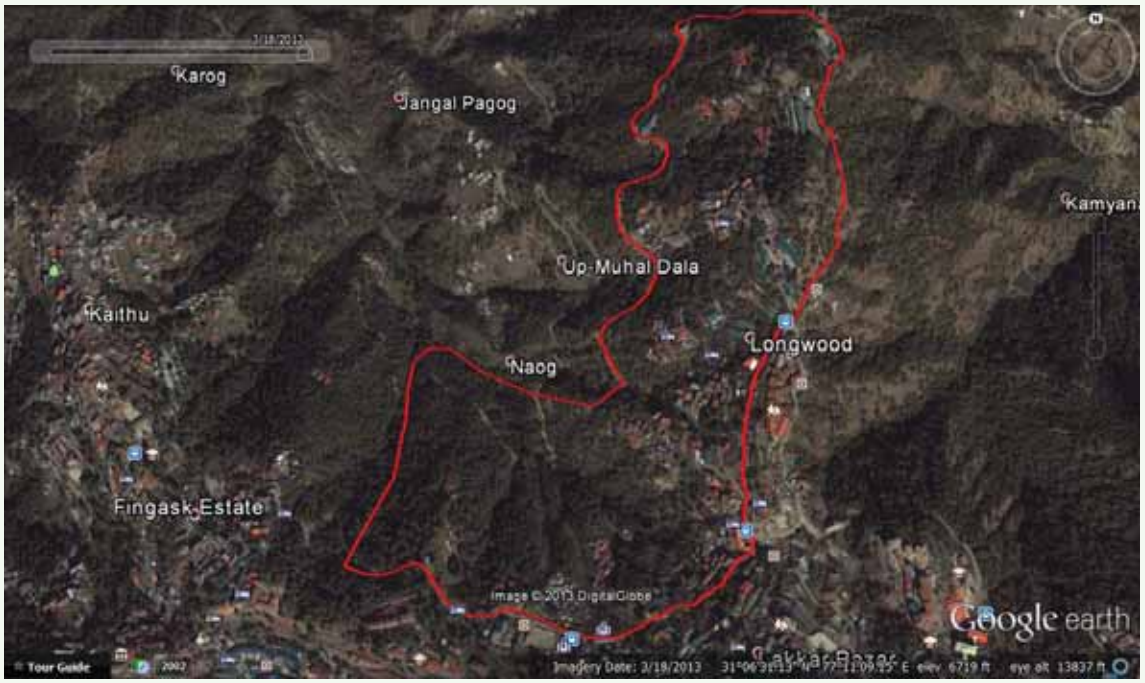


Google Image: 13 Sanjauli : Year 2002



Google Image: 13 Sanjauli : Year 2013

Google Image: 14 Bharari-Shankli-Ruldu bhatta : Year 2002

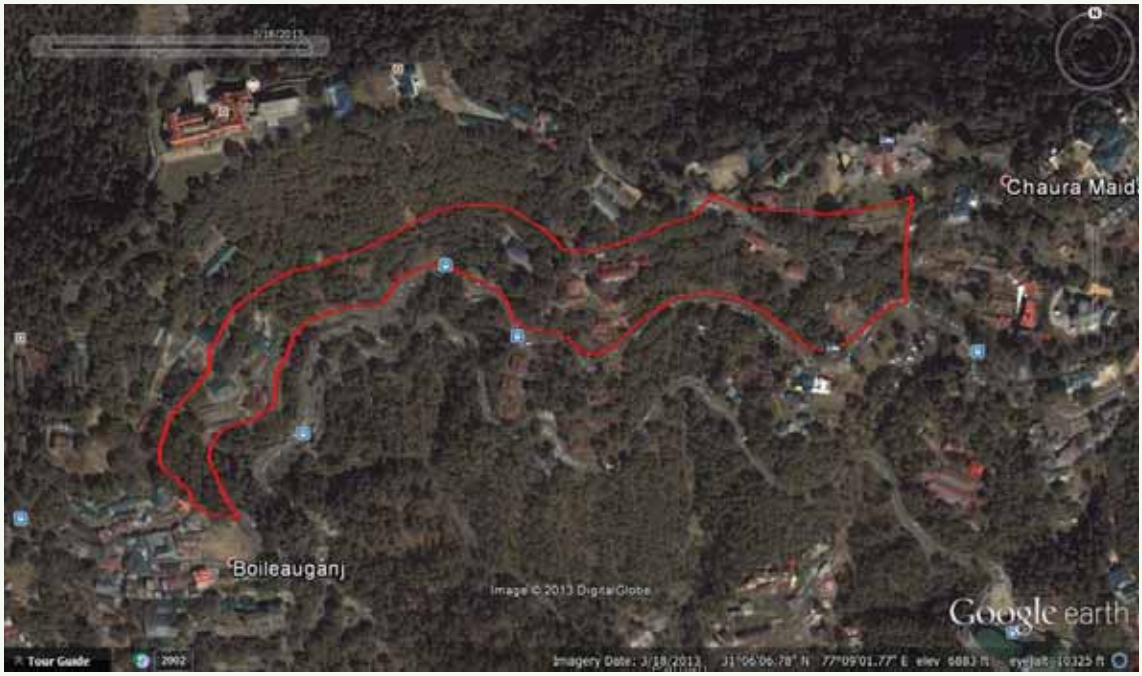


Google Image: 14 Bharari-Shankli-Ruldu bhatta : Year 2013

Google Image: 15 Summer Hill : Year 2002

Google Image: 15 Summer Hill : Year 2013

Google Image: 16 Boileauganj : Year 2002



Google Image: 16 Boileauganj : Year 2002

Google Image: 16 Elysium Hill : Year 2002

Google Image: 16 Elysium Hill : Year 2013

Comparative Google Images for the year 2002 & 2013 outside the boundaries of 17 Identified Green belts of Shimla Town

Google Image : Sanjauli Area : Year 2002

Google Image : Sanjauli Area : Year 2013

Google Image : Dhali Area : Year 2002

Google Image : Dhali Area : Year 2013

Google Image : New Shimla Area : Year 2002

Google Image : New Shimla Area : Year 2013

Google Image: Khalini Area : Year 2002

Google Image: Khalini Area : Year 2013

Google Image: Kaithu Area : Year 2002

Google Image: Kaithu Area : Year 2013

Google Image: Chakkar Ghora Chowki Area : Year 2002

Google Image: Chakkar Ghora Chowki Area : Year 2013

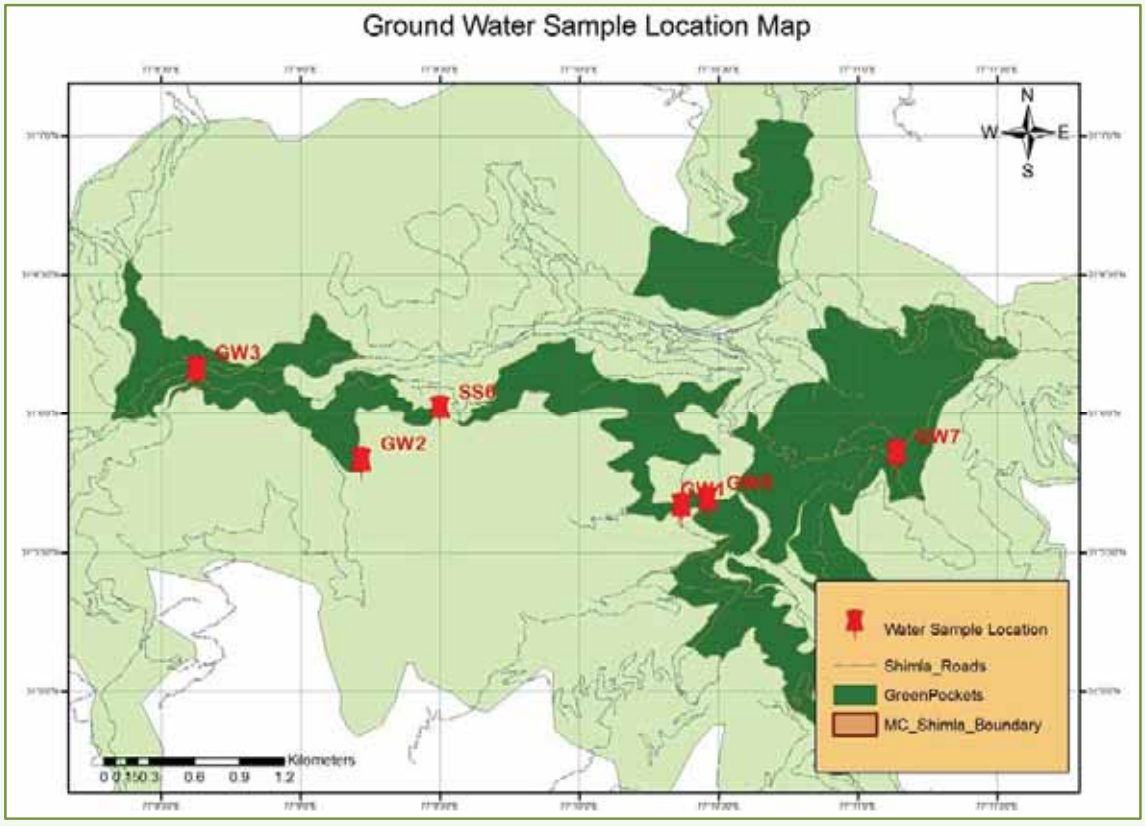
4.4 Water Environment

The physiography of the land control the drainage pattern in the region. The drainage pattern in the entire 17 green pockets has been drawn. Hydro-geological settings and the ground water sources have been examined. Ground water, surface water and waste water generated in the study area has been surveyed as per CPCB norms (Annexure 1) and examined for physico-chemical, heavy metals and bacteriological parameters. The drinking water and fresh water standards are given in Annexure 3. Developmental activity if undertaken create a continuous demand on the water resources. The ground water quality data is given in following tables. One can calculate the amount of water demand based on the occupancy of the region and the per capita consumption (Annexure 4) as given by BIS for different categories.

Total quantity of water used= Occupancy x Quantity (LPCD)

Similarly the format in which the data for surface water quality has been presented is shown in the tables. It is evident from the available database that there is hardly any permanent rivulet/drainage which is flowing and could be considered as clean source of water in the study area besides the fact that entire vegetation is completely dependent on the quality of soil. The ground water sources are limited which reveals that the natural springs has been dried up since long.

Ground water & Spring Water samples were taken from hand-pumps located in and around identified green belts of Shimla planning area for water quality analysis, which is depicted on the map as follows:



Description of Ground Water Sampling Locations

Station No.	Location	Source	Coordinates
GW1	Bye-pass Road Khalini	Ground Water	31.094045 N, 77.172768 E
GW2	Bye-pass Tutikandi	Ground Water	31.095167 N, 77.161432 E
GW3	Boileauganj Road	Ground Water	31.102361 N, 77.143751 E
SS4	Bemloe	Spring Source	31.097801 N, 77.125038 E
GW5	Himland	Ground Water	31.094453 N, 77.174324 E
SS6	Bye-pass Road Nabha	Spring Source	31.100021 N, 77.158321 E
GW7	Near Navbhar	Ground Water	31.097238 N, 77.185630 E



Pictures showing hand-pumps from where ground water sample were taken


Pictures showing spring water source location from where ground water sample were taken

Analysis of Ground Water

S. No	Parameters	Results						
		GW1	GW2	GW3	SS4	GW5	SS6	GW7
1.	Conductivity, µmho/cm	249	251.1	102.6	395	260	246.3	249.4
2.	BOD mg/l	0.2	0.2	0.1	0.2	0.2	1.4	0.2
3.	DO mg/l	6.7	6.5	7.4	8.4	7.6	7.5	7.2
4.	pH	8.18	8.19	7.89	7.72	8.03	8.33	8.24
5.	Turbidity, NTU	0.1	0.1	1.5	1.5	2.5	0.1	0.1
6.	Alkalinity. mg/l	40	40	30	60	40	40	40

7.	Chloride as Cl mg/l	9	14	6	7	16	6	15
8.	COD mg/l	6.4	7.2	3.6	9.6	7.6	23	9.2
9.	TKN mg/l	Nd	Nd	0.34	0.34	Nd	0.11	0.23
10.	NH_3 mg/l	Nd	Nd	0.11	0.11	Nd	Nd	Nd
11.	$CaCO_3$ mg/l	81	80	50	61	81	80	82
12.	SO_4 mg/l	42.82	42.02	20.60	55	30.3	50.9	32.93
13.	Na mg/l	6.1	7.8	0	4.5	7.2	2.2	9.2
14.	TDS, mg/l	144	146	67	198	132	140	147
15.	TSS, mg/l	8.0	31.6	13.0	6.3	16.1	11	15
16.	DFS, mg/l	135	135	53	425	130	130	134
17.	Total Phosphate, mg/l	ND	ND	0.003	0.004	ND	0.001	0.001
18.	Magnesium Mg mg/l	22	20	12	55	21	10	17
19.	Fluoride F mg/l	0.20	0.13	0.08	ND	0.10	0.11	0.12
20.	T. Hardness $CaCo_3$ mg/l	103	100	62	310	110	90	95
21.	Copper Cu_2 mg/l	0.02	0.02	0.04	0.02	0.02	0.03	0.02
22.	Lead Pb, mg/l	0.01	0.03	0.01	0.01	0.01	0.03	ND
23.	Nickel Ni_2 mg/l	0.01	0.02	ND	0.01	ND	0.01	ND
24.	Zinc Zn mg/l	0.06	0.02	0.03	0.04	0.04	0.01	0.02
25.	Total Iron Fe, mg/l	1.12	2.66	4.54	4.10	6.95	4.86	1.34
26.	Potassium K, mg/l	3.3	1.4	0.0	0.0	6.8	0.5	5.4
27.	T ^0C	9.4	9.5	9.0	8.5	9.2	8.5	9.5

Surface Water Quality Results during April-2012 to March 2013

Location	April, 2012				July, 2012				Oct., 2012				January 2013			
	pH	DO	BOD	TC	pH	DO	BOD	TC	pH	DO	BOD	TC	pH	DO	BOD	TC
U/s Lift nallah before conf. to Ashwani Khad	6.58	8.9	0.6	42	7.8	9.6	0.2	16	7.64	9.3	0.1	3	7.42	9.2	0.1	112
Lift Nallah D/s hotel Combermere, Shimla	6.73	5.1	42	182	7.67	4.3	1.5	50	7.16	4.7	18	7	6.98	5.9	41	12
Lift Nallah U/s Bridge at bye pass road Near MC waste Processing site	6.8	5.4	52	110	7.72	4.6	2	10	7.11	4.5	15	2	6.93	5.8	50	60

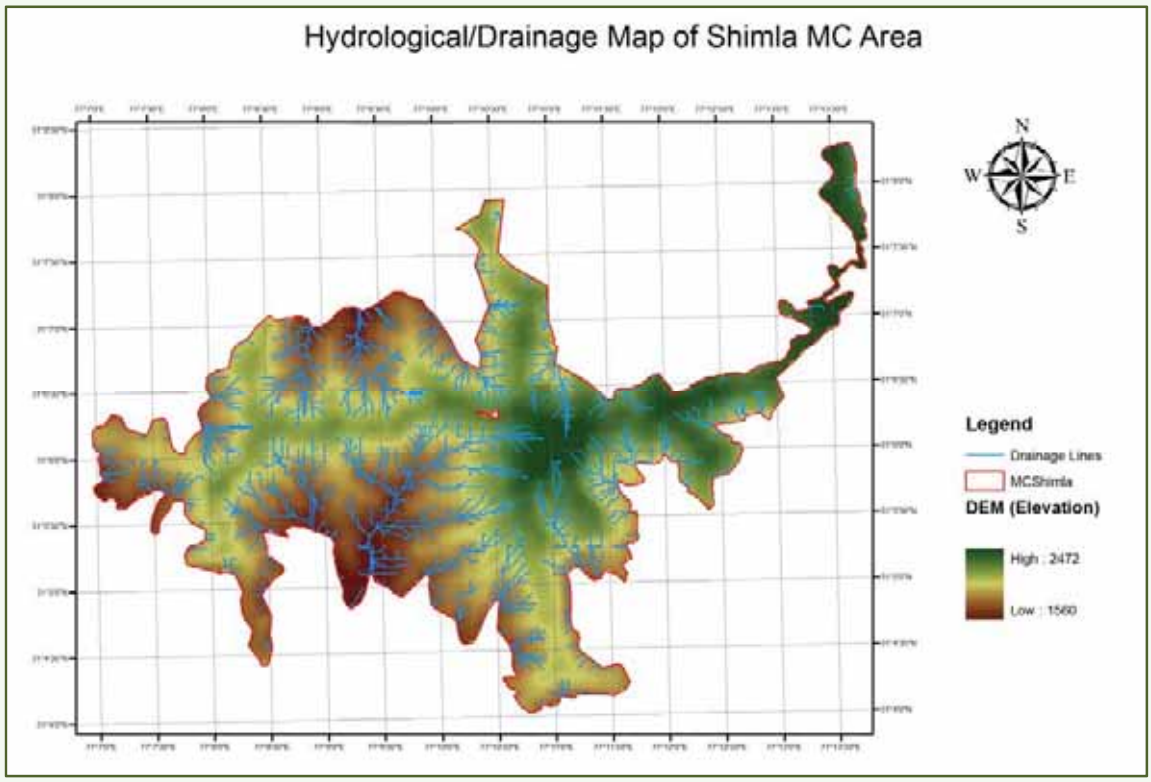
Source: HPPCB, Annual Report 2012-13

4.4.1 Drainage

The average annual rainfall over Shimla is between 900-1650 mm. The hilly terrain of Shimla has been gifted itself with a good natural drainage pattern by the open streams or nallahs. The rainwater runoff finds its own course to open streams or nallahs.

The Kufri-Dhalli-Sanjauli-Ridge-Tutu spinal is a drainage divide of Shimla city. The tributaries on southern side go to Yamuna and those on northern side to Satluj. Shimla has 13 major nallahs and number of minor nallahs, which are natural drains for rain water and off late for waste water too. Some lining is visible along these major nallahs but is not effectively coursing the storm water. Most of the natural drains (nallahs) are encroached upon and disposal or household debris is a common view of these nallah, that has in turn spoiled the vegetation cover to a greater extent.

The Shimla being on hill town, natural drains carries the water to valleys into Khads, which are used as source of water supply for Shimla. There are no major surface water bodies both natural and artificial within Shimla Planning Area. Although a few small bawaries are (natural springs) located in this area.



The role of Irrigation & Public Health (IPH) Department is to develop water related infrastructures for drinking water supply schemes, sewerage systems, irrigation systems through source development, lifting water, boring of hand pumps & providing distribution systems and flood protection works to protect life and property in the state. Presently, Irrigation & Public Health (IPH) Department is involved in sourcing the water, treatment of water, and transmission of water through raising and gravity mains to storage reservoirs. The Irrigation & Public Health (IPH) Department is also responsible for operation and maintenance of these systems. Irrigation & Public Health (IPH) Department supplies bulk water to SMC, which in turns distributes the water to domestic and commercial connections. SMC is responsible for releasing water connections, reading of water meter, billing and receipt posting besides collection of water charges, attending public grievances.

4.4.2 History of water source development of Shimla

First water supply scheme of 4.54 MLD, was implemented to utilize the water from the storage reservoir of 10.92 million liters (located at 12.85 km. from Shimla), which stores water from spring sources from Dhalli Catchment Area, during 1875 to support a population of 16,000. 1st Augmentation (year 1914): Subsequently, to fulfill the growing need of the city and the tourists, the first augmentation of Shimla Water Supply Scheme by provision of pump sets near Cherot Nallah (year 1889) and Jagroti Nallah (year 1914) to tap 4.80 MLD of water at source. 2nd Augmentation (year 1914): The second augmentation of Shimla Water Supply Scheme (year 1914) was implemented by installation of 2 pump sets at Chair Nallah to tap 2.50 MLD of water at source. 3rd Augmentation (year 1924): The third augmentation of Shimla Water Supply Scheme was commissioned during the year 1924 to tap 7.72 MLD of water from Nauti Khad with further upgradation of pumps at various stages. 4th Augmentation (year 1981-82): The fourth augmentation of Shimla Water Supply Scheme was installation of pump sets at Gumma and Darabla to tap additional 16.34 MLD of water at source. Today, the system is designed to lift 24.06 MLD of water at source. 5th Augmentation (year 1992): The fifth augmentation of Shimla Water Supply Scheme was commissioned in April 1992 designed to pump 10.80 MLD of water at two stage lifting at Ashwani Khad and at Kawalag.

4.4.3 Water demand and deficit

The present water requirement per day for Shimla City during peak tourist season for a total population of 2,84,635 @ 140 lpcd is 39.85 MLD as against the supply of 33 MLD. Thus, there is deficit of water supply of about 7 MLD, which increases to 17 MLD during summer due to shortfall because of failure of snow or rain in previous winter.

At current growth of existing and floating population, the water requirement of Shimla City and its surrounding areas is expected to be 105.66 MLD for the horizon year 2037, which creates a huge gap between present supply and expected demand. To bridge this gap between the future water demand of 105.66 MLD and present water supply of 33 MLD, 72.66 MLD of water has to be sourced, but big concern is from where?

Estimation of water requirement

Nature of Population		Total Population (no.)	Rate of consum-ption (ltrs/day)	Water Requi-rement Million (ltrs/day)
Permanent Population		415497	150	62.32
Floating Population		239398	100	23.94
General requirement for various purposes other than residents.				
a)	Schools 48 no. @ 450 students / school	21600	45	0.97
b)	Community Centres 21 no. @ 200 each	4200	45	0.19
c)	3 Service Industries @ 100 vehicles each	300	45	0.01
d)	Zonal Commercial Centres 3 no. @ 1500 each	4500	45	0.20

e)	Hospitals 9 no. with 100 bed each	900	450	0.41
f)	Colleges 6 no. with average strength 800 students each	4800	45	0.22
g)	Special Public Institutions 8 no. @ 1000 each	8000	45	0.36
h)	Cantonment area	3000	150	0.41
i)	Multipurpose Cultural complexes	250	45	0.01
j)	Railway stations 3 no. for 1st-6000, II-2000 & III-1000	9000	45	0.41
k)	Parking-cum-commercial areas 5 no. @ 50 each	250	45	0.01
l)	University Complex 1No.	5000	150	0.75
m)	Milk processing plant optimum capacity 100001st. Milk. (Complex Processing)	10000	10	0.10
			Sub Total	**90.30**
Adding for wastage @ 2% for backwashing of filter beds				1.81
Adding 15% on account of losses in conveyance mains etc				**13.55**
			Grand Total	**105.66**
Water available from existing schemes				33
Net water requirement for the year 2037				**72.66**
				Source: I&PH Department

With the fast increase in population/tourist population in the major towns, mainly Shimla the State capital is already highly vulnerable to infrastructure pressure, pollution load from Municipal effluent and small industries. There is thus need to have proper ETPs and waste disposal system with all the industries and major towns. Proper monitoring is very essential which is lacking.

4.4.4 Sewage system

Sewerage system is as important as the water supply system and forms an integral part of environmental character of any eco system. Sewage treatment facilities of Shimla have been substantially improved over the years to cater to future demand, but it also lacks issues like connectivity, leakages, maintenance and overall performance.

The network of new sewerage system in Shimla is about 179 km and diameter of sewer pipes ranges from 150 mm to 800 mm. The network covers 90% of municipal area serving upto 80% of population. Special Areas, which are now merged in SMC, are without any sewerage network.

Performance Indicators

S. N.	Indicator	SMC Area	Dhalli, Tutu, New Shimla	Special Areas of Ghanahatti, Kufri, and Shoghi
1	Network Coverage	90%	No coverage	No coverage
2	Access to Sewerage	80%	No access	No access

3	Total Quantity Collected	4.80 MLD	Information Not Available	Information Not Available
4	Capacity of Treatment Plants	35.63 MLD	-	-
5	Utilization of treatment and disposal plants	13.5%	Septic Tanks	Septic Tanks
6	Recycling / Reuse	Nil	Nil	Nil

Irrigation & Public Health (IPH) Department has constructed 6 Sewage Treatment Plants (STPs) with total capacity of 35.63 MLD through OPEC funding. Irrigation & Public Health (IPH) Department has operation & maintenance of these STPs on management contract. The total sewage received by these six plants is only about 4.8 MLD for treatment against the capacity of 35.63MLD. The treated effluents from STPs are disposed in adjoining Nallahs.

Details of Sewerage Treatment Plant

S. N	Name of Sewage Treatment Plant	Capacity (MLD)	Locations	Technology Used
1	Lalpani	19.35	Near Baragaon on Shoghi Bypass	UASB
2	Sanjauli Malyana	4.44	Below Malyana Village on Shoghi Sanjauli Bypass	Extended Aeration System
3	Dhalli	0.76	Below Dhalli Churat Road	
4	Snowdown	1.35	Near Barmoo Village below Snowdown	
5	North Disposal	5.80	At Golcha below Annadale	
6	Summer Hill	3.93	At Gadog Village Summer Hill	

Monitoring Status of STP Plants during 2012-13

Name of STP	Date of Collection	Parameters					
		pH 5.5-9.0	BOD 30 mg/l	COD 250 mg/l	TSS 100 mg/l	TDS 2100 mg/l	Oil & Grease 10 mg/l
Sanjauli Malyana	06/2012	7.45	46.0	196.0	86.0	482.0	1.96
	2/9/2012	9.15	15.0	80.0	25.0	412.0	2.88
	11/2012	7.25	250.0	616.0	630.0	723.0	3.0
	24/2/2013	6.79	460.0	1000	615.0	570.0	12.4
	7/3/2013	7.58	22.0	180.0	47.0	442.0	2.20
Dhalli	15/6/2012	7.19	28.0	104.0	43.0	311.0	1.88
	19/6/2012	7.28	20.0	96.0	30.0	316.0	-

	19/6/2012	7.47	18.0	68.0	52.0	334.0	-
	9/2012	7.16	4.0	10.0	13.0	263.0	-
	3/1/2013	7.38	2.0	20.0	17.0	353.0	-
North Disposal Shimla	06/2012	7.05	5.0	52.0	42.0	211.0	0.24
	9/2012	7.58	3.0	24.0	11.0	191.0	-
	11/2012	7.36	59.0	112.0	33.0	425.0	1.12
	3/1/2013	7.81	6.0	56.0	1.0	133.0	2.12
Snowdon	06/2012	7.33	1.4	8.0	4.0	216.0	-
	9/2012	7.62	6.0	44.0	98.0	4.0	1.04
	11/2012	7.44	4.0	28.0	11.0	310.0	-
	7/3/2013	7.02	3.0	28.0	1.0	211.0	-
Lalpani	06/2012	7.18	18.0	80.0	73.0	265.0	0.48
	9/2012	7.65	2.0	16.0	2.0	180.0	-
	11/2012	7.41	5.5	36.0	15.0	314.0	-
	3/1/2013	7.36	5.0	32.0	11.0	313.0	-
Summer Hill	06/2012	7.17	42.0	148.0	66.0	420.0	2.0
	9/2012	7.14	6.0	44.0	17.0	270.0	-
	11/2012	7.36	5.0	32.0	17.0	380.0	-
	3/1/2013	7.83	1.5	12.0	2.0	136.0	-

Source: Annual Report, 2012-13, HPPCB

4.5 Air Environment

The climatic data procured from secondary sources is very important for identifying the season and period of monitoring primary data. The climatic data can help in using suitable building technologies and energy conservation measures.

The methodology adopted for collection of climatic data specific to the site is to compile the mean monthly normals of atmospheric parameters, form previous 10 yrs data recorded by the nearest IMD station. Wind Roses giving the wind direction speed have not been prepared. Most probable wind speed class and wind direction at the nearest IMD site is 35 kms., NE and EWS.

Baseline data of air pollutant parameters extending an area of 2 Km. from the study area needs to be done in such cases, but since SPCB has established its permanent monitoring stations in Shimla MC area, and air quality is monitored at two locations. Description of baseline data of ambient air parameters namely RSPM, nitrogen dioxide, sulphur dioxide

have been collected. All the season data has been monitored as per the CPCB Norms on daily basis & reported by SPCB. Sampling locations are located as per CPCB norms. The ambient air quality standards are given in Annexure 5. Number and locations of Ambient Air quality monitoring (AAQM) stations has been decided based on the nature of area, meteorological conditions, Topography, selected major pollution pockets in the area and likely impact areas. The parameters measured, frequencies of sampling, technique to be as prescribed by CPCB are given in Annexure 1. The monitoring locations for air quality are given as shown in the table and data represented as shown table.

Description of Ambient Air Quality Monitoring Stations

Station No.	Location	Distance & Direction from project area	Project area / study area	Environmental Setting
Shimla-I	Takka Bench, The Ridge	With in Green zone	Green Belt Jakhoo	As per standards sensitive zone
Shimla-II	Old Bus Stand	Adjoining to green Zone	Green Belt Phagli & Nabha	Mix use.

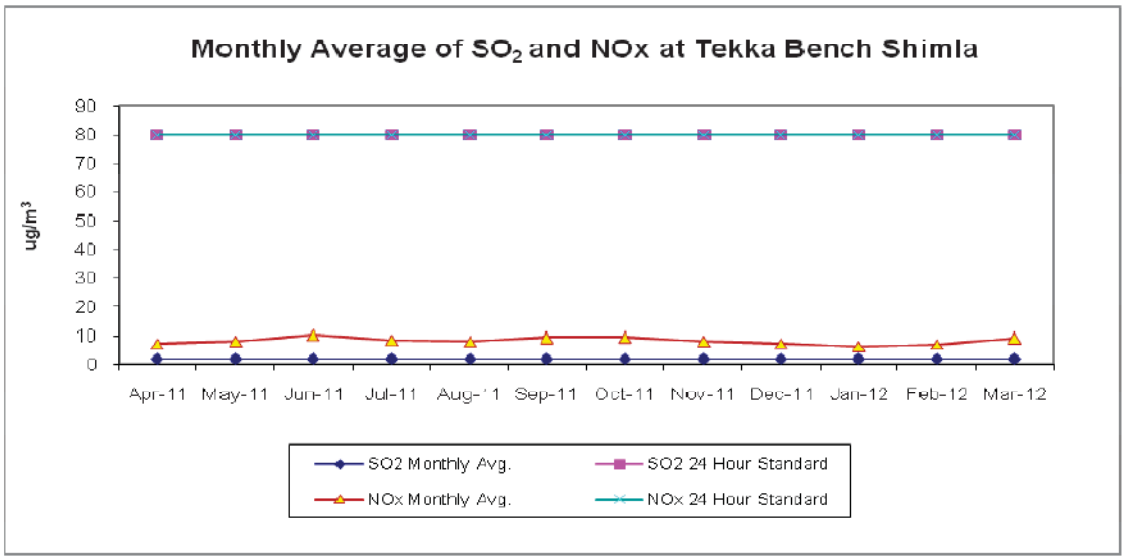
Ambient Air Quality Status (Year 2012-13)

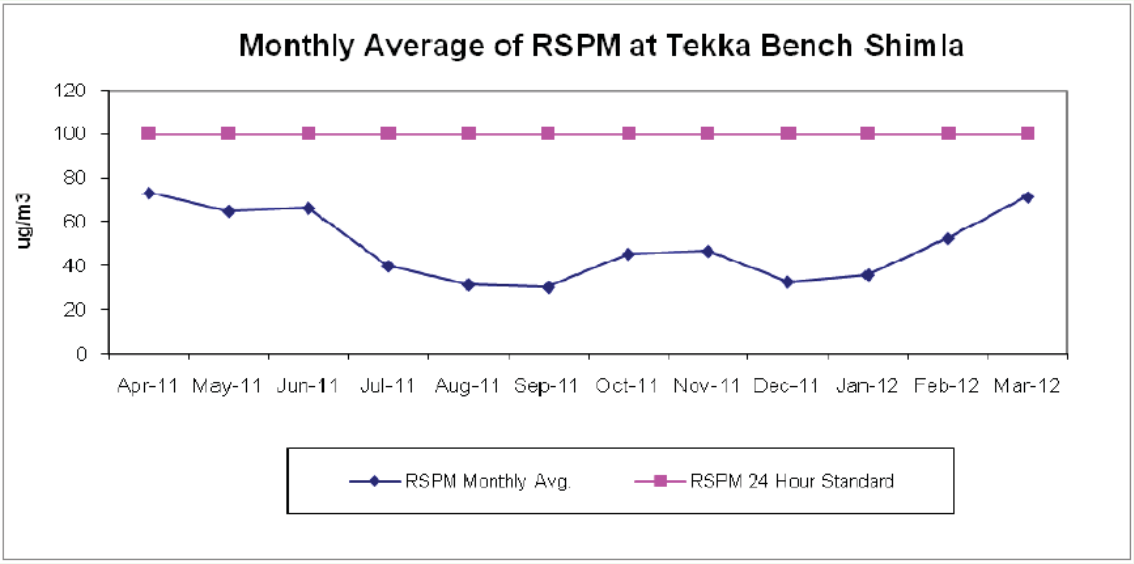
Stations	SO_2	Peak	No_x (Annual Average)	Peak	RSPM Annual Average	Peak
Shimla-I	2.0	6.8	9.4	28.8	47.4	167.0
Shimla-II	2.0	9.7	12.7	48.17	57.6	203.0

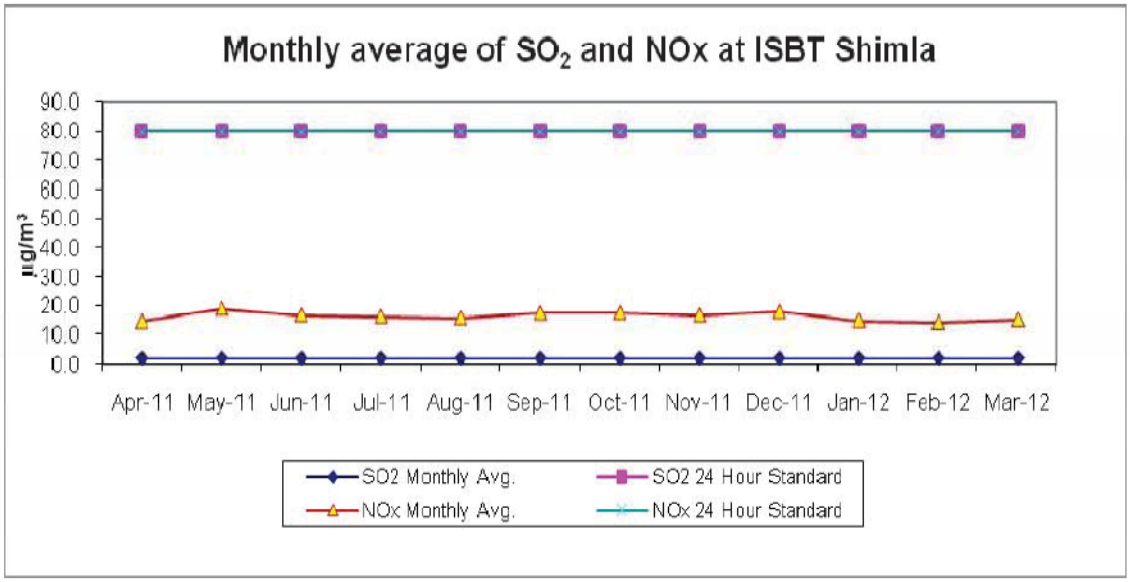
Source: HPPCB, Annual Report 2012-13

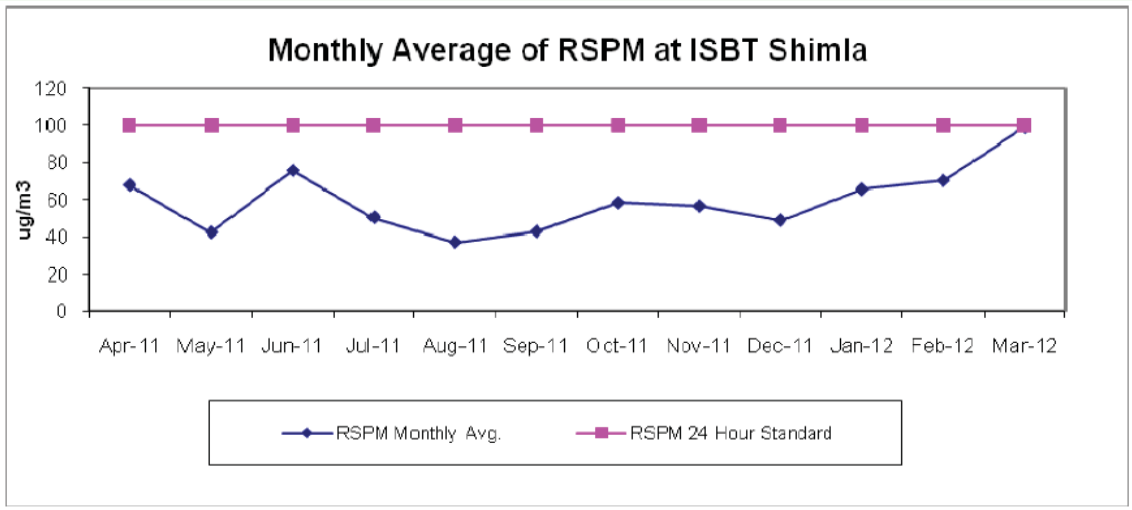
Shimla is an important hill station and is at an elevation of 2000 meters from Mean Sea level. It has remained summer capital of India during British regime. In 1972 it became the capital of Himachal Pradesh. A large number of tourists use to visits the city in summer and Dussehra & Diwali holidays in earlier times but now on every weekends there is terminal-load.

Ambient air quality is being monitored at 2 locations i.e. Station No 1 at Tekka Bench, Ridge and Station No. 2 at Bus Stand Shimla. Air quality standards fixed for 24 hour average is 100 µg/m3 for RSPM and 80 µg/m3 for SO2 & NO2 and annual average standard is 60 µg/m3for RSPM, 50 µg/m3 for SO2 & 40 µg/m3 for NO2. The data collected for the year 2011-12 scrutinized for monthly average and peak values for both these locations and trends of monthly average of SO2, NO2 and RSPM are shown below;


Monthly Average of SO2 and NOx at Tekka Bench Shimla
ug/m3
90
80
70
60
50
40
30
20
10
0
Apr-11 May-11 Jun-11 Jul-11 Aug-11 Sep-11 Oct-11 Nov-11 Dec-11 Jan-12 Feb-12 Mar-12
SO2 Monthly Avg.
SO2 24 Hour Standard
NOx Monthly Avg.
NOx 24 Hour Standard


Monthly Average of RSPM at Tekka Bench Shimla
ug/m3
120
100
80
60
40
20
0
Apr-11 May-11 Jun-11 Jul-11 Aug-11 Sep-11 Oct-11 Nov-11 Dec-11 Jan-12 Feb-12 Mar-12
RSPM Monthly Avg.
RSPM 24 Hour Standard


Monthly average of SO2 and NOx at ISBT Shimla
µg/m3
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Apr-11 May-11 Jun-11 Jul-11 Aug-11 Sep-11 Oct-11 Nov-11 Dec-11 Jan-12 Feb-12 Mar-12
SO2 Monthly Avg.
SO2 24 Hour Standard
NOx Monthly Avg.
NOx 24 Hour Standard



Monthly mean average values of SO_2 and NOx at both stations were observed well below the permissible limit for 24 hour average. The peak value of SO2 was observed as high as 16.5 µg/m3 in the month of September 2011 and 79.0 µg/m3 for NOx in the month of July 2011 for Station No.1. The peak value of RSPM was observed as 218.0 µg/m3 in the month of March, 2012 at Station No. 1. However, for Station No. 2 the peak value of SO2 was observed as 12.6 µg/m3 in the month of September 2011and NOx as 82.3 µg/m3 in the month of January 2012. The peak value of RSPM for Station No. 2 was observed as 206.0 µg/m3 in the month of October, 2012. Annual average value for RSPM observed as 49.1 µg/m3 and 59.7 at Station No. 1 and 2 respectively which are within the permissible limit of 60 µg/m3 prescribed for industrial, residential, rural and other area. In comparison to previous year's data, decrease in the level of RSPM at Station I and slight increase in the level of RSPM at Station II is observed.

Recommendations by HPPCB

- Condition of roads is required to be improved.
- Regular vehicular monitoring is required to be conducted.
- Open burning of waste/ papers/ MSW etc. to be discouraged.
- Forest fire is required to be prevented.
- Construction activities like Road, Bridge, Building, Project etc. should be carried out in planned manner and debris is required to be managed properly.
- Regular air quality monitoring/ stack emission of industries is required to be carried out.
- Air polluting activities should not be allowed.

4.5.1 Noise

Noise can be defined as unwanted sound or sound in the wrong place at the wrong time. Noise can also be defined as any sound that is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or is otherwise annoying. The definition of noise as unwanted sound implies that it has an adverse effect on human beings and their

environment, including land, structures, and domestic animals. Noise disturbs natural wildlife and ecological systems.

Sound is mechanical energy from a vibrating surface, transmitted through gases, liquid and solids. A vibrating surface producing sound has a total power output, and the sound results in sound pressure that alternatively rises to a maximum pressure of compression and drops to minimum pressure of rarefaction. The number of compressions and rarefactions of the air molecules in a unit of time is described as its frequency. Frequency is expressed in Hertz (Hz), which is the same as the number of cycles per second. Humans can identify sounds with frequency between about 16 to 20,000 Hz.

Noise measurement are expressed by the tern "Sound Pressure Level" (SPL), which is the logarithmic ration of the sound, pressure to a reference pressure and is expressed as a dimension less unit of power, the decibel (dB). The reference level is 0.0002 μ bar, the threshold of human hearing. The equation for sound pressure level is as follows:

$$SPL = 20 \log_{10} (P/P_0)$$

Where SPL = sound pressure level, dB

P = sound pressure, μ bar

P = reference pressure, 0.0002 μ bar

Construction equipment and road traffic are the major sources of noise. Baseline data of noise at the project area and the neighborhood habitat areas has been ascertained. Daytime and nighttime data has been collected and presented as shown in table the parameters, frequencies of sampling are shown in Annexure 1 and the standards for noise are given in Annexure 6.

Noise Levels recorded in Green area

Level	Db (Leq)																
Location / Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Day Time	86.86	80.12	82.17	73.91	84.21	80.53	81.12	86.80	71.85	74.00	72.09	73.00	87.43	88.15	79.21	78.15	70.12
Night Time	50.16	47.20	45.16	42.30	44.81	40.72	43.75	46.51	40.00	42.45	40.42	41.23	49.52	51.15	42.97	47.00	40.89

The HP State Pollution Control Board carry out noise monitoring during Diwali festive period on regular basis, but it cannot be considered as representative of the noise levels in seventeen green areas. The noise level sampling has been done in and around the Shimla town. The data as a representative of ambient noise levels in Shimla has been collected in all the seventeen green areas and given in above table.

4.6 Biological Environment

Major impacts from many actions occur on floral and faunal species that are components of the biological environment within and adjacent to the current study areas. General impacts on

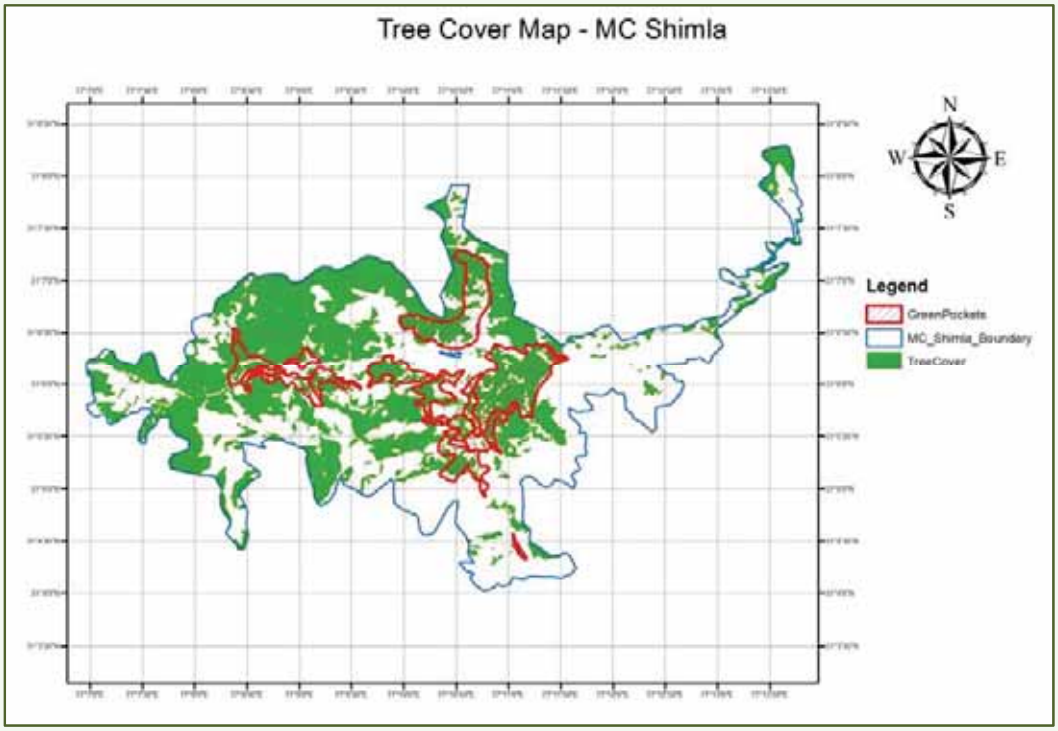
the biological environment are related to changes in community types and their geographical distribution. Specific impacts may occur in the life cycles of rare and endangered species inhabiting the area of concern. We have followed following steps for prediction and assessment of biological environment:

- Prepared a description of the flora and fauna comprising the biological environmental setting.
- Identified species inhabiting the area of interest.
- Summarized the critical impacts associated.

Baseline data from field observations for various terrestrial and aquatic systems has been generated. Wild life sanctuaries and National parks location within 10 k.m. radius from study area boundary have been identified based on secondary data. Primary data on survey of the wild animals and birds in the study area is collected and identified with the classification into various schedules taken from secondary data.

4.6.1 Forests

Forest plays an important role in shaping the ecosystem, economy and social life of the people. The climatic condition of Himachal Pradesh as a whole is very much suitable for the growth of forests. The forests provide valuable timber, medicinal herbs, raw material for large and small scale industries and also provide employment. Forests play a vital role in protecting/ conserving the soil water holding capacity. It also plays in shaping the climatic condition of the area and ensures timely and sufficient rains. In this entire region soil is generally deep and contains a thin layer of humus or leaf molded species of Ban Oak, Chil, Kail and Deodar.



During the early period of the princely states some of the forests were reserved by the then ruling chiefs for games. It was in the year 1872 that Superintendent of Shimla Hill states directed the then ruling chiefs of the states to afford adequate protection to the forest areas. These directions of the British Government paved the way for demarcating the forests. Thus, all the hill states got this work of demarcation done in stages by the creation of forest department and all possible protective measures were adopted.

Shimla is known for its City/Urban Forest. It is perhaps the last surviving urban forest in the country. The urban forests contribute to value of Shimla by absorbing storm water and improving air and water supply besides quality. Urban forest is part of the fabric of Shimla bringing nature into urban landscape.

Forests in Shimla

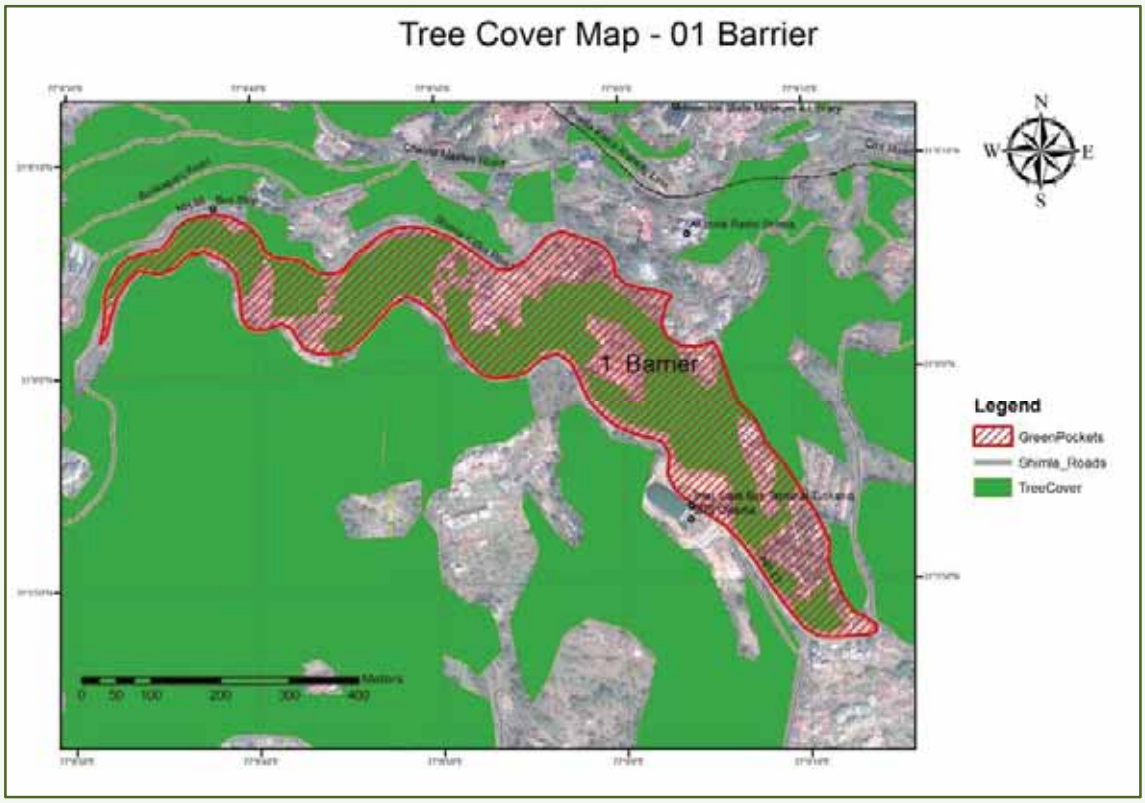
SN.	Administrative Area	Forest Area (in Hectare)
1	SMC Area	832.40
2	SADA Area (Tutu, New Shimla, Dhalli, Ganahatti, Kufri and Shoghi)	4680.00
	Total	5512.40

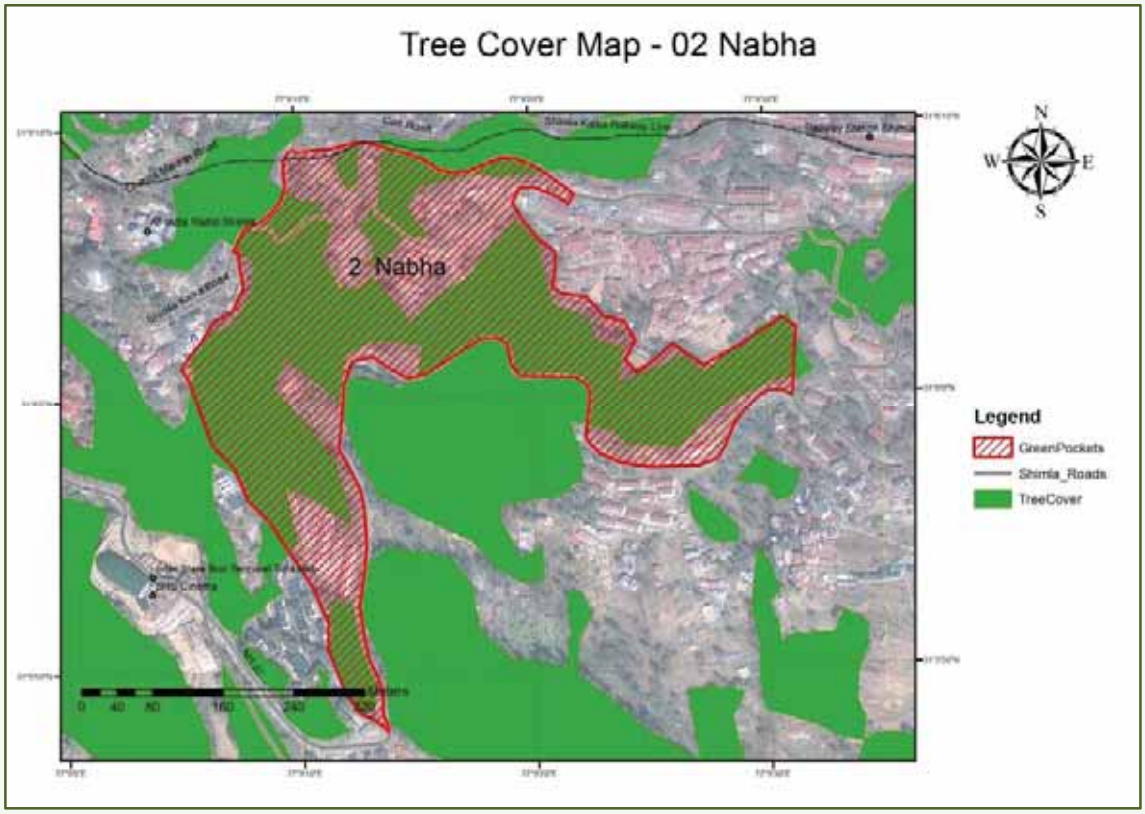
The forests constitute about 55% of the Shimla Planning Area. The predominant species in the forest are Deodar, Pine, Oak, Kail, Rai and Rhododendron. Due to excessive population the wild life has migrated towards deep forests and is presently limited to Pheasants.

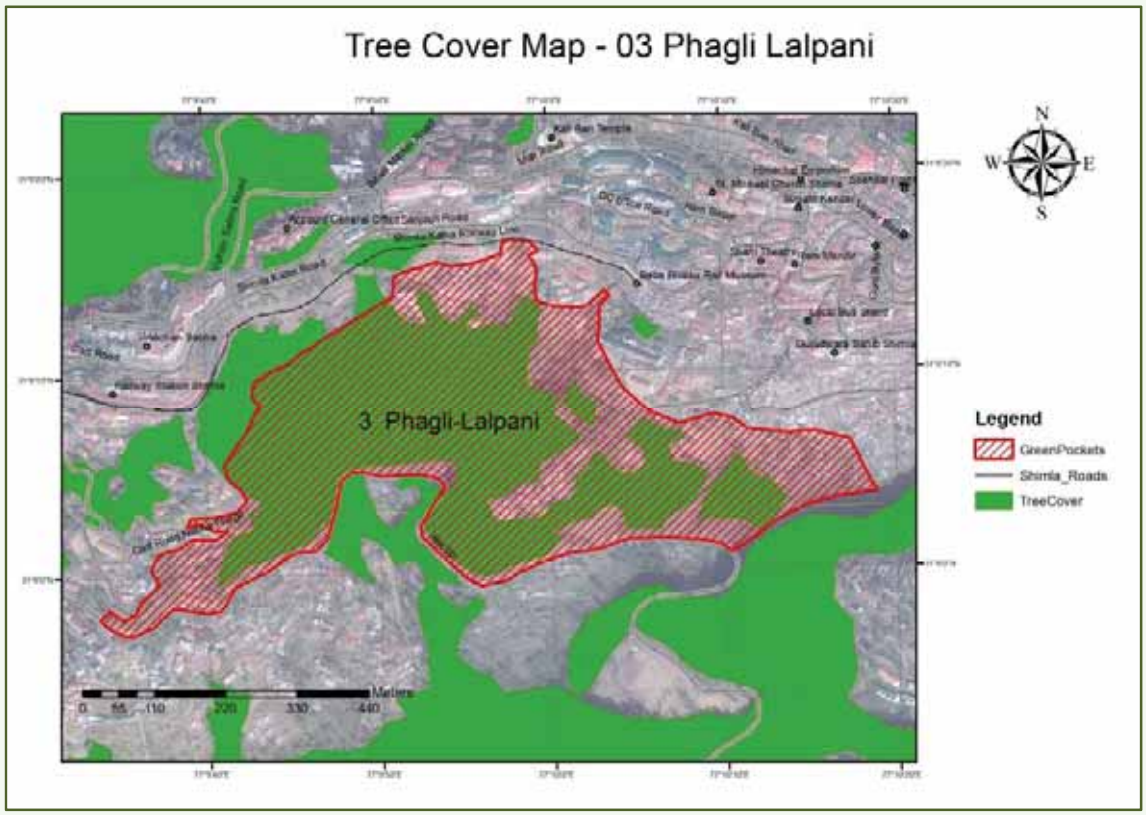
The forest within SMC area was managed by SMC till recently under Himachal Pradesh Municipal Corporation Act, 1994 and now has been transferred to Department of Forest for better and efficient management.

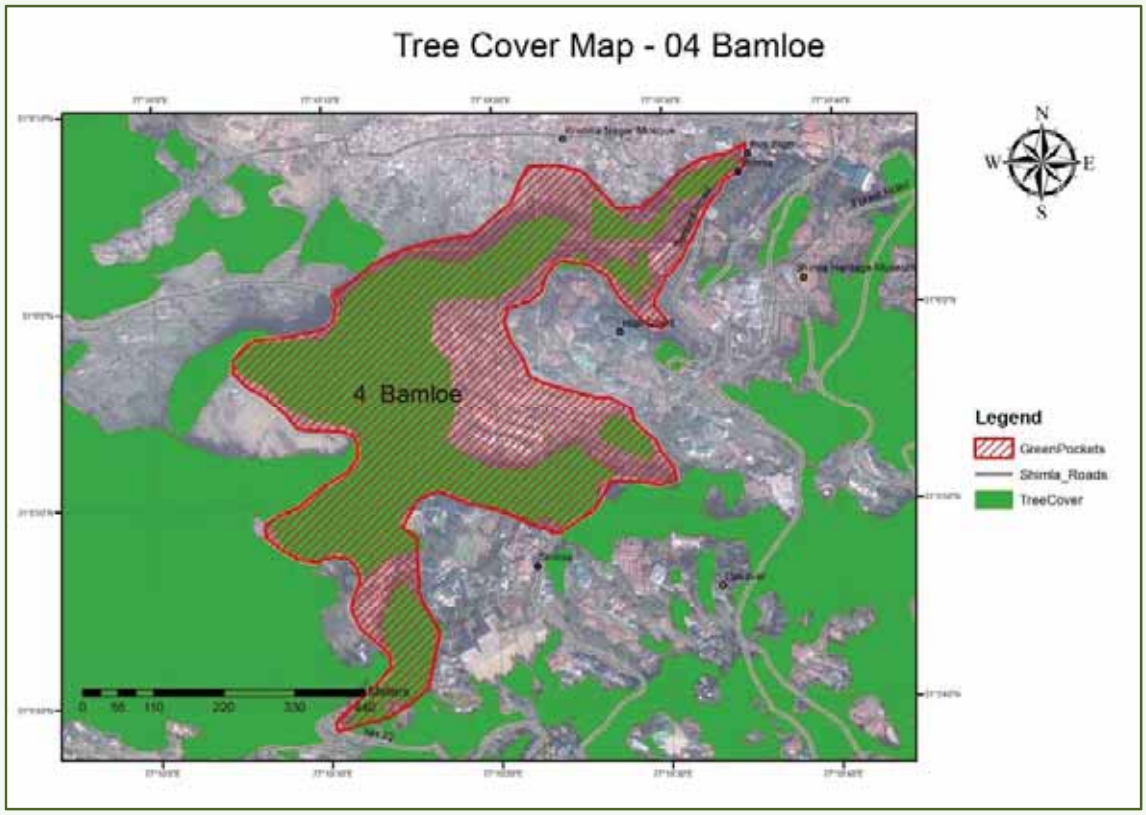
In addition to forestlands, 1000 ha of land is under estate forest. GoHP in August 2000 notified that all areas possessing substantial green cover but not classified as forest, whether public or private ownership designated as Green Belts. 17 such Green Belts covering 414 hectares were identified and notified in Core and Restricted zone for construction.

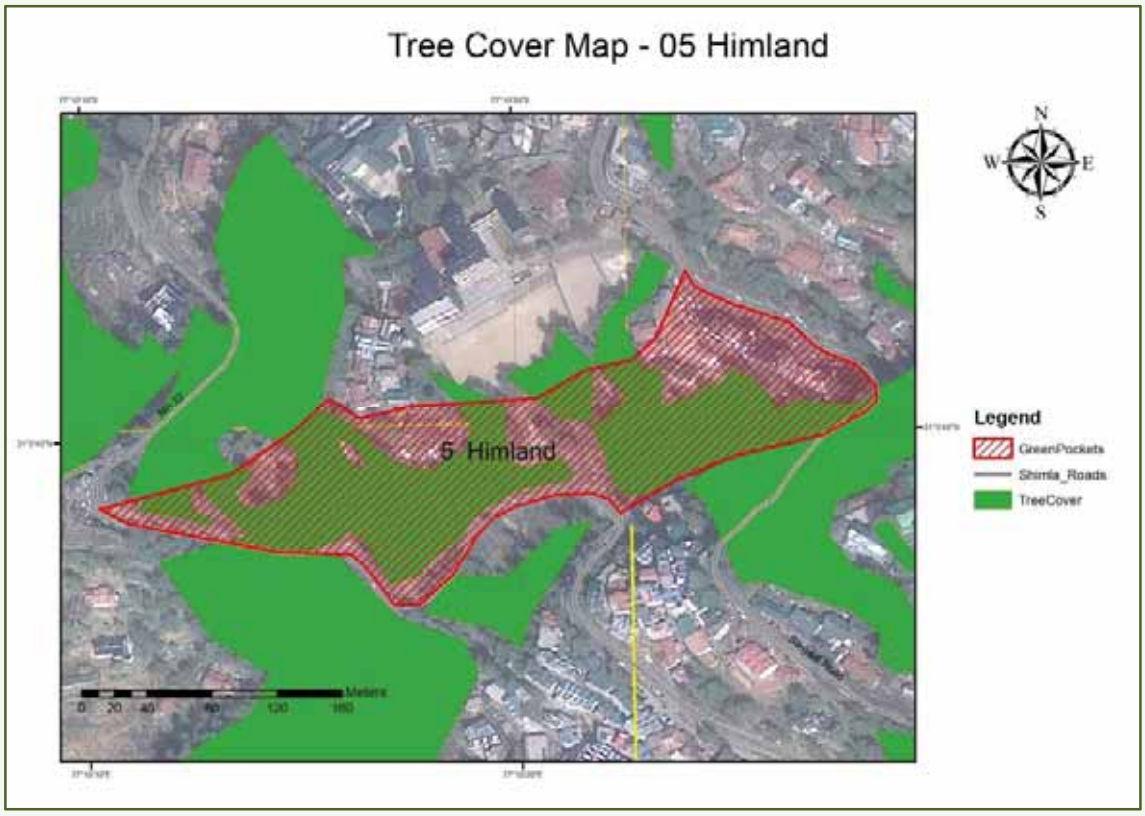
Overall, the dense forest cover provides environmental buffer for the city. Large areas under scrub forest also provide adequate scope for expansion. Deodar Trees in Shimla has reached maturity level which is an issue of great concern. GoHP has banned the green felling of trees and therefore limiting its regeneration. The regeneration of Deodar is through artificial regeneration on the forest blanks. Tree felling for construction activity and unregulated dumping of solid waste and debris along the hill slopes by people causing degradation of forests. Soil erosion and landslides especially along the natural drains is causing widening of drains especially during flash floods and exposing trees along the drain to felling, besides the fact that the soil compaction has lead to deterioration of soil quality and which in turn has led to phenomenon of tree felling in the entire Shimla region. Tree cover for all 17 green pockets has been analyzed and depicted on the maps as under:

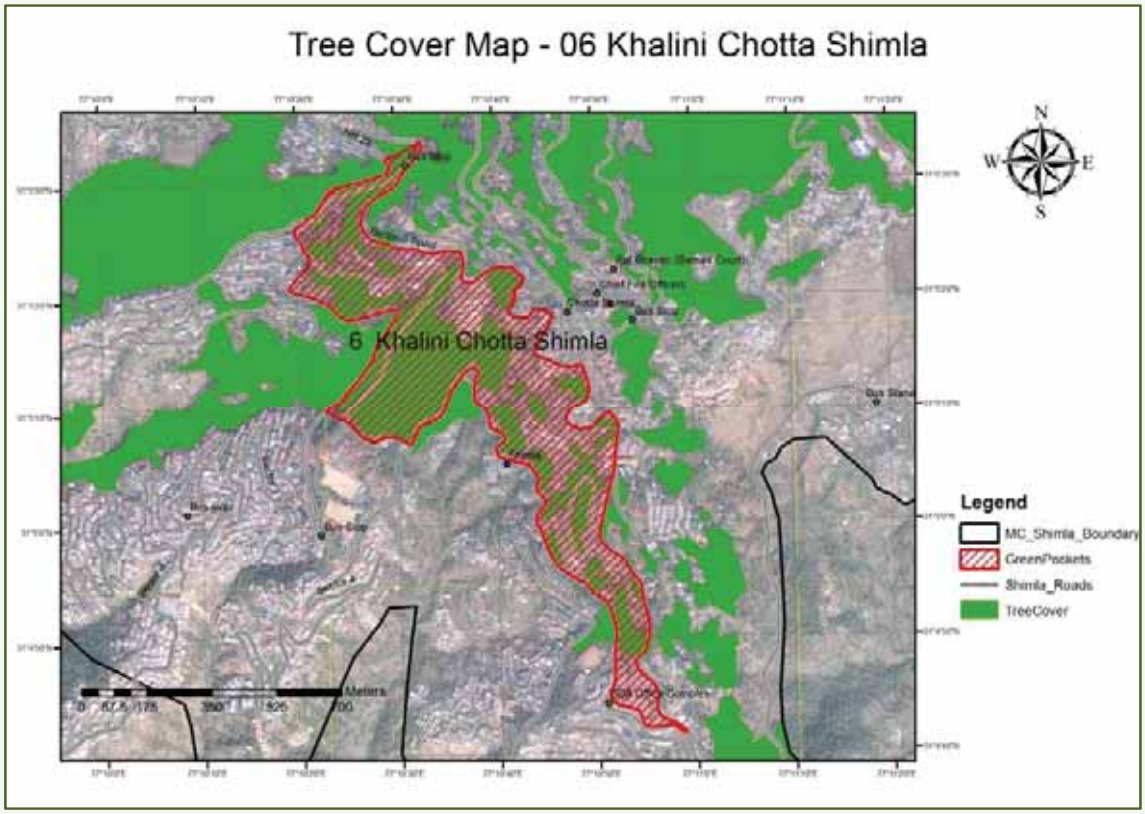

Tree Cover Map - 01 Barrier
1 Barrier
N
W
E
S
Legend
GreenPockets
Shimla_Roads
TreeCover
Meters
0 50 100 200 300 400

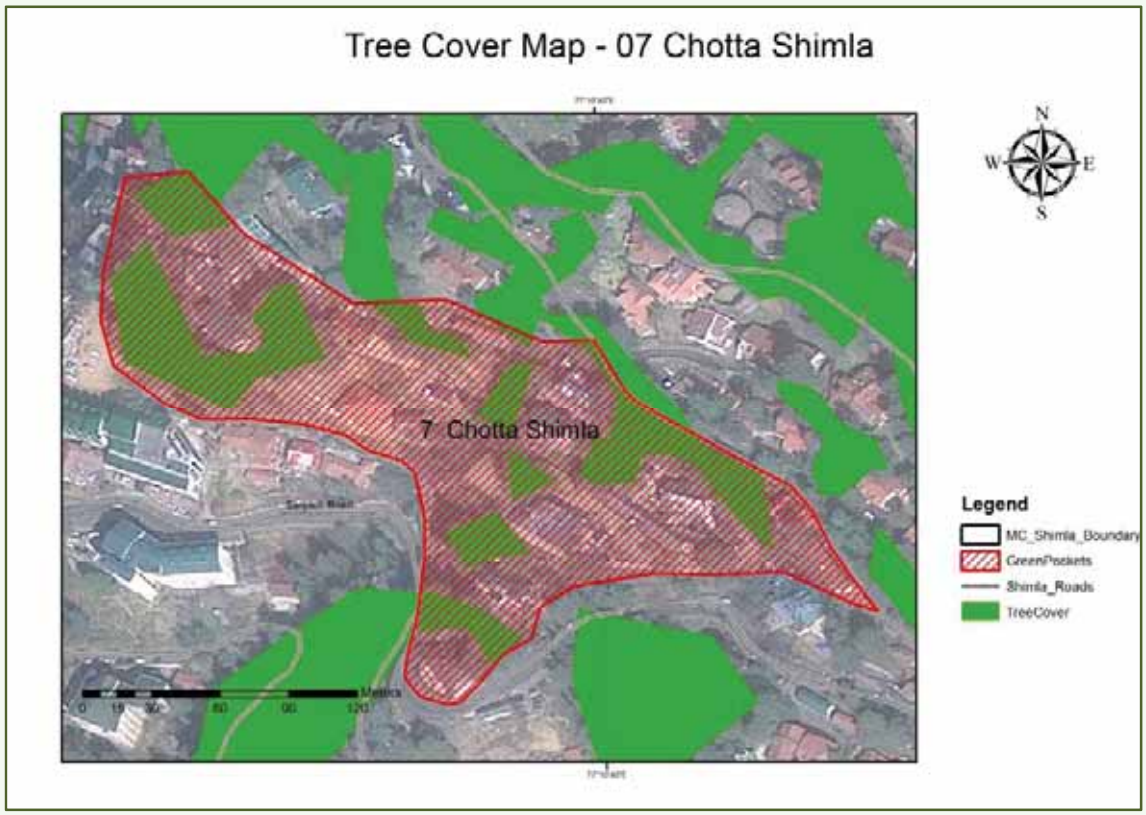

Tree Cover Map - 02 Nabha
2 Nabha
N
W
E
S
Legend
GreenPockets
Shimla_Roads
TreeCover
Meters
0 40 80 160 240 320

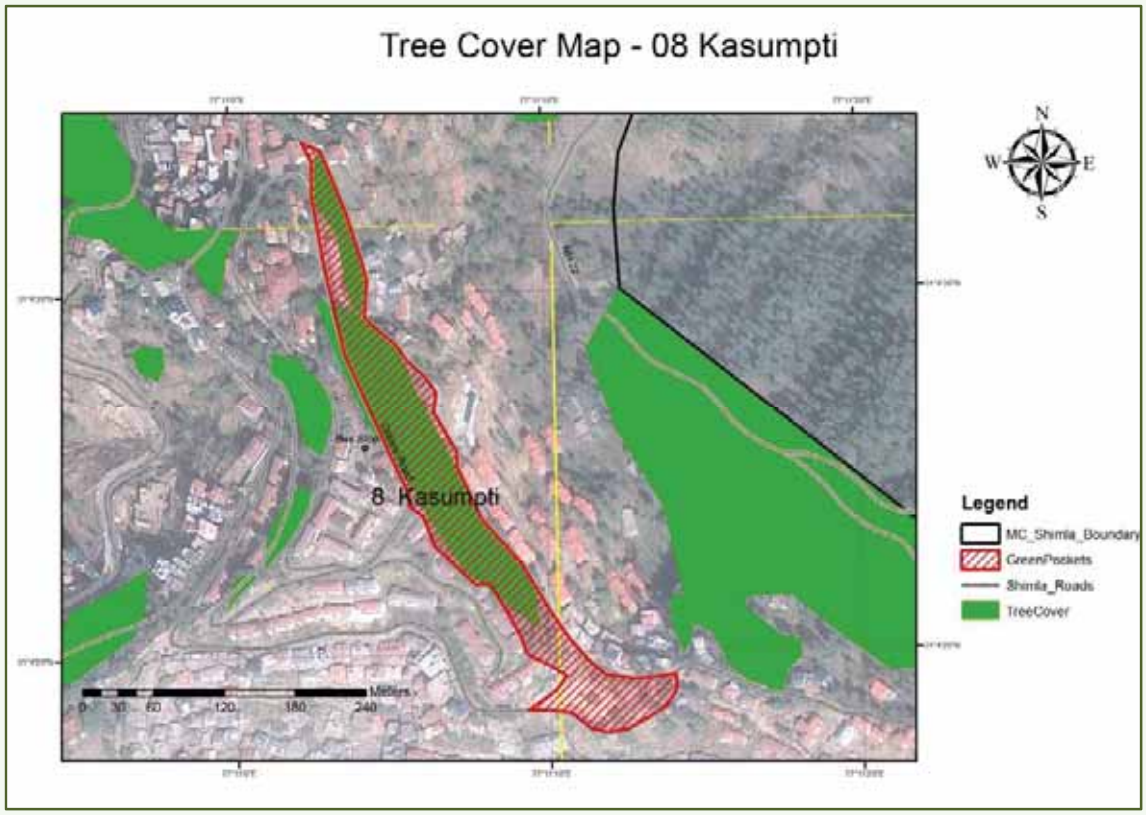

Tree Cover Map - 03 Phagli Lalpani
3 Phagli-Lalpani
N
W
E
S
Legend
GreenPockets
Shimla_Roads
TreeCover
Meters
0 55 110 220 330 440


Tree Cover Map - 04 Bamloe
4 Bamloe
N
W
E
S
Legend
GreenPockets
Shimla_Roads
TreeCover
Meters
0 55 110 220 330 440


Tree Cover Map - 05 Himland
5 Himland
N
W
E
S
Legend
GreenPockets
Shimla_Roads
TreeCover
Meters
0 20 40 80 120 160

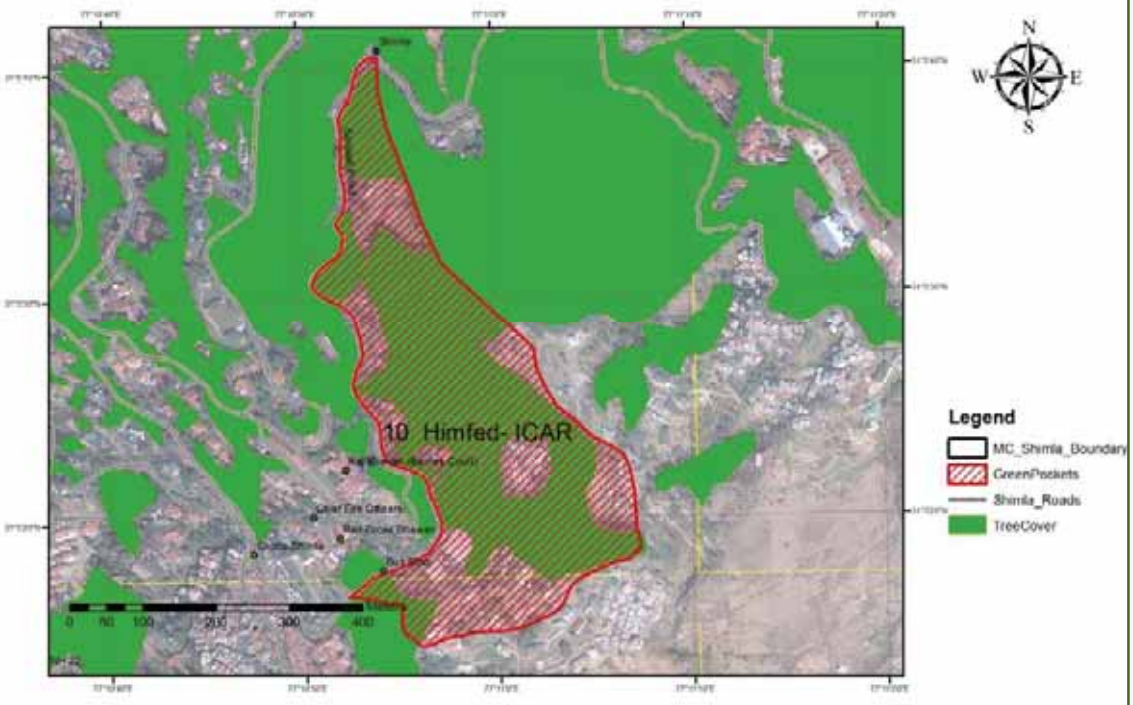

Tree Cover Map - 06 Khalini Chotta Shimla
6 Khalini Chotta Shimla
N
W
E
S
Legend
MC_Shimla_Boundary
GreenPockets
Shimla_Roads
TreeCover
Meters
0 87.5 175 350 525 700

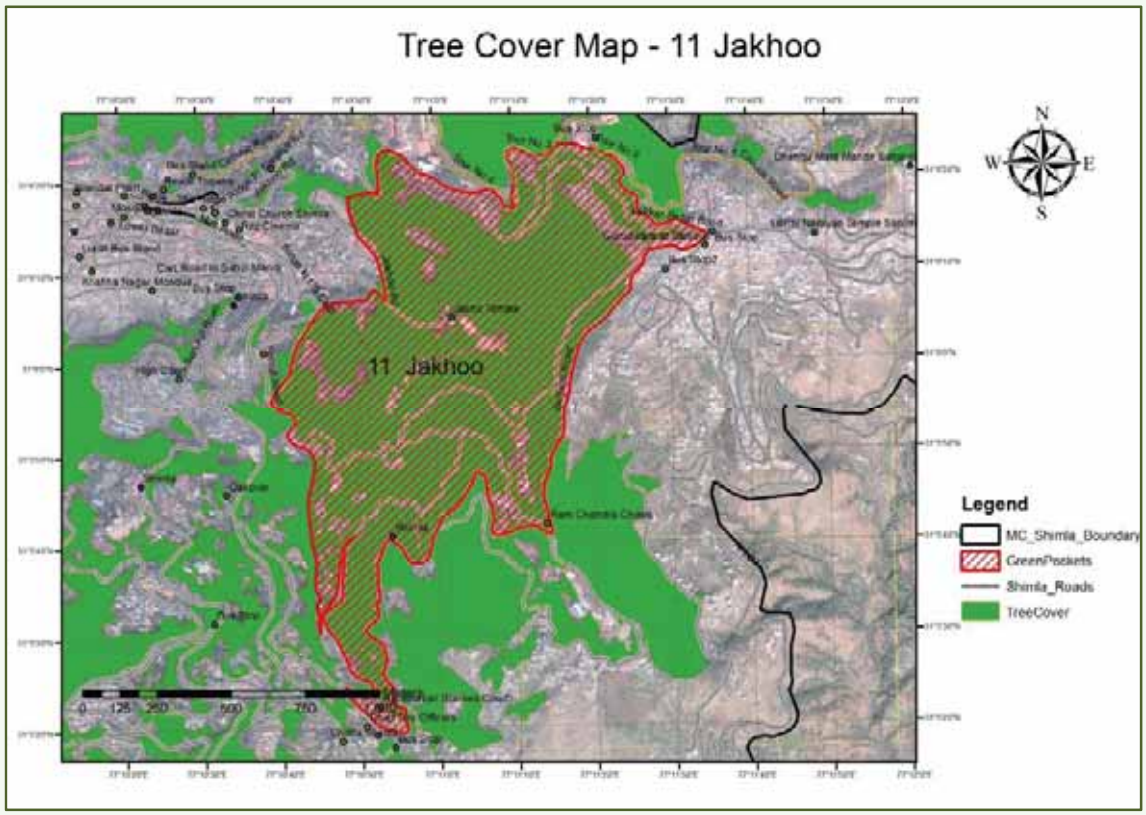

Tree Cover Map - 07 Chotta Shimla
7 Chotta Shimla
N
W
E
S
Legend
MC_Shimla_Boundary
GreenPockets
Shimla_Roads
TreeCover

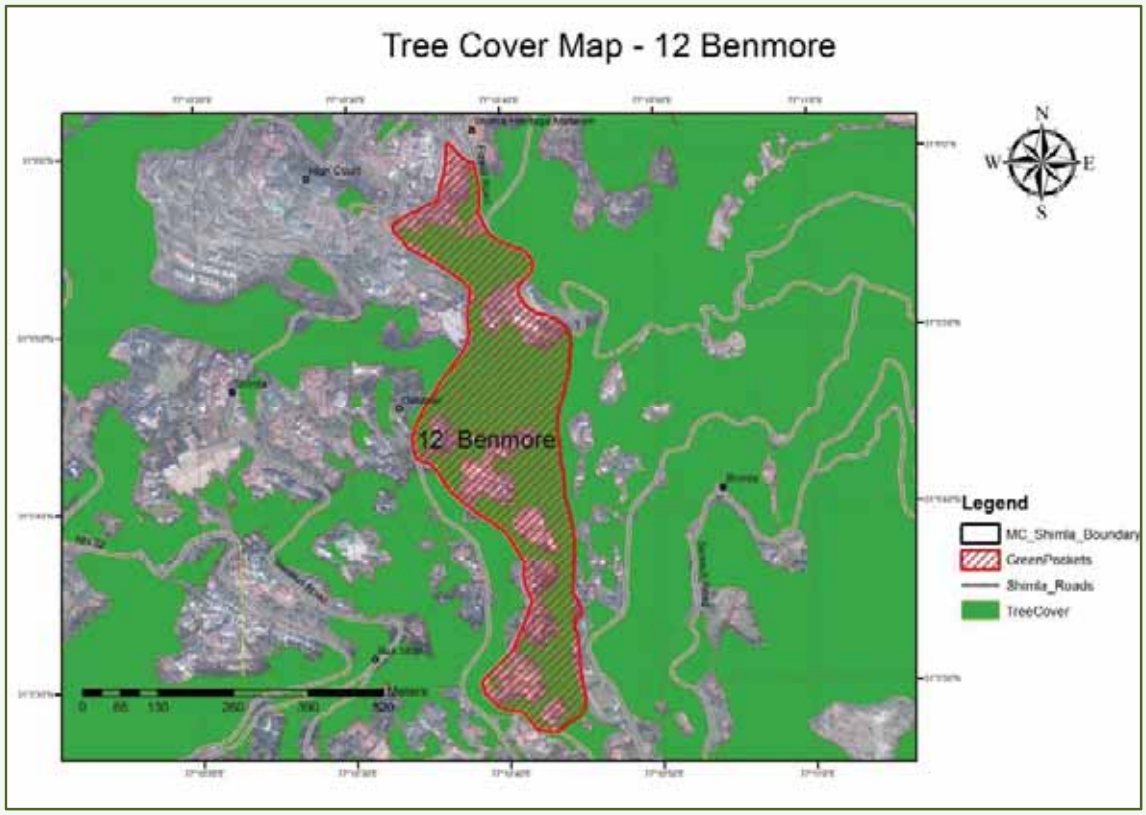

Tree Cover Map - 08 Kasumpti
8 Kasumpti
N
W
E
S
Legend
MC_Shimla_Boundary
GreenPockets
Shimla_Roads
TreeCover

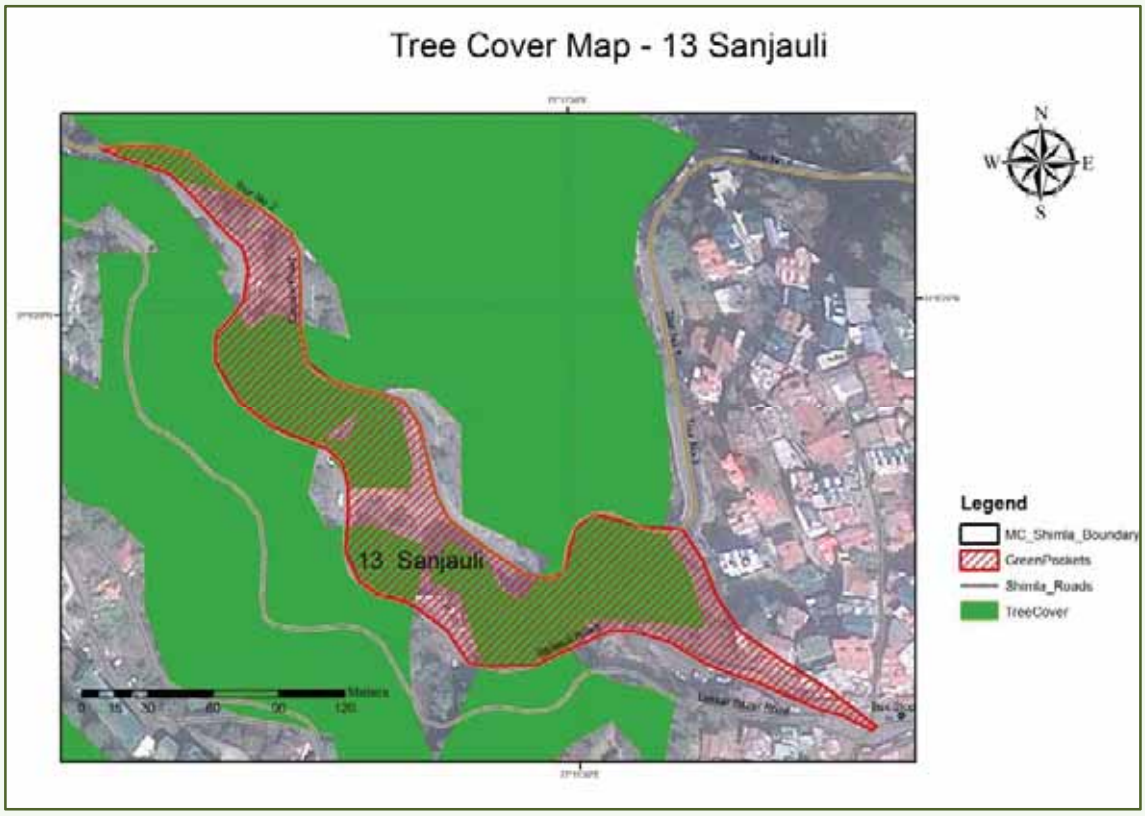
Tree Cover Map - 09 Charlie Villa

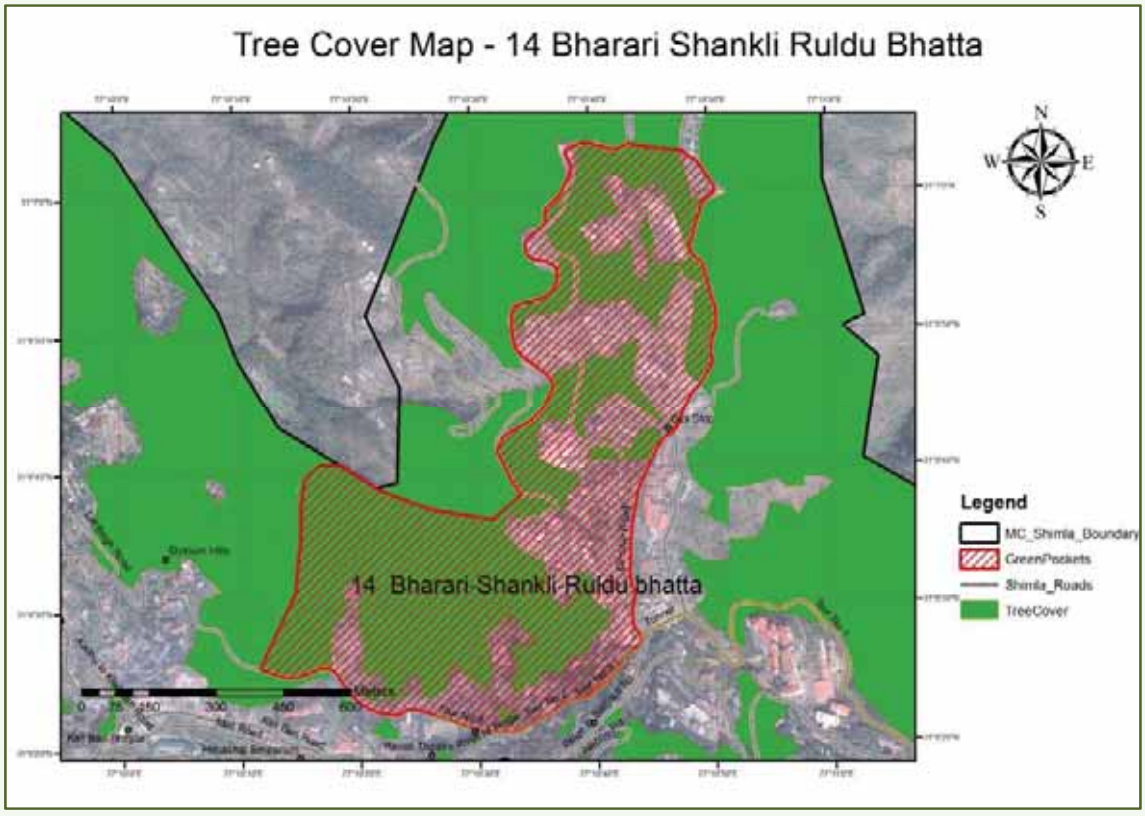
Tree Cover Map - 10 Himland ICAR

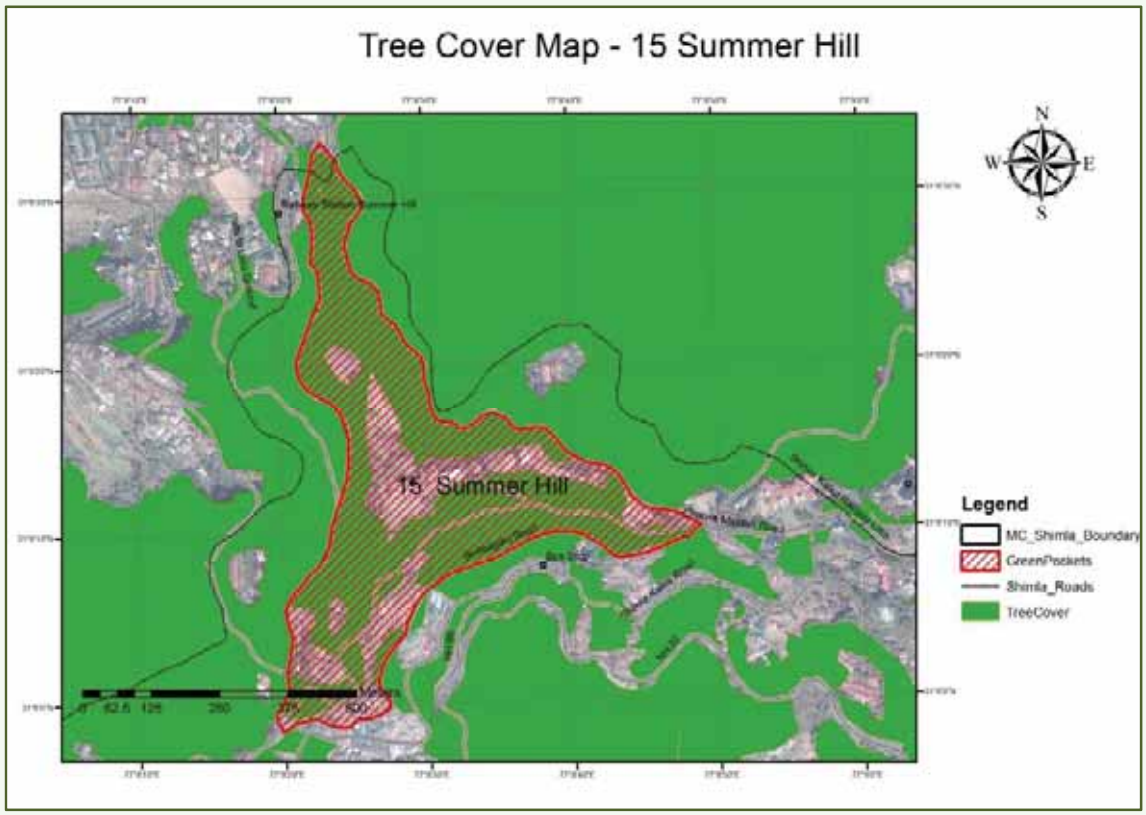


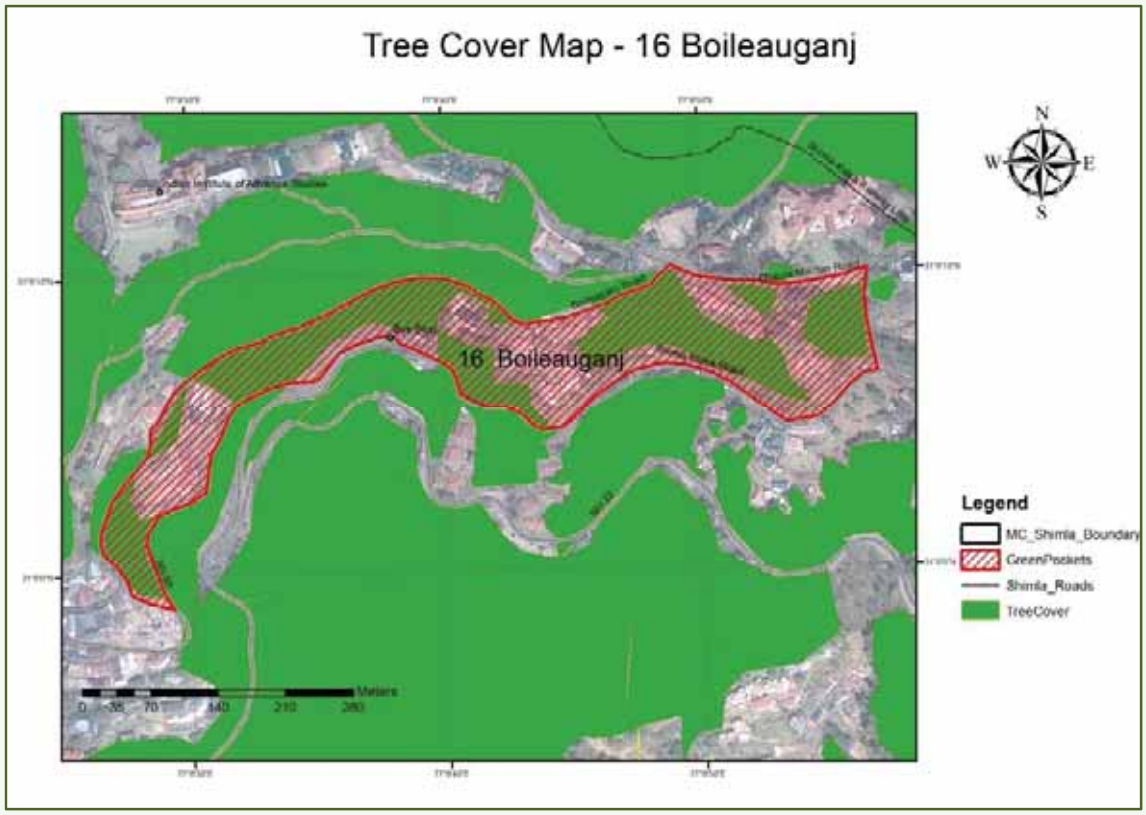

Tree Cover Map - 11 Jakhoo
11 Jakhoo
N
W
E
S
Legend
MC_Shimla_Boundary
GreenPockets
Shimla_Roads
TreeCover

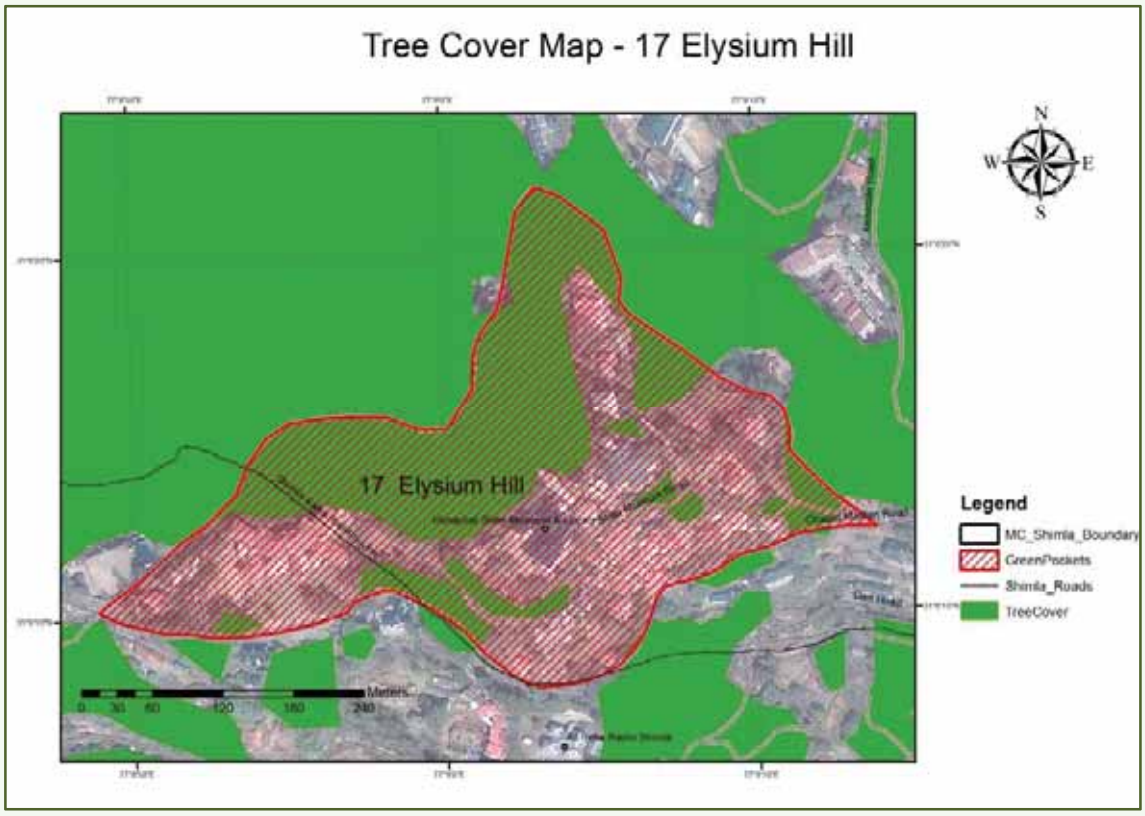

Tree Cover Map - 12 Benmore
12 Benmore
N
W
E
S
Legend
MC_Shimla_Boundary
GreenPockets
Shimla_Roads
TreeCover


Tree Cover Map - 13 Sanjauli
13 Sanjauli
N
W
E
S
Legend
MC_Shimla_Boundary
GreenPockets
Shimla_Roads
TreeCover
Meters


Tree Cover Map - 14 Bharari Shankli Ruldu Bhatta
14 Bharari Shankli Ruldu bhatta
N
W
E
S
Legend
MC_Shimla_Boundary
GreenPockets
Shimla_Roads
TreeCover
Meters


Tree Cover Map - 15 Summer Hill
15 Summer Hill
N
W
E
S
Legend
MC_Shimla_Boundary
GreenPockets
Shimla_Roads
TreeCover
Meters
0 62.5 125 250 375 500


Tree Cover Map - 16 Boileauganj
16 Boileauganj
N
W
E
S
Legend
MC_Shimla_Boundary
GreenPockets
Shimla_Roads
TreeCover
Meters
0 35 70 140 210 280



4.7.2 Flora & Fauna

So far as floral biodiversity is concerned, Ban (*Quercus leucotrichophora*), Deodar (*Cedrus deodara*), Chir (*Pinus roxburghii)* and Rhododendron *(Rhododendron arboreum*), Horse chestnut *(Aesculus indica)*, and Kail *(Pinus wallichiana)* are common, Spruce *(Picea smithiana)* and Silver Fir (*Abies pindrow*) have successfully introduced on the Northern slopes, Cypress (*Cupressus torulosa*) has been successfully introduced on Southern slopes. Mohru oak (*Quercus dilatata*) is found on higher slopes of Jakko. Other common forest genera *include Celtis spp., Cornus spp., Ficus spp., Ilex spp., Pieris spp., Prunus spp., Populus spp., Pyrus spp.* and *Salix spp*. Among exotics may be mentioned *Acacia dealbata, Ailanthus glandulosa* and *Robinia spp.,* all of which have been extensively planted in the past or recent years, and are very valuable from the forest point of view. Among the common shrubs are *Daphne desmodium*, *Indigofera spp., Plectranthus spp., Prinsepia spp., Rosa spp., Rubus spp., Rumex spp., Spiraea spp. and Viburnum spp.*

The stock is irregular, and all degrees of density are found, but three distinct types of forests are recognizable, namely, deodar, oak forest with an irregular second storey of conifers and Chir forest.

(a) Deodar: occurs throughout the area except in the lowest belt of Chir and forms almost pure forest over about a third of the area. Many fine crops of deodar are found, notably on the slopes above Annandale and on the western slopes of Jakhoo. Improvement felling in the past removed many older stems including most of the unsound and malformed trees. Thinning have operated regularly at a 10 years average interval for forty years, so that the immature forest of seedlings to poles described by Hart, now consist of greatly improved tree and pole forest. During last forty years deodar has been sown or planted extensively and deodar forest now covers an appreciably larger area than it did formerly. Natural reproduction is not so satisfactory on suitable soils, but owing to grass cutting, grazing etc., planting is the best method for restocking. As usual in western Himalayan forest the quality varies constantly from place to place: many of the trees on spurs being of iv quality class, while some of those in pockets are of I quality class. Although the average quality is probably only iii quality class, its beauty, comparative drought and fire resistance, and the value of its timber combine to make deodar the best tree for Shimla.

(b) Ban: at one time predominantly oak forests occupied about half the area of Shimla and the oak still predominates over large areas. Heavy coppice fellings combined with planting of Deodar, *Robinia* and Horse chestnut etc have greatly reduced the total area under oak, and there are extensive areas of mixed forests where oak coppice frequently forms an under storey. Very well oak is produced in the more fertile areas such as glen valley, and elsewhere oak is extremely useful on clayey and shallow soil. Results of coppicing oak have varied considerably; in the glen valley forests, coppicied during the past 10 years, the results are good. Natural regeneration of oak appears to be poor, but this may be due to grass cutting. It is too early to judge results of planting recently undertaken.

(c) Chir: Chir forest occupies extensive areas at lowest elevation and on hot slopes. The main blocks of pure Chir forest occur north of the main ridge above the central northern boundary and south of the main ridge in the north western portion, but Chir in mixture is found along most of the lower boundary except in the eastern portion. Above this zone Chir is found in mixture with oak, deodar and Kail. A few old Chir trees are still to be found up to elevations of 7000 feet or more, and there is ample evidence to show that, owing to protection from fires and browsing, Chir pine above its normal zone has been replaced by Deodar, Oak and Kail.

Owing to the presence of the villages in the neighbour hood and the necessity of granting rights or concessions the Chir forest is more heavily grazed than other types. A large proportion of the mature trees were removed during the war and the present woods consist mainly of poles. Thinning has operated several times, and the condition of the forests is satisfactory considering that it occupies some of the most sterile slopes.

The three main types tend to merge, and this is specially the case with the oak which was rightly included by the plan under revision in the Mixed Working Circle. The following species may be briefly mentioned:

Kail was probably more extensive at one time; single trees and groups are found scattered throughout Shimla, but many of them are diseased owing to lopping in the past. The most extensive Kail areas lie between the Glen valley and the Chhaba nala.

Horse chestnut regenerates naturally in some of the more fertile valleys and grows well on suitable sites. During the past 10 years it has been extensively introduced on shallow soil with poor results.

Bird cherry does well on steep slopes and deserves more extensive planting.

Willows have proved most useful for planting up slips and the weeping willow is one of the most beautiful trees in Shimla.

Robinia has been extensively planted throughout Shimla and is most useful for restocking blanks with a reasonably loose soil. It coppices and has spread extensively by root suckers.

Acacia dealbata is specially suitable as a first crop on bad ground, and has done extremely well on shallow soiled slopes near Sanjauli and in the catchment area; it also spreads extensively by root suckers.

Ailanthus glandulosa introduced some years ago at Annandale did so well that it has been extensively planted during the past three years and shows great promise on loose soils.

Ligustrum lucidum is useful as a shade bearer and the two last named species are worth planting in the Chir pine areas, where a broad leaved mixture is most desirable.

The list of exotic species growing in Shimla and Catchment area
Broad Leaved Species

Name of the Species	Name of the Place
Abutilon spp.	Ridge
Acacia decurrens	Tara Devi
Acacia dealbata	Common
Acacia podalyriaefolia	Glen, Emma villa, Seog
Acer ginala	Glen, Talland and Seog, Ladies' Park
Acer negundo	Talland
Ailanthus glandulosa	Common
Ailanthus vilmorniana	Seog
Ampelocissus quinqefolia	Common
Ampelocissus veitchii	Common
Buddleia lindleyana	Common
Buddleia variabilis	Common
Crataegus oxyacantha	Tara Devi
Carya alba	Glen
Castanea sativa	Sanjauli, Annandale, Gahan

Catalpa spp.	Imperial Bank, Ridge, Glen
Cercidiphyllum japonicum	Glen, Bishop Cotton School
Cestrum parqui	Glen, Talland, Gahan, Sanjauli, Ladies' Park
Cinnamomum camphora	Annandale
Clematis tangutica	Ridge, Peterhoff
Clerodendendron fargesii	Glen, U.S Club, Municipal Forest office, Ridge and Seog
Cydonia japonica	Annandale, Emma villa, Ladies park
Cytisus spp.	Ridge, U.S. Club, A.H.Q., and below Benmore
Diervilla florida	Tara Devi
Erythrina umbrosa	Tuti Kandi, Glen and Sanjauli
Eucalyptus globules	Below A.H.Q.
Eucalyptus viminalis	
Eucalyptus regnans	Glen
Euonymus japonica	Common
Exochorda grandiflora	Glen, Ridge and Seog
Gleditschia triacanthos	Mall from Snowdon to Sanjauli, Tallland, Seog, Glen
Grevillea robusta	Tara Devi, Emma Villa
Hibiscus syriacus	Common
Hydrangea hortensia	Common
Juglans spp.	Annandale, Glen
Kerria japonica	Annandale, Melville Cottage
Koelreuteria paniculata	Glen, Seog
Laburnum vosii	U.S. Club, Glen, Viceregal retreat
Lagerstroemia indica	Annandale
Ligustrum lucidum	Common
Ligustrum vulgare	A.H.Q.
Liriodendron tulipifera	Viceregal Gardens, A.H.Q.
Lonicera japonica	Common
Magnolia grandiflora	Annandale
Mandevillea sueveolens	Viceregal Gardens, Glen valley, Ridge
Myrtus communis	Cheriton Shimla- W
Passiflora caeruulea	Common
Passiflora incarnate	Glen, Ladies Park
Paulownia imperialis	Common
Piptanthus forestii	Glen, U.S. Club
Pittosporum tobria	Talland
Platanus orientalis	Ridge
Populous alba	Annandale, Cpts. 29 and 30, Glen, B.C. School
Populous nigra	Nabha Estate, Glen
Prunus laurocerasus	Common
Pterocarya stenoptera	Glen, Talland, Municipal Forest Office

Pyrus aucuparia	Mashobra
Quercus pedunculata	Corner house near Sanjauli, Talland
Robinia pseudoacacia	Common
Robinia viscose	Glen(Cpt. 10), Cpt.24 and 34 above Cart road
Salix babylonica	Common
Salvia jeucantha	Common
Sambucus nigra	Common
Solanum jasminoides	Common
Sophora japonica	Cpts. 6B, 10, 32 and Seog
Spartium junceum	Common
Spiraea cantoniensis	Common
Syringe vulgaris	Ridge and other Gardens
Tecoma grandiflora	Viceregal Gardens, Barnes Court, Emma villa
Tecoma radicans	Common
Tilia spp.	A.H.Q. Benmore, Glen, Viceregal Lodge, B.C. School
Trachycarpus excels (or takil)	Common
Ulex europaeus	Glen, Tara Devi
Viburnum opulus	Tara Devi
Vinca major	Common
Wisteria sinensis	Common
Zelkova keaki	Benmore, Glen, Grand Hotel

Conifers

Name of the Species	Name of the Place
Araucaria bidwilli	Annandale
Chamaecyparia obtusa	Annandale
Cryptomeria japonica	Common, Plantation in Glen, Cpt. 10, Cpt. 3, Seog
Cunninghamia lanceolata	Barnes Court, Annandale, Glen, Talland and Seog
Cupressus arizonica	Hotel Cecil, B.C. school, Elysium, Summer hill, Glen, Sanjauli Cpt. 24, Seog
Cupressus funebris	Common
Cupressus jusitanica	Prospect Hill, Glen, B.C. School, Cpt. 32 and Seog
Cupressus sempervirens	Near Railway Station, Cpts. 22, 24. Elysium, Ladies' Park and Seog
Ginkgo biloba	Corstorphans, Talland, Benmore
Juniperus procera	Summer Hill, Gahan, Glen, B.C. School, Cpts. 6(b). 10,22,24 and Seog
Juniperus procumbens	Below G.P.O
Larix europaea	Viceregal Gardens
Picea pungens	Tara Devi
Pinus austriaca	Near Sanjauli

Pinus hartwegii	Cpt. 22(a), Elysium
Pinus patula	Elysium, Glen, Mall, B.C. School, Cpts. 10, 24, 32, 34 and Seog
Pinus pinaster	Elysium
Pseudolarix kaempferi	Glen Cpt. 6(b)
Thuja orientalis	Common
Thujopsis dolobrata	Annandale

Shimla Water Catchment Sanctuary is located at an altitude which varies from 1900 meters to 2620 meters. It was first notified as a sanctuary on 29th July 1958 and re-notified on 4th December 1982. This is one of the few sanctuaries in Himachal Pradesh free from habitation; this area has been preserved since the last century as the catchment area providing water to Shimla town. It was earlier the part of the Koti State and came under the State control in 1947-48. It has perhaps the highest density of 'Koklas Pheasant' among the State's national parks and sanctuaries.

Mammals: Leopard, Rhesus Macaque, Barking Deer, Pine Martin, Musk Deer, Himalayan Yellow Throated Porcupine, Goral, Indian Sambar, Kashmir flying Squirrel and common Langur.

Pheasants: Red Jungle fowl (Gallus Gallus), Chir Pheasant (Catreus Wallichii), Khalij Pheasant (Lophura Leucomelanos)

Himalayan National Park situated about 18 km from Shimla, at over 2,600 metres altitude, the Himalayan Nature Park is located amidst 90 hectares of temperate vegetation that forms natural habitat for many a wild animals of the Western Himalaya. The animals in the Nature Park include Musk Deer, Bharal, Black Bear, Tibetan Wolf, Leopard Cat, Sambhar, Ghoral, Barking Deer, Monal, White Crested Kaleej and Cheer pheasant.

Nature Park, Kufri in these park rare varieties of Hangal, Barking Deer, Musk Deer, Brown Bear, jackals, bonnet macaques, jungle cats, sloth bears, Foxes. Faunal list of Shimla area is given as under:

S.No.	Common Name	Scientific Name
1)	Alexandrine Parakeet	*Psittacula eupatria*
2)	Barn Swallow	*Hirundo rustica*
3)	Bar- tailed tree Creeper	*Certibia bimalayana*
4)	Black Drongo	*Dicrurus macrocerus*
5)	Black Kite	*Milvus migrans*
6)	Black- lored Tit	*Parus xanthogenys*
7)	Blue whistling Thrush	*Myophonus caeruleus*
8)	Common lara	*Aegitbina tipbia*
9)	Common Myna	*Acridotheres tristis*
10)	Great Barbet	*Megalaima virens*
11)	Great Tit	*Parus major*
12)	Green- backed Tit	*Parus monticolus*

13)	Grey tree Pie	*Dendrocitta formosae*
14)	Himalayan Bulbul	*Pycnonotus leucogenys*
15)	House Sparrow	*Passer domesticus*
16)	Indian Silverbill	*Lonchura malabarica*
17)	Large- Billed Crow	*Corus macrorhynchos*
18)	Little Forktail	*Enicurus leschenaultt*
19)	Oriental Turtle Dove	*Streptopelia orientalis*
20)	Pied Bush chat	*Saxicola caprata*
21)	Plain prinia	*Prinia inomata*
22)	Plum headed Parakeet	*Psittacula cyanocephala*
23)	Red Adavant	*Amadava amadava*
24)	Rock Pigeon	*Columba livia*
25)	Rufos- bellied Wood Pecker	*Dendrocopus hyperythrus*
26)	Rufos- naped Tit	*Parus rufonuchalis*
27)	Scaly- breasted Munia	*Lonchura punctulata*
28)	Verditer Flycatcher	*Eumyias thallasina*
29)	White throated Dipper	*Cinclus cinclus*
30)	Yellow- billed Blue Magpie	*Urocissa flavirostris*
31)	Yellow-crowned Wood pecker	*Dendrocopus mabrattensis*

4.7 Socio-economic Environment

Baseline data on the socio economic environment in the study area has been collected. The issues to be focused include demographic structure, economic activity, education, literacy profile, land use, health status and infrastructure resources. Primary data within the study area has been is collected besides data from secondary sources the demographic details consisting of population distribution, Average household size, population density, sex ratio, social structure and literacy levels within the study area are concluded from the data so collected.

4.7.1 Demography

Shimla city consists of the Shimla Municipal Corporation and Shimla planning areas (SPA). The SPAs are Dhalli, Tutu, and New Shimla urban agglomerations. In 2011 the total population of District Shimla was 813,384 compared to 722,502 of 2001. Male and female population was 424,486 and 388,898 respectively.

Population Growth for Shimla District recorded in 2011 for the decade has remained 12.58 percent. Same figure for 1991-2001 decade was 17.02 percent. Total Area of Shimla District was 5,131 with average density of 159 per sq. km. Shimla Population constituted 11.86 percent of total Himachal Pradesh Population. Sex Ratio of Shimla District is now 916, while child sex ratio (0-6) is 922 per 1000 boys. Children below 0-6 age were 80,778 which forms 9.93 of total Shimla District population. Average Literacy rate for Shimla District is 84.55 percent, a change of from past figure of 79.12 percent. In India, literacy rate is counted only for those above 7 years of age. Child between 0-6 ages are exempted from this. Total literates

in the Shimla District increased to 619,427. Resident population of MC Shimla according to 2011 census was 1,69,758 persons.

The population projections have been made for the year 2011 and 2021. It is anticipated that there will be a population of 2,35,970 and 3,18,560 respectively. The increasing trends of migration and decreasing death rate will affect the projected population. Shimla's changing socio-economic conditions and better amenities are now the major pull factors for rural population migrating to the city. If the migration is unchecked, no doubt, it will have its adverse effect on the growth of population and overall development of Shimla City. Apart from resident, projections for floating population for Shimla town is also made as under:

Floating Population of Shimla- Existing and Projected

Year	Floating Population	% Decadal Growth Rate
1971	23459	36.00
1981	30000	31.74
1991	40000	31.70
2001*	56000	40.00
2011*	76000	35.00
2021*	100000	31.00
		** Projected Source: Town and Country Planning Department, Shimla*

4.7.2 Employment

Employment is largely driven by the government and tourism. Being the administrative capital of the state of Himachal Pradesh, the city houses several central and state government offices. Government jobs account for almost half (47%) of the working population. Direct hospitality industry personnel such as tour guides, hotel and restaurant employees, etc., are few (10%). Individual crafts and small scale industries, such as tourist souvenir production and horticultural produce processing, comprise most of the remainder. In addition to being the local hub of transportation and trade, Shimla is the area's healthcare centre, hosting a medical college and four major hospitals: the Indira Gandhi Hospital (formerly known as Snowdon Hospital) Deen Dayal Upadhyay Hospital (formerly called Ripon Hospital,) Kamala Nehru Hospital, and Indus Hospital. The city's development plan aims make Shimla an attractive health tourism spot. The unemployment rate in the city has come down from 36% in 1992 to 22.6% in 2006. This drop is attributed to recent industrialization, the growth of service industries, and knowledge development.

4.7.3 Religious Centres

The Major religious centres of the city are:

- The Kali Bari temple, dedicated to the Hindu goddess Kali is near the mall.
- Jakhoo Temple, for Lord Hanuman is located at the highest point in Shimla.
- Sankat Mochan, another Hanuman temple, located on Shimla-Kalka Highway about 10 kilometres from the city.

- The nearby temple of Tara Devi is a place for performing rituals and festivals.
- Gurudwara near the bus terminus
- Christ Church: Situated on the Ridge, is the second oldest church in Northern India.

4.7.4 Health Services

The city provides very good and effective health services in Shimla. People across from State come here for treatment and health care. The main Government Hospitals are as follows:

- Indira Gandhi Hospital, Shimla
- Kamla Nehru Hospital, Shimla
- DDU Zonal Hospital, Shimla
- Regional Ayurvedic Hospital, Shimla

Apart from above public health service provides there are many other private hospitals providing health services in and around Shimla town.

4.7.5 Education Facilities

Shimla, the Queen of the Himalayas is a heart of quality education. Since the British India, Shimla had been the hub of good schools. Almost all the schools are affiliated either with ICSE council or the CBSE board. The small city also has medical, dental, engineering as well as MBA College. Shimla is home to Himachal Pradesh University and all the degree colleges are affiliated to Himachal Pradesh University. Famous Public Schools like Jesus & Mary, Auckland House School, Tara Hall, St. Edwards, Bishop Cotton School etc. have very good reputation, not just in the local area, but also in other parts of the country.

Degree Colleges under Himachal Pradesh University, Shimla:

- St Bedes College, Shimla.
- Government Degree College, Sanjaulli, Shimla
- Rajkiya Kanya MahaVidayaliya (RKMV)
- G B Pant Memorial Govt. College, Shimla
- H P U Evening College, Shimla
- Institute of Vocational Studies

Medical & Dental College under Himachal Pradesh University, Shimla:

- Indira Gandhi Medical College, Shimla
- H P Government Dental College & Hospital, Shimla

Apart from above there are many private institutions and colleges providing education in and around shimla.

4.7.6 Tourist Centres

Shimla is a major tourist spot of India. The main tourist centers in city are:

- The Mall
- The Ridge
- Christ Church- At the Ridge

- Jakhoo Hill- 2 km. from the Ridge, at a height of 8000 ft, Jakhoo Hill is the highest peak in Shimla.
- Institute of Advance Studies- This institute is housed in the Viceregal Lodge, built in 1884-88.
- State Museum- Asides with the Institute of Advance Studies
- Annadale- 2-4 km. from the Ridge at a height of 6,117 ft is a favourite spot for cricket, picnics and polo.
- Summer Hill- 5 km. from the Ridge is the lovely township of Summer Hill at a height of 6,500 ft on the Shimla-Kalka railway line
- Tara Devi- 11 km. from the Shimla bus-stand
- Junga- 26 km. north of Shimla
- Chadwick Falls- A 4 km. long forest road, starting from Christ Church on the Ridge continues along the wooded slopes of Jakhoo Hills

4.7.7 Economy and Industrialization

Shimla industries mainly centre around the small scale industries. Since Shimla is a hill resort, so the construction of big industries is quite impossible in Shimla due to a number of valid reasons like the unavailability of adequate human resource and uneven terrain.

Shimla being an ideal place for a getaway, the tourism industry in Shimla has emerged as a booming one. The tourism industry has been a major source of income for the people of Shimla. The overall scenic beauty of Shimla with the rolling hills and salubrious climate drags domestic as well as foreign tourists. The various other industries of Shimla are Food industry, Hosiery and textile industry, Wood based industry, Paper, glass and leather industry, Fruit Processing industry, Bakery Products industry, Essential Oil industry, Implements of agriculture and horticulture and Jute Bags industry.

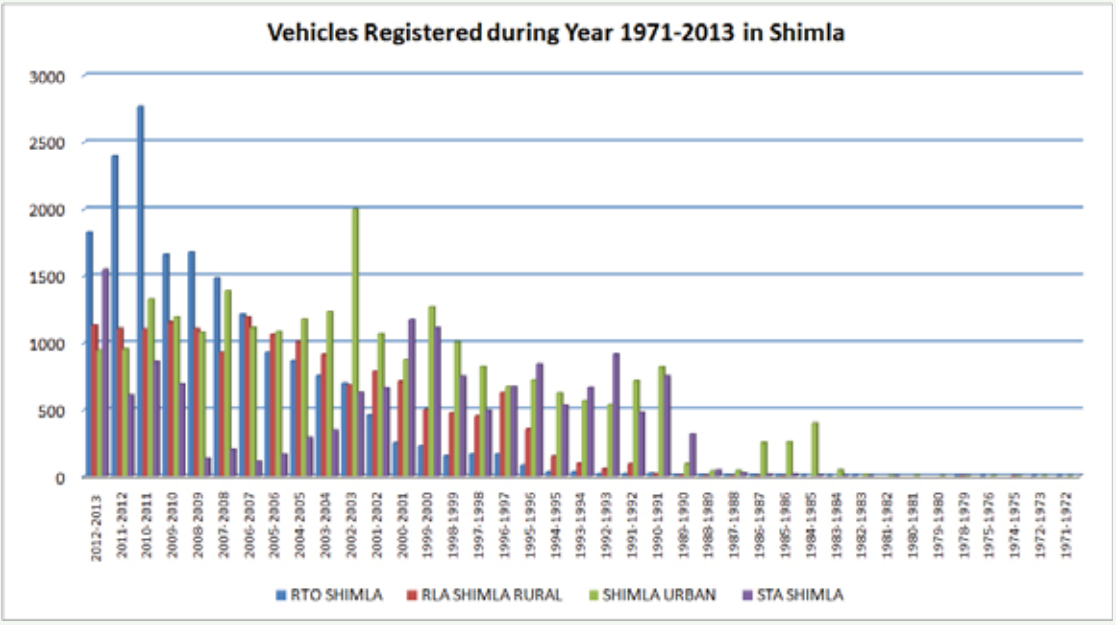
Settlement Wise Workforce

Sr. No.	Category	M.C Area.
1	Cultivators	439
2	Agriculturist	149
3	Household Industry	504
4	Others	53312
	Total	**54404**

4.7.8 Transport Network

Shimla town has serious problem or traffic congestion due to peculiar geography and age old construction. Moreover, the road infrastructure in the town was created in very old times to cater to the needs of the then populations and little progress was made in this regards subsequently. With the passage of time the population and inflow of the tourist increased resulting into increased traffic congestion. Educational institution particularly the schools are the places of traffic bottlenecks which are characterized by regular traffics jam. During the busy tourist season around 3,000 tourist vehicles also fight for space on Shimla's narrow

roads. Vehicles which are registered in Shimla have already crossed its carrying capacity. Graph and table below shows the vehicular population in Shimla during 1971-2013.



Vehicles Registered in Shimla, Himachal Pradesh

YEAR	NAME OF THE AGENCIES				
	RTO SHIMLA	RLA SHIMLA RURAL	SHIMLA URBAN	STA SHIMLA	Total
2012-2013	1826	1131	943	1548	**5448**
2011-2012	2401	1106	952	608	**5067**
2010-2011	2769	1102	1326	858	**6055**
2009-2010	1658	1154	1195	694	**4701**
2008-2009	1678	1104	1077	136	**3995**
2007-2008	1485	927	1390	200	**4002**
2006-2007	1212	1195	1114	110	**3631**
2005-2006	927	1061	1083	163	**3234**
2004-2005	864	1009	1175	288	**3336**
2003-2004	752	912	1233	344	**3241**
2002-2003	700	684	2002	628	**4014**
2001-2002	459	786	1065	659	**2969**
2000-2001	249	712	872	1171	**3004**
1999-2000	228	502	1266	1111	**3107**
1998-1999	153	475	1006	747	**2381**
1997-1998	166	450	821	497	**1934**
1996-1997	166	627	670	669	**2132**
1995-1996	83	354	721	842	**2000**
1994-1995	36	149	623	535	**1343**
1993-1994	37	95	563	663	**1358**
1992-1993	20	58	538	914	**1530**
1991-1992	20	91	715	480	**1306**
1990-1991	25	19	818	749	**1611**
1989-1990	11	7	92	314	**424**

1988-1989	10	4	41	44	**99**
1987-1988	9	4	43	27	**83**
1986-1987	10	1	252	15	**278**
1985-1986	3	1	257	18	**279**
1984-1985	3	-	401	9	**413**
1983-1984	2	-	47	2	**51**
1982-1983	4	-	13	1	**18**
1981-1982	-	-	6	1	**7**
1980-1981	-	-	8	-	**8**
1979-1980	-	-	3	-	**3**
1978-1979	1	1	1	-	**3**
1975-1976	1	-	3	-	**4**
1974-1975	-	1	1	-	**2**
1972-1973	1	-	4	-	**5**
1971-1972	1		1	-	**2**
Total	**19,643**	**16,465**	**25,090**	**16,544**	**73,078**

Source: Deptt. of Transport

The above graph and table reveals that total ~73,078 vehicles have been registered in Shimla and around and this figure is increasing. As a result the situation of traffic is getting worst day-by-day. Photograph taken near old bus stand Shimla itself speaks traffic situation of Shimla town.

4.8 Solid Waste

Present data available on solid waste generated in the area have been collected. The present quantities of wastes – hazardous household wastes, electronic wastes, biomedical and non-hazardous generated in the study has been collected and analyzed.

We know almost all cities in India are faced with environmental degradation and visual pollution from increasing generation of solid wastes and its inadequate management due to population growth and rapid urbanization. Shimla is not different from other cities in this aspect. With increasing urbanization and influx of tourists, solid waste management is daunting task.

In 2000, the Ministry of Environment and Forest, GoI, (MoEF) notified the Municipal Solid Waste (Management and Handling) Rules {MSW (M&H) Rules, 2000} for all Indian cities. The Rules contained directives for all ULBs to establish a proper system of waste management.

To improve the Municipal Solid Waste Management systems in the cities the following seven directives were given:

- Prohibit littering on the streets by ensuring storage of waste at source in two bins; one for biodegradable waste and another for recyclable material.
- Primary collection of (segregated) biodegradable and non-biodegradable waste from the doorstep, (including slums and squatter areas) at pre-informed timings on a day-to-day basis using containerized tri-cycle/hand carts/pick up vans.
- Street sweeping covering all the residential and commercial areas on all the days of the year irrespective of Sundays and public holidays.
- Abolition of open waste storage depots and provision of covered containers or closed body waste storage depots.
- Transportation of waste in covered vehicles on a day to day basis.
- Treatment of biodegradable waste using composting or waste to energy technologies meeting the standards laid down.
- Minimize the waste going to scientifically engineered landfills (SLFs) and dispose of only rejects from the treatment plants and inert material at the landfills as per the standards laid down in the rules.

Shimla Municipal Corporation is responsible for collection, transportation, treatment and disposal of solid waste in SMC limits, while SADA is responsible for SWM services in their respective special areas. However, SMC is providing collection and transportation services is few SADA areas.

SMC has introduced bylaws on Door-to-Door Garbage collection vide notification UD-A(3)-2/2006, dated August 2006 following the directions issued by Hon'ble High Court. The Municipal Corporation Shimla Door to Door Garbage Collection Bylaws, 2006 prohibits littering and promotes participation of community and private sector in collection of waste.

As per MC Shimla's present estimates, the daily waste generation in Shimla City is approximately 86.01 MT. This depicts that waste generation per capita per day is 350 gm/capita/day. The collection of the waste through door to door collection and community bins is approximately 70-75 MT.

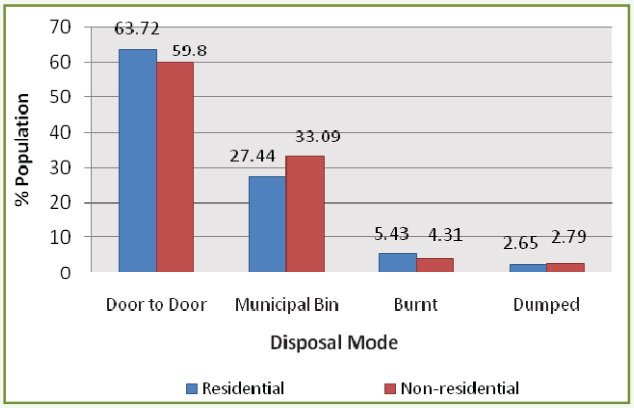
The population growth rate of the city during the last decade has been significant. This type of growth rate may be witnessed in the current decade also. Keeping above factors in view the projected quantity of MSW is 125 TPD by the year 2021 and 200 TPD by the year 2041.

Population growth and SWM generation in SMC area

Head/ Years	2011	2021	2031	2041
Resident Population (Nos.)	1,69, 758	2,56,883	3,49,361	4,18,296
Floating Population	76,000	1,00,000	1,25,000	1,50,000
Solid Waste Generation (MT)	86.01	124.91	166.03	198.90

Source: Projections-City Sanitation Plan for Shimla; 2011 figures are from the Census 2011

According to MCS, approx. 85 % of the residential population is covered under door to door waste collection system, followed by 15% population dependent on the community bins for waste disposal. The door to door waste collection has been initiated in all the wards through the SEHB Society; however the percentage population covered under this system varies from ward to ward. The workers from SEHB are collecting the waste from the entire city but due to shortage of manpower in hilly areas, residents in some areas also have their private collection systems. The commercial establishments (hotels, offices etc) have their own system of collection and do not give the waste to SEHB workers. They deposit their waste directly in the containers provided by the MC Shimla. An overview of the different disposal modes adopted by the residential as wells as non-residential users in Shimla is depicted on graph.



The community bin system comprising of 20 concrete dust bins and 93 small dust bins of 1 cu.m are placed for disposal of waste by the residents in Shimla. Also, there are 148 numbers of dumper containers of 4.5 cum capacity and 54 numbers of dumper containers of 3.0 cum capacity. The frequency of clearing of these bins varies from daily, alternate day, twice a week or even once a week depending on the area. These concrete bins and dumper containers are placed at convenient locations for the residents to access and dispose their waste in an appropriate manner.

The old treatment plant in Shimla established in 1999 is located at Dharni-ka-Baghicha for bio conversion of solid waste into compost. The plant started functioning at the above mentioned site from December 2001 and was initially run by M/s L & T Company on a turnkey basis. Owing to the increase in population and subsequent increase in amount of waste generation, the plant at Darni ka Bagicha was found to be inadequate and gradually became ill managed, leading to environmental degradation and public nuisance. After Public Interest Litigations were filed in the Hon'ble High Court, the H.P. Government decided to shift the plant to its new location in Bharial.

The Cities can have substantial impact on regional carrying capacity thresholds through their concentration of activity. The environmental implications are diverse and manifest themselves in a number of different ways. The quality of life in city is determined by its natural resources and environmental quality. But it is under pressure for municipal solid waste management point of view. It is not that the efforts are not made but the public at large citizen of town are largely responsible for creating pressure due to irresponsible attitude towards environmental conservation.

Chapter 5 - Existing Environmental Issues & Problems in Shimla Planning Area

As discussed there are definite direct, indirect and cumulative impacts, predictable impacts, local and wide spread impacts, long term and short term impacts. The report preferable give to cover all these impacts. Suitable avoidance/ mitigation methods have been given/ discussed here.

5.1 Land Environment

The availability of land is big concern in Shimla and whatever land/ space is left has various problems such as illegal dumping of debris, muck, uprooting of trees etc. This has affected the hydrological regime of the ecosystem as the soil quality is not good. There are noticeable incidents of slippage of soil, erosion etc.

Soil erosion is an important parameter which needs to be addressed for developmental activities of any type. Some of the mitigation measures which are required in Shimla area are:

- Create vegetative cover on the sites on which developmental activity has already been done and not to disturb the vegetation in adjacent areas at all. No land clearing activities should be done.
- Landscape, open areas, create eco sensitive zones.
- Paved areas to be installed with permeable paving.
- Check dams built near muck dumping sites to reduce the quantity of eroded soil particles reaching free-flowing streams of downstream areas.
- Action for retaining the natural topography of the area or design the landscape with at least 15% to 25% of the area. Parking areas, walkways and landscaping should be created and considered in Shimla planning area.

5.2 Water Environment

Water demand and supply in Shimla has huge gaps, the total demand for permanent and floating population of 2,84,635 person is 39.85 MLD. However, only 33 MLD water is available.

The hydrological regime plays very critical role in water availability in the downstream areas of Shimla town from where the water is lifted for Shimla habitat. The water supply is already erratic and therefore needs to evaluate qualitatively as well as quantitatively. There is a need of urgent actions to be taken to resolve this issue.

Measures for reducing water demand are already demanded by service provider agency in Shimla town, water demand and supply is already on pressure.

- **Monitoring of water use.**
- **Use of water saving devices/ fixtures:** About 40% of all water used indoors is in the bathroom and toilets and more than 10% of that used is in the kitchen.
- Installation of dual pipe plumbing for using recycled water / rain water can reduce usage of potable water considerably.
- The quantity of ground water usage and waste water generated in different phases is to be estimated based on the population, reuse and recycle activities planned. Quantification of waste water, the treatment plants should be suitably designed. In case of already installed they should be brought to optimum use capacity.
- In townships and developmental areas, it is expected that all the buildings are connected by sewers. Treatment plants normally used for building sewage are based on biological processes.
- In Shimla though the STP's have been installed but not used optimally and the sewage connectivity is not proper, monitoring is not done. The waste water has lead to problems in quality of soil etc.
- **Rainwater Harvesting Structures** are required to be installed. The rainwater harvesting structure to be designed based on the sub-surface characteristics.

5.3 Air Environment

The maintenance of air quality of Shimla is big challenge due to traffic jams, soil erosion dust. The air quality gets affected adversely. The tree cover gives immense protection for air pollutants and therefore needs to be protected at any cost.

The mains concerns during activities whether building or demolition true the emissions generated by various means excavation, vehicles and the machineries. Air Pollution is also caused by areas or point sources such as cities, commercial areas, or by linear sources such as highways. Vegetation buffers minimizes the build–up of pollution levels in urban areas by acting as pollution sinks, therefore, the vegetation in Shimla acts as lungs to the entire habitat.

- A dense belt provides greater shelter immediately to leeward but the sheltered area is not as extensive as when a more permeable zone of vegetation is provided.

- More plantation should be done. Plants are good absorbers of sulphur dioxide. Parks with trees have an SO_2 level lower than city streets, minimize the pollution load.
- Evergreen trees should be planted which are found to be more effective.
- The species chosen for plantation must be resistant to pollutants, particularly in the early stages of their growth.

5.3.1 Noise

Noise pollution though is not big issue here but increase in number of private vehicles, transportation vehicle is matter of concern. Green belts and landscaping are effective means to control noise pollution. Therefore it should be enhanced in and around Shimla town.

Strong leafy trees be planted to act as noise baffles. Shrubs and creepers may also be planted for additional protection between tree trunks. As little hard paving and as much grass as possible should be used.

5.4 Socio- economic Environment

Effective provisions for the basic facilities of sanitation, more drinking water supply facilities, hazard mitigation or machinery etc are required in view of existing/ prevailing conditions. Following are some of the recommendations to be followed:

- Provide clean drinking water to existing population.
- Provide adequate number of decentralized public toilets and urinals for tourists.
- Provide measures to prevent fires incidents.
- Walking zones be created free form traffic.

5.5 Solid Waste

As explained that there are wastes which comprise of excavated and demolition material wastes comprises of domestic, commercial and biomedical wastes being generated for all around the Shimla area in huge quantity. The different types of wastes needs to be handled as per their needs and regulatory requirements. It is not advisable to dispose off all type of wastes in open or forest land and has to be dealt with depending upon their type and characteristics. Building construction leads to generation of sand, gravel, concrete, stone, bricks, wood, metal, glass, polythene sheets plastic, paper etc. as waste.

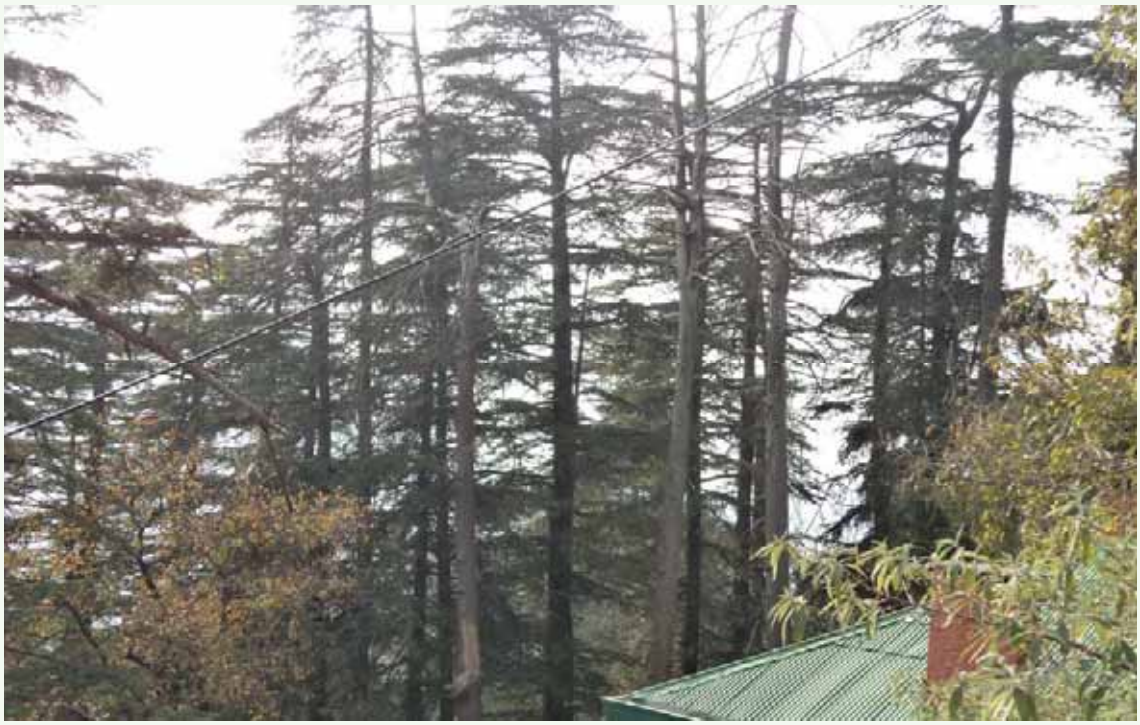
Effective arrangement/ practices are required to be adopted in Shimla town over all in view of existing conditions. The municipal solid waste are not handled as per required norms.

The construction and demolition waste includes debris, concrete everywhere on open and forest along tree cover which needs to be stopped immediately otherwise it will have long term impacts on entire ecosystem viz. hydrology, tree cover and vegetation.

5.6 Biological/Forest Environment

In view of soil conditions and pressure of already existing terrestrial development, tree cover has been affected in Shimla area. The survival rate of plantation is very poor. Uprooting/ tree falling in normal rain has become very common phenomenon.

It needs to be stopped otherwise the entire ecosystem will get adversely affected living long term impacts. The Massive plantation, landscaping required to be ensured in the entire Shimla areas. Species of trees, plants needs to be identified for specific areas so that the plants survive in these conditions.



Chapter 6 - Anticipated Impact

Impacts can be classified in the presentation as direct, indirect and cumulative impacts. These can be further subdivided for convenience and clarity to positive and negative impacts, random and predictable impacts, local and widespread impacts, temporary and permanent impacts, long term and short term impacts. The report preferably cover the facts/aspects as discussed above. Since the matter precisely pertains to the development/ construction of house, buildings etc.

Prediction of Impact of Construction: The activities that take place during construction phases of any site are leveling of site, construction and an erection of old buildings etc., and associated equipments in operation. There are potential impacts on the environment.

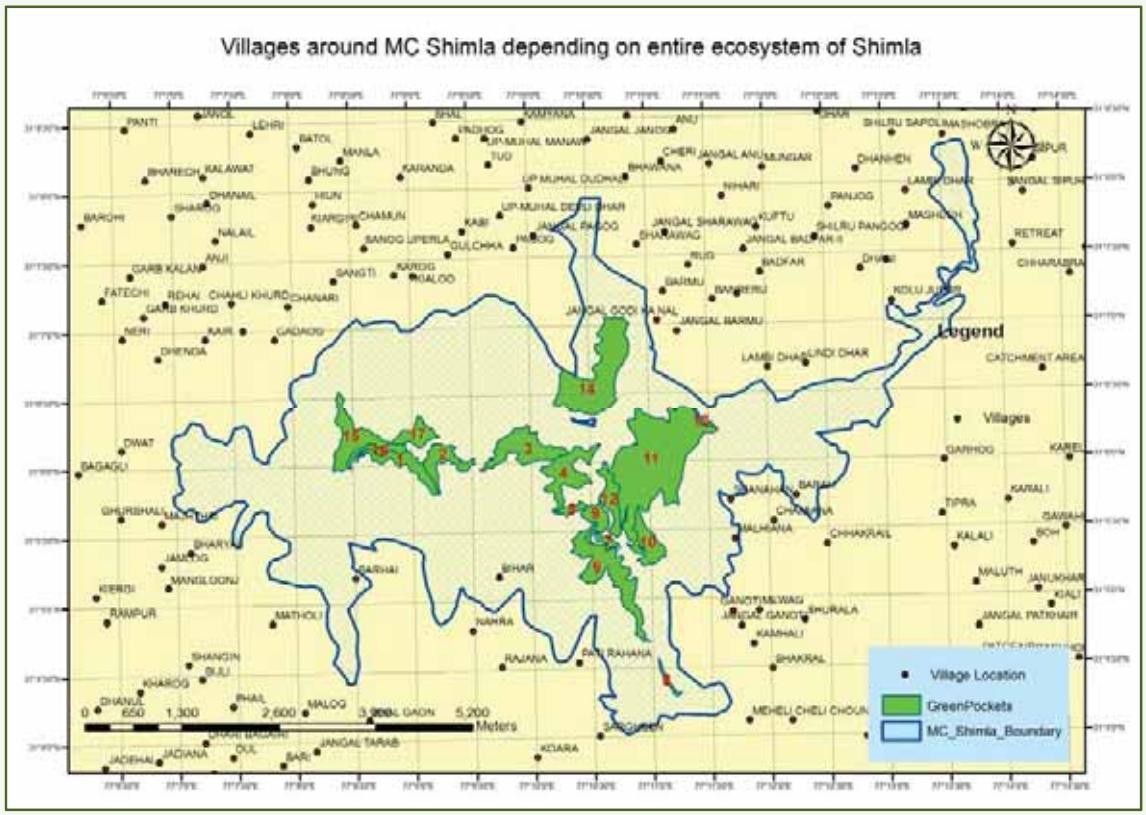
These potential significant impacts are on topography, land use, soil quality, ambient air quality, noise levels, traffic densities, water resources, water quality, biological environment, demography and socio- economics. During construction and operational phase of the various activities, may have impact on some or other environmental parameters. Various environmental attributes are required to be studied during these phases for their overall impact on the surrounding environment. It is not easy to see the problem at once within a very limited period of time. Here we have discussed the impact as follows:

6.1 Land Environment

Impacts due to any such activity has been identified that may be caused could be:

- Direct impact on hydrological regime of downstream ecosystem underground sub surface water quality gets affected.
- Compaction of soils by putting extra load, using earth moving equipments etc.
- Erosion and modification of surface.
- Over exploitation of fertile soils due to site development in a zone sensitive to erosion.
- Soil quality gets adversely affected.

Soil erosion is an important problem both at its source and downstream of the development site. Lost soil will be deposited somewhere, and the either location of the deposition could alter downstream hydrology and increase flooding. It may also pose a water quality issue directly as a result of siltation and indirectly from contaminants carried with or attached to soil particles and later the huge impacts on vegetation/ tree cover. In Shimla about 1,69,578 people are living at present besides downstream areas along Shimla town, about 40,000 people of about 220 villages are directly dependent on this ecosystem so balanced by the uphill catchment i.e. Shimla town. The impact of any further activity is definite on these areas, whether it is water regime or agricultural.



6.2 Water Environment

The construction phase would involve water related issues besides water requirements for the following activities such as site preparation involves levelling for infrastructure development and removal of vegetation. Water is required for dust settlement, consolidation, compaction and curing. Construction of building infrastructure involves water for construction activities and domestic and other water requirements for labour and staff onsite. The water environment gets affected by several means:

- Requirement of large quantities of water in developmental activities.
- Requirement load during the later phase by residence for routine activities.
- Loss of soil water holding capacity, quality and less water available for vegetation.

Changes in surface hydrology alter the flow of water through the landscape. Construction of impervious surfaces such as parking lots, roads, and buildings increase the volume and rate of runoff, resulting in habitat destruction, increased pollutant loads, and flooding. Built or paved areas and changes in the shape of the land also influence adversely groundwater hydrology (i.e., recharge rates, flow, conditions).

Development activities (e.g., construction, commercial or residential development) as well as the spillover effects of development such as increased demand for drinking water and increased auto use can impact water quality by contributing sediment, nutrients, and other pollutants to limited water supplies, increasing the temperature of the water, and increasing the rate and volume of runoff.

Changes in surface hydrology and water quality can have adverse impacts on aquatic species such as fish, plants, and microbes. Increased turbidity, temperature, velocity of flow, and pollutant loads can have direct impacts on the species and their habitat.

6.3 Air Environment

Air pollution has direct and potentially hazardous impacts on human health. Air pollution includes two types: gas emissions, and particulate emissions. If seen at micro level non-hazardous, undesirable air pollution including odors produced from certain manufacturers and fast food restaurants, etc. has already created pressure on air quality of Shimla.

Construction phase would involve site clearances and preparation, infrastructure development, building construction and other related activities and later phase involve impacts from vehicular movement and diesel generators, and negligible emissions from sewage and solid waste handling and disposal.

The building material carrying vehicles as well as the construction activities generate emissions and pollute the environment which normally is ignored has long term impacts on vegetation cover if looked into in pure sense. Dusts including brick and silica dusts, wood dust from joinery and other woodworking and from earthmoving and other vehicle movements within the site. Asbestos-containing dust especially during the demolition of buildings is very harmful. It is a difficult task to separate these wastes. Construction machineries pose a special threat to air quality. It is estimated that construction machineries emit toxic pollutants and are sources of fine particulate matter (PM2.5, which lodges deeply in the human lung) and oxides of nitrogen (NOx), a key ingredient in the formation of ground-level ozone and urban smog. It has very slow but definite impact on soil and forests.

6.3.1 Noise

During the construction phase of the site, the following source of noise pollution is expected:

- Construction equipment, vehicles etc.
- Construction activity.

During operational phase the following sources of noise pollution is expected:

- Vehicular activities,
- Increase in transport noise from within the site from nearby roads.

Noise pollution has a significant impact on both human health and quality of life for the residents of a community. Such pollution is most commonly associated with airports, highway and interstate traffic over the period the noise level has gone up in Shimla town and in case further development is allowed it will add to the pollution levels.

6.4 Socio-economic Environment

The impact on the socio-economic status of the people in the area has been studied and detailed out. Positive impacts could include job creation, infrastructure development and benefits to local population by way of job opportunities. Long term impacts include aspects of demography, aesthetics, and archeological sites. Negative impacts include impacts on livelihood practices depending on water, air quality and cultural aspects etc.

In any township and area development there are severe social impacts. Some of these could include increase in noise and interference with existing access to habitation, storm water drainage and loss of enjoyment of open space. Unhygienic site sanitation facilities cause damage to environment and accordingly the impact on health of people. In Shimla the tourism is the big opportunity as far livelihood of people and that solely dependent of its beautiful environment and in case it is lost the ecology will get affected to a greater extent. Additionally the impact on water resources ecosystem there by on social life of people leaving downstream areas are expected.

6.5 Solid Waste

The construction activities waste comprise of excavated and demolition material while at later stage waste may comprise of domestic, commercial and biomedical wastes, depending upon the activity undertaken but it is seen that pressure is going to increase due to any further development. The different types of wastes need to be handled as per their needs and regulatory requirements. It is not possible to dispose off all type of wastes onto the land and has to be dealt with depending upon their type and characteristics but it is observed that the waste of all kinds are mixed in MC waste and taken to one site without any segregation, treatment and thrown adjoining to forest area/ green area. Building construction leads to generation of sand, gravel, concrete, stone, bricks, wood, metal, glass, polythene sheets plastic, paper etc. as waste. Type of wastes, which are likely to be generated and further added load is classified into four categories.

- Construction or demolition waste, i.e., massive and inert waste.
- Municipal waste, i.e., biodegradable and recyclable waste.
- Hazardous waste.
- E-waste.

The waste characterization in constructional stage estimated by reviewing other similar already existing projects can be analyzed. Similarly, wastes generated in later stage also estimated and classified as Biodegradable, Recyclable, Inert, hazardous waste, over all the pressure impact is certain whether it is during or after the development stage.

6.6 Biological Environment

Loss of plant species and communities could be one of the direct impacts result from, disturbances that cause changes in temperature, light, moisture, and nutrient levels; removal activities (e.g., clearcutting, bulldozing); impacts resulting from air and water pollution (e.g., illegal dumping of MSW, turbidity, eutrophication). Indirect impacts result from changes in natural community processes (e.g., fire) or invasion of non-native plant species. Loss of plant communities also results in decreased water quality (e.g., loss of filter function associated with plant communities), increased erosion as a result of unstable soil, nutrient imbalances in the soil, and/or compaction of soil.

Loss of wildlife and wildlife habitat, like plant communities, wildlife habitat is impacted both from direct and indirect activities associated with development. Alteration, fragmentation, or destruction of wildlife habitat can result in the direct loss or displacement of species and the ability of the ecosystem to support other biological resources such as the plant communities

upon which the wildlife relied for survival. The Shimla town forests are already under pressure and further development will definitely aggravate the pressure; there is no doubt about it.

Loss of natural resources such as quality water supply, clean air, forests, mineral resources, rare-species and recreation opportunities can impact a community's ability to sustain itself over the long term. In case the further development is subjected it will lead to water quality, air quality problems.

Chapter 7 - Discussions

Ecology is the science of the study of ecosystems. Ecological balance is a state of dynamic equilibrium within a community of organisms in which genetic, species and ecosystem diversity remain relatively stable, subject to gradual changes through natural succession and a stable balance in the numbers of each species in an ecosystem. The most important point and concern is the maintaining of natural balance of ecosystem. This balance may be disturbed due to introduction of any type of cause whether it is natural or manmade. There is no doubt about the fact that human population, activities directly affects the ecological balance.

The 17 green areas/ pockets of Shimla are important and integral part of Shimla Town-ecosystem. Over the period on one hand the population of Shimla has gone significantly very high, number of roads, commercial building have increased and on other hand the land resources has decreased, natural resource, have been affected, whether, it is forest, soil, air quality or water quality etc. It is very much clear from the factual comparative analysis of year 2002 & 2013 images of various pockets of Shimla that how along all these green pockets the human habitat has increased haphazardly leading to population load and other pressures by all means. The green land area has declined. There is hardly any space left for further development. It is a fact that this increased development has deep demand of more infrastructural facility such as roads, parking, commercial spaces, water, energy and in turn has put huge pressure on these basic requirements. The impact on soil quality is apart from all this. One need to understand how this entire development has affected the entire ecosystem which has led to depleting of natural resource, land, forest, water etc. not only within the Shimla but also the entire downstream areas.

The solitude and serenity of the hills have been adversely affected, soil erosion, falling of trees in normal rains is very common phenomenon and we have to understand that uprooting of trees has a direct bearing on the ecology.

To allow construction in 17 green pockets and sandwiched plots cannot be dealt in isolation by way of simple assessment of environmental impacts in these pockets, while carrying out environmental impact assessment the entire ecosystem has to be considered as how it is attached to the ecological balance and how it helps in maintaining the water, air, soil quality, in the system. All these components have been discussed as follows in view of the above explained impacts/ results etc:

7.1 Land

Built or paved surfaces prevent infiltration of water into soil, thereby increasing storm water run-off and amount of pollutants transported to receiving water bodies. The direct result is degraded water quality, impact on wildlife, aquatic habitat, uprooting of trees, soil quality etc.

It is evident from the analysis that the water holding capacity of soil in all the 17 green pockets is poor, water holding capacity is the ability of a soil micropores to hold water for plant use. The porosity in ranging between 0.53% - 0.70% which directly affects the soil texture, structure, compaction and organic matter.

The texture of soil is more of coarse type and is not ideal for holding water therefore poor soil quality prevails in the region. It is direct result of the construction activity already taken please in the area and further development of area, construction area within in or outside the Green pocket will adversely affect further the soil quality.

Construction in area will lead to compaction of soil which restricts the rooting depth, decrease pore size. Huge construction in surrounding areas have already been done and soil requires restoration rather than further compaction.

Soil pH is also not very good in the entire study area. Higher levels of Aluminum is observed may be due to low pH (<6.0), Aluminum is toxic to plants, higher concentration of metals affects the activity of soil organisms; thus affects nutrient cycling and enhance disease risk.

The soil cation exchange capacity is also not good as per analysis, and there by affecting vegetation cover.

Shimla is hilly area, slopes are quite vulnerable to damage for site disruption, soil erosion, sediment load. The leftover tree cover is absolutely important support or is the only hope for survival of the ecological balance, no activity leading to loss of soil quality, tree cover can be permitted in the area at the moment. Not only the 17 green pockets but also the entire region i.e. area of MC Shimla needs to be imposed with complete ban on further construction activities whether on private or government land.

Often, slopes are altered to create level areas for the placement of buildings etc. This process is known as "cut and fill." To cut a slope, a section perpendicular to the natural slope is excavated so that a flat area can be created below the natural terrain. A fill slope is the opposite, where it is desired to raise the level area above the natural terrain. Soil is added, and retaining walls are generally used. Cuts are preferable to fills as they are more stable and have generally less impact on surrounding vegetation and off-site views. The problem with fill is that it has a tendency to return to the natural grade. A house built on fill is generally less stable than one placed on natural soils. Unless proper compacting and retaining practices are followed, fill will continue to compress on its own. Fill around a house tends to settle or wash into the surrounding vegetation eventually smothering it.

The building so constructed in this region are observed to be on steep slopes more the 50-60 degree in some cased it is more than 80 degree slope and has caused huge pressure on soil/ land.

The land availability, open space in Shimla are very less and further exploitation of land resources is not appropriate from environmental point of view. The analysis of soil-land does not permit single iota of further developmental activities in this area.

7.2 Water

Analysis of water quality reveals that the water quality is not good in and around the study area, no free flowing water is available in any of the green pocket. There are hardly any natural water spring in the area. The drinking water sources are under pressure due to higher demand. The water supply is quite erratic in the study area.

The availability of water resources largely dependent of the catchment, all the water resources downstream of this hill town are completely, solely depending upon the quality, size of the uphill ecosystem i.e. forests, tree cover and soil quality. Whatever water is available it is available due to uphill or protected tree cover, open land having good soil quality. In case any change is taken to further disturb this ecosystem this will lead to huge impacts on water system in the Shimla as a whole. At present there is need to restore the already caused impacts rather than putting more pressure on these resources. Both water quantity, quality are under pressure and cannot bear any further load. Rain water harvesting is essential mode/ technology to be implemented in Shimla but current state of affairs indicates that there are rain water harvesting structures but lacking technical support, most of these are not functional therefore need is otherwise i.e. to restore/ correct the existing rain water harvesting structures.

7.3 Air

The State Pollution Control Board is analyzing air quality of Shimla town as per national standards and different parameters are analyzed on regular basis. Any developmental activity e.g. construction activity will lead to adverse impact on air quality during the construction and later as well in view of associated activities. The reason of present air quality in Shimla is buffers of vegetation cover though it is also not sufficient. The moment this area is opened for activities it will initially affect the land, soil, and later vegetation cover leading to bad air quality.

The SO_2 levels in Shimla are well within the prescribed limits but how and why? One should understand scientifically the ecological chain behind it, the available tree cover is serving as excellent absorbent of SO_2 concentration and lowers the SO_2 concentration in the study area.

No one can afford any action which directly or indirectly impacts the tree cover in the region as it will have the direct bearing on the air quality. There is rather need to plant more ever green trees in the green pocket, open land, species chosen must be resistant to pollutants particularly in the early stage of growth. The advice of Forest Department should be taken for the purpose

7.4 Noise

Very high noise levels are observed due in the study area due to high traffic flux. There is no chance of allowing further load of traffic in any of the area since it would mean further increase on noise levels which has already affected the biological habitat of the area.

It is important to mention that the green belts acts as an effective means of control of noise pollution. The present level of noise pollution indicate more and thick green canopy in and around various pockets for additional protection. To control noise pollution paving of land surface needs to be avoided and as much as vegetative cover such as grass is required in the area.

In case further development is permitted in the green belt it will affect adversely the tree cover, soil quality etc. and would further aggravate the noise pollution levels. Therefore it is not feasible to make any such recommendation.

7.5 Socio-economic

The Shimla town is worldwide known hill station, tourists destination. Livelihood of thousands of people living in and around this town are depending on it. Any damage to beautiful environment of this town which has already been subjected to huge pressure would adversely affect the tourism potential of the region and there by affecting the livelihood practices of the people dependent on it.

No activity leading to any impact on landscape tree canopy of Shimla can be permitted at present. There is already debris generated from construction activities which have been dumped illegally on roadsides, forest areas having long term impacts on demography, aesthetics, besides the loss of vegetation cover, free space. There is lack of unhygienic site sanitation facilities, drinking water, public toilets etc. in Shimla town.

7.6 Solid Wastes

The existing solid waste management practices in Shimla are far from standard practices and it may take time even for the present scenario to meet the norms 86.01 MT/ day and waste is generated in Shimla as on date. One can easily going around and visualize the municipal solid storage waste & management site at "Darni Ka Bagicha" that this site has affected the entire catchment forest. Subjecting any further development this situation will further be adding the load on entire ecosystem. Need is not of further development but need is of taking corrective measure to restore the ecology which have been affected due to unscientific disposal of municipal waste which also contain hazardous, biomedical waste. Any action in aggravation of this act will leave long term impact on entire ecosystem and it may take hundreds of years to restore it.

7.7 Hazard-risk in Shimla

Himachal Pradesh lies almost entirely in the Himalayan Mountains, and is part of the Punjab Himalayas. Due to its location, it weathers dozens of mild earthquakes every year. Large earthquakes have occurred in all parts of the state, the biggest being the Kangra Earthquake of 1905. The Himalayan Frontal Thrust, the Main boundary Thrust, the Karol, the Giri, Jutogh and Nahan thrusts lie in this region. Besides that, there are scores of smaller faults, like the Kaurik Fault which triggered the 1975 earthquake. However, it must be stated that proximity to faults does not necessarily translate into a higher hazard as compared to areas located further away, as damage from earthquakes depends on numerous factors such as subsurface geology as well as adherence to the building codes and population density etc.

Shimla is situated on mountainous Middle Himalayas, which form the last traverse spur of the Central Himalayas, south of the river Satluj. The city is spread across twenty six kilometres along a ridge that that overlooks terrace cultivated hillsides. Administratively, The Municipal Corporation Shimla looks after the civil management. The municipal area is further divided into twenty five wards.

The unique setting of Shimla district is that it is bounded by two major thrusts, the Main Central Thrust (MCT) & Main Boundary Fault (MBF). Other thrusts present in the region, such as the Jwalamukhi Thrusts and the Drang Thrust, result in several other lineaments

piercing the zone into fractured and faulted blocks and active faults enhancing the structural discontinuities. The region has experienced frequent mild tremors and periodic major earthquakes in the past, and will continue to do so in the future.

Issues Associated during construction phase: ***Muck / Debris, Gradient of Land, Tree Canopy***

Shimla can expect maximum peak ground acceleration (PGA) of 4.0 meters per Second Square. This suggests that Shimla can expect an earthquake of seismic intensity of VIII on the Modified Mercalli (MM) Intensity Scale. MM VIII indicates that there can be slight damage in specially designed structures; considerable in ordinary substantial buildings; and great damage in poorly built structures. Panel Walls can be thrown out of frame structures. Chimneys, factory stacks, columns, walls and monuments can collapse. Heavy furniture can get overturned. Sand and mud can get ejected in small amounts. Changes can be caused in water levels. Most of the structures in Shimla fall in the 'poor built' classification. Earthquake induced ground failure can be expected along the northern slopes of the ridge, i.e. in Lakkar Bazar, New Shimla and Vikas Nagar, Ruldu Bhatha.

The already constructed building in Shimla town does not have considerable safety technology from earthquake point of view and are highly prone to earthquake. Any activity which unstable the soil type, topography i.e. excavation etc. would lead to serious impact and therefore it can be concluded that the further developmental activities are not feasible at the moment as per analysis.

Geographically weak areas identified as highly sinking prone areas such as The Ridge, Phagli, Bemloe, Grand hotel, Lakkar Bazar, Jakhoo, Dhobighat, Chotta Shimla etc. which are integral part of Green area, any further load is likely to be quite hazardous in these areas.

7.8 SWOT Analysis of Shimla

Strengths	Weakness
- Location & landscape - Climatic conditions - Historical importance - School, institutions, administrative setup - Awareness of unique nature - Well known/ established station - Tourism as an important economic pillar - Safety of tourists and residents	- Infrastructure: public transport, accessibility and road maintenance, parking spaces - No (national/ international) service standards. - Lacking basic infrastructure and facilities - Lacking municipal solid waste management - Gap in water supply and demand/erratic water supply - Tree falling, soil erosion.
Opportunities	**Threats**
- To become international tourist destination - Diversification of tourism towards eco-tourism products	- Administrative setup expansion - Natural hazard prone/ vulnerable area - Tree canopy under pressure - No regular surface water source - Over populated - Unplanned urbanization - Degrading soil quality - Sensitive Gradient of land

7.9 Public Perception

Even a cursory glance at the literature on environmental impact assessment (EIA) reveals that public participation is being considered as an integral part of the assessment procedure. Public participation in EIA is commonly deemed to foster democratic policy-making and to render EIA more effective. In view of this fact public opinion/ perception about Green Belts of Shimla region is given as under:

- ✓ Management and conservation of species like Deodar Forests in Shimla Municipal Corporation (About 3200 ha. In scattered 17 Green Belts is a very challenging task in view of intense biotic pressure and haphazard constructions. Undoubtedly it requires political will, administrative support and technical expertise. These forests should be

under the direct control of Forest Department to set right matters without any further delay. The plantation undertaken in and around Shimla has poor survival rate.

- ✓ Identify critical issues causing environmental degradation like haphazard construction etc. and impacting planning and future growth of Shimla town, where we are living and witnessing degradation in quality of life day to day.
- ✓ In order to set right matters releasing to Shimla town Shimla Development Board should be constituted so that all environmental issues are address holistically/ culturally and can even now save Shimla from further degradation and maintain its glory as Queen of Hills.
- ✓ Enforcement of complete ban on construction and other developmental projects/ activities not only in Green Belts but on entire Shimla town. Any relaxation for construction activities in Green Belts and abolition of Green Area Committee. As it is, Shimla has lost its grandeur and if more construction gets underway in majestic Deodar forests, it will be a very sad day for this hill station. Any further urbanization plans at the cost of existing left over green cover would be an extremely disastrous and retrograde step and must be banned totally at all costs with political will and administrative interventions.
- ✓ Undertake a massive afforestation and beautification programme in and around Shimla and survival of planted trees need to be monitored at site regularly.

There are many public representations received from residents of Shimla which are also Annexed along with this report.

Chapter 8 - Conclusion and Recommendations

The green pockets are located either in Core or in Restricted Areas, where there is already heavy stress and strain with respect to services infrastructure and transportation, whereby there is inconvenience to already residing population. Thickly built up pockets amidst green areas namely Boileauganj, Tutikandi, Phagli, Lalpani, Himland locality, Dhobighat, Jakhoo, Bothwell Estate, Goodwood, Shankli, Ruldu-ka-Bhatta, Chaura Maidan and Elysium Hill near Chaura Maidan are highly congested, facing severe infrastructural and environmental problems.

An irreparable loss to green cover has already been caused by providing accessibility to such pockets. The prime green pockets on the higher altitude and on slopes, though form the crown of the town, already carried constructions thereon and in their immediate surroundings, however, look ugly and visually disturbing and are disliked by the tourists. Adjoining to Green pockets, spread at several locations, on either side of cart road/ National Highway-22, Circular Road and Mall Road or in vicinity thereof, there is already inadequate width of the roads, a heavy traffic load, inadequate parking lots to cater even for present requirements and mixed traffic.

The Core wherein many green pockets are situated, comprising of most of the Shimla, possess a precious natural and built heritage, requiring preservation at any cost, without any disturbance.

Cutting and filling activities in and around green pockets have already caused a lot of damage to precious coniferous Deodar green cover and cannot be further allowed.

The natural setting of the premier city of Shimla has already been subjected to huge disturbance due to felling of trees, deterioration of soil and water quality.

Any additional construction in Shimla will aggravate the threats to green cover. Excessive use of R.C.C. has already damaged the eco-system to a large extent and should not be permitted.

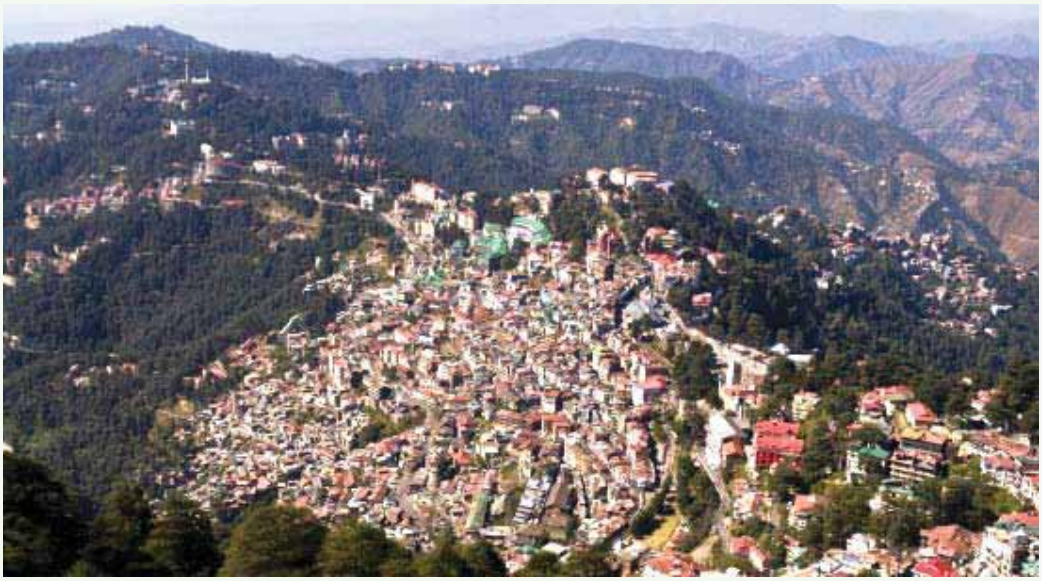
Indiscriminate tapping of natural resources in terms of wood, and stone, construction of roads, has led to loss of scenic beauty of green cover in the city and its surroundings, which has been acting as a major tourist attraction, throughout the year. As majority of tourists visit Shimla for pleasure and site seeing, it is imperative that areas with predominant green cover are not opened for construction activities, and factually, the construction need to be completely banned in entire Shimla

Furthermore green cover is required to be increased for the vital cause of environment and betterment of eco-system of future Shimla, at any cost.

Recommendations:

- ✓ Complete ban on any type of construction activities in entire Shimla planning area including 17 green areas and renovation of existing buildings in private as well as government sector.

- ✓ Demand of water is higher than supply and it is likely to grow in times to come. Pressure on water supply needs to be discouraged. Effective monitoring of water sources misuse and water supply network to be done.
- ✓ Protection and conservation of land in Shimla. Land resource is limited in Shimla, it is required to be conserved for saving ecosystem balance.
- ✓ Restoration of soil quality in Shimla planning area. Soil quality has already been adversely affected and therefore, any activity such as construction in Shimla needs to be completely stopped in future which leads to affect the soil quality.
- ✓ Improve the natural environment, service quality in the Shimla region.
- ✓ Create eco sensitive zones within the Shimla planning area and to protect and conserve the ecosystem.
- ✓ Adopt the decentralized planning principles in Shimla planning area. Develop satellite sub towns at appropriate locations after observing all desired means so as to reduce the existing pressure on natural ecosystem of Shimla planning area.
- ✓ Create walking zones and declare them as free from human habitat, vehicular traffics.
- ✓ Enhance tree cover, vegetation cover for maintaining air quality in the area.
- ✓ Ensure adoption of Rain Water Harvesting structure and make them functional in all existing buildings.
- ✓ Instead of paved roads other means of environment friendly transport networks like ropeways, electric mono rails etc. to be introduced in Shimla planning area.
- ✓ Plantation on open land, plots (Govt. as well as private) may be done. With a view to protect & conserve land/ forest/ tree cover the private lands may be taken over by competent authority.



Annexure-1
Sampling, Frequency & Method of Baseline Environment Monitoring

Attributes	Sampling		Measurement Method	Remarks
A. Air Environment	**Network**	**Frequency**		
• Meteorological • Wind speed • Wind direction • Maximum • temperature • Minimum • temperature • Relative • humidity • Rainfall • Solar radiation • Cloud cover • Adiabatic • Lapse Rate	1 site in the project area	1 hourly continuous	Mechanical/automatic weather station Max/Min Thermometer Hygrometer Rain gauge As per IMD specifications As per IMD specifications Mini Sonde/SODAR	IS 5182 Part 1-20 Site specific primary data is essential Secondary data from IMD CPCB guidelines
Pollutants • SPM	Nos. of sampling location to be decided	24 hourly twice a week	As per CPCB guidelines	Monitoring Network Minimum one locations in upwind side, two sites in downwind side / impact zone
• RSPM		@4 hourly. Twice a week, One non monsoon season		All the sensitive receptors need to be covered for core zone and buffer zone
• SO_2		8 hourly, twice a week		
• NO_x				
• Hourly equivalent noise levels	Identified study area	Once in season	Noise level meter	IS:4954-1968 as adopted by CPCB
C. Water				
Parameters for water quality • pH, temperature, turbidity, magnesium hardness, total alkalinity, chloride, sulphate, nitrate, fluoride, sodium, potassium, salinity		Set of grab samples for ground and surface water	Samples for water quality should be collected and analysed as per : IS : 2488 (Part 1-5) methods for sampling and testing of Industrial effluents	

• Total nitrogen, total phosphorus, DO, BOD,COD • Heavy metals • Total coliforms, faecal coliforms • Phyto plankton			Standard methods for examination of water and wastewater analysis published by American Public Health Association.	
D. Land environment				
Soil • Organic Matter • Texture • pH • Electrical conductivity • Permeability • Water holding capacity • Porosity	Sample from villages (soil samples be collected as per BIS specifications)	*One season*	Collected and analysed as per soil analysis reference	Analysis be done as per BIS specifications
Adopted from: EIA manual 2001, Ministry of Environment and Forests, New Delhi				

Annexure-2

Annexure 4.1 Hydraulic Conductivities of Soil

S.No.	Soils	K-Values (m/day)
1	Clay surface	0.01-0.2
2	Deep clay layer	10^{-8}- 10^{-2}
3	Loam	0.1-10
4	Fine sand	1-5
5	Medium sand	5-20
6	Coarse sand	20-100
7	Gravel	100-1000
8	Sand and gravel	5-100
9	Clay, sand & gravel	0.001-0.1
		Source: MoWR, GoI, 2004, pg. 15, 84

Annexure 2.2

Specific Yield of Different Formation

	Yield (%)
Sand :	10-30
Gravelly Sand (coarse sand) :	15-30
Sand and Gravel :	15-25
Sand stone coarse-grained :	10-15
Sand stone fine–grained :	5-15
Thick plastic clay :	3-5
Weathered rock :	2-5
Clay :	1-10
Fractured and jointed rock :	0.50-5

Annexure 2.3
Typical Porosities of soil

Soil Texture	Porosity
Sandstone	0.19
Sandy loam sub soil	0.36
Sandy loam plough layer	0.42
Clay loam subsoil	0.44
Recently ploughed clay loam	0.58

Source: Manual on norms and standards for EC of large construction projects-MoEF

Annexure 2.4
Rating Chart for Soil Test Values of Primary Nutrients

Nutrient	Rating*			Recommended test**
	Low	Medium	High	
Organic carbon Available nitrogen alkaline KMnO4 N (Kg/ha)	<0.50	0.50-0.75	>0.75	Colorimetric method; Datta et al
Available phosphorus Olsen's P (Kg/ha)	<280	281-560	>560	Kjeldahl apparatus
Available potassium	<10	11-25	>25	Olsen method
Ammonium Acetate-K (Kg/ha)	<120	121-280	>280	Ammonium acetate extraction Method

*Subject to minor variation as per local conditions.
**Tests to be performed at ICAR (Indian Council of Agricultural Research)–accredited laboratory.

Source: Singh D, Chhoker, P K and Pandey, R N. 2000. Soil plant water analysis: a methods manual. New Delhi: Indian Agricultural Research Institute, 160 pp.

Annexure 3.1
Criteria for Raw Water Used for Organized Community Water Supplies (Surface and Ground Water) Primary Parameters

S.No.	Parameters	Range/Limiting Value		Note
		Use with only disinfection	Use after conventional treatment	
1.	pH	6.5 to 8.5	6.0 to 9.0	To ensure prevention of corrosion in treatment plant and distribution system and interference in coagulation and

				chlorinating.
2.	Colour Pt. scale Hz Units	< 10	< 50	Color may not get totally removed during treatment
3.	Suspended Solids mg/l	< 10	< 50	High SS may increase the cost of treatment.
4.	Odour, dilution factor	< 3	< 10	May not be tackled during treatment.
5.	DO, (%saturation)	90-100	80-120	May imply higher chlorine demand.
6.	BOD, mg/l	< 3	< 5	Same as above.
7.	TKN, mg/l	< 1	< 3	Same as above.
8.	Ammonia, mg/l	< 0.05	< 1	Same as above.
9.	Faecal coliform MPN/100 ml	< 200	< 2000	Not more than 20% samples show greater than limit.
10.	EC, µm/hos/cm	< 2000	< 2000	High conductivity implies dissolved high solids making water unpalatable.
11.	Chloride, mg/l	< 300	< 300	May cause physiological impact and unpalatable taste.
12.	Sulphates, mg/l	< 250	<250	May cause digestive problems
13.	Phosphates, mg/l	< 0.7	< 1.0	May interfere with coagulation
14.	Nitrate, mg/l	< 50	< 50	May cause methamoplobinemea
15.	Fluoride, mg/l	< 1.0	< 1.5	Higher value shall cause fluorosis and lower value shall carries.
16.	Surfactants, mg/l	< 0.2	< 0.2	May impair treatability and cause foaming.
Additional Parameters for Periodic Monitoring (Seasonal – Only to be done when there are known natural or anthropogenic sources in the upstream catchment region likely or apprehended to contribute or other well founded apprehensions)				
Sr.No.	**Parameters**	**Desirable**	**Acceptable**	**Note**
28.	Dissolved Iron mg/l	< 0.3	< 0.5	Affect taste and cause stains
29.	Copper, mg/l	—	< 1.0	May cause live damage
30.	Zinc, mg/l	—	< 5.0	Cause bitter stringent taste
31.	Arsenic, mg/l	< 0.01	< 0.05	Cause hyperkeratosis & skin cancer
32.	Cadmium, mg/l	< 0.001	< 0.005	Toxic
33.	Total Chromium, mg/l	< 0.05	< 0.05	Toxic
34.	Lead, mg/l	< 0.05	< 0.05	Physiological abnormality
35.	Selenium, mg/l	< 0.01	< 0.01	Toxic symptoms similar to arsenic
36.	Mercury, mg/l	< 0.005	<0.0005	Carcinogenic and poisonous
37.	Phenols, mg/l	< 0.001	< 0.001	Toxic and cause taste and odour problem
38.	Cyanides, mg/l	< 0.05	< 0.05	Physiological abnormality

39.	PAH, mg/l	< 0.0002	< 0.0002	Carcinogenic
40.	Total Pesticides, mg/l	< 0.001	< 0.0025	Trend to bioaccumulates & carcinogenic

(Source: Ecological Impact Assessment Series: EIAS/03/2002-03 Published by CPCB)

Annexure 3.2
Use Based Classification of Surface Waters in India

Designated-Best-Use	Class of Water	Criteria
Drinking Water Source without conventional disinfection	A	1. Total Coliforms OrganismMPN/100ml shall be 50 treatment but after or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 6mg/l or more 4. Biochemical Oxygen Demand 5 days 20oC 2mg/l or less
Outdoor bathing (Organized)	B	1. Total Coliforms Organism MPN/100ml shall be 500 or less 2. pH between 6.5 and 8.5 3. Dissolved Oxygen 5mg/l or more 4. Biochemical Oxygen Demand 5 days 20oC 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	1. Total Coliforms Organism MPN/100ml shall be 5000 or less 2. pH between 6 to 9 3. Dissolved Oxygen 4mg/l or more 4. Biochemical Oxygen Demand 5 days 20oC 3mg/l or less
Propagation of Wild life and Fisheries	D	1. pH between 6.5 to 8.5 2. Dissolved Oxygen 4mg/l or more 3. Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	1. pH between 6.0 to 8.5 2. Electrical Conductivity at 25oC micro mhos/cm Max.2250 3. Sodium absorption Ratio Max. 26 4. Boron Max. 2mg/l

(Source: Guidelines for Water Quality Management –CPCB 2008)

Annexure 4
Water Requirements for Different Types of Buildings

Sl. No	Type of Building	Consumption (liters/day)
i)	Factories with bath rooms	45 per head
ii)	Factories without bath rooms	30 per head
iii)	Hospital (including laundry): a) Number of beds not exceeding 100	 340 per head
	b) Number of beds exceeding 100	450 per head
iv)	Nurses' homes and medical quarters	135 per head
v)	Hostels	135 per head
vi)	Hotel (up to 4 star)	180 per head

vii)	Hotel (5 star and above)	320 per head
viii)	Offices	45 per head
ix)	Restaurants	70 per seat
x)	Cinemas, concert halls and theaters	15 per seat
xi)	Schools	
	a) Day schools	45 per head
	b) Boarding schools	135 per head
In addition, water demand of visitors to these building is considered as 15 LPCD *Source: National Building Code, 2005*		

Annexure 5
National Ambient Air Quality Standards (NAAQS)

Sr. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		
			Residential, Rural and other areas	Ecologically sensitive area (notified by central government)	Methods of measurement
1	2	3	4	5	6
1	Sulphur dioxide (SO2), µg/m3	Annual* 24 hours**	50 50	20 80	-Improved West & Gaeke -Ultraviolet fluorescence
2	Nitrogen Dioxide (NO2), µg/m3	Annual* 24 hours**	40 30	80 80	-Modified Jacob & Hochheiser (Na-Arsenite) -Chemiluminescence
3	Particulate Matter (Size less than 10m) or PM10µg/ m3	Annual* 24 hours**	60 100	60 100	- Gravimetric - TOEM - Beta attenuation
4	Particulate Matter (Size less than 2.5m) or PM2.5µg/ m3	Annual* 24 hours**	40 60	40 60	- Gravimetric - TOEM - Beta attenuation
5	Ozone (O3) µg/ m3	8 hours** 1 hour**	100 180	100 180	- UV photometric - Chemiluminescence - Chemical method
6	Lead (Pb) µg/m3	Annual* 24 hours**	0.50 1.0	0.50 0.50	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper -ED-XRF using Teflon filter
7	Carbon Monoxide (CO) mg/ m3	8 hours** 1 hour**	02 04	02 04	-Non Dispersive Infra Red (NDIR) spectroscopy

8	Ammonia (NH µg/m3	Annual* 24 hours**	100 400	100 400	- Chemiluminescence - Indophenol blue Method
9	Benzene (C6H6) µg/m3	Annual*	05	05	-Gas chromatography based continuous analyzer -Adsorption and Desorption followed by GC analysis
10	Benzo(a)Pyrene (BaP)– particulate phase only, ng/m3	Annual*	01	01	-Solvent extraction followed by HPLC /GC analysis
11	Arsenic (As) ng/m3	Annual*	06	06	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni) ng/m3	Annual*	20	20	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note:

Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation

(Source: National Ambient Air Quality Standards, CPCB Notification dated 18th November 2009)

Annexure 6
Ambient Noise Standards

Area Code	Category of Area	Noise Levels dB(a) eg	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial	65	55
C	Residential	55	45
D	Silence	50	40

*#Day – 6 AM – 10 PM, Night 10 PM – 6 AM; Silence zone is not less than 100 m from around hospitals, schools, courts, religious places.

Source: *National Pollution Regulations In India, CPCB, Pollution Control Law Series: PCL/06/ 2001-02*

The IS standards for noise abatement include :

_ IS-4954-1968 for Noise abatement in town planning recommendations

_ IS-3098-1980 for Noise emitted by moving road vehicles, measurement

_ IS-10399-1982 for Noise emitted by stationary road vehicles, methods of measurement

_ IS-6098-1971 for Air borne noise emitted by rotating electrical machinery

_ IS-4758-1968 for Noise emitted by machines

Annexure 7
General Standards for Discharge of Effluents

Sr.No.	Parameters	Standards			
		Inland surface water	Public sewers	Land for irrigation	Marine coastal areas
		(a)	(b)	(c)	(d)
1.	Color & odour				
2.	Suspended solids mg/l, Max	100	600	200	1. For process waste water-100 2. For cooling water effluent 10% above total suspended matter of effluent
3.	Particle size of suspended solids	Shall pass 850 Micron IS sieve	-	-	1. Floatable solids max. 3 mm 2. Settleable solids max. 850 microns
4.	pH Value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
5.	Temperature	Shall not exceed 5^0C above the receiving water temperature	-	-	Shall not exceed 5^0C above the receiving water Temperature
6.	Oil and grease mg/l Max.	10	20	10	20
7.	Total residual chlorine mg/l Max.	1.0	-	-	1.0
8.	Ammonical Nitrogen (as N), mg/l Max.	50	50	-	50
9.	Total Kjeldahl nitrogen (as NH_3), mg/l Max.	100	-	-	100
10.	Free ammonia (as NH_3), mg/l Max.	5.0	-	-	5.0
11.	Bio-chemical	30	350	100	100

	oxygen demand (3 days at 27_0 C), mg/l max				
12.	Chemical oxygen demand, mg/l max.	250	-	0.2	250
13.	Arsenic (as As), mg/l max.	0.2	0.2	-	0.2
14.	Mercury (as Hg), mg/l max.	0.01	0.01	-	0.01
15.	Lead (as Pb), mg/ l max.	0.1	1.0	-	2.0
16.	Cadmium (as Cd), mg/l max.	2.0	1.0	-	2.0
17.	Hexavalent chromium (as Cr +6), mg/l max.	2.0	1.0	-	2.0
18.	Total chromium (as Cr), mg/l max.	2.0	2.0	—	2.0
19.	Copper (as Cu), mg/l max.	3.0	3.0	—	3.0
20.	Zinc (as Zn), mg/ l max.	5.0	15	—	15
21.	Selenium (as Se), mg/l max.	0.05	0.05	—	0.05
22.	Nickel (as Ni), mg/l max.	3.0	3.0	—	5.0
23.	Cyanide (as CN), mg/l max.	0.2	2.0	0.2	0.2
24.	Fluoride (as F), mg/l max.	2.0	15	—	15
25.	Dissolved phosphates (as P), mg/l max.	5.0	—	—	—
26.	Sulphide (as S), mg/l max.	2.0	—	—	5.0
27.	Phenolic compounds (as C_6H_5OH), mg/ l max.	1.0	5.0	—	5.0
28.	Radio active materials:	10^{-7}	10^{-7}	10^{-7}	10^{-7}

	a. Alpha emitter micro curie/ml b. Beta emitter micro curie/ml	10^{-6}	10^{-6}	10^{-6}	10^{-6}
29.	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
30.	Manganese (as Mn), mg/l	2	2	-	2
31.	Iron (as Fe), g/l	3	3	-	3
32.	Vanadium (as V), mg/l	0.2	0.2	-	0.2
33.	Nitrate nitrogen, mg/l	10	—	-	20
* These standards shall be applicable for industries, operations or processes other than those industries, operations or process for which standards have been specified of the Environment Protection Rules, 1989					
Source: G.S.R 422 (E) dated 19.05.1993 and G.S.R 801 (E) dated 31.12.1993 issued under the provisions of E (P) Act 1986					

COPY of our appeal submitted to Chief Secy, Govt of HP, Secy, Dept of Urban Dev & TCP in Shimla on 26th June, 2012

Subject: Plea for the continuation of construction ban under the Green Belt area in Shimla

Plea for assessing the grave threats to the survival of the city of Shimla and a request to respond to the urgency of the situation

Dear Sir/Ma'am,

This is to request your office not to lift the ban on construction in Shimla and not to allow construction of buildings in the area declared as Green Belt by your office. This is also a plea to assess the grave threats to the survival of the city of Shimla and to respond to the urgency of the situation.

Shimla once upon a time was a beautiful hill station, especially known for its magnificence and freshness, but today Shimla is not only extremely ugly but it is highly polluted as well. It is really alarming that in every corner of Shimla there are illegal high-rise and absolutely unplanned massive buildings (numbering above six thousand). It seems that Shimla is nothing but a concrete jungle.

We, who love Shimla are today feeling alienated, we feel the pain and suffocation when we see Shimla being destroyed and we can do nothing to save it. Because of these massive constructions, nature has been devastated and endless trees have been cut in almost all localities of Shimla. It is not just a question of the scenic beauty of Shimla, but of the survival of the ecosystem of the Shimla region.

Shimla is not a city sitting on a level land or a stable valley. Most of it is precariously clinging on to the sloping side of hills. And, what is the nature of this foundation upon which the city of Shimla is sitting? It is not made of granite, or hard rock. But its top layer and much of its body has significant amount of clay or mud and soft stone. When water seeps in it, the mud becomes soft. When weight is put on it, it flows like toothpaste under pressure. If we put cement or danga (stone surfacing), it will prevent the top soil in that patch from running off, but it will not stop the deeper soil from seeping down. One can see the major landslide of the old 'danga' besides the High Court that happened just a few days ago. To put is simply, the more weight we will put on our foundation, the more it will seep away. The ability of the soil to hold the heavy weight of the city is degrading continually. Massive erosion of deep soil is taking place and surely there is a limit after which large sections of the city will begin to collapse like a house of cards. How far are we from this catastrophic 'tipping point' in this unstable system? In order to understand this, we need only to take account of what is happening all around us right now. Both on the north side and the south side of the Shimla hill, we are seeing increasingly a rapid number of tree-falls, cracks in soil, mini-cave-ins, small and massive land-slides happening all over Shimla. Some of the major landslides that have recently happened in Shimla are at the beginning of the Chhota Shimla bazaar, opposite to the High court, on the ridge... as well as in many places around Shimla. The Municipal Corporation, Shimla has already been forced to pay Rs. 40 Lakhs as compensation for the landslide victims in the year 2012. All these landslides happened due to the light rains that have taken place much before the onset of the heavy monsoon that is yet to arrive! We all helplessly see the creeping caving in of our hill-top at ridge area, on the Mall. After every torrential rain, the streams and *nullahs* become muddy, this clearly indicates the heavy erosion of the subsoil. During every monsoon most of the residents of Shimla are scared and wander whether their houses will survive the monsoon or not.

On the other side, the serious consequences of Global climate change predicted earlier (increasing intensity and frequency of torrential downpours, total rainfall etc.) are already happening and are quite visible. We can also note that these climate change effects are all the more severe in high hilly areas where the stability of the weather is much lower than in the vast plain lands below. It seems that the city of Shimla is poised right on the edge of an ecological catastrophe. We shudder to imagine what will happen five, ten or twenty years from now.

More alarming is the fact that if we ever have an earthquake of even half the scale that once happened in Kangra, which is not a remote possibility, the entire city and a large number of its inhabitants will be destroyed. In fact the situation of Shimla is far worse than Kangra. Experts say, *"Shimla falls in seismic*

1

Zone-IV of earthquake. Shimla will have cascading effect, in terms of damage, in case of any such occurrence. In such a scenario, no building is safe. Therefore, risk analysis of such a zone is of utmost importance, and slope analysis is crucial. ... According to the Geological Survey of India, any slope more than 250 (25 degrees) is not conducive to urban use. ... As per one estimate, some 90 percent of central Shimla is built on a 60 degrees slope, and is covered with buildings which are four to five storeys high. In the event of an earth tremor, devastation could be enormous with buildings on slopes steeper than 45 degrees collapsing like a house of cards. ...".(see attachment)

Thus the landslide prone foundation of Shimla, the destruction of Shimla's stability due to soil erosion, over-loading, increasingly heavy downpours, sensitivity to even mild earthquakes and the rapidly growing occurrence of cracks, sinks, land-slides ... point to a grim scenario for the future of Shimla. These major disasters can destroy thousands of lives and homes. One day Shimla becoming a ghost city is not a remote possibility.

For many years now, there have been a lot of public cries of protest against the disaster looming over the Shimla city. Several specialists, researchers, concerned journalists (in many major newspapers) and several citizen's initiatives have raised this very cry. We are attaching a glimpse of these protests herewith. The question is, why, in spite of such awareness and protests, Shimla was allowed to 'develop' into such a disaster zone; why did the government adopt such a 'denial mode' despite of all the protests?

It is more than obvious that the 'development' of the Shimla city has been pushed more by the blind greed of the real estate and construction/ promoter corporate agglomerate and not by scientific prudence and planning. The recent plans for urban dispersal should have been in place twenty years ago. People of course need houses to live in, but to construct houses in such an unplanned way will definitely lead to their future destruction and also to the destruction of the whole environment. We need housing that is safe for people and their children and for the sustenance of the entire environment. In fact, the residents/public of Shimla have no way of knowing the real threats to the survival of their homes and the city and the mechanics of its development.

In the recent trend setting judgement of the Green Bench of the Himachal Pradesh High Court against the power conglomerate 'Jai Prakash Associate Limited', for their gross greed, opportunism, violation of laws, public interest and environment, the Bench delivered harsh comments exposing as to how the corporate power could subvert the authorities. The court noted that *the officials who were manning these authorities and are supposed to act like watch dogs to fiercely protect the interest of the public unfortunately behaved like meek lambs being led for slaughter*. The promoter/ construction industry and real estate corporate sector in Shimla, taken as a whole, is vastly more powerful and rooted in the Shimla governance compared to 'Jai Prakash Associate Limited'. They have forced upon urban Shimla, the greed driven path of destruction, flouting all sanity, safety-norms. We wonder what a similar Bench would have commented if this case was brought before them!

Long-range town planning, particularly where the very survival of this crucial city is at stake, must be based upon consideration of the possible but worst case scenarios. What we have described above is just a factual and a reasonable analysis of reality. Here, we believe, there is only one principle and policy that can address the urgency of the situation, which can give us a viable future, which is one of zero tolerance to any further stressing of the sensitive ecological basis of Shimla. We need this will and determination, unambiguous and firm, to survive as a liveable city. To begin with this needs a clear assessment of the threats to survival of our city, and the need to make these threats collective public knowledge. Continuing the current policy of avoidance, at not looking at holistic and future-oriented perspectives, not taking strong decisions, being lax and dealing with problems only as and when they occur is a sure prescription for major disasters. If we are really on the edge of the abyss of chaos, even the smallest additional over-loading can precipitate a collapse. One never knows which will be the last straw to break the camel's back!

In order to prevent such future calamities and the present calamity of a feeling of utter clutter and claustrophobic atmosphere that Shimla has become, the government needs to form more and more stringent laws rather than become lax. In view of the larger cause of saving Shimla, its hills, tress and the

entire atmosphere, the area under Green Belt, should, under no circumstances be allowed to be converted into a clutter of buildings.

We shudder at the thought that if more construction is allowed in Shimla, then what kind of place we are leaving for our children, all beings and for the future thriving of the biosphere. As it is, all of us are well aware about climate change and global warming, our every step towards constructing more and more buildings, is a step towards destroying our planet. Today our struggle should be to save the earth and not to move in contrary directions.

One might argue that partial lifting of the Green Belt Ban and allowing construction on seventy plots (that were bought before the Green Belt notification was issued) is not such a major thing. The ease with which the construction lobby has subverted the will of the Municipal Corporation & Town & Country Planning authorities so far, even getting laws changed to legalise thousands of high-rises (permissible building height policy changed seven times already) should alert us to the reality of the power-equation and vulnerability of our town authorities to the building construction lobby. Can one guarantee that the commercial interests, building construction lobby won't dominate these plots and seize and encroach more? Also, seventy plots mean these many more residential complexes in the heart of the city at the least. Also each of these new construction will be a mini-growth pole This means additional support businesses, infrastructural facilities, more vehicles and so on.. All this will trigger further congestion and overloading. Only a complete ban can express our determination and send a clear and strong message.

We of course hold that no one should suffer on account of the ban on construction in green belt. The problem of the pre-notification plot holders in the green belt should have been solved humanely much earlier. We are sure that the Municipal Corporation and the Government has lots of powers and resources to solve this problem in a humane and just way. Hence as residents of this city, we earnestly request you not to lift the ban on construction in the area that the government had declared as green belt.

It is the residents of Shimla who will be the main losers if the stability of the fragile and sensitive ecosystem of Shimla cracks up. They/we have a right to know the threats to the survival of the city and how the authorities are planning to prevent these threats. We do not even know of the existence of any serious and reliable scientific analysis of the threats to the survival of the city. Only an informed public opinion can help the authorities strive against the vested interests and pressures of greed that has led to such a menacing situation. Now is the time when the government and the Municipal Corporation of Shimla should set up a committee of expert environmentalists and ecologists, and seriously asses the threats to the survival of our city. Such threat evaluation should be made public so that all citizens can know and participate in this assessment. We must then plan strategies to save the ecology of Shimla and adopt methods which are eco-friendly, sustainable and humanistic. Till such an evaluation and planning exercise has been conducted, no private or even public construction that can worsen the problems should be allowed. By destroying our ecosystem we are not only destroying ourselves, but we are destroying the earth which for centuries has sustained us.

Looking forward to your kind consideration

Sd.

Jogin Sen Gupta, Amreen and Others, Shimla

3

ATTACHMENTS

1. Institute of Town Planners, India Journal 8 - 3, July - September 2011, 53 – 66

Urban Sprawl and other Spatial Planning Issues in Shimla, Himachal Pradesh

Shashi Shekhar

... In view of the fact that Shimla falls in seismic Zone-IV of earthquake, experts say that it will have cascading effect in terms of damage in case of any such occurrence. In such a scenario, no building is safe. Therefore, risk analysis of such a zone is of utmost importance, and slope analysis is crucial. ...

According to the Geological Survey of India, slope more than 250 (25 degrees) is not conducive to urban use. ...

Although Shimla Municipal Corporation has quite belatedly prohibited any construction on slopes steeper than 45 degrees, the damage has already been done. As per one estimate, some 90 percent of central Shimla is built on a 60 degrees slope, and is covered with buildings which are four to five storeys high. In the event of an earth tremor, devastation could be enormous with buildings on slopes steeper than 45 degrees collapsing like a house of cards. ...

Natural setting of Shimla has already been disturbed a lot due to felling of trees even by foul means to give way for construction. ...

Sinking problem of Shimla has again come to the fore, when some portion of the Ridge Maidan recently witnessed sinking. Geologically weak areas, identified as highly sinking areas, which include the northern slope of the Ridge extending upto Grand Hotel in the west, covering Lakkar Bazaar, Central School upto Auckland Nursery School, Dhobi Ghat below Idgah electric sub-station and sliding areas including Ladakhi Mohalla, the spur below the office of the Director of Education and surrounding areas of Clark's Hotel are also integral parts of green areas. Any further addition of load is likely to be hazardous in these areas. Moreover, Shimla also falls in Seismic Zone-IV, which is also susceptible to earthquakes. ...

Shimla city and its surrounding areas have a complicated physiography due to tectonic events, folding, faulting and thrusting processes, and resulting inversion of topography and formation of irregular landforms. On account of predominance of dolomite and limestone rocks, landslides are common. As rocks are unstable, dislocation of buildings is quite likely and can occur after any heavy spell of rainfall. Being located in seismic zone, it is susceptible to earthquakes. ...

---

2. **Rapid urbanisation take its toll on Shimla**

Manjeet Singh Shimla, April 21, 2012

Once known as the Queen of the Hills, Shimla has almost shed its pristine glory, thanks to the concrete jungle that is swallowing its green cover, the pine-scented air and even historic structures.

Established for a population of 25,000 people, Shimla now houses almost seven times the number, with rapid urbanisation drawing more tourists than ever. The population pressure is clearly visible in the form of high-rise buildings - most of which are illegal.

Official sources confirmed that 6,000 such structures have been detected in the town. To "legalise" them, the Himachal Pradesh government is set to amend the retention policy for the eighth time, despite facing allegations of favouritism towards the land mafia by the opposition Congress.

Read more at: In a cabinet meeting held on April 18, it approved the new draft retention policy, besides allowing amendments in the HP Town and Country Planning Rules, 1978.

4

The cabinet also accepted a proposal by the town and country planning department about exploring the possibility of the municipal corporation acquiring vacant plots in the green belt area.

The retention policy, which relates to the number of floors a building should have, its setback area, etc, was introduced to provide one-time relief to people, but is now amended regularly. Over 1,300 illegal structures in Shimla were regularised under the policy till 2003.

This time, the state government is apparently amending the policy to woo voters ahead of the municipal polls, due later this month in the hill station. "It has become a compulsion to regularise the structures as the owners of these buildings have been making requests time and again," a top-level official said.

Last year, Jairam Ramesh, the then Union minister for forests and environment, had expressed disappointment over the multi-storey buildings crowding Shimla. At the same time, the Himachal Assembly was rocked when it was alleged that the Bamloe Infrastructure Developers' project had violated the Forest Conservation Act and the ruling BJP had showed favouritism towards the promoters.

Kaul Singh, president of the Himachal Congress Committee, said: "The state government is hell-bent on destroying the beauty of Shimla. The new retention policy is nothing but a poll gimmick to attract voters. The Annandale ground issue still fresh. The state government just wants to help those who have acquired land around the ground." Under attack, the government insists it is taking steps to preserve Shimla's environment and cultural heritage. "The government revived the cedar afforestation project 2009. Over 5,000 saplings were planted in Shimla under this project last year," a government spokesperson said.

CM Prem Kumar Dhumal also expressed concern over the unplanned construction.Shimla has been known its climate and scenic beauty. We are trying to preserve it by checking anti-environment activities and are undertaking constructions in a planned manner," he said.

---

3. Can shimla be saved?

The capital city of Himachal Pradesh is no longer the 'Queen of Hills'. The state government is compounding the problem with its willingness to withdraw the ban on construction in its green zones, finds PRATIBHA CHAUHAN

It is warmer than ever before and the capital city of Himachal Pradesh increasingly looks like a shanty town rather than the Queen of Hills as it has been known for long.

Worse is to follow as the state government is all set to withdraw the ban on construction in 17 'Green pockets' in Shimla. The proposal awaits a formal cabinet approval and realtors are eagerly waiting to cash in on the bonanza. Even more alarmingly for some citizens, the government proposes to authorise the Municipal Corporation to clear all building plans. The MC in Shimla does not inspire much confidence and its past record in curbing illegal construction has been dismal, which explains why people respond with dismay to the proposal.

Not just hoteliers and politicians but even government departments flouting building rules

187 high-rise buildings in violation of the law

Offenders get away by paying fines

It is curious partly because the BJP government in the state swears by its 'Green' agenda and its resolve to 'greening' the hill state.

Despite concerns expressed by environmentalists, experts and citizens, construction activities continue unabated in violation of rules. To the consternation of many, high-rise buildings too are steadily coming up in the capital , notwithstanding the ban on such buildings.

The violators are apparently quite happy to pay the paltry penalty they are slapped with. Once the penalty is paid, the construction stands 'regularised' and acquires legitimacy.

5

The building boom, accompanied by a phenomenal increase in the number of vehicles, has stretched the city to the brink and spawned a large number of prophets of doom who see calamity in the horizon, ranging from a mighty earthquake to equally devastating cloudbursts and landslides.

The government's move will open the floodgates for construction activity, especially in the core, restricted and heritage zones, each of which has a separate committee of experts to preserve their status.

Even more ironically, there is the Shimla Development Plan, which is awaiting approval for the past four years and which actually had recommended that the number of green belts be increased to 100. But now, even the 17 earmarked green belts are being sought to be de-notified.

> "It is multiplicity of authorities which has led to the problem. Moreover, the merger of the three Special Area Development Authorities (SADA) of New Shimla, Totu and Dhalli Has also compounded problems as buildings constructed in those areas do not conform to the regulations.
>
> — A.N. Sharma
> Commissioner, Municipal Commissioner.

The manner in which buildings are being raised in violation of the regulations confirms that the law is a wonder net, through which the big fish escape while the small get caught. The moneyed and the people with the right kind of connections get away with anything, whether it is pulling down a century old heritage structure or erecting high-rise buildings in the no-construction zones.

> Over 200 deodar trees have either been killed or removed illegally from the area below my house in Aira Home during the last two years, despite strict rules. Exceptions may have to be made in some cases but each case must be dealt with individually and expert opinion should be made mandatory."
>
> — B.S. Malhans
> State Convener of Indian National Trust for Art, Culture and Heritage (INTACH)

Succesive governments were responsible for bending over backwards to regularise illegal constructions. They in effect encouraged people to go in for even more brazen violation of the rules.

Meanwhile, the law abiding citizens are compelled to make endless visits to the Municipal Corporation (MC) and Town and Country Planning (TCP) offices even for inadvertent violations of very small magnitude.

There are more than 14,000 unauthorised structures in the state, built in violation of the regulations. There has been no attempt by authorities, however, to disconnect their water and electricity connections as per the provisions in the law. In Shimla alone there are 187 buildings, which are higher than five-storeys, some of these owned by MLAs and bureaucrats in violation of the law.

In a relatively small town, there cannot be any excuse for the authorities' failure to stop illegal constructions while the construction is on. But neither the Municipal Corporation nor the Town and Country Planning department or the forest department, for that matter, intervenes when the violation is being committed.

The influential builders have exceeded the permissible height, covered surplus area and caused damage to trees. Their pleas for compounding have been generally considered sympathetically and even the gross violations are regularised.

There is the case of an under construction hotel close to the chief minister's residence where gross violations have been regularised after a fine worth Rs 80 lacs was paid by the hotelier. The case was treated as an extra-special case and the initial compounding amount, which was close to Rs 1.85 crore, was scaled down.

Should such exceptions be there at all in the statutes when they are routinely abused by people in power ? If the law is meant to be applied uniformly to everyone, how can the executive be left with discretion to discriminate ?

The area in this instant case falls within 25 mts of the Heritage Zone extending from Chotta Shimla to Indian Institute of Advanced Studies (IIAS), where reconstruction is allowed only in accordance with old traditional architecture with no change allowed in the facade. Moreover even after granting special favour of allowing fresh construction in the heritage zone, gross violations were committed which have been regularised now.

Similar leniency has been shown for the owner of Jagson International Ltd despite his house burying majestic deodar trees within the fortress like boundary walls erected by him all around

6

the house in Richmond in Jakhu. The issue rocked the assembly several times as legislators both from the BJP as well as the Congress demanded to know why action had not been taken for the violations till now.

In the report sent by the MC to the Core Area Committee, serious deviations in terms of height and constructed area were cited. The report also mentions construction of a road and walls exceeding height and thickness without permission.

The construction of the wall has resulted in 20 deodar trees being buried in the massive walls and the trees have already started withering. The Forest department also reported the damage to the trees , on the basis of which a nominal fine was imposed by the Assistant Commissioner (MC) under Himachal Pradesh Municipal Act, 1994.

Another case of violation is the manner in which 30 trees were buried within the boundary wall of the Radha Swami Satsang Bhawan near Ramachandran Chowk on the Forest Road, right next to the Raj Bhawan. In complete violation of the rules, a huge 10 mts high wall was raised against the permissible limit of 4 mts all around the property and the case has now been referred to the Core Area Committee.

The list of such gross violations by influential people is endless as they are able to manage their cases at the higher level. Buildings along the heritage zone in the heart of the town on the Mall are being constructed with no resemblance to the old structures but the MC has failed to take note.

All this is being done while the government routinely pays lip service to the need of decongesting the core area of the town.

To make matters worse, the law enforcing agencies are themselves responsible for grave violations as they go ahead with construction without obtaining the requisite permission. Even though built as public utility buildings, majority of the government structures are erected without even bothering to get the necessary permissions and following procedures.

More than 60 land-owners have reportedly urged the government to give them relief as the green belt notification was issued after they had bought the land. " Why should they alone be made to pay for protecting the lungs of the town, " asks Rajeev Verma, a local architect.

He suggests that either the plots should be purchased at market value or alternatively they should be given plots of the same size at any other location within Shimla. Some advocate giving one-time relief to persons who bought the plots before the green belts were designated in 2000.

In stark contrast are the speculative deals made by some people who bought plots in the green areas after 2000 at very depressed rates in anticipation of making big bucks as and when the ban is lifted.

"There seems to be no justification for lifting the ban on construction in the 17 green belts as this will worsen the already unplanned and haphazard construction activity in the town," holds Yogender Chander, a former MLA .

While trees can be felled in Shimla only if they have dried up or are deemed to be 'dangerous', people have found ways to circumvent the law. The trees are being suffocated to death by either burying their roots in the fortress like boundary walls, retaining walls or septic tanks.

While the government swears to protect each and every tree and a deodar plantation project too has been launched in the state capital, little effort is made to protect century-old majestic deodars which can be seen jutting out of roof tops as they have been included inside the buildings, a way to evade felling which is banned.

People have also been quite innovative as chemicals are injected into the trees to dry them so that permission can be sought to fell them after getting them declared as dead. Although rules provide that no construction can take place within 2 meters of a tree and 5 meters of a forest, there is little or no monitoring.

A survey by the Himalayan Forest Research Institute indicates that natural regeneration of deodars has stopped in Shimla as there is little soil cover available but only concrete on account

7

of haphazard construction activity. Another reason attributed for drying of trees is unscientific dumping of debris as well as garbage in the forest area.

At several places dry deodar trees stand mute spectators to the reckless and mindless urbanisation to which there is no stopping. While the law abiding citizens have to toil hard to seek permission from the Tress Authority Committee to fell even a single tree which poses a threat to life and property, those adopting unfair means get away far more easily.

B.S. Malhans, State Convener of the INTACH says undertaking fresh demarcation of the green belts could solve a lot of problem. "Certain areas without a single tree have been included in green belts and they should be deleted at once from the list while other thick forested areas have been excluded," he points out.

2012

==========

4. Govt blamed for haphazard growth in Shimla

Pratibha Chauhan / Tribune News Service

Shimla, September 23

Questioning the wisdom of the government in raising multi-storeyed structures in sliding zones and over water channels, Baljit Malik, coordinator of the Kasauli Bachao Andolan, said today that the state of affairs in the state capital was dismal, requiring immediate intervention.

He said when the government was itself guilty of constructing a mammoth sports complex over a water channel and a multi-storeyed high court building, leading to slides, there was little one could expect from the authorities.

"I demand that the government should first come out clean and set an example before it enforces the law on others," he added. He said the agencies responsible for regulating construction activity had completely failed, turning the erstwhile British summer capital into a concrete jungle.

"We will shortly be preparing a report on violations all along the Hindustan-Tibet Highway, right from Parwanoo and submit it to the Supreme Court, seeking its intervention," he added. He said the road was termed as a strategic link to the borders but it was completely devoid of safety measures like luminous road dividers, putting the safety of commuters to risk.

"The haphazard and unregulated construction all over the place has triggered massive slides whether it is for house construction, hotels, roads or even power projects," lamented Malik. He added that the depleting green cover, including deodar, fir, spruce and other bushes, had been the victim of excessive construction activity and mindless developmental activity.

Echoing his concerns about the dwindling forests in and around Shimla, he pointed out that most of the coniferous variety trees had developed flat tops indicating that they would soon dry up. "The most unfortunate part is that those very people who are entrusted with the task of enforcing laws have themselves turned violators," he said.

He said the Shimla Development Plan, which should have come out 20 years back, was still awaiting approval of the government. "By the time the plan will be approved it will be rendered redundant as the damage in terms of chaotic construction activity has already been done," said Malik.

He also regretted the fact that the Kasauli Development Plan had still not been notified by the government despite the directions of the HC. He had been spearheading the "Save Kasauli" campaign, which had forced the government to come out with a development plan for the hill town, putting curb on multi-storeyed structures and big projects.

2009?

8

To
The Chief Minister, Shri Virbhadra Singh
CM's Office, Shimla; Dtd: 6th March, 2013

Subject: Objection to the proposed relaxation of the ban on construction inside the area declared as the Green belt of Shimla in the broader context of the grave threat to the survival of the city/ hill ecosystem

Sir,

We have great respect for your concerns for environment, nature, and the ecological health of the city of Shimla. So we want to share our grave concerns on this matter with you. The existing forest land and Green Belt is crucial to the health and survival of the Shimla city/ hill ecosystem. In this context we address to you our objection to the proposed relaxation of the construction ban on the area declared as Green Belt. Such relaxation will subject our Green Belt, Forest land and the whole of our environment to unpredictable, un-assessed and serious hazards. We urgently request you not to give clearance to such an action.

1. We sketch below some of the main roots of the environmental hazards faced by Shimla city/ hill ecosystem:

Large scale over-construction in Shimla has reduced the quality of life, beauty, air and all other positive features that the city of Shimla was once known for. But the crisis today is much graver.

Shimla hill, the base on which our city stands, is made up of much more clay and soft stone as compared to, for instance, the granite based hills of Deccan plateau.

Global warming means increasingly more rainfall and its severity. Also, the large population of the city means large scale use of water. All these events lead to large scale seepage/ throughput of water through our clay-like sub-soil and the growing erosion of the infrastructure of the Shimla city.

The already huge build-up of the city means increasing load on the soil, increasing structural instability.

Shimla city does not sit on a stable valley. It is built up on steep slopes. 90% of the core city has been constructed on slopes above 60 degrees. Such constructions, against all architectural and geological norms, make Shimla highly unstable and also add to the underground soil erosion.

Finally, the Shimla hill is situated on seismic zone IV in the earthquake proneness scale.

In such an unstable situation, disturbances - whether from a landslide or from a tiny earthquake tremor could act as a trigger creating a avalanche-like cascade effect. Here, *"devastation could be enormous; with buildings on slopes steeper than 45 degrees collapsing like a house of cards'* (from an architectural study of Shimla city).

We need only to take a look at what is happening all around us right now to check that we are not just speculating. Both on the north and the south side of the Shimla hill, we are seeing in the last few years an increasingly large number of tree-falls, cracks in soil, mini-cave-ins, small and large land-slides. Recently we all helplessly saw the repeated creeping caving-in of our hill-top at the Ridge, on the Mall. After every torrential rain, the streams and *nullahs* become muddy showing the heavy run-off/ erosion of the subsoil. During every monsoon many of the residents of Shimla are scared and wander whether their houses will survive.

Thus we must seriously consider the possibility that the city/ hill ecosystem of Shimla is already on the edge of a catastrophe, that we are possibly entering the unpredictable and unstable zone of the 'tipping

1

point'. Here, according to the science of eco-system theory, even a tiny excess stress on the ecosystem can lead to a large avalanche-like disaster. The consequences of such a disaster are so grim (destroying thousands of lives and homes, making Shimla a ghost city) – a catastrophe of national concern - that we must reflect upon such possibilities, however small, with great seriousness.

2. It is in this context that we must look at the role of the Green Belt. A forest land is much more than trees. It is constituted by an active and alive top soil, grass/ shrubs and trees not destroyed by construction. The Green Belt is much more than the lungs of the city. It checks the soil seepage, pumps out the moisture in the soil, absorbs small shocks, and stabilizes the ecosystem as a whole. In various ways it is the only counterweight to all the processes destabilizing the stability of our ecosystem. Our Green Belt is a crucial bulwark protecting the health and the very survival of the infrastructure of the city.

3. One might argue that the partial lifting of the Green Belt ban and allowing construction on seventy plots is a small matter – one whose environmental impact will also be small.

The ease with which the construction lobby has subverted the will of the Municipal Corporation & Town & Country Planning authorities so far, even getting laws changed to legalize thousands of high-rises (permissible building height policy has already changed seven times) should alert us to the reality of the power-equation and vulnerability of our town authorities to the construction/builder's lobby. Given such a ground reality, can one guarantee that the commercial interests will not infiltrate these plots and seize and encroach upon more?

Secondly, to allow construction on seventy plots mean these many more residential complexes in the heart of the Green Belt at the least. The TCP Authority, in their proposal for sanctioning construction in the Green Belt for these plots, argue that all of them are 'sandwiched plots', implying that these plots are not such an important part of the Green Belt area. How does the TCP define 'sandwiched' plots? Why is this being said when all of us can clearly see that many of these plots are not touching/bordering constructed plots on any side. Also, most of these plots have no connection to any road nearby; they are thus surrounded on all sides by green (un-constructed) land. Connecting roads, water/electricity/ drainage/sewage lines for many of these plots do not exist at present and will have to be built from the scratch, meaning an escalating damage to the Green Belt. Also, each of these new constructions will be a mini growth pole. This means additional support businesses, infrastructural facilities, more vehicles and so on… in these areas. All this will trigger further congestion, overloading, tree felling, water seepage. Also, many of these plots are situated on steep slopes, many of them more than 45 degrees; some even more than 60 to 70 degrees. Architectural and geological norms forbid construction of buildings on such steep slopes. It is also hazardous for the trees around, trees and buildings above those plots – those also being on sloping sides and already somewhat unstable.

Thirdly, the crucial point is, can we make a scientific EIA of even a small damage – the plot by plot EIA that is being presently considered - to the Green Belt without considering the situation of the 'single integral ecosystem' of Shimla as a whole? It is a common & respectable scientific knowledge that for complex eco-systems that are unstable, that are on the edge of a catastrophe, a 'small' disturbance can trigger an unpredictably large avalanche-like change. There are substantial reasons to consider the eco-system of Shimla hill/ city as sensitive or unstable. Green Belt is the most crucial part of the stabilizing forces here. Hence we cannot asses the environmental impact of the construction on these plots inside the Green belt just on their immediate vicinity. Any realistic and scientific consideration of the impact of such constructions within the Green Belt area must have as a background an environmental assessment of the whole of the integral ecosystem of the Shimla hill and the city.

For many years now, there has been a lot of public outcry against the disaster looming over the Shimla hill/city. Several specialists, researchers, concerned journalists (in many major newspapers) and several citizens' initiatives have raised this cry.

Long-range town planning, particularly where the very survival of this nationally important city is at stake, must be based upon consideration of the possible worst-case scenarios. Here, we believe, there is only one principle and policy that can address the urgency of the situation, which can give us a viable future. This is one of zero tolerance to any further stressing of the sensitive ecosystem of Shimla – at least till the hazards to the city as a whole is examined. We need this will and determination - unambiguous and firm - to survive as a liveable city. Continuing the current policy of avoidance, not looking with holistic and future-oriented perspectives, not taking strong decisions, being lax and dealing with problems only as and when they arise is a prescription for major disasters.

Now is the time when the government and the MC of Shimla should set up a committee of expert environmentalists and ecologists of national eminence to seriously assess the threats to the survival of our city – the assessment of the stress/ instability of the whole of the city & hill ecosystem of Shimla. Such threat evaluation should be made public so that all citizens can know and participate in this assessment. We must then plan strategies to save the ecology of Shimla. Till such an evaluation has been conducted, no private or even public construction that can worsen the existing problems should be allowed. By destroying our ecosystem we are not only destroying ourselves, but we are destroying the earth which for centuries has sustained us.

We of course hold that no one should suffer on account of the ban on construction in the area declared as Green Belt. The problem of the pre-notification plot holders in the Green Belt should be solved. We are sure that the MC and the Himachal Government can mobilise the requisite powers and resources to solve this problem in a humane and just way. The plot holders could be offered plots to compensate them in places outside the Green Belt wherever possible so that justice is done to them but at the same time we could ensure that we do not add to the threat to the city of Shimla and its ecosystem by relaxing the ban on the Green Belt. Under your leadership, to ensure the safety of a city of such national importance, surely the central authorities can help, financially and otherwise. We need leadership with vision to think beyond disaster management to that of disaster prevention.

(Attaching few writes that throw light on the hazards to the survival of Shimla)

Amreen, Jogin and others - Shimla
e-mail: amreenmurad@gmail.com; joginrani@gmail.com

3

To
The
Environment Department, Shimla

2nd. April, 2013

Subject: Objection to the proposed relaxation of the ban on construction inside the area declared as the Green belt of Shimla in the broader context of the grave threat to the survival of the city and its ecosystem

Ma'am/ Sir,

It is the responsibility of your Department to look into and maintain the environmental health of the Shimla city/ hill ecosystem, to protect it from hazards in the short and long term. This crucial ecosystem is much degraded and unstable today. In this context we address to you our objection to the relaxation of the construction ban on the area declared as Green Belt. This will subject our environment to unpredictable and un-assessed hazards. We urgently request you not to give environmental clearance to such an action.

1. We sketch below some of the main roots of the environmental hazards faced by Shimla city/ hill ecosystem:

Large scale over-construction of Shimla has reduced the quality of life, beauty, air and all other positive things that the city of Shimla was once known for. But the crisis today is much graver.

Shimla hill, the base on which our city stands, is made up of much more clay and soft stone as compared to, for instance, the granite based hills of Deccan plateau.

Global warming means increasingly more and more rainfall and its severity. Also, the large population of the city means large scale use of water. All these events lead to large scale seepage of our clay-like sub-soil and the growing erosion of the infrastructure of the Shimla city.

The already huge build-up of the city means increasing load on the soil, increasing soil seepage and structural instability.

Shimla city does not sit on a stable valley. It is built up on steep slopes. 90% of the core city has been constructed on slopes above 60 degrees. Such construction, against all architectural and geological norms, makes Shimla highly unstable and also adds to the underground soil erosion.

Finally, the Shimla hill is situated on seismic zone IV in the earthquake proneness scale.

In such an unstable situation disturbances whether from a landslide or from a tiny earthquake tremor could act as a trigger creating a cascade effect. Here, "*devastation could be enormous with buildings on slopes steeper than 45 degrees collapsing like a house of cards*'.

We need only to take account of what is happening all around us right now to check that we are not just speculating. Both on the north and the south side of the Shimla hill, we are seeing increasingly a large number of tree-falls, cracks in soil, mini-cave-ins, small and large land-slides. Recently we all helplessly saw the creeping caving in of our hill-top at the Ridge, on the Mall. After every torrential rain, the streams and *nullah*s become muddy showing the heavy run-off/ erosion of the subsoil. During every monsoon many of the residents of Shimla are scared and wander whether their houses will survive.

Thus we must seriously consider the possibility that the ecosystem of Shimla is already on the edge of a catastrophe, that we are already crossing the 'tipping point'. The consequences of such a disaster are so grim (destroying thousands of lives and homes, making Shimla a ghost city) that we must reflect upon such possibilities, however small, with great seriousness.

2. It is in this context that we must look at the role of the Green Belt. A forest land is more than trees. It is constituted by an active and alive top soil not destroyed by construction, grass/ shrubs and trees. The Green Belt is much more than the lungs of the city. It checks the soil seepage, absorbs small shocks, and stabilizes the ecosystem as a whole. In various ways it is the only counterweight to all the destabilizing processes. Our Green Belt is a crucial bulwark protecting the health and the very survival of the infrastructure of the city.

3. One might argue that the partial lifting of the Green Belt ban and allowing construction on seventy plots is a small matter – one whose environmental impact will also be small.

The ease with which the construction lobby has subverted the will of the Municipal Corporation & Town & Country Planning authorities so far, even getting laws changed to legalize thousands of high-rises (permissible building height policy has already changed seven times) should alert us to the reality of the power-equation and vulnerability of our town authorities to the construction/builder's lobby. Given such a ground reality, can one guarantee that the commercial interests will not dominate these plots and seize and encroach more?

Secondly, to allow construction on seventy plots mean these many more residential complexes in the heart of the Green Belt at the least. (see attached photos) The Town and the Country Planning in their proposal for sanctioning construction in the Green Belt for seventy plots argues that all of them are 'sandwiched plots', implying that these seventy plots are not such an important part of the Green Belt area. How does the Town and Country Planning define 'sandwiched' plots? Why this is being said when all of us can clearly see that some of these plots are not touching/bordering constructed plots on any side. Not only this but most of these plots have no connection to any road nearby; they are thus surrounded on all sides by green (un-constructed) land. Connecting roads, water/electricity/ drainage/sewage lines for many of these plots do not exist at present and will have to be built from the scratch – this means an absolute damage to the Green Belt area. Also each of these new constructions will be a mini-growth pole. This means additional support businesses, infrastructural facilities, more vehicles and so on... All this will trigger further congestion and overloading. This will certainly enhance the environmental damage to the Shimla city which is already collapsing. Also, many of these plots are situated on steep slopes, many of them more than 45 degrees; some even more than 60 to 70 degrees. Architectural and geological norms are against construction of buildings on such steep slopes. It is also hazardous for the trees around, trees and buildings above those plots – those also being on sloping sides and already somewhat unstable.

Thirdly, the crucial point is, can we make a scientific EIA of even a small damage to the Green Belt without considering the situation of the single integral ecosystem of Shimla as a whole? It is a common & respectable scientific knowledge that for complex eco-systems that are unstable, are on the edge of a catastrophe, a 'small' disturbance can trigger an unpredictably large change. The science of sensitive or unstable ecosystem talks about the 'butterfly effect' – "a butterfly flaps its wing in Beijing, there is a storm in Moscow". There are substantial reasons to consider the eco-system of Shimla hill/ city as sensitive or unstable. Green Belt is the most crucial part of the stabilizing forces here. Hence we cannot asses the environmental impact of the construction on these plots just on their immediate vicinity. Any realistic and scientific consideration of the impact of such constructions within the Green Belt area must have as a background an environmental assessment of the whole of the integral ecosystem of the Shimla hill and the city.

For many years now, there have been a lot of public cries of protest against the disaster looming over the Shimla city. Several specialists, researchers, concerned journalists (in many major newspapers) and several citizens' initiatives have raised this very cry.

2.

Long-range town planning, particularly where the very survival of this crucial city is at stake, must be based upon consideration of the possible worst case scenarios. Here, we believe, there is only one principle and policy that can address the urgency of the situation, which can give us a viable future. This is one of zero tolerance to any further stressing of the sensitive ecosystem of Shimla. We need this will and determination, unambiguous and firm, to survive as a liveable city. Continuing the current policy of avoidance, at not looking at holistic and future-oriented perspectives, not taking strong decisions, being lax and dealing with problems only as and when they occur is a sure prescription for major disasters.

Now is the time when the government and the Municipal Corporation of Shimla should set up a committee of expert environmentalists and ecologists, and seriously assess the threats to the survival of our city – the assessment of the stress/ instability of the whole of the city & hill ecosystem of Shimla. Such threat evaluation should be made public so that all citizens can know and participate in this assessment. We must then plan strategies to save the ecology of Shimla and adopt methods which are eco-friendly, sustainable and humanistic. Till such an evaluation has been conducted, no private or even public construction that can worsen the problems should be allowed. By destroying our ecosystem we are not only destroying ourselves, but we are destroying the earth which for centuries has sustained us.

We of course hold that no one should suffer on account of the ban on construction in the area declared as Green Belt. The problem of the pre-notification plot holders in the Green Belt should have been solved humanely much earlier. We are sure that the Municipal Corporation and the Shimla/Himachal Government have tremendous of powers and resources to solve this problem in a humane and just way. The plot holders could be offered plots that are large enough to compensate them in places outside the Green Belt, wherever possible so that justice is done to them but at the same time we should ensure that the city of Shimla and its ecosystem is not destroyed by relaxing the ban on the Green Belt which sure will have devastating consequences.

Yours respectfully

Dimple (Amreen) Okersi Vakali

Joshi

SHAM ROCK BANK
SHIMLA - East

3

To: All those **involved in the process of conducting the EIA of the Green Belt in Shimla**

Dtd. 14 Dec. 2013

Subject: Crucial input regarding the baseline ground level reality in the corner of the Green belt where I live for properly executing the EIA for the Green Belt here

Respect Ma'am/ Sir,

I want to give you this input regarding the baseline ground level reality for properly doing the EIA in the corner of the Green belt where I live as it is my lived experience.

I am also a so called 'sufferer' of the Green belt construction ban. My joint family had around 4000 sq yards of land around our residence in Chhota Shimla. After subdivision, my family owns more than 2000 sq yards of un-constructed land around my residence that came under the Green Belt promulgation.

We all siblings, our parents, all of us strongly believed in nurturing every green corner of our land much before the Green belt was ever heard of. Years before the Green belt ban declaration we resisted all pressure to sale and allow construction on our vacant land. It was only once in 1997 then we had to sale a part of our land (which was owned by our joint family) due to heavy financial crisis.

We have an old heritage house – SHAM ROCK BANK - about 130 year old that we strive to cherish as such.

There is a lot of vacant land that surrounds our present land. This land was auctioned by the custodian department to some individuals.

Our land in Chhota Shimla is the end point of an inclined mini-ridge from where the land falls abruptly and steeply on the east, west and south side, and dense and lush green areas begin. The eight sold plots inside the Green belt whose construction ban is under consideration are all downhill sides our residence, situated on the sheer sloping land on these three sides of our ground. Though these plots do not have trees directly inside them, they are part of a lush prime green land with a large number of deodar trees closely situated around them. The foliage growth here is so thick most of the year that one cannot see the ground land from a little distance. Earlier when there were deodar trees inside the sold plots, then some of the plot owners got some of the trees felled by falsely claiming that they were endangering people's lives. For instance, a huge healthy deodar tree inside one plot (below our land), not threatening anyone, was felled in this manner after the recent High Court order permitting such felling. And cutting of deodar saplings inside these plots has been a regular and a rampant practice.

There are no connecting roads touching these sold plots below our land. This means that a big area of green belt is to further allotted and cleared for the connecting roads and sewage line and other infrastructural facilities for each of these plots. This extra loss of green belt land must be estimated in the EIA.

Also, on the top of most of these plots we have a large level land that is under Green belt and that we have kept green, with high deodar trees and foliage. Thus most of these plots have un-constructed green areas and trees on all the four sides. They can in no way be considered to be 'sandwiched' plots.

Most of these plots are situated on steep slopes – some of them generally of more than 60 degrees incline downhill to existing built-up areas and trees. Thus any construction on these lands will be

1

dangerous for all the trees and buildings above them. The subsoil runoff here is considerable. Cracks and depressions abound on our land as it is.

The situation on the east and south-east side of our residence is especially dangerous. Here the plot lands are mostly steeper than 70 degrees, and the land below it is bordered by a big nullah running much below. Large landsides, tree falls, and trees inclining dangerously (the forest department had to cut them down once or twice) keep happening here as it is. On the east side of our plot we have a huge tree that has been protecting our guest house for many years. This tree is already inclining and fragile, with cracks around it. Any digging below this tree (if there is construction on the plot that is directly downhill to the tree) will surely bring about the fall of the land here and in consequence fall of this tree.

On the steep west side of our residence two huge vertical buildings, one with five plus floors, were constructed a few years back within the Green belt, after the Green belt promulgation (on the land sold by the custodian department). MC constructed roads for these two powerful individuals in this prime forest belt. The construction of that road without giving retaining walls led to serious damage to our outhouses where a poor dalit family lives. In between the above buildings stands a sandwiched plot on this steep slope that endangers the same outhouse that is already on the verge of falling.

If this kind of high rises and irresponsible construction can be done despite Green belt construction ban by persons with enough clout, how can we be sure that the same will not happen when the construction ban is lifted all around the areas below our land and all of Shimla?

Thus we, who have stood for environmental protection, have kept the land in our control free from commerce and construction, find ourselves endangered and insecure if we get caged with these possible buildings that threaten our trees, environs and heritage home if the Green belt ban is lifted from this area.

Thus, as technically 'sufferers' of the Green belt ban and also as ardent lovers of environment and heritage we seek your support to defend our cherished ecosystem.

Dimple Oberoi Vahali

Amreen (Dimple) Oberoi Vahali,

14 Dec. 2013

SHAM ROCK BANK, SHIMLA EAST

2

To

All those involved in the process of conducting the EIA of the Green Belt in Shimla

Dtd. 14 December 2013

Subject: A few points for consideration for conducting the EIA of the area under Green Belt of Shimla, in the broader context of the grave threat to the survival of the city and its ecosystem.

Respected Ma'am/ Sir,

At the outset we would like to state that we are residents of the Green Belt area in Shimla. Our concern about the Green Belt is because we are sensitive and deeply concerned about the ecosystem of the city of Shimla perse. We value the safety of the Shimla environment in itself. We have always stood for the integrity of the Green Belt.

We would like to present a few points for your consideration related to the environment of Shimla and to the EIA of the Green Belt area within the broader context of the grave threat to the survival of the city and its ecosystem. This is in continuation of our representations submitted earlier (attached herewith).

Impact of construction on plots in the green belt area - Green cover, 'Sandwiched plots', Access to road, Sewerage...

A green/ forest land is more than the mere presence of trees standing on it. It is constituted by an active and alive top soil which should not be destroyed by construction. Grass, shrubs and every variety of trees are as important as deodar trees in the life of green area. Even if a single tree is not required to be cut in order to construct on a vacant plot inside the green belt area, still the nature of the soil of the plot will be changed from 'green', a part of the green belt that was thriving there. Construction would also mean destroying the green soil in the immediate surroundings.

Moreover few of these plots have no connection with existing roads or sewage exits particularly in the plots around our residential area. Neither such extra land has been provided as common to all these plots. Hence the EIA must also calculate the area of the green belt that will be destroyed (in addition to the individual plot area) to provide for the construction of the approach of roads and other infrastructural facilities – for each of these plots.

Too many of these plots are surrounded by entirely unconstructed, green soil. The Town and the Country Planning in their proposal for sanctioning construction in the Green Belt for these plots often argues that most of them are 'sandwiched plots', implying that these plots are not such an important part of the main body of the Green Belt area. How do we define the term 'a sandwiched' plot? A look at the field reality clearly shows that some of these plots are not touching/ bordering the constructed plots on any side. Around our residence in Chhota Shimla, only one among the 7/8 such Green Belt plots can be said to be touching constructed plots on two sides. Most of them touch that section of our land that we have kept unconstructed – green in character. Thus they mostly touch pure green belt soil on all the four sides. Not only this but most of these plots here have no connection to any road nearby; they are thus surrounded on all sides by green (un-constructed) land. Connecting roads, water/electricity/ drainage/sewage lines for many of these plots do not exist at present and will have to be built from the scratch.

Impact on – The existing built up area/ Soil Quality, Slope, and excavation involved:

1

The EIA must consider whether these plots are situated on the downhill side of the existing built-up spaces. The EIA must also consider the slope, the soil quality and the horizontal distance of the plot under assessment from the existing built structures - all these factors need to be considered in order to evaluate the impact. Moreover we also need to consider as to what will be the proper, standard architectural guidelines/ safety norms that must be used to evaluate such hazards?

Many of these plots around our residence in Chhota Shimla are situated on steep slopes, many of them more than 45 degrees; some even more than 60 to 70 degrees. Many of these plots are on the downhill side of dense residential housings. Architectural and geological norms are against construction of buildings on such steep slopes. It is also hazardous for the trees around, trees and buildings above these plots – as these trees are also on the sides that are sloping and are already somewhat fragile. The soil quality of this hill side is really poor. During every monsoon, cracks, fissures, soil sinkage, tree falls take place on these very sites.

We would like to emphasize that many of the soil/ hillside/ built-up structures at the border of the green belt are unstable and are an ecologically sensitive terrain – as we see graphically in our residence area. Here large and small land-slides, tree falls, cracks and fissures, sinking of the ground is common and is increasing every year. Here the environmental impact of even normal rains is often catastrophic. Thus the EIA must evaluate the level of stability/ instability/ fragility/ integrity of the soil infrastructure of the hillside where the plot to be constructed.

As a general principle, EIA of an environmental ecosystem that is unstable and is on the verge of a minor and major breakdown is qualitatively different from that of a system that is stable. If the soil system is unstable, then even a relatively small disturbance like construction on a single plot can trigger a mini landslide on the upper part of the slope.

The overall Impact of construction on the Green Belt area on the city of Shimla

Lastly, the crucial point is, can we make a scientific EIA of even a small damage to the Green Belt (assuming all the seventy plots are allowed to be built-up) without considering the situation (environmental viability/ health) on the single integral ecosystem of Shimla as a whole? It is a common & respectable scientific knowledge that for complex eco-systems that are unstable and are on the edge of a catastrophe, a 'small' disturbance can trigger an unpredictably large change. There are substantial reasons to consider the eco-system of Shimla hill/ city as sensitive or unstable. The maintainance of the Green Belt is the most crucial part of the environmental stabilizing forces here. Hence we cannot asses the environmental impact of the construction on these plots merely by assessing the impact of the construction on its immediate vicinity. The impact of a disturbance on a structure depends on the disturbance and also on the viability, stability/ instability of the structure concerned, the status of the ecosystem as a whole. The same disturbance might cause no damage or it may cause the structure to collapse – it all depends upon the viability of the structure, the nature of the foundation, the soil structure below the foundation. **Any realistic and scientific consideration of the impact of such constructions within the Green Belt area upon the city/ hill ecosystem of Shimla must have as a backgrounc a study of the environmental status - structural viability/ fragility of whole of the integral ecosystem of the Shimla hill and the city.** As we know, no such study has been done as yet. How will the EIA (of relaxation of green belt - its impact on the environment of the city of Shimla) is to be done without such a baseline study? To highlight the urgency of our point we sketch below some of the main roots of the environmental hazards faced by Shimla city/ hill ecosystem:

Large scale over-construction of Shimla has reduced the quality of life, beauty, air and all other positive things that the city of Shimla was once known for. But the crisis today is much graver.

Shimla hill, the base on which our city stands, is made up of much more clay and soft stone as compared to, for instance, the granite based hills of Deccan plateau.

Global warming means increasingly more and more rainfall and its severity. Also, the large population of the city means large scale use of water. All these events lead to large scale seepage of our clay-like sub-soil and the growing erosion of the infrastructure of the Shimla city.

The already huge build-up of the city means increasing load on the soil, increasing soil seepage and structural instability.

Shimla city does not sit on a stable valley. It is built up on steep slopes. 90% of the core city has been constructed on slopes above 60 degrees. Such construction, against all architectural and geological norms, makes Shimla highly unstable and also adds to the underground soil erosion.

Finally, the Shimla hill is situated on seismic zone IV in the earthquake proneness scale.

In such an unstable situation disturbances whether from a landslide or from a tiny earthquake tremor could act as a trigger creating a cascade effect. Here, ***"devastation could be enormous with buildings on slopes steeper than 45 degrees collapsing like a house of cards'.***

We need only to take account of what is happening all around us right now to acertain that this is not just a speculation. On the North and the South side of the Shimla hill, we are increasingly witnessing a large number of tree-falls, cracks in soil, mini-cave-ins, small and large land-slides. Recently we all helplessly saw the creeping caving in of our hill-top at the Ridge, on the Mall. After every torrential rain, the streams and nullahs become muddy showing the heavy run-off/ erosion of the subsoil. During every monsoon many of the residents of Shimla are scared and wander whether their houses will survive.

Thus we must seriously consider the possibility that the ecosystem of Shimla is already on the edge of a catastrophe, that we are already crossing the 'tipping point'. The consequences of such a disaster are so grim (destroying thousands of lives and homes, making Shimla a nightmare city) that we must reflect upon such possibilities, however small, with great seriousness.

We believe strongly in all that we have presented here. My family owns more than 2000 sq yards of un-constructed land around my residence that came under the Green Belt promulgation. We all siblings, our parents, grandparents - all of us strongly believed in nurturing every green corner of our land much before the Green belt was ever heard of. Years before the Green belt ban declaration we resisted all pressure to sale and allow construction on our vacant land. It was only once in 1997 that we had to sale a part of our land (which was owned by our joint family) due to heavy financial crisis, by getting it plotted by TCP.

Respectfully,
Dimple Vahali Oberoi
Jogin
Dimple Oberoi Vahali, Jogin
Sham Rock Bank, Shimla East

3

References

1. Annual Report-2011-12 & 2012-13, Himachal Pradesh State Pollution Control Board, Shimla-9
2. Report on City Developmental Plan Shimla Himachal Pradesh http://www.shimlamc.gov.in/MC/admin/Pages/page/City-Development-Plan.aspx
3. Working Plan of Shimla Municipal Forest.
4. Ground Water Information Booklet Shimla District, Himachal Pradesh, Central Ground Water Board, 2008.
5. ASTER (Advanced Space-borne Thermal Emission and Reflection Radiometer) DEM from http://asterweb.jpl.nasa.gov/.
6. Google Images from Google Earth.
7. Draft City Disaster Management Plan, MC Shimla
8. Kulkarni, A.N and Goswami, P.2012.The Bioscan. An international quarterly Journal of Life Sciences. Avian fauna of summer hill, Shimla – HP.7(1): 61-64.
9. EIA GUIDANCE MANUAL - Building, Construction, Townships and Area Development Projects Administrative Staff College of India, February 2010.

Society of Environment Protection and Sustainable Development (SEPSD)
Department of Environment, Science & Technology, Government of Himachal Pradesh
Narayan Villa, Chotta Shimla, Himachal Pradesh
India-171002