



# Sanitation Management Profile & Proposal

-

## Shamli



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## About CURE

**Centre for Urban and Regional Excellence (CURE)** is a not-for-profit development organization working with urban informal and low-income communities to un-think, reimagine, innovate and de-engineer solutions to include and integrate people in the processes of city development.

Our mission is to achieve three goals; reconnected urban societies that take rightful decisions to ensure sustainable urban development; strengthened local agencies with capacities for participatory community development; and real evidence built from the ground up for effective service delivery.

CURE's strength is in its communitarian approach. We believe that community participation is a powerful organizing ideal that fosters sustainable development in and of communities and can contribute to local development planning and design. We facilitate processes that enable people to come together, recognize their problems, articulate their needs and concerns, formulate shared goals and take collective decisions. We believe in a community's wisdom.

CURE's work focuses on building resilient communities and cities. It helps cities with the preparation of citywide slum upgrading and environmental resilience plans. The plans are designed to do three things; level people up – ensure equality; connect all the dots – ensure comprehensive and sustainable ecological solutions; and integrate people within the city's fabric – ensure inclusive development.

CURE believes all people are equal and must get access to an equal level of services – taps and toilets at home to live a life with dignity and to sustainably reduce poverty. CURE has set up several integrative models of sustainable urban development where the poor have been enabled to build home toilets and houses, connect to potable drinking water, get access to solid waste management services, harvest rain water and be water resilient and improve their living environments.

## Introduction

The district was carved out of Muzaffarnagar district in September 2011 and named Prabhudh Nagar. Shamli and Kairana tehsils of Muzaffarnagar formed the new district. It was renamed Shamli in July 2012 by the Uttar Pradesh government.

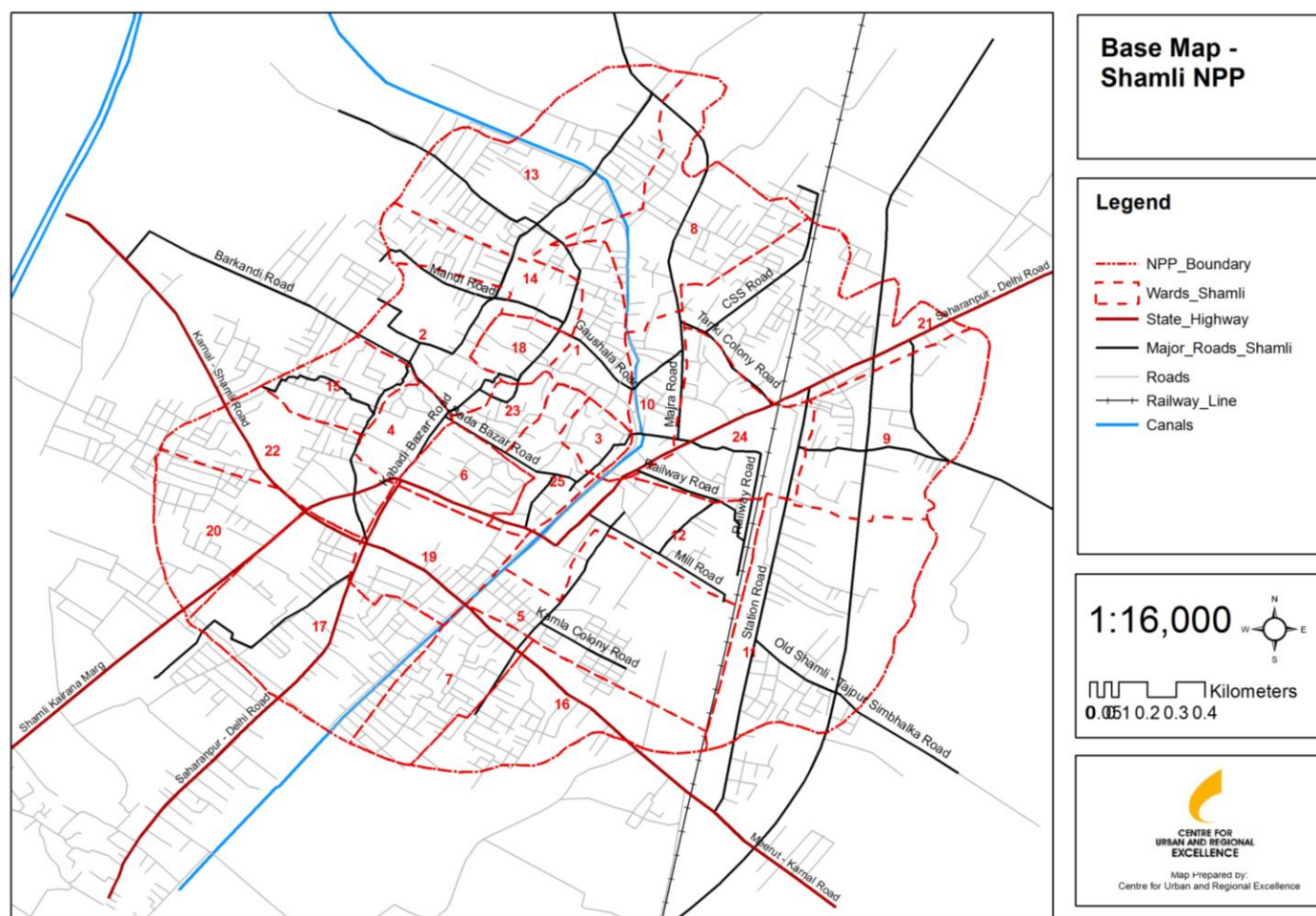
The City comes in the national capital region(NCR) and is located along the Delhi–Saharanpur, Meerut-Karnal and Muzaffarnagar-Panipat Highways. Shamli is located at 29.45°N 77.32°E. It has an average elevation of 248 metres (813 feet).

### Connectivity

Shamli is well connected to the Capital and other major towns & cities of the Uttar Pradesh and Haryana state and the Country as well by Road and Rail.

**Road:** Road plays an important role in connecting Shamli town to other towns and cities of the country. National Highway (NH) and State Highway are passing through the center of the city connects the city to all major towns of States as well as capital city and other states of country. Panipat to Haridwar, Bijnor road is connected and pass through city. Meerut –Karnal road also major connectivity of City. Shali is well connected with National Capital through road.

**Railway:** The city is an important station on the broad gauge line. Shamli is connected to Delhi and Saharanpur.

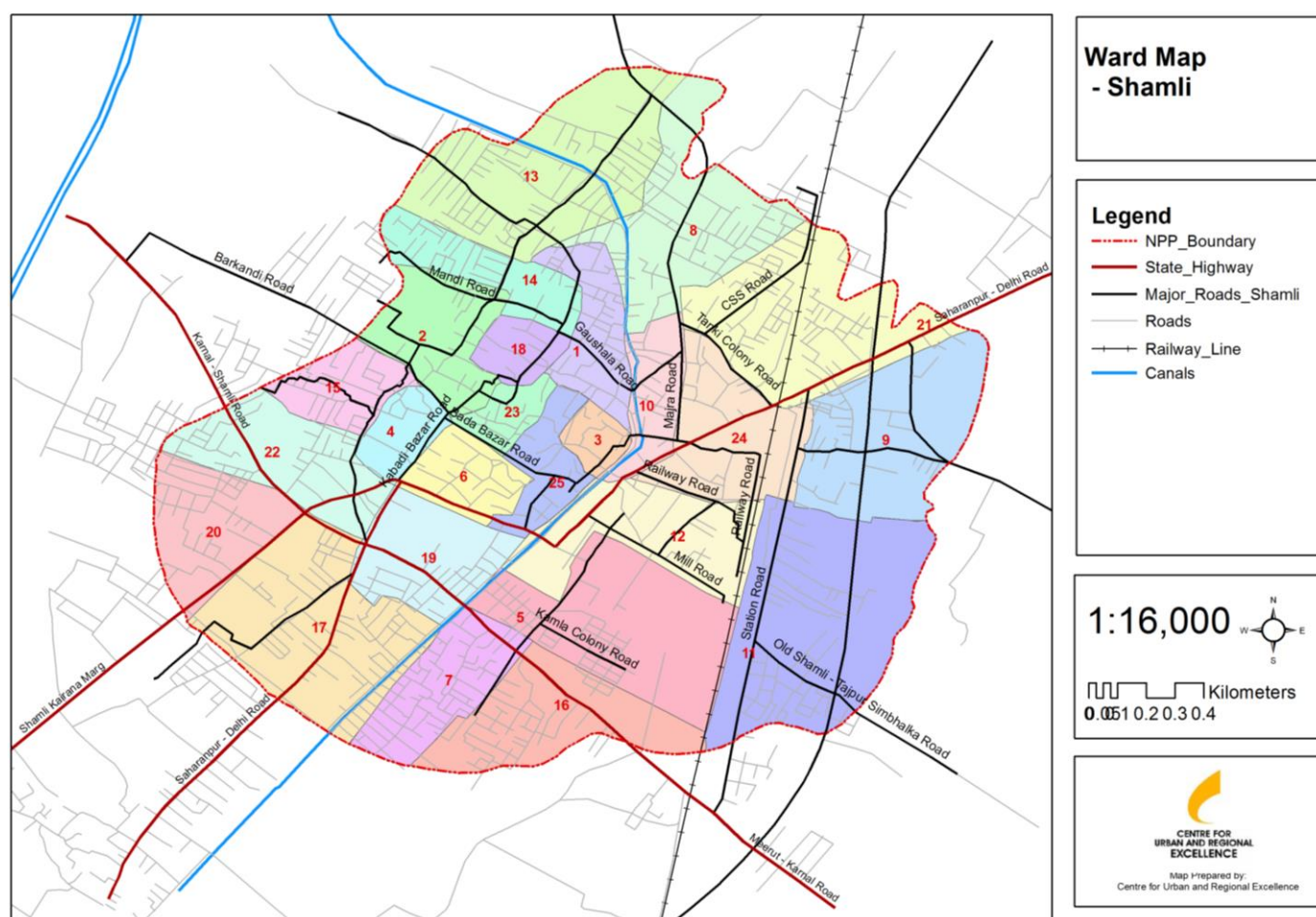


Map 1 : Base Map Shamli NPP, 2017

## Demography

The Shamli city is divided into 25 wards and has population of 107,266 of which 57,187 are males while 50,079 are females as per report released by Census India 2011.

Population of Children with age of 0-6 is 14036 which is 13.09 % of total population of Shamli (NPP). In Shamli Nagar Palika Parishad, Female Sex Ratio is of 876 against state average of 912. Moreover, Child Sex Ratio in Shamli is around 794 compared to Uttar Pradesh state average of 902. Literacy rate of Shamli city is 80.32 % higher than state average of 67.68 %. In Shamli, Male literacy is around 86.21 % while female literacy rate is 73.70 % (Source – Census 2011). Shamli Nagar Palika Parishad has total administration over 21,450 households to which it supplies basic amenities like water and sewerage.

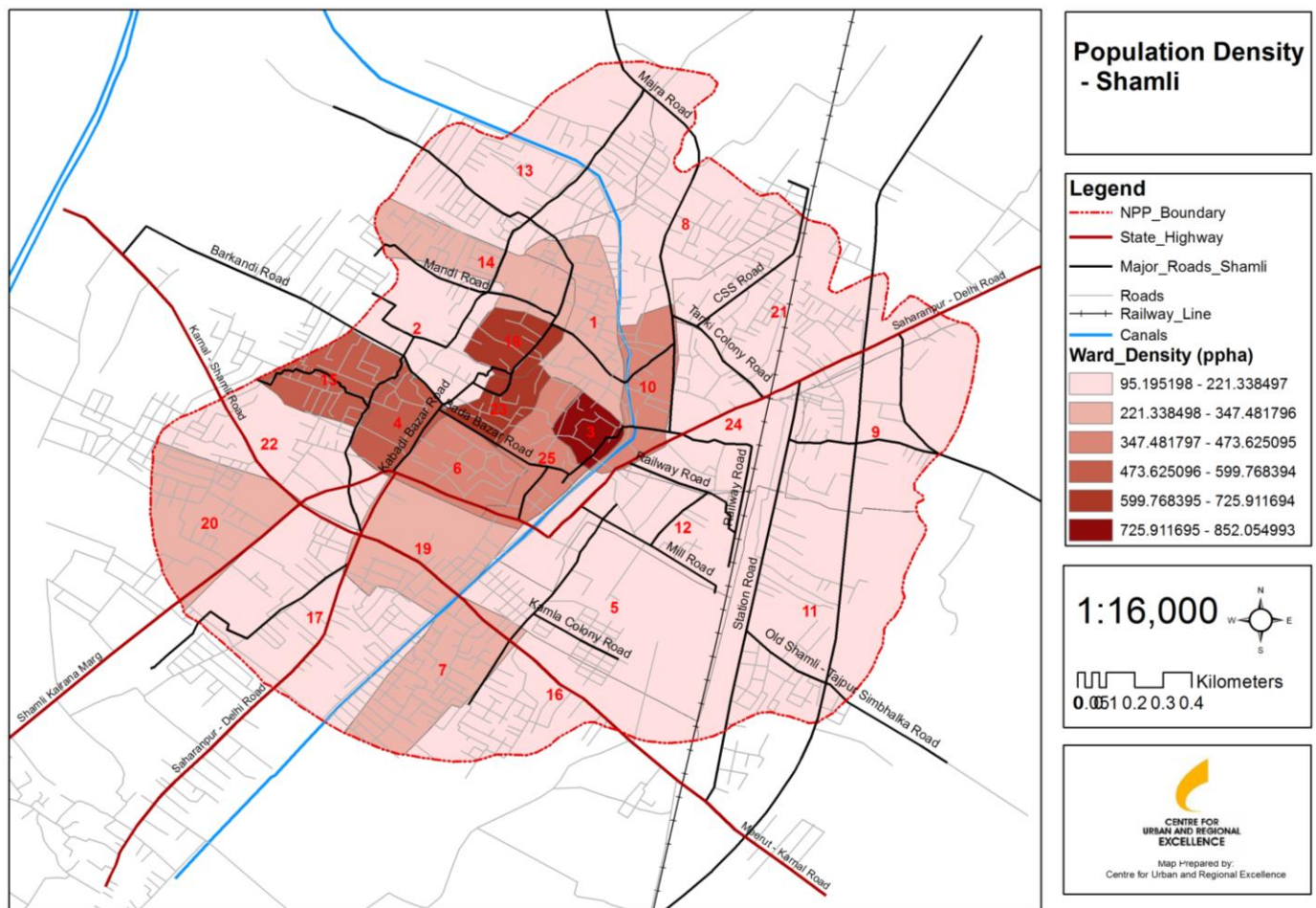


Map 2 : Ward Map of Shamli NPP, 2017

### Population Density

There are 25 wards in the city, among them Shamli ward no. 3 is the most dense ward with population density of 852 persons per hectare (ppha). The map above shows the variation in the densities ward wise. The wards in inner city can be observed as dense as compared to the wards in periphery of the city.





Map 3 : Ward Wise Population Density of Shamli NPP (Census 2011)

## Ward Details

Shamli Ward No 17 is the most populous ward with population of 6556 and Shamli Ward No 12 is the least populous ward with population of 2990.

Ward	Population	Area (Ha)	Density	Ward	Population	Area (Ha)	Density
1	4606	13.387	344.065	17	6556	40.993	159.929
2	3543	17.917	197.745	18	4297	6.429	668.377
3	3842	4.509	852.073	19	4814	19.259	249.961
4	3752	7.585	494.660	20	5343	19.803	269.807
5	3558	36.608	97.191	21	3790	37.534	100.975
6	4926	10.611	464.235	22	3289	22.438	146.581
7	5507	17.926	307.207	23	3888	5.630	690.5861
8	4306	31.046	138.697	24	3700	23.422	157.971
9	4218	33.308	126.636	25	4651	10.131	459.086
10	3979	11.105	358.307				
11	5171	50.273	102.858	<b>Total</b>	<b>107266</b>		
12	2990	25.040	119.408				
13	4055	42.596	95.196				
14	3063	13.715	223.332				
15	5782	11.271	512.998				
16	3640	25.244	144.192				

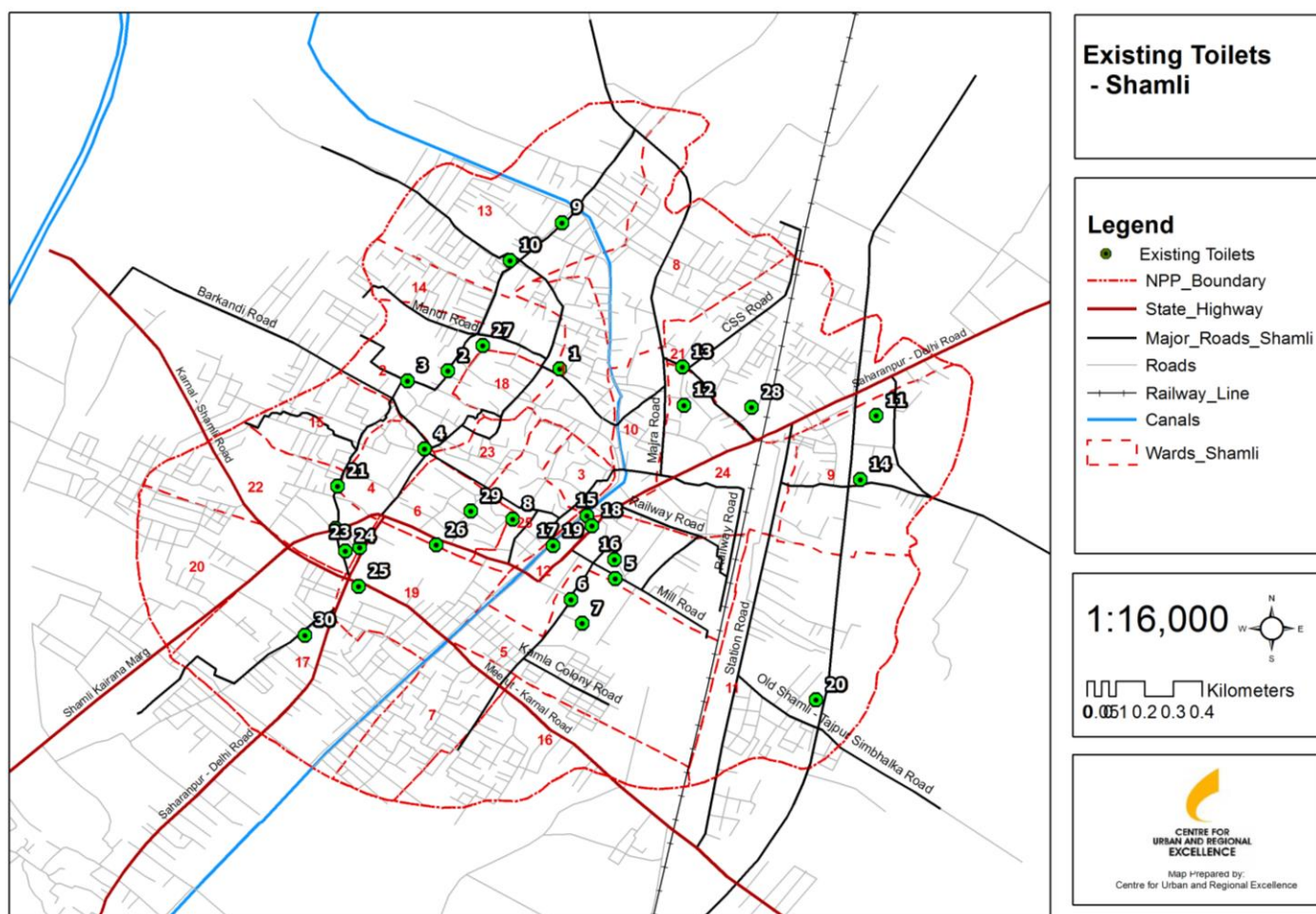
Table 1 : Ward wise Population and Density of Shamli NPP



## Public Toilets

### Existing Scenario

Shamli has 30 Public Toilets having 89 toilet seats and 59 Urinals for male and 35 toilet seats for females. In terms of Spatial distribution of existing public toilets (*i.e. a public toilet within a distance of 500m*), the locations of existing toilets cover the entire NPP area. However, there is a shortfall of 55 seats (analysis given below) which needs to be built in order to meet the norms as specified under SBM.



Map 4: Map showing existing public toilets in Shamli NPP, 2017

### Analysis

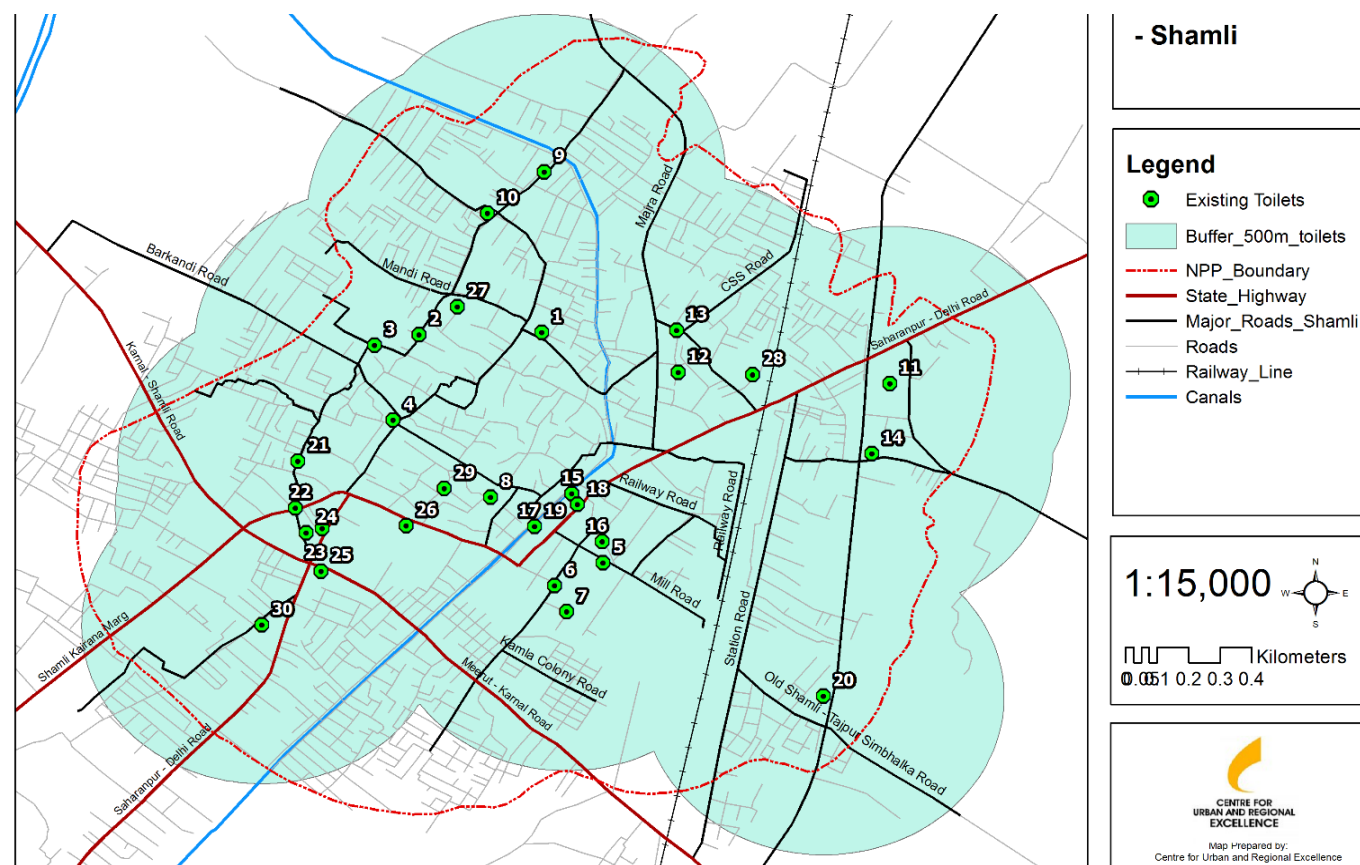
With buffers of 500m around existing public toilets, it can be seen (refer map no. **XX**) that the existing toilets cover the entire NPP area. This infers that Shamli has 100% accessibility within the city.

However, in terms of number of seats for the estimated users of public toilets in Shamli, there is a shortfall of 55 seats.

1. The floating population of the NPP Shamli = 5% of Total population = 5% of 107266 = 5363 persons.
2. Total number of toilet seats required for the floating population = 1 seat per 30 persons =  $5363/30 = 179$  Seats.

### 3. Existing number of seats with NPP Shamli = **124 Seats**

There is a deficit of **55 Seats** in the City.



Map 5 : Coverage Assessment of Existing Toilets, 2017

### List of Existing Public Toilets in Shamli Nagar Palika Parishad

The existing public toilets, community toilets and urinals have been mapped and their details of their location and number of seats present in them are given below in the table.

S.No	Ward No.	Type	Maintained by	Location Name	Male Seat	Female Seat	Male Urinal	Male Bathroom	Female Bathroom
1	1	PT	Nagar Palika	Mohala Badiyal Nala Patri	4	4	2	-	-
2	2	PT	Nagar Palika	Mohala Nandu Parsad	5	5	-	-	-
3	2	PT	Nagar Palika	Mohala Barkhandi	7	3	-	-	-
4	4	PT	Nagar Palika	thatharan Masjid	3	-	-	-	-
5	5	CTC	Nagar Palika	Thana Kotwali	5	-	2	3	-
6	5	Urinal	Nagar Palika	Hanuman Dhaam	-	-	2	-	-
7	5	PT	Nagar Palika	Sarkari Hospital	3	4	2	-	-
8	6	PT	Nagar Palika	Mohala Kajiwada (Harijan Chopal)	3	-	-	-	-
9	8	CTC	Nagar Palika	Pansarayan Dhewa Basti	4	2	-	1	1
10	8	PT	Nagar Palika	Nagar Palika Quarter	6	4	-	-	-
11	9	PT	Nagar Palika	Bhainswall Road	2	-	1	-	-

S.No	Ward No.	Type	Maintained by	Location Name	Male Seat	Female Seat	Male Urinal	Male Bathroom	Female Bathroom
12	10	PT	Nagar Palika	Bakhu wala Mandir	3	-	2	-	-
13	10	PT	Nagar Palika	Pragati Market	3	2	2	-	-
14	11	PT	Nagar Palika	Kisaan Dharamshala	3	4	4	-	-
15	12	Urinal	Nagar Palika	Nala Patri	-	-	1	-	-
16	13	PT	Nagar Palika	Nagar Palika Parishad Office	1	1	4	-	-
17	13	PT	Nagar Palika	Kamla Market	1	1	3	-	-
18	13	PT	Nagar Palika	Bijli Ghar	1	1	3	-	-
19	13	Urinal	Nagar Palika	Apna Bazar	1	-	1	-	-
20	18	PT	Nagar Palika	SP Office Backside	2	-	-	-	-
21	19	PT	Nagar Palika	Now Kuan Road near bhumiya kherda	3	2	2	-	-
22	19	Urinal	Nagar Palika	Now Kuan Puliya	-	-	3	-	-
23	19	Urinal	Nagar Palika	Lal Singh Market	-	-	2	-	-
24	19	PT	Nagar Palika	Gango Bus Stand	2	-	-	-	-
25	20	PT	Nagar Palika	Roadways Bus Stand	5	2	5	-	-
26	20	PT	Nagar Palika	V V Inter College	5	-	10	-	-
27	21	PT	Nagar Palika	Rajo wali Masjid	4	-	3	-	-
28	22	PT	Nagar Palika	Bharav Mandir Tanki Road	2	-	2	-	-
29	23	PT	Nagar Palika	Kureshiyan Masjid	4	-	3	-	-
30	24	PT	Nagar Palika	Madrasa Delhi Road	7	-	-	-	-
Total Seats					89	35	59	4	1

Table 2 : Detail of Existing Toilets in Shamli NPP, 2017

## Recommendations for Public Toilets

In order to meet the demands of Public toilets, Shamli must ensure that –

1. Augment Existing Toilets or Construction of new toilets with at least 55 Seats toilet seats to fulfil the deficit and to serve the floating population in the NPP Shamli.
2. Focus of Shamli must be to have more number of Female Toilet Seats in order to minimise the gap. The existing Public toilets can be augmented to have adequate provision for women and facilities for the disabled (e.g. ramp provision, braille signage, etc.) wherever possible.
3. New toilets to be constructed along 'Major Roads' and 'Bus/Railway stops'.

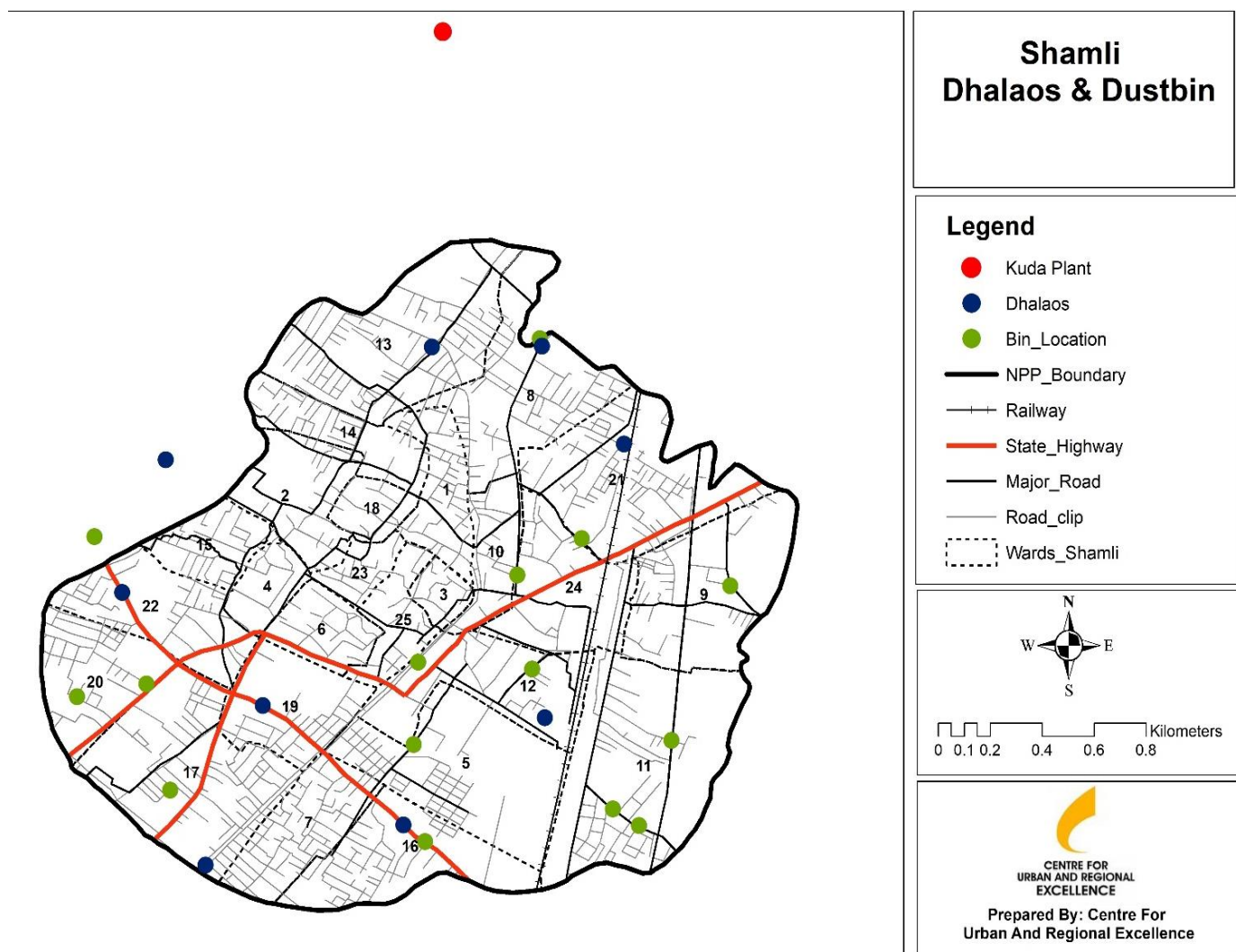
## Solid Waste Management

### Existing Scenario

Shamli has 1 landfill site (dumping site) and a total of 9 dhalao located towards outer parts of the city (shown below in the map). These are the only secondary disposal points the city has. The waste generation profile of the city has also been analysed and is discussed later in the report.

### Primary Collection

The NPP Shamli is covered by 15 number of dustbins that acts as primary disposal of waste generated from the households, commercial areas and industrial areas. These dustbins are apart from the dhalaos and form the backbone of SWM in Shamli. The locations are shown in the map below.



Map 6 : Location of Existing Dhalaos and Dustbins

## Door to Door Waste Collection

Presently, there is no door to door collection mechanism in NPP Shamli. The households dispose off their waste in dustbins nearby. The waste from the dustbins is then taken to the nearby dhalaos through Tippers and Tractors, that eventually is transferred to the Landfill site (Kuda Plant) for further treatment and disposal.

### List of Dhalaos and Dustbins in Shamli NPP along with their Locations

S.No	Ward	Type	Location of Dhalaos in Shamli
1	16	Open	Budhana road Dr D. P.Gupta ke samne
2	17	Open	Dyanand nager gali 12 City Green Ke pass shamli
3	12	Open	Rui mill Mill road shamli
4	19	Open	budhana road Bus stand near Ailum buggi walo Ke samne
5	21	Open	Charn Singh caloni Railway lines Ke pass shamli
6	13	Open	Dhewa pul Ke pass block road shamli
7	8	Open	Mazra road bigredear college Ke samne
8	-	Open	Mohalla barkhandi bag Ke pass shamli
9	22	Open	kisan inter college Ke pass karnaal road shamli

Table 3 : Location of Dhalaos in Shamli NPP, 2017

S.No	Location of Dustbins in Shamli
1	Talab road near Jain Dharmshala
2	Bickymoad Jain vihar
3	Dr Bheal wali gali Gagan vihar
4	Dr sunil bharti Ke samne budhana road
5	Dr Tej Singh wali gali rail Parr
6	Dr Vineta wali gali Gagan vihar
7	Khan nursing home Ke samne Delhi road
8	Kudana road Suraj mal vihar Ke samne
9	Lancer public school Ke pass karnal road
10	Mazra road near V. V. PG. college
11	Palika market
12	Rail Parr Gali No 5 Ke pass
13	S. P. office Ke pass rail Parr
14	Tanki road near Bhairav mander
15	Ward 13 near Apna bazaar nala patri

Table 4 : Location of Dustbins in Shamli NPP, 2017

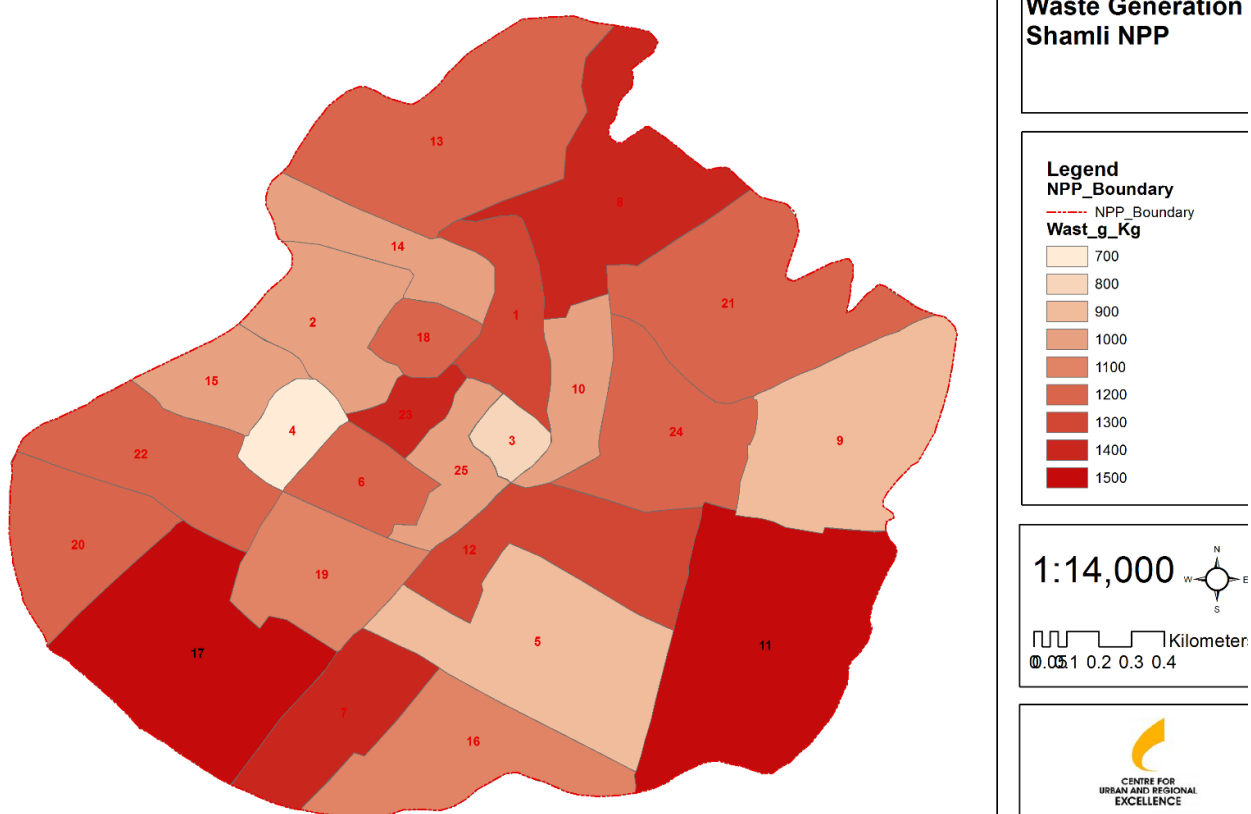
## Waste Generation Profile

Shamli has a population of more than 1 lac, that generates a total of 28700 Kgs of waste every day. The shades of red color show the wards with highest to lowest waste generation within wards, where darker the shade indicates



larger the quantity of waste being generated. Ward 11 and Ward 17 generated the maximum amount of waste (1500 kg/day), whereas Ward 4 and 3 generates less than 700 kgs of waste per day.

Shamli NPP has 356 Safai Karamcharis to collect, manage and dispose the daily waste generated, along with machinery including 9 tractors of 2500kgs capacity, 10 tippers of 1200 kgs capacity and 4 yuvraj with 1000 kgs capacity. The details are given in the table in the following page.



Map 7 : Ward Wise Waste Generation profile in Shamli NPP, 2017

Ward No.	Total HH	Waste Generation (Quintel Per Day) As per NPP	Cycle Rickshaw	Tempo/ Tipper	Yuvraj/ Small Tractor	Tractor	Existing Safai Karamchari	Road Length	SK required for Street Sweeping
1	921	13	1	1	0	1	13	3860	8
2	709	10	2	0	0	0	18	4714	9
3	768	8	1	0	0	0	15	1151	2
4	750	7	1	1	0	0	13	1979	4
5	712	9	0	0	1	0	14	5881	12
6	985	12	2	0	0	0	13	2195	4
7	1101	14	0	0	1	0	11	5696	11
8	861	14	2	1	0	0	13	6903	14
9	844	9	1	1	0	0	12	5877	12
10	796	10	0	1	0	1	15	3885	8
11	1034	15	0	0	0	1	18	9257	19
12	598	13	1	1	0	0	12	6184	12
13	811	12	1	1	1	0	16	10388	21
14	613	10	2	0	0	1	17	3856	8



Ward No.	Total HH	Waste Generation (Quintal Per Day) As per NPP	Cycle Rickshaw	Tempo/ Tipper	Yuvraj/ Small Tractor	Tractor	Existing Safai Karamchari	Road Length	SK required for Street Sweeping
15	1156	10	2	1	0	0	13	3547	7
16	728	11	1	0	0	1	17	4667	9
17	1311	15	1	0	0	0	13	9571	19
18	859	12	1	0	0	1	17	1507	3
19	963	11	2	0	0	1	12	3702	7
20	1069	12	1	0	0	0	11	4348	9
21	758	12	1	1	0	0	13	9086	18
22	658	12	1	0	0	1	17	4533	9
23	778	14	0	1	0	1	13	1745	3
24	740	12	2	0	1	0	18	5764	12
25	930	10	2	0	0	0	12	2557	5
<b>Total</b>	<b>21453.2</b>	<b>287</b>	<b>28</b>	<b>10</b>	<b>4</b>	<b>9</b>	<b>356</b>	<b>122853</b>	<b>246</b>

Table 5 : SWM Resources with Shamli NPP, 2017

## Analysis

The solid waste component of the town can be divided in to two sub-sectors, a. street sweeping and b. the waste collection and disposal from the households, markets and industrial areas. Therefore, the analysis of the existing resources has been done accordingly.

### A. Safai Karamchari (Human Resource) needed for Street Sweeping, Shamli NPP

1. Total Roads to be swept in Shamli = 122853 Meters.
2. Total number of SK required for Street Sweeping (as per SWM Manual 2016, allocation of 1 SK every 500meters) =  $122853 / 500$  Nos. = **246 Nos. of Safai Karmachari**

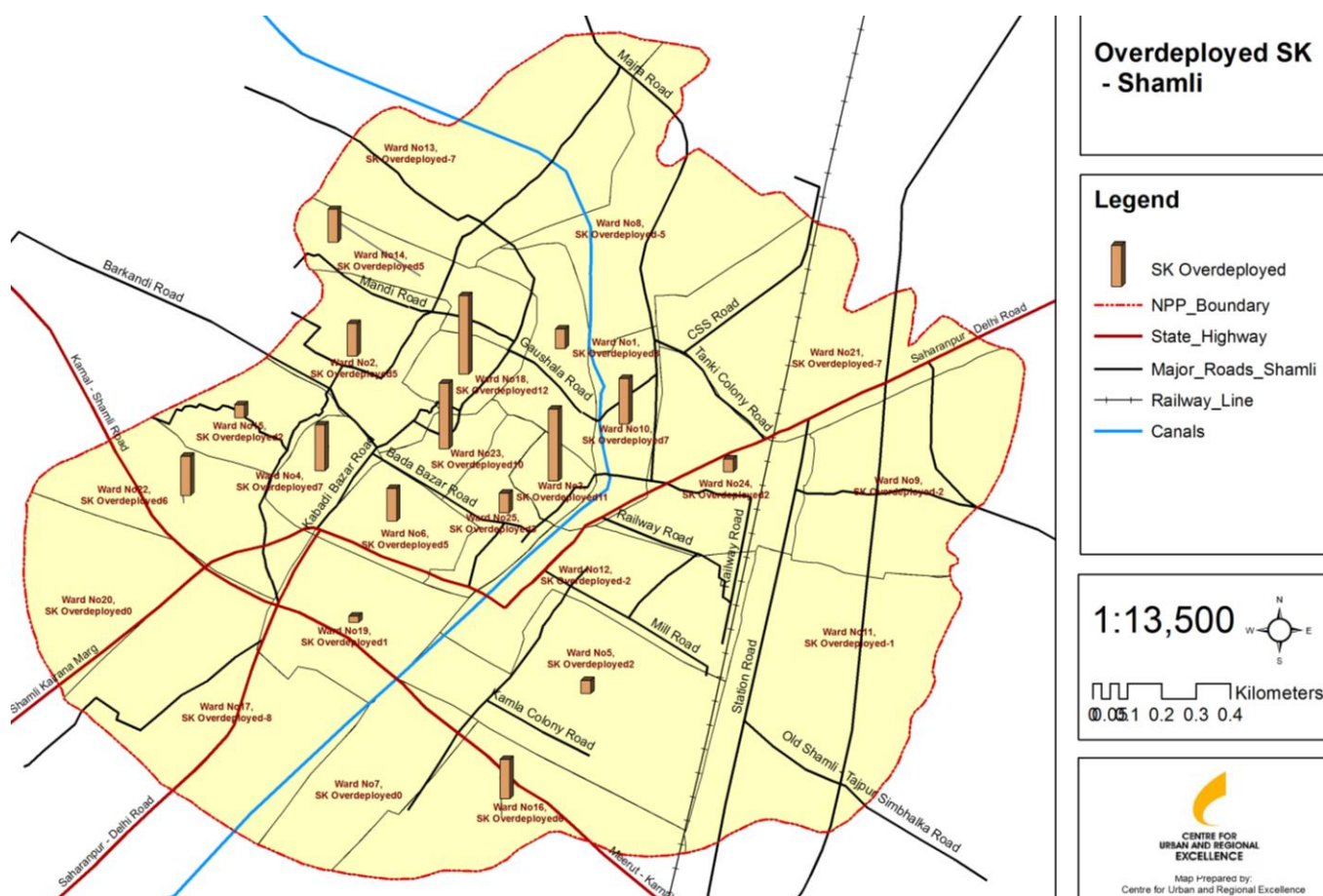
Therefore, there are 110 SKs available for other sanitation related work, like collection and disposal of Household waste.

The table below details out the Safai Karmachari required for street sweeping in all the wards of Shamli.

Ward No.	Total HH	Waste Generation (Quintal Per Day) As per NPP	Existing Safai Karmachari	Road Length	SK required for Street Sweeping
1	921	13	13	3860	8
2	709	10	18	4714	9
3	768	8	15	1151	2
4	750	7	13	1979	4
5	712	9	14	5881	12
6	985	12	13	2195	4
7	1101	14	11	5696	11
8	861	14	13	6903	14
9	844	9	12	5877	12
10	796	10	15	3885	8
11	1034	15	18	9257	19
12	598	13	12	6184	12

Ward No.	Total HH	Waste Generation (Quintal Per Day) As per NPP	Existing Safai Karmachari	Road Length	SK required for Street Sweeping
13	811	12	16	10388	21
14	613	10	17	3856	8
15	1156	10	13	3547	7
16	728	11	17	4667	9
17	1311	15	13	9571	19
18	859	12	17	1507	3
19	963	11	12	3702	7
20	1069	12	11	4348	9
21	758	12	13	9086	18
22	658	12	17	4533	9
23	778	14	13	1745	3
24	740	12	18	5764	12
25	930	10	12	2557	5
<b>Total</b>	<b>21453.2</b>	<b>287</b>	<b>356</b>	<b>122853</b>	<b>246</b>

Table 6 : Safai Karmachari required for street sweeping in Shamli NPP, 2017



Map 8 : Overdeployed SK in Wards of Shamli NPP, 2017

## B. Collection and Disposal of Household Waste

Shamli NPP has about 28 cycle rickshaws that can be used as primary vehicles for collection of waste from households. Considering 2 people are allocated per cycle rickshaw, a total of 56 SKs can be employed for Door to Door (D2D) Waste Collection. 54 SKs are left unused which can be redeployed in carrying out/

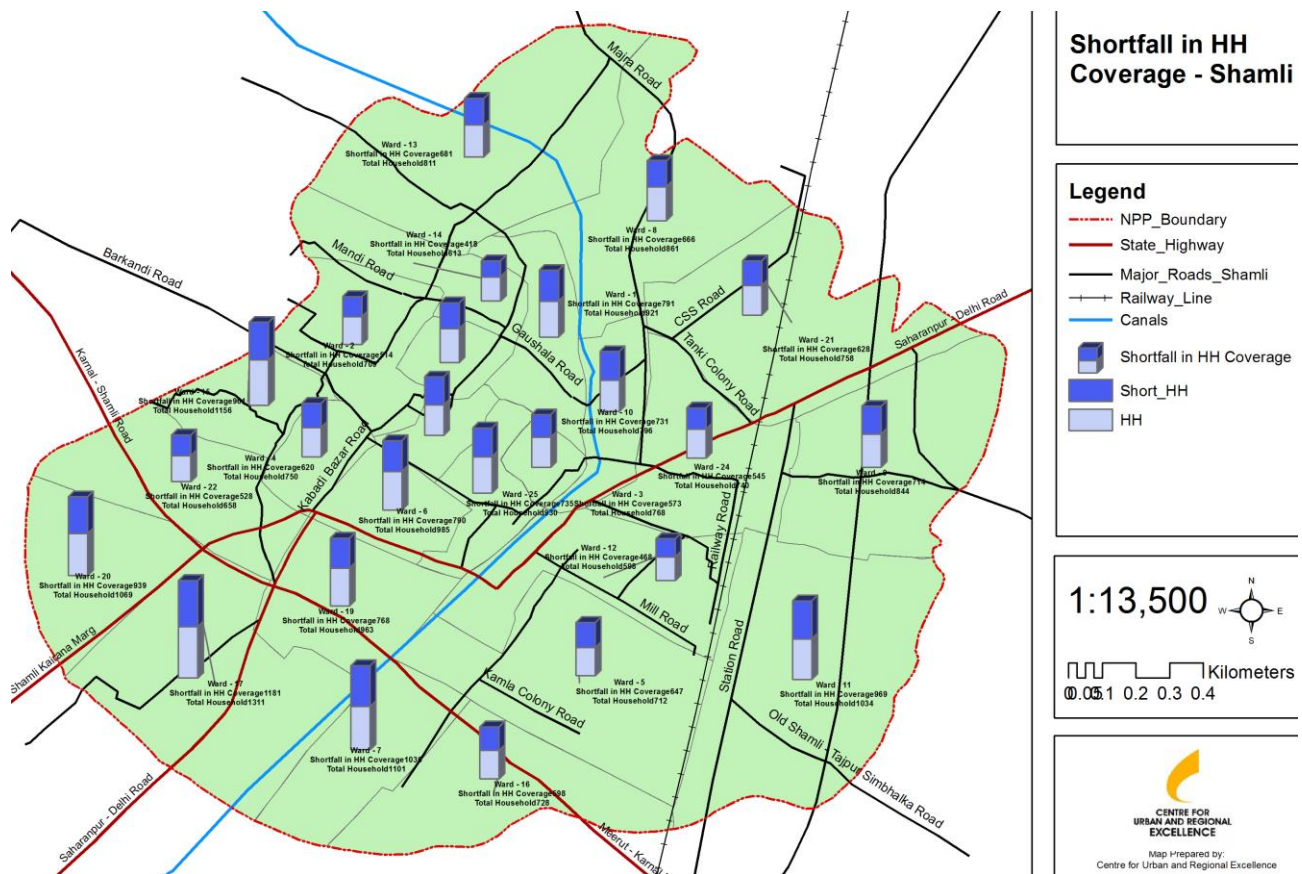
increasing the coverage for D2D waste collection. The table below shows the details of Safai Karamcharis for D2D Collection.

Ward No.	Total HH	Waste Generation (Quintal Per Day) As per NPP	Cycle Rickshaw	SK required for existing cycle rickshaw	SK that can be redeployed	SK to be redeployed in Cycle Rickshaw	Number of SK (After redeployment of SK in Cycle Rickshaw)	HH Coverage with Existing Resource Allocation	Shortfall in HH Coverage	Dustbins Required (Shortfall)	No. of Tippers required
1	921	13	1	2	3	2	4	130	791	20	0
2	709	10	2	4	5	2	6	195	514	13	1
3	768	8	1	2	11	4	6	195	573	14	1
4	750	7	1	2	7	2	4	130	620	16	1
5	712	9	0	0	2	2	2	65	647	16	1
6	985	12	2	4	5	2	6	195	790	20	2
7	1101	14	0	0	0	2	2	65	1036	26	2
8	861	14	2	4	-5	2	6	195	666	17	1
9	844	9	1	2	-2	2	4	130	714	18	1
10	796	10	0	0	7	2	2	65	731	18	0
11	1034	15	0	0	-1	2	2	65	969	24	1
12	598	13	1	2	-2	2	4	130	468	12	0
13	811	12	1	2	-7	2	4	130	681	17	0
14	613	10	2	4	5	2	6	195	418	10	0
15	1156	10	2	4	2	2	6	195	961	24	1
16	728	11	1	2	6	2	4	130	598	15	0
17	1311	15	1	2	-8	2	4	130	1181	30	3
18	859	12	1	2	12	4	6	195	664	17	1
19	963	11	2	4	1	2	6	195	768	19	1
20	1069	12	1	2	0	2	4	130	939	23	2
21	758	12	1	2	-7	2	4	130	628	16	1
22	658	12	1	2	6	2	4	130	528	13	0
23	778	14	0	0	10	2	2	65	713	18	0
24	740	12	2	4	2	2	6	195	545	14	0
25	930	10	2	4	3	2	6	195	735	18	2
<b>Total</b>	<b>21453.2</b>	<b>287</b>	<b>28</b>	<b>56</b>	<b>54</b>	<b>54</b>	<b>110</b>	<b>3575</b>	<b>17878</b>	<b>447</b>	<b>22</b>

Table 7 : Analysis of Existing SWM Resource with Shamli NPP

### Incremental Door to Door Waste Collection

The assessment also shows that with existing resources Shamli NPP can easily cover about 16.5% Households via D2D. In order to cover the entire municipal limits of Shamli NPP through D2D, the NPP needs around 447 secondary collection bins and about 22 trips by tippers of 1200 Kgs capacity.



## Recommendations for Solid Waste Management

1. Shamli NPP has to reallocate its human resource to maximise its efficiency in sanitation domain.
2. NPP has resources to initiate Door to Door waste collection and cover about 17% Households, however an incremental approach would be the right approach with creating secondary collection points and an efficient route management of tippers and other vehicles.
3. Shamli in order to have 100% coverage through D2D waste collection, would need about 1.2 Cr of capital investment. it is necessary that NPP finds resources under SBM and other state and central schemes.