



CITY LEVEL PROJECTS

PUNJABI BAGH

Site Specific Design Study Ward Number 103





(An ISO 9001 : 2008 Certified Organisation)

Delhi Urban Art Commission

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North Delhi Municipal Corporation
East Delhi Municipal Corporation
South Delhi Municipal Corporation
New Delhi Municipal Council
Geospatial Delhi Limited
Delhi Metro Rail Corporation
Delhi Urban Shelter Improvement Board
BSES Rajdhani Power Limited
BSES Yamuna Power Limited
RWA

Preface



The city of Delhi, capital of this vast land of diversities, is a city laden with layers of history, a place where civilizations have lived, prospered and perished over centuries. The modern city today, built over and around a rich tapestry of heritage, presents an opportunity at every turn, to allow for co-existence of the past, present and the future. In order to understand this multidimensional urban spectrum and attempt to plan the future, various city level studies have been initiated by the DUAC. I hope that these studies will help the planners of modern day Delhi to carefully articulate urban space, structure, form and environment and sensitively address future requirements.

I convey my thanks to all the Consultants and Members of the Commission who have tirelessly worked on this research project to bring out this document. I also take this opportunity to place on record my sincere appreciation of the efforts of Secretary and other staff of DUAC for providing the necessary administrative support to make this happen.

I fondly hope that the authorities of the local, state and national government take these studies seriously and implement, in right earnest, the suggestions given herein.

March, 2015

Sd/-
Prof. Dr. P.S.N. Rao
Chairman, DUAC

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Summary

Local Area Planning (LAP), which is part of the 74th Constitutional Amendment, was introduced by Master Plan Delhi (MPD) 2021 in order to achieve a better planning process, which is inclusive, participatory and has a bottom-up and top-down approach to make it comprehensive. Thus, LAP also caters to the need to bridge the disconnect between “Zonal Plan” and “Layout Plan”.

The Delhi Urban Art Commission (DUAC) has undertaken a site-specific ward design study under LAP. Delhi has a total number of 272 municipal wards out of which DUAC has identified a few for detailed study. This report deals in detail with Ward 103, Punjabi Bagh.

Punjabi Bagh is already a developed area. It has different categories of development within pockets such as Punjabi Bagh West (Plotted Housing), Madipur (Urban Village), DDA flats, resettlement colonies and slums, etc. Due to the differences in development patterns and socioeconomic backgrounds, the planning approach to these areas vary accordingly. With due course of time, market forces and economic restructuring, the functions of these areas have changed. The objective of Local Area Plan is based on the need to provide for better and improved infrastructure support to cater to changing functions and appropriately managing the change in the built character.

Addressing the potentials and issues, certain proposals were made in consultation with stakeholders and locals. The proposals are related to slum rehabilitation, redesigning of the streets, identification of feasible sites for multilevel car parking, community centre, revitalization of existing greens, rejuvenation of the Najafgarh Nullah, rejuvenation of lakes, energy efficiency and management of stormwater, wastewater and solid-waste in the ward.

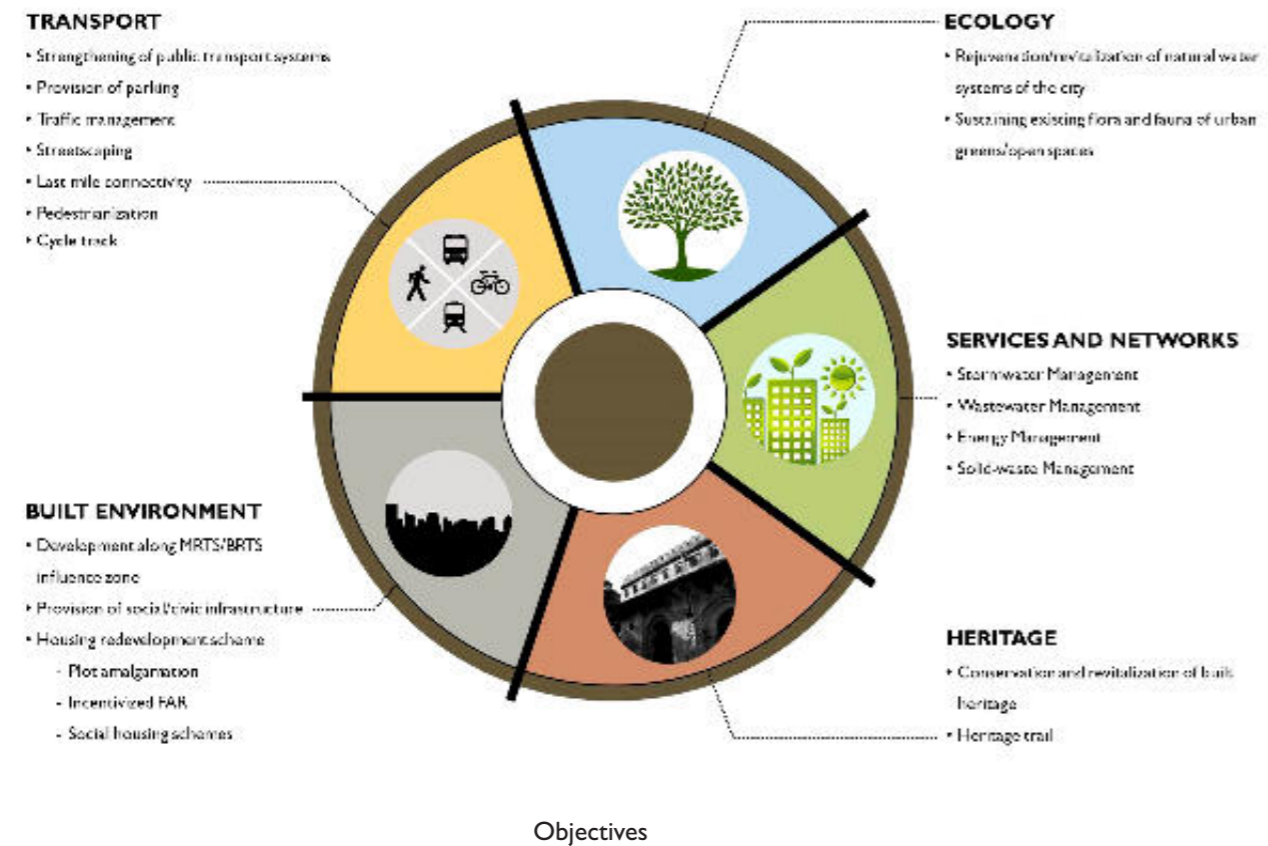
One of the main concerns in the overall study was to cater to the slum dwellers of the ward. There are four slums spread across approximately 1.96 ha in the ward with a population of 6750. A slum rehabilitation scheme has been developed and has been represented with the help of two and three dimensional models.

This study is an outcome of extensive on-site survey and continuous dialogue with the residents and stakeholders. It is not just limited to addressing the common problems faced in all such developed areas, but also identifies and makes suitable proposals to deal with the specific problems of Punjabi Bagh within the framework of Local Area Plan as suggested in the Master Plan of Delhi 2021.

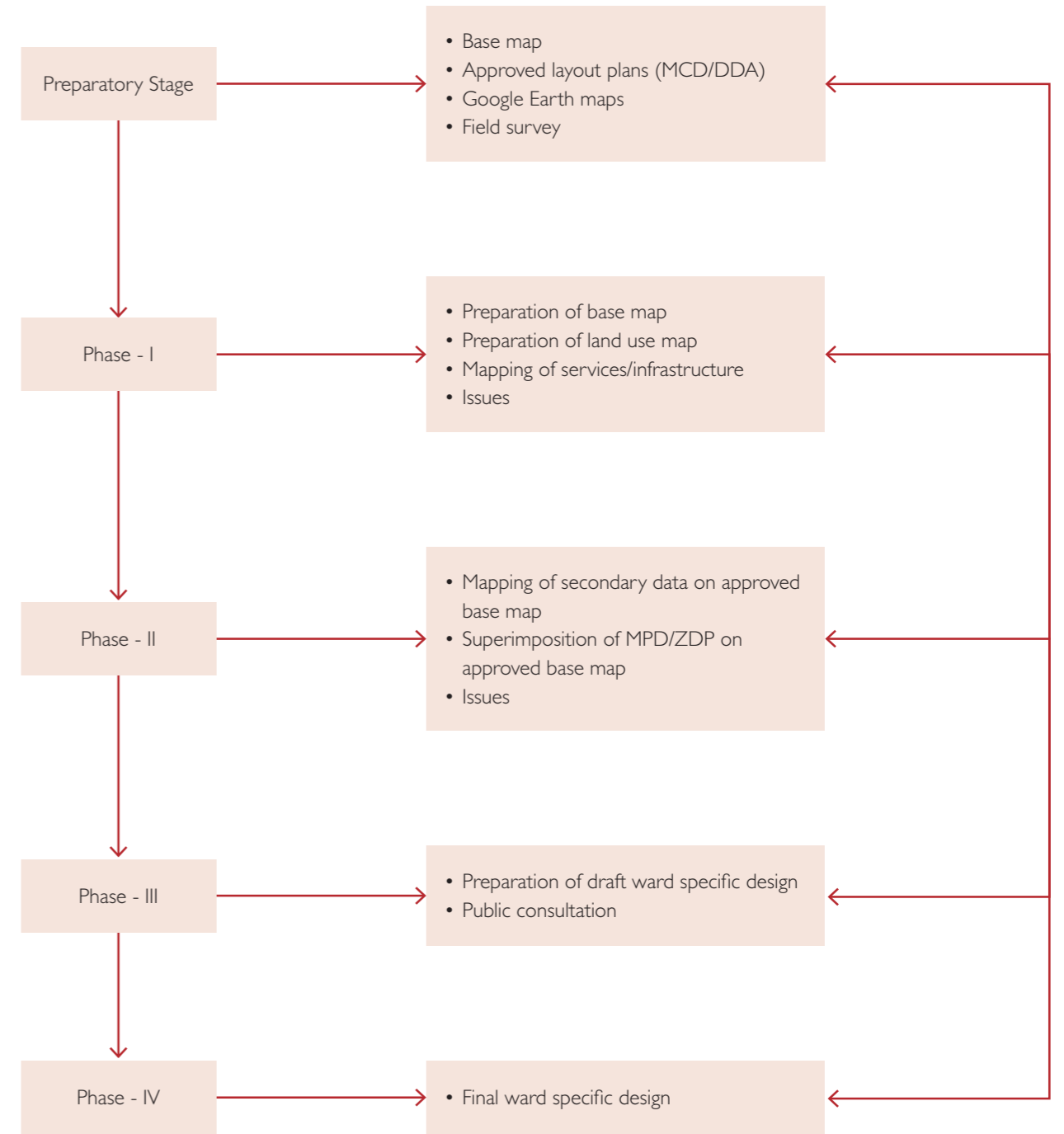
1.1 Objectives

The Delhi Urban Art Commission envisions undertaking area specific ward design under the Local Area Planning domain in order to present comprehensive planning policies and proposals for the upgradation of the wards. The objectives are listed below:

- Urban design interventions for upgrading the urban environment and for ecological restoration – urban parks, greens, water bodies, wetlands and urban agriculture.
- Conservation of heritage and enhancement of original character/environment.
- Upgrading of social infrastructure – schools, sports facilities, dispensaries, community centres, cultural centres, etc.
- Earmarking of livelihood generating areas for informal sectors – vending zones, weekly markets.
- Redevelopment/revitalization of unused/underutilized and degraded areas.
- Transportation – road space allocation, and parking facilities for different modes of transport such as cycles, rickshaws, other non-motorized vehicles (NMVs) and pedestrians, including senior citizens and differently-abled people.
- Physical infrastructure – civic infrastructure upgradation and removal of disfunctionalities:
 - Stormwater management/rainwater harvesting at community/local area level.
 - Decentralized wastewater treatment systems (DEWATS) for untreated/surplus sewage/wastewater for recovery of resources and recycled water at local levels.
 - Segregation and collection of solid-waste at source in segregated sections, as a step towards achievement of “zero-waste”.
 - Ensure complete separation of stormwater and sewerage.
 - Solutions for local traffic bottlenecks, and vehicular parking related issues.
 - “First and last mile” connectivity for access to public transport.
- Energy efficiency, renewable energy applications, conservation and efficiency in use of water, and other “sustainability” measures, as well as awareness promotion at local area levels for “greenhouse gas” and “climate change” mitigation. Adequate importance must be provided to the consultative/participatory process with stakeholders within the ward.



1.2 Methodology

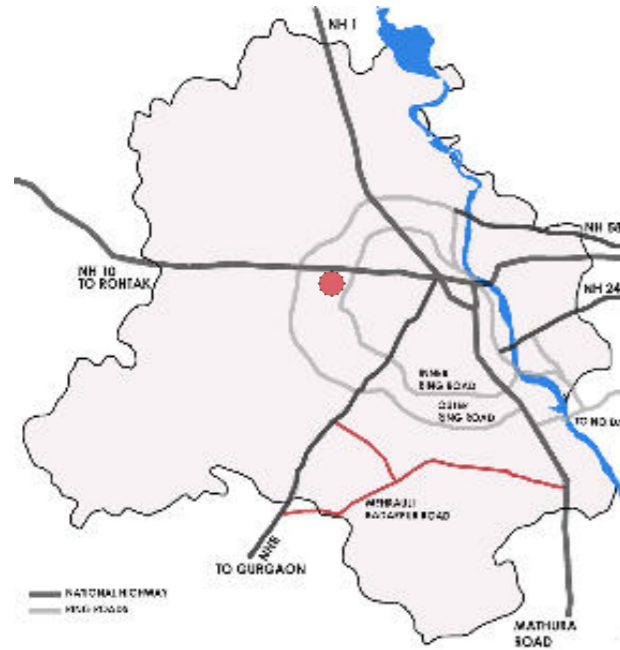


Methodology for Ward Specific Design



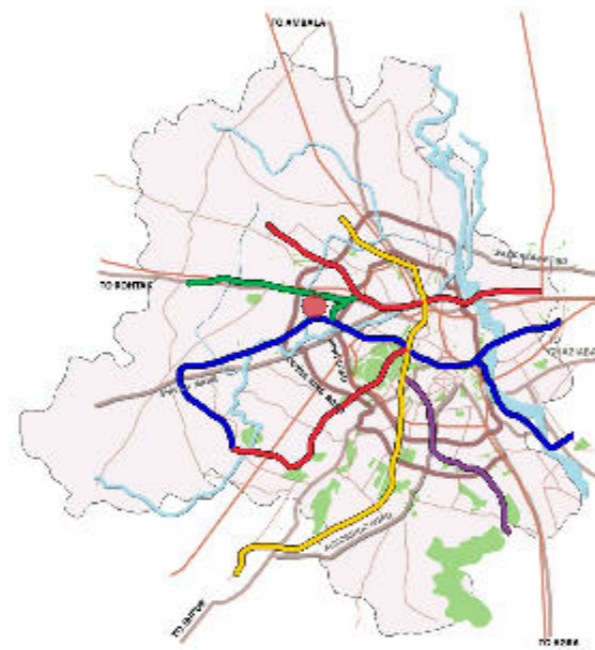
Methodology for Ward Specific Design

1.3 Punjabi Bagh in Context of Delhi



City Level Roads

- Northern edge of Punjabi Bagh is marked by arterial road, NH10 (Rohtak Road – ROW 60 m).
- The eastern side of the ward is marked by another arterial road, Mahatma Gandhi Marg (ROW 60 m).



City Level Metro Network

- Punjabi Bagh is well connected to the Delhi Metro network.
- Green Line of Metro runs along the northern edge of the ward, that is along NH10.
- A new Metro line on Mahatma Gandhi Marg is under construction.



City Level Greens

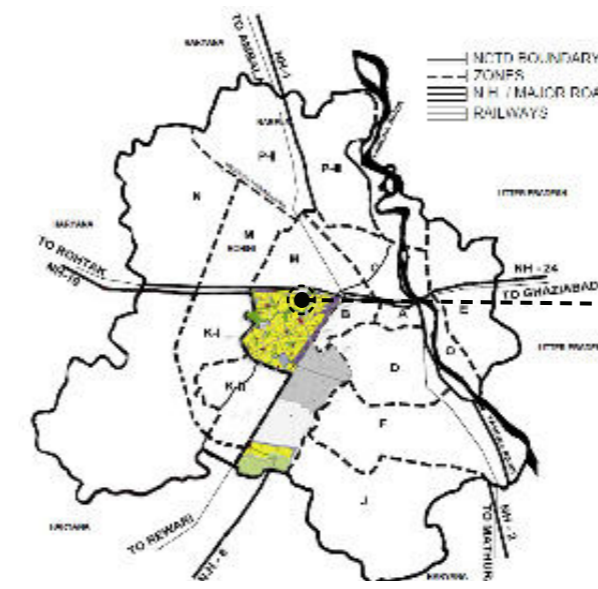
- Southern part of the ward is formed by the nullah and Master Plan green belt.
- Part of this green belt has been encroached upon by slum dwellers.



City Level Drains

- Southern edge of the ward is marked by Najafgarh Nullah.
- The area along the nullah is marked as Master Plan green in MPD 2021.
- PWD is planning to construct a 26.9 km, six-lane elevated corridor over the Najafgarh Nullah, connecting Kakrola Mor to Wazirabad over Outer Ring Road.

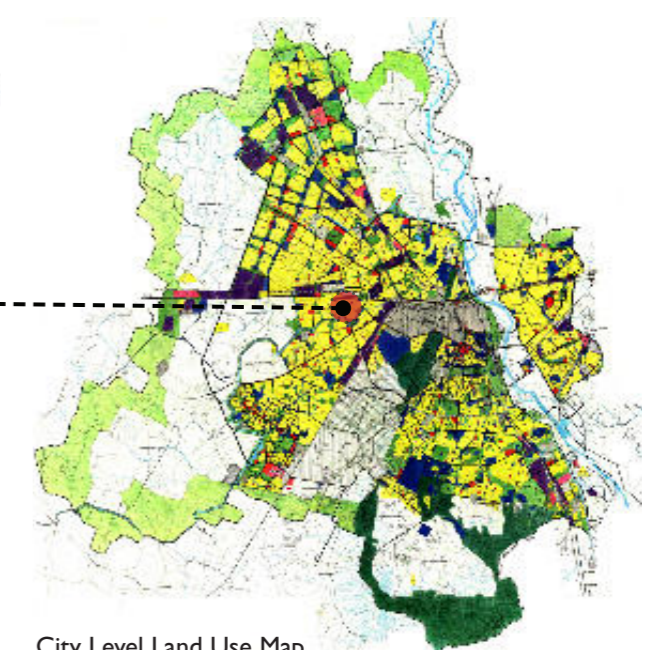
1.4 Master Plan and Zonal Plan 2021



City Level Planning Zones by DDA

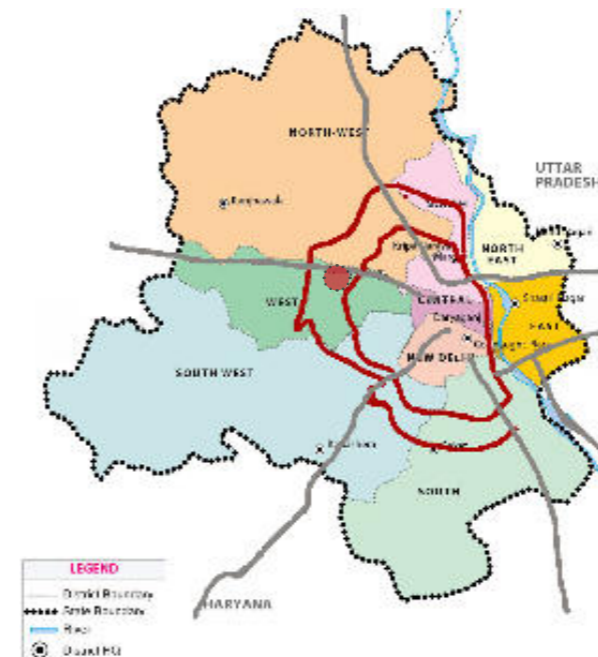


Zonal Map of Sub-Zone G-10



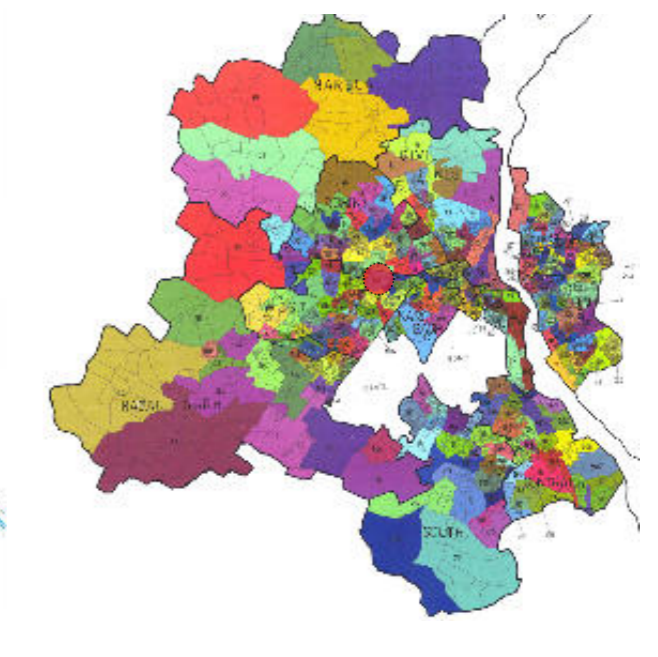
City Level Land Use Map

- Zone 'G' is located in West Delhi covering an area of about 11,865 ha and consists of 18 sub-zones.
- Land use of Zone G is mainly residential.
- Punjabi Bagh (Ward 103) lies in Delhi Development Authority (DDA) Planning Sub-Zone G-10.
- The land use of G-10 is mainly residential. Green/recreation is fairly high at 15%.



Municipal Zones of Delhi

- The ward lies in West Municipal Zone as defined by the Municipal Corporation of Delhi.



Ward Map of Delhi

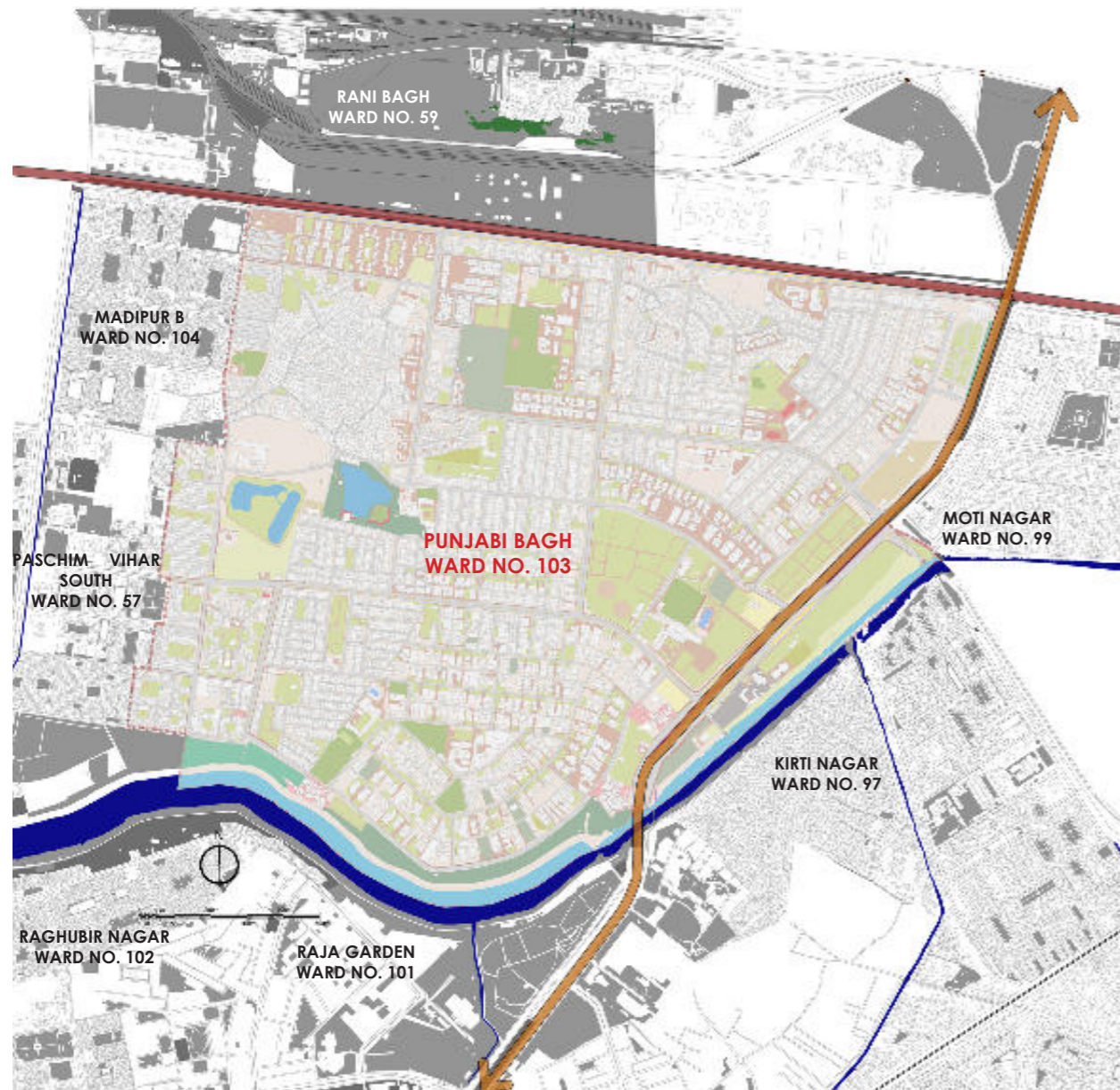
- The above map depicts the location of Ward 103 along with other wards of Delhi.

1.5 Area Context

The Ward was previously called Refugees Colony, but was renamed as Punjabi Bagh in 1950 by the then Prime Minister Pandit Jawaharlal Nehru. In its earliest stages this settlement was for Hindus and Sikhs who moved from Pakistan during Partition. Not much later it started becoming the locality for big bungalows of wealthy traders, businessmen, and transporters. The area is famous for these huge bungalows mostly in the range of 400-700 square yards, some even bigger than 2200 square yards. It has also thus developed an image as a posh residential locality.

Ward 103 (Punjabi Bagh) is surrounded by Ward 59 (Rani Bagh) on the northern side, Ward 104 (Madipur) and Ward 57 (Paschim Vihar South) on the western side, Ward 99 (Moti Nagar) and Ward 97 (Kirti Nagar) on the eastern side and Ward 102 (Raghubir Nagar) and Ward 101 (Raja Garden) on the southern side.

The total population of the ward is 50,069, total area of the ward is 31259 ha and the density is 160 PPha.

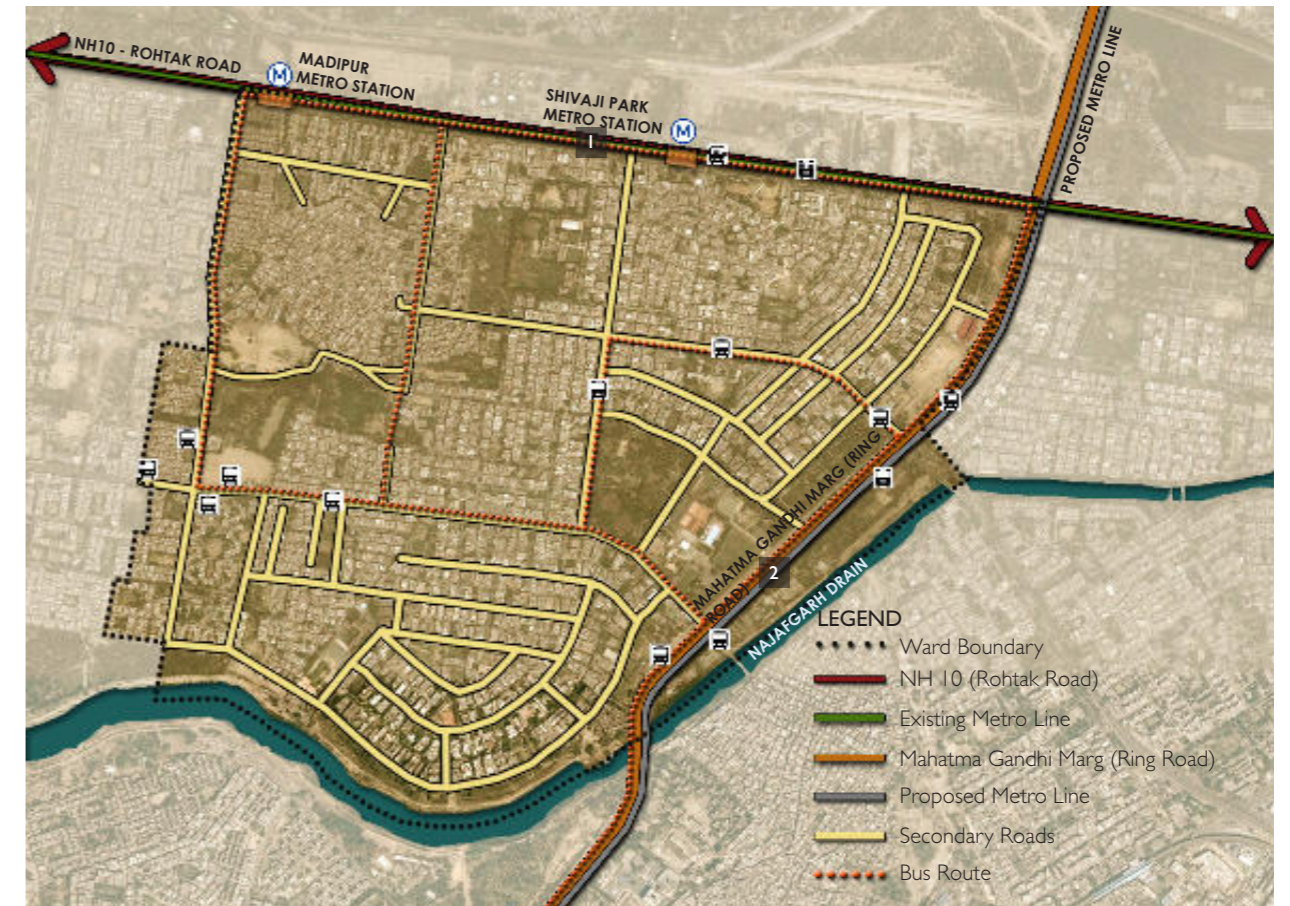


Surroundings of Ward 103 (Survey of India maps, 2013-14)

Total Ward Area: **312.59** ha
 Total Ward population: **50069**
 Density = 160 PPha

- Northern edge of the ward is marked by NH10/Rohtak Road (ROW: 60 m).
- Eastern edge is marked by the Ring Road (ROW: 60 m).
- Well connected by Metro running along NH10.
- Proposed Metro line along Ring Road will make the connectivity better.
- Para-transit modes such as autos, taxis, cycle-rickshaws etc., are integrated with existing public transport systems for last mile connectivity.

1.6 Connectivity



Internal Connectivity (Survey of India maps, 2013-14)

- Connectivity of Ward to:
- Inter-State Bus Terminal: 13 km
 - Indira Gandhi International Airport Domestic Terminal: 14 km
 - Indira Gandhi International Airport: 16 km
 - New Delhi Railway Station: 10 km
 - Old Delhi Railway Station: 11 km



Shivaji Park Metro Station, Rohtak Road



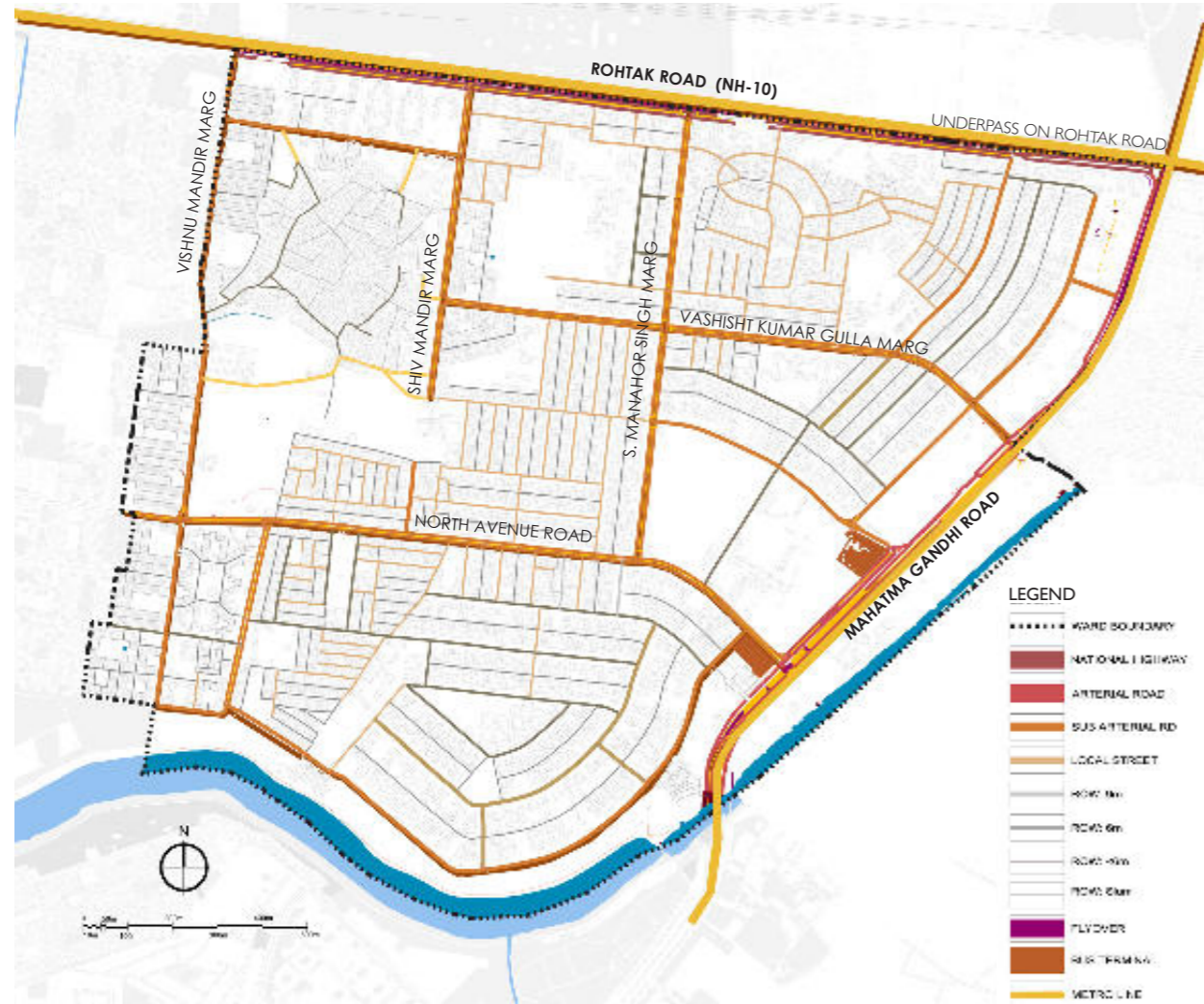
Mahatma Gandhi Marg (Ring Road)

MPD 2001 had proposed that major road intersections would be provided with grade separators to ease out the traffic. Emphasis had also been given to grade separators for pedestrians and cyclists wherever required. According to MPD 2001, these were to be provided in the following areas in Zone G-10:

1. Mayapuri ROB (Ring Road)
2. Near Punjabi Bagh (Transport Centre) ROB

2.1 Road Network

- Northern edge of the ward is marked by Rohtak Road (ROW: 60 m) and eastern part of the site is marked by Mahatma Gandhi Marg (ROW: 60 m).
- The ward has as many as 14 bus stops, a DTC bus depot and a traffic training park.
- It is well connected by Metro and DTC buses.
- A new Metro line on Mahatma Gandhi Marg is under construction and will further increase the connectivity to the ward.



Road Typology (Primary Survey 2013-14)



Few observations were made regarding the transportation system of the ward:

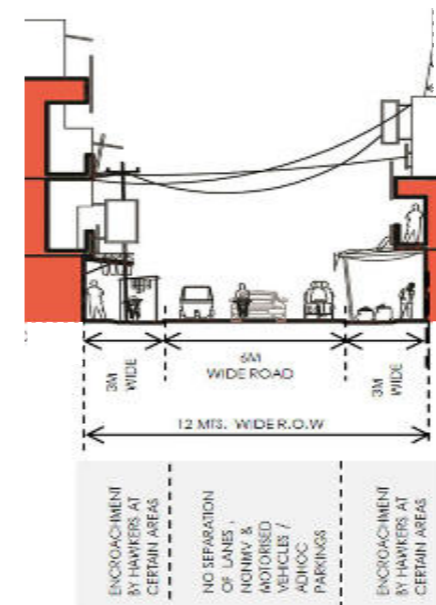
- Absence of para-transit connectivity from Metro station to the ward.
- Congestion on major roads at peak hours.
- On-street parking near markets/temples/schools leads to congestion and traffic jams.
- Unplanned auto and taxi stands again lead to congestion on roads.
- No proper parking facility in the ward results in vehicles being parked on pavements and roads.

Internal Roads of the Area

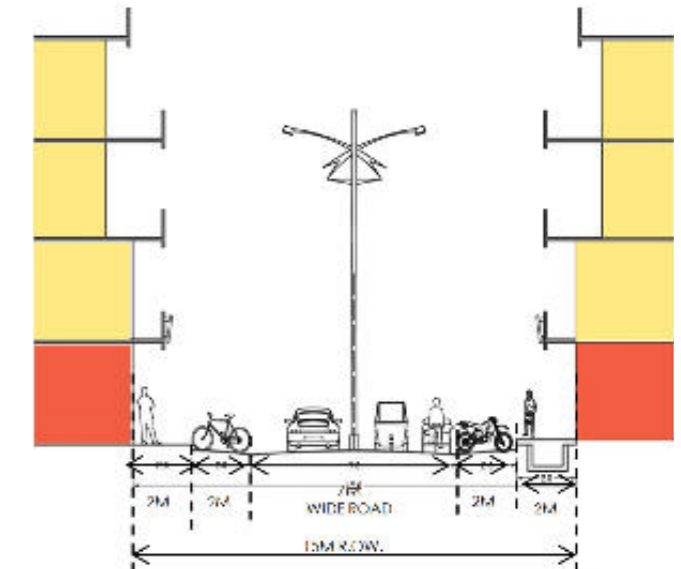
Roads of all widths are generally in a poor state of maintenance. The actual Right of Way (ROW) is considerably reduced due to encroachments and unauthorized parking by residents and visitors alike. Extension of balconies and chajjas at upper floors has considerably reduced ingress of natural light and adversely affected ventilation. Movement of fire tenders and ambulances during emergencies is virtually impossible due to narrow lanes which are further encroached upon.



Key Map

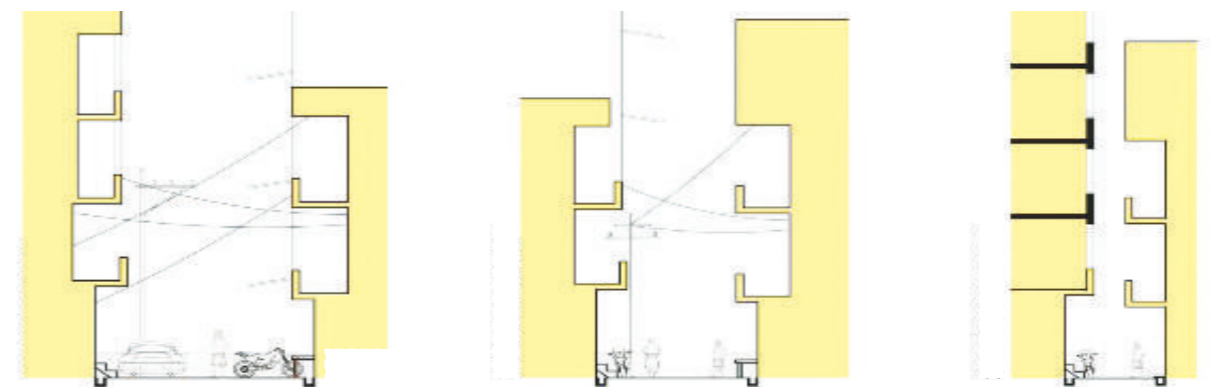


ROW: 12 m



ROW: 15 m

Typology of Road Section: Madipur Village

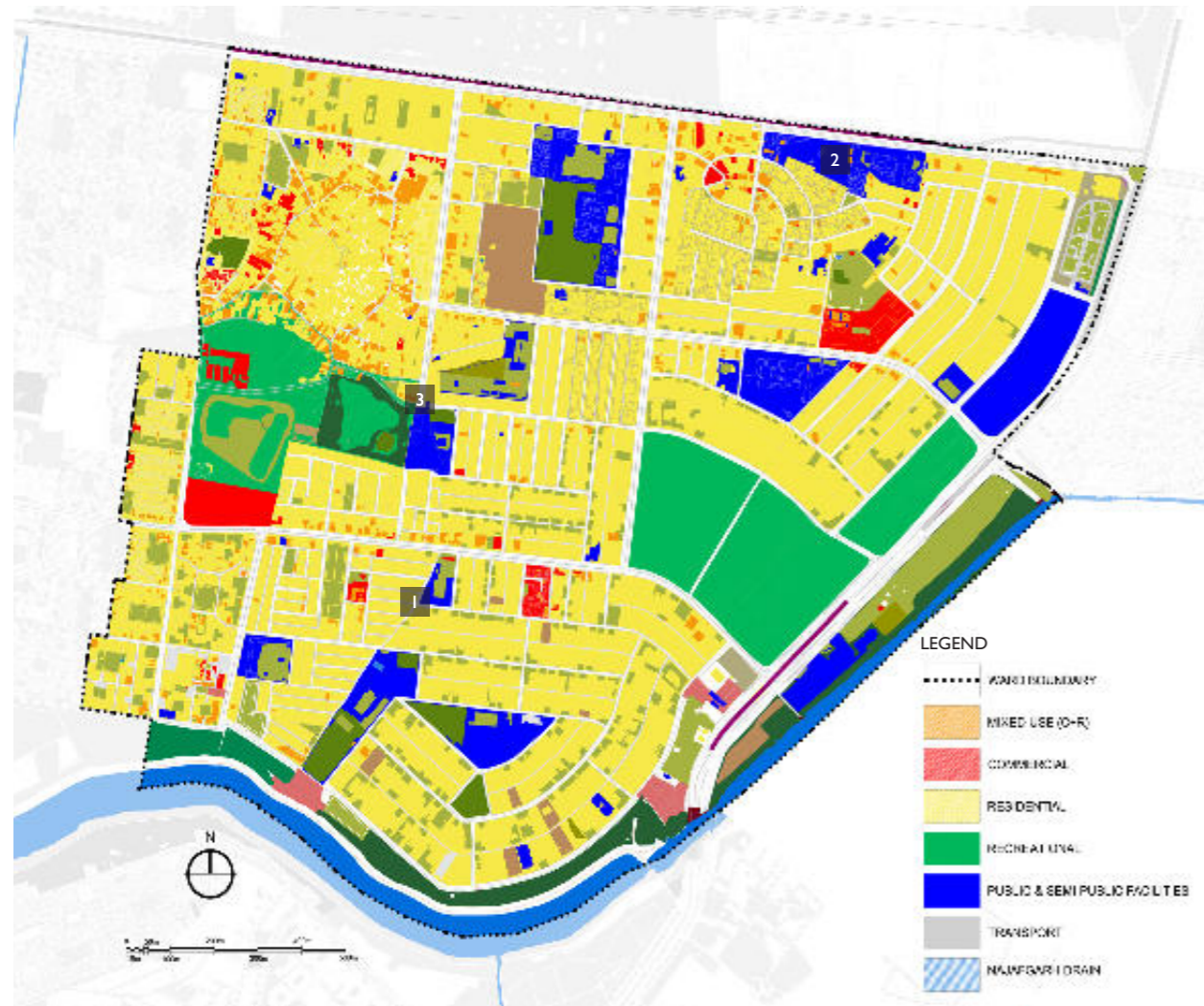


ROW: 6M

ROW: 4.5M

ROW: 3M

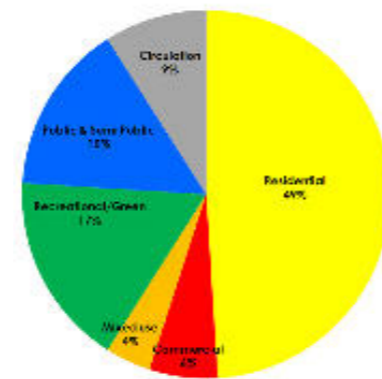
2.2 Building Use



Building Use (Primary Survey 2013-14)

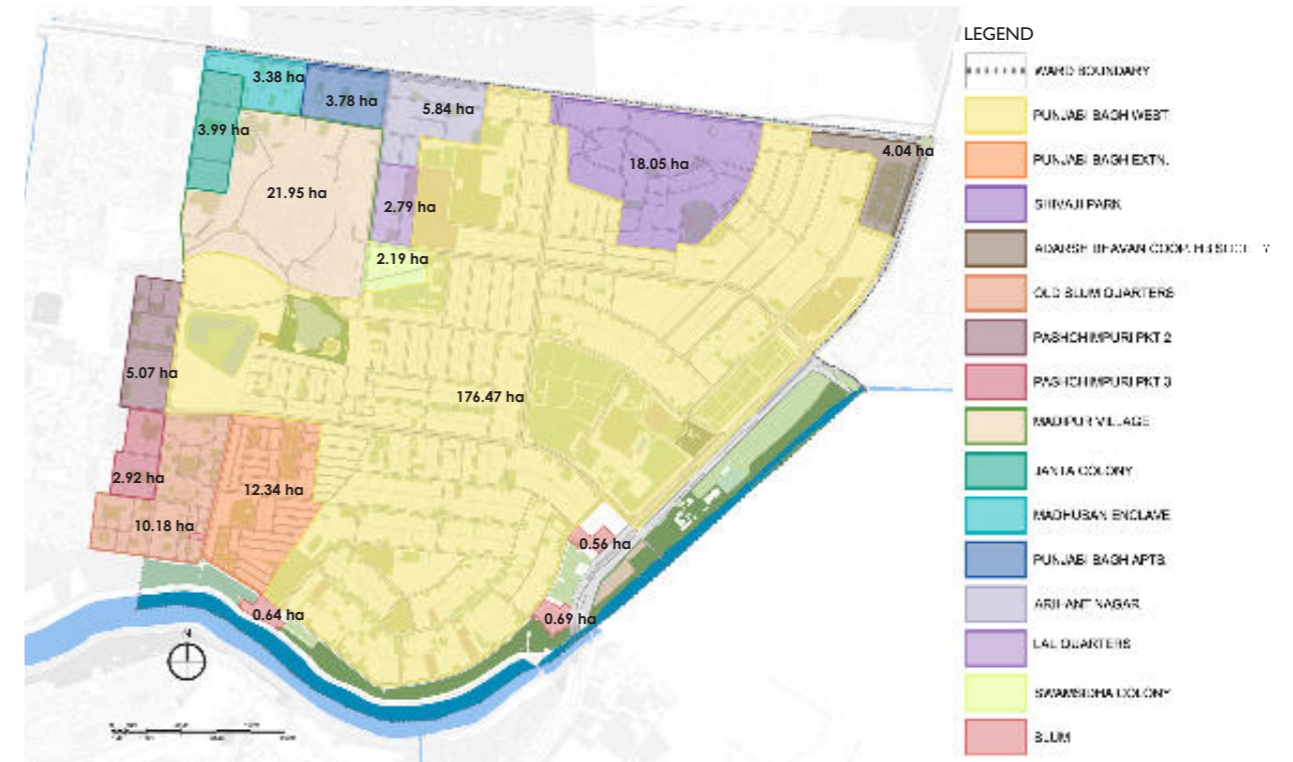


The ward has predominately residential land use. It has a total of 75 parks, some of them are located in gated colonies and a few can be approached by all. The ward does not have proper planned commercial areas and this has resulted in mixed-use development around the arterial and secondary roads in and around the ward. The ward has social and physical infrastructure facilities, but these have been overburdened in the course of time. There is one girls' college, namely SPM college for higher education, in Punjabi Bagh. The total number of schools is 13. There are various other clinics and laboratories which cater to the medical needs of the residents. Maharaja Agrasen Multispeciality Hospital offers services to all socioeconomic strata of society.



Building Use (Primary survey -2013-14)

2.3 Residential Character



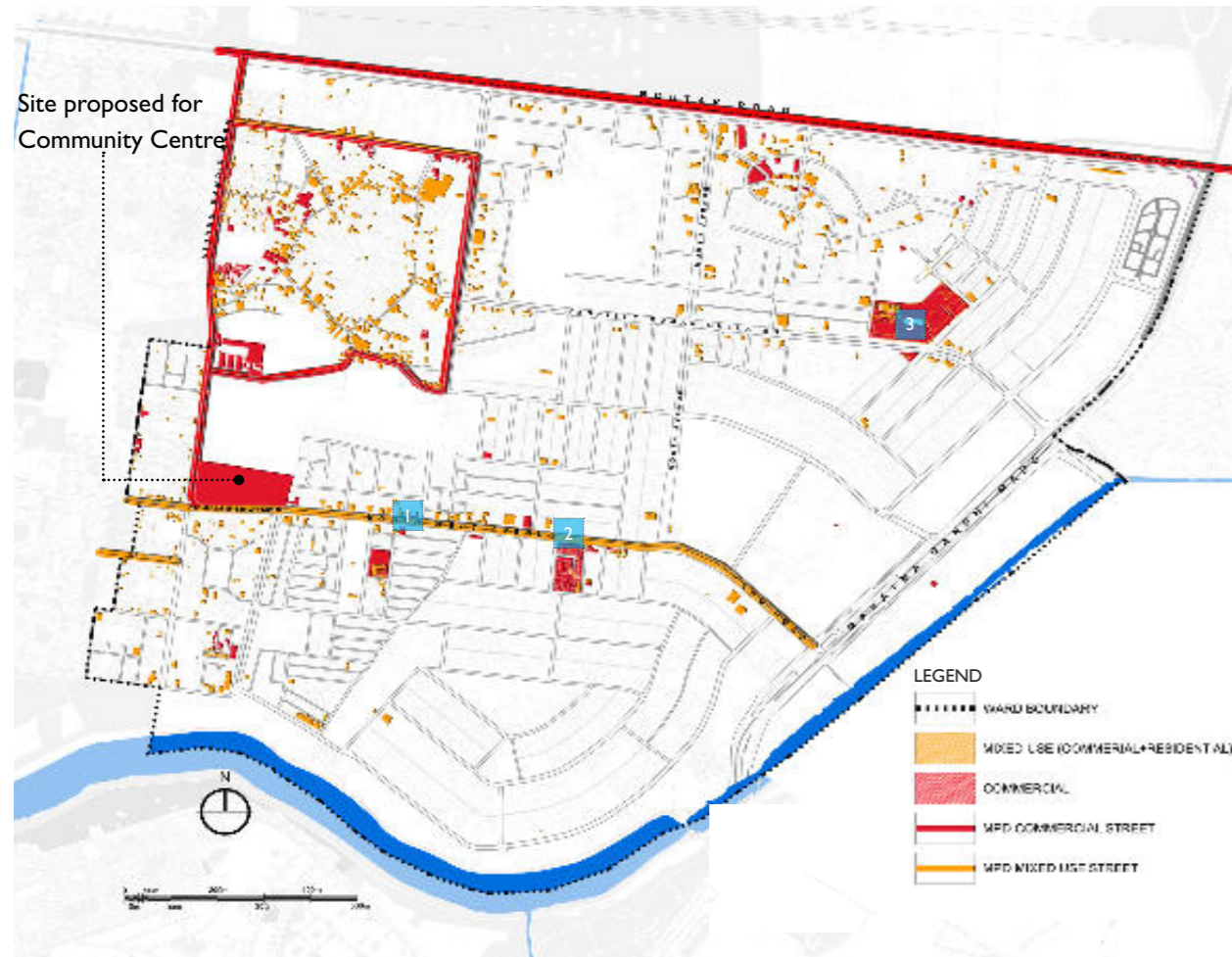
Residential Character (Primary Survey 2013-14)

- Ward 103 is further subdivided into 15 residential colonies.
- Each residential colony has a diverse character.
- The major part of the ward is Punjabi Bagh West which has an area of 176.47 ha.
- The ward has an urban village (Madipur Village), four slums, janta colony and plotted housing.

Comparative Analysis

	Madipur Village	Punjabi Bagh West	Shivaji Park	Paschim Puri	Slum
Built/Open					
Street Network					
Number of units per/10000 sq m	540 units	21 units	50 units	395 units	581 units
Average Plot Size	65 - 175 sq m	250 - 510 sq m	325 - 475 sq m	325 - 475 sq m	10 - 18 sq m
Typology					

2.4 Commercial Character



Commercial: Mixed-Use Character (Primary Survey 2013-14)

Ward 103 has very few planned commercial areas. Punjabi Bagh Central Market is the one planned commercial area and has an area of 20,064 sq m. Due to lack of such areas and their continuous need, mixed-use streets (as per MPD 2021, mixed-use means the provision for non-residential activity in residential premises) have developed in and around Punjabi Bagh.

List of Identification of Mixed-Use Streets in Ward 103 (West Zone – I) received from GNCTD (ZDP 2021) are as following:

Maharishi Road R/C Madipur and Ch. Balbir Singh Marg

List of commercial streets: Main Market Road R/C Madipur; Dispensary Road R/C Madipur; Som Bazar Road R/C Madipur; Vishnu Mandir Marg R/C Madipur; Rohtak Road (one side).

A Community Centre is also proposed to be developed in Zonal Development Plan 2021.

The major extensive industrial areas located in this ward are along Rohtak Road. These are the major employment centres. Madipur Village has many shoe-making factories which provide raw material for the final finished product.



Mixed-Use Street (North Avenue Road)



Mixed-Use Street (Club Road)



Central Market (Club Road)

2.5 Green Areas



Open Space (Primary Survey 2013-14)

Green Areas: The total green area includes Master Plan green areas, district parks, stadiums and children's parks and green areas in residential colonies.

District Parks And Sports Stadium: Besides retaining the Master Plan green areas, a number of sports stations and children's parks have been proposed in conformity with the recommendations of MPD 2021.

Neighbourhood Parks: The large green areas in the ward have been considered for inclusion in the neighbourhood parks and are distributed in most of the residential colonies of the zone.



Tot-lot in Paschim Puri



Vir Savarkar Park



Herbal Garden

2.6 Built/Open



Built/Open (Primary Survey 2013-14)



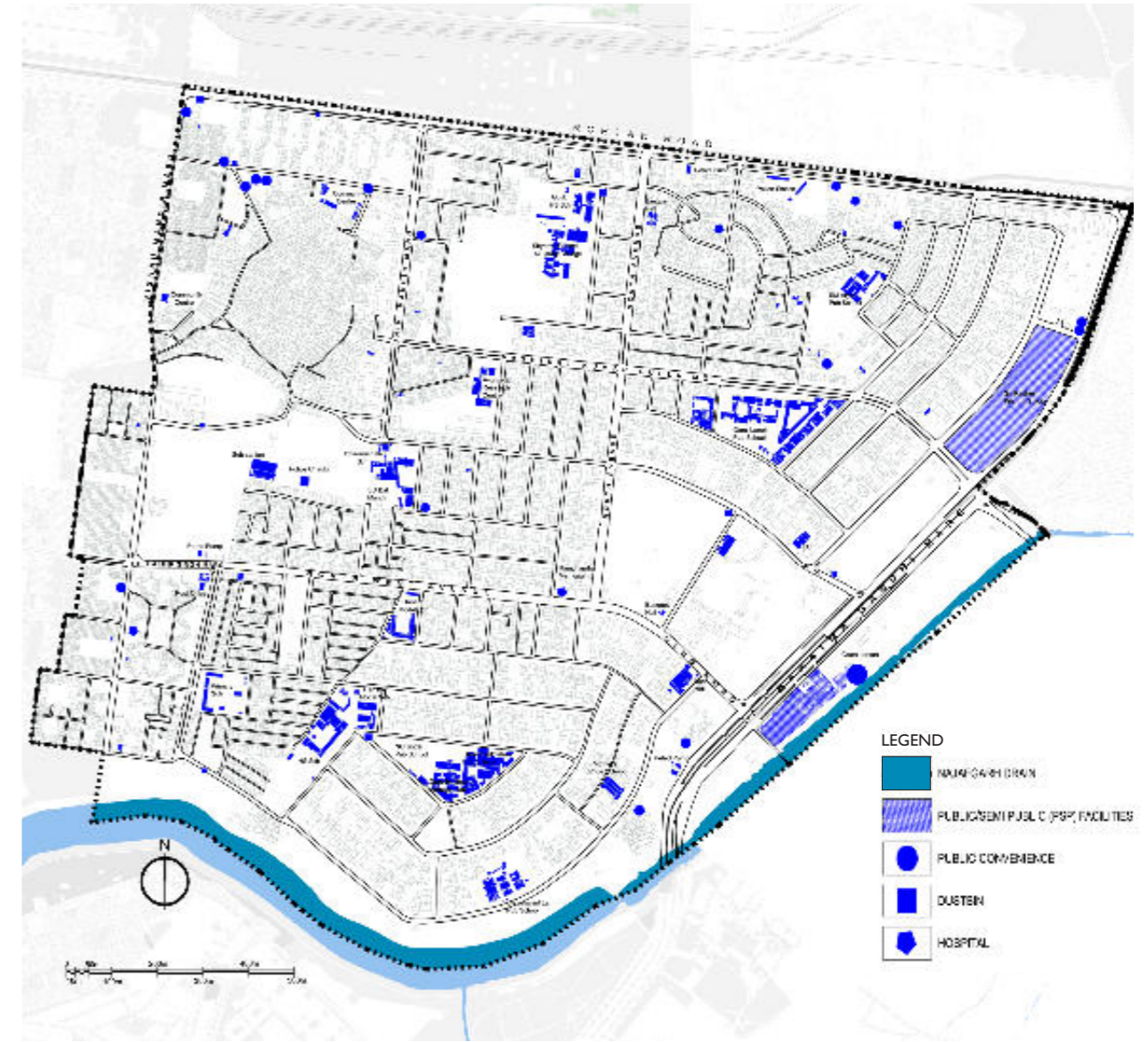
Madipur Village

Shivaji Park

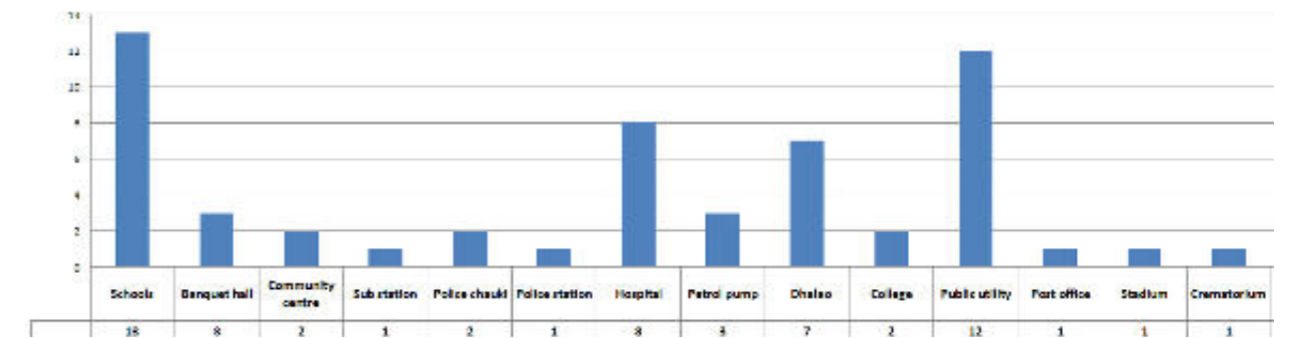


Punjabi Bagh West

2.7 Social Infrastructure



Social Infrastructure (Primary Survey 2013-14)



Statistics of Social Infrastructure (Primary Survey 2013-14)

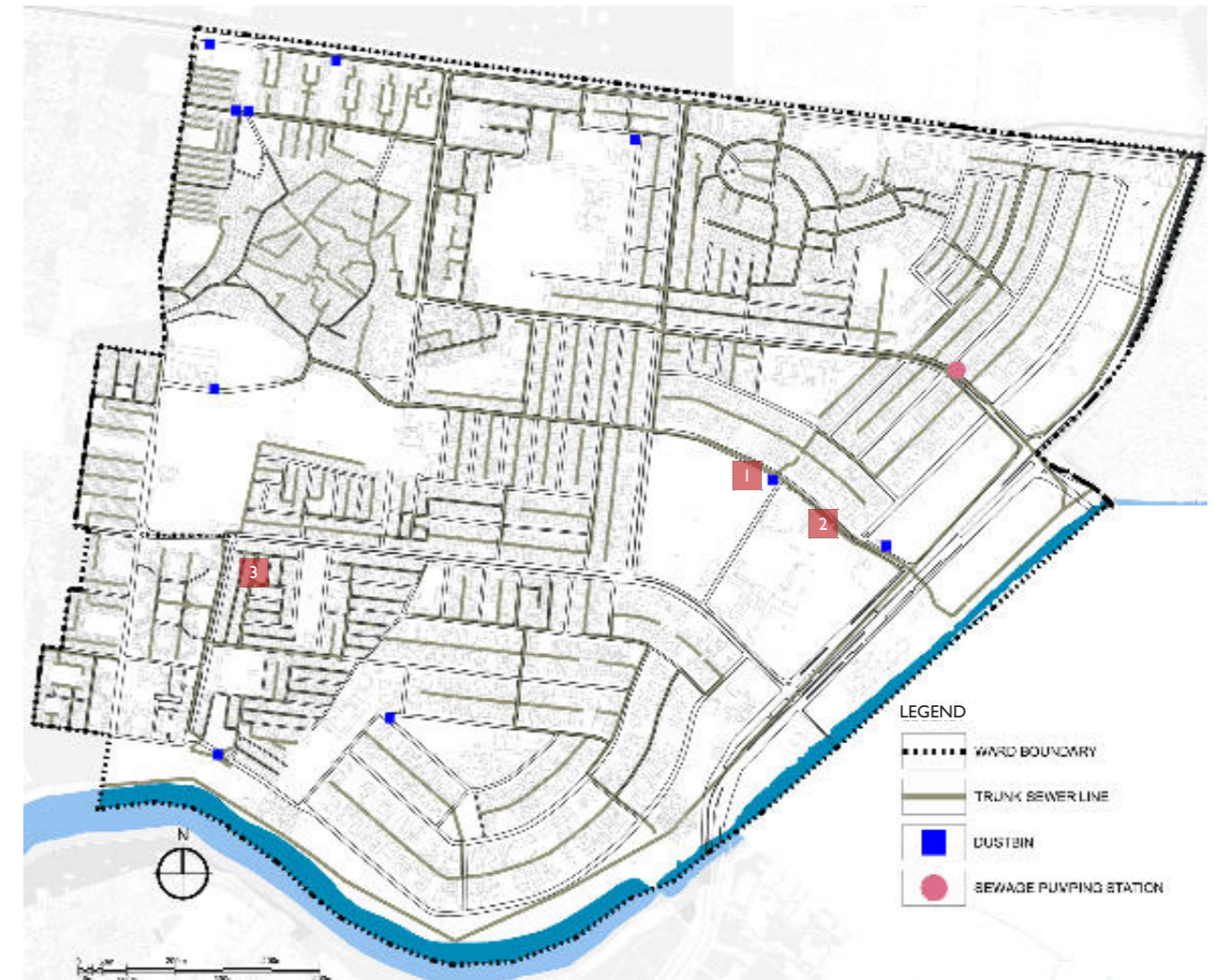
- Social infrastructure has been looked at in terms of the facilities indicated in the City Level Master Plan, and Community Facilities, which are indicated at the layout plan level in sub-zone G-10.
- Together, these include social infrastructure facilities pertaining to health, education, sports facilities, recreation, religious activities, social congregation and community events, cremation/burial grounds, etc
- Data from secondary sources show that the ward has ample number of schools, a college, hospitals, etc. It also has a designated stadium (not in working condition), banquet halls, community centres and other community level facilities.

2.8 Physical Infrastructure: Water Supply & Drainage



Water Supply and Drainage (Primary Survey 2013-14)

2.9 Physical Infrastructure: Sewage & Solid-waste



Solid-waste and Sewerage (Primary Survey 2013-14)



Open Sewer Line at Madipur Village



Water Connection in Slum



Garbage spilling from dhalao



Ragpicker sorting out plastic from garbage



Unkept dhalao

- Najafgarh Nullah, a city level drain, flows along the southern edge of the ward.
- The ward has two tubewells, two lakes and five underground water reservoirs.
- The water and sewerage systems in Punjabi Bagh are more than 40 to 50 years old and only minor rehabilitation work has been undertaken in the last 15 years. Generally, water supply and sewerage systems have a lifespan of 30 years, whereas for electrical and mechanical items like pumps, valves, etc., it is 15 years. The area thus needs a complete rehabilitation of its water and sewerage systems.
- Many houses receive suspended solids and turbidity in the water, which may be due to old pipelines, leakages, fractures of main pipe, infiltration of water, etc. A non-revenue water study is recommended for the area, that will help in complete replacement of pipes and will result in water saving and better water quality.

- The waste disposal is managed by **Metro Waste Handling Pvt. Ltd.**
- Three dhalaos, one open site and one dustbin cater to 34 metric tonnes of waste generated in the ward daily.
- The number of garbage pick-up sites is insufficient as the waste spills on to the streets.
- The ward has one sewerage pumping station.
- The sewage from the slum areas goes directly, without treatment, into the city level Najafgarh Nullah.

The sewerage system is very old, and at some places it is overloaded due to increase in floor area ratio and population; or the pipe diameter is small and the sewer system is probably silted.

Transportation

- Lack of connectivity from Ward 103 to the nearest Metro station.
- Absence of para-transit connectivity from Ward 103 to Metro station.
- Congestion on major roads at peak hours.
- On-street parking near markets/schools leads to congestion and traffic jams.
- Absence of planned auto and taxi stands again lead to congestion.
- Lack of parking facilities.
- Absence of designated parking lots have resulted in vehicles being parked on pavements and roads.



Encroachment on ROW: On-street parking

Urban Design

A. Streets

- Encroachment on ROW designated in Master Plan – vehicles, hawkers, vendors.
- Lack of proper lane division for motorized and non-motorized vehicles leading to traffic jams.
- Inadequate footpaths.
- Absence of facilities for the disabled and elderly.
- Absence of dedicated lanes for cyclists and pedestrians.
- Lack of proper signage, streetlights, street furniture and grating at base of trees.
- Absence of organized hoardings, signage and street furniture.



Tree without grating at base

B. Markets

- No guidelines for façade control.
- Absence of organized hoardings, signage and street furniture.

Physical Infrastructure

- Overhead electric cables look aesthetically unpleasant.

Public Utilities

- Lack of public utilities such as toilets and drinking water facilities.



Haphazard hoardings and on-street parking

Stormwater Management

- Stormwater drains are poorly designed and clogged due to lack of maintenance resulting in water overflowing on to the streets during the monsoon season.

Solid-Waste Management

- No scheme for waste segregation at source.
- The dhalaos in the ward are so designed that waste segregation is not possible.

Wastewater Management

- Wastewater from the slums flows into the Najafgarh Nullah (stormwater drains).
- In other areas, wastewater is being treated at the city level where there is likelihood of it getting mixed with stormwater, thus leading to inadequate treatment with little chance for recycling and resource recovery.

Slums

- The ward comprises four slums with 1400 dwelling units.
- The conditions of streets, houses and services like water supply, drainage, waste disposal, electricity are all in a dilapidated state.
- The living conditions in the slums are unhygienic for the slum dwellers.

Horticulture

- Underutilized green spaces.
- Open lands are being used as dumping grounds.
- No scheme for horticulture waste disposal.

City Management Structure

- Lack of democratic decentralization and people's participation in management of the ward's affairs.



Condition of drains



Condition of slums



Condition of dhalaos

Transportation

- Para-transit modes such as autos, taxis, Metro feeders, rickshaws etc., should be integrated with the existing public transport system for better connectivity to nearest Metro station, for last mile connectivity.
- Ward should have designated taxi/auto/feeder/bus/rickshaw stands.
- Community level parking sites should be developed.
- Location for underpass to facilitate pedestrian crossing should be identified.
- A Mobility Plan should be developed at ward level in consultation with RWAs/Residents/Councillors and other stakeholders. The plan should include all bus routes/bus stands/auto stands/feeder stands. It should provide basic information about bus timings, their origin, destination, etc. It should mark pedestrian streets, cycle tracks, one-way roads, two-way roads etc. It should also indicate information regarding modified routes during peak hours.
- Air quality monitoring systems should be placed in every ward.

Urban Design

A. Streets

- Encroachment on ROW in any form (hawkers/vendors/parking/milk booths/electric feeder pillars) should be removed.
- Street sections should be designed with proper lane division for motorized and non-motorized vehicles.
- The ward should be made pedestrian friendly by providing adequate footpaths on all roads and underpass wherever applicable.
- While designing, care should be taken to provide facilities for the disabled and elderly.
- The ward should become cyclable with provision of a dedicated lane for cyclists.
- The streets in the ward should have proper streetlights, signage and street furniture.
- Trees should have proper gratings at base.
- Pedestrian and disabled friendly crossings/junctions should be designed.
- Public spaces and streets should be made more interesting/dynamic by giving them certain character through landscaping, wall murals, wall paintings, statues, etc.
- The back lanes of houses should be cleaned and maintained regularly. Certain activities should be developed in these lanes to make them lively so that they are not treated as just back lanes.

B. Markets

- Guidelines for signage should be formulated which will be applicable to markets, all public buildings, etc.
- As markets form an important part of Ward 103, these should be redeveloped/renovated.
- Multilevel underground car park to cater to growing needs of car parking should be addressed.
- Unused market terraces can be converted into open-air food courts with solar photo voltaic trellis.

C. Parks

- High fencing around the parks and playgrounds should be replaced with low height boundary walls.
- Underutilized green spaces should be redesigned.
- A hindrance free walkable green network should be chalked out to utilize the abundantly available parks.
- Underground multilevel car park could be developed under playgrounds and green areas.
- A sustainability park can be developed where residents can learn about sustainability features and can incorporate the same in their lifestyles.

Physical Infrastructure

- Common utility ducts should be made an integral part of streetscaping.
- All services such as electric, cable, gas, telecom lines and other such should be put underground in common utility ducts.

Public Utilities

- Public utilities such as toilets and drinking water points should be available at regular intervals with proper signage.

Stormwater Management

- Stormwater drains should have proper grating to avoid waterlogging.
- A de-silting chamber should be incorporated to avoid silt from clogging the stormwater drains.
- The drains should be maintained and cleaned regularly.
- Bioswales and groundwater recharging pits should be built at regular intervals to facilitate stormwater management within the ward.

Solid-Waste Management

- Solid-waste management scheme which facilitates waste segregation at all levels – household, storage, collection and transportation should be developed.
- Wastebins, collection trolleys, dhalaos and collection trucks should all be designed with segregated chambers.
- For a start, the RWAs should involve certain NGOs to help in waste segregation and collection.
- Biogas plants should be installed within the ward for generating energy and compost from organic waste produced in the ward.

Wastewater Management

- Wastewater lines should be laid properly in market areas.
- Wastewater may be treated at ward level to reduce the volume of untreated wastewater discharge to city level drains
- The treated water should then be reused for landscaping of urban greens within the ward, for flushing in public toilets and for cleaning roads.
- Apart from the conventional sewage treatment plants, some decentralized wastewater treatment systems may be used for treatment.

Water Supply

- Water shortage in the ward can be reduced by demand side management.
- Treated wastewater can be reused for landscaping, for flushing in public toilets and for cleaning roads.
- Stormwater, instead of going into city level drains, can recharge groundwater within the ward.

Energy Efficiency & Renewable Energy

- In case of new construction/renovation of buildings in the ward, various energy efficiency measures can be incorporated.
- Solar photo voltaic panels can be installed at community level (public buildings, markets, toilets, etc) and household level for renewable energy generations.

Decentralized City Management Structure

- For democratic decentralization and people's participation in management of the ward's affairs, a combination of bottom-up and top-down approach should be followed in the whole city.

5.1 Existing Development Initiatives

The local area planning procedure is based on the approach of decentralization and devolution of Urban Local Governance according to the 73rd and 74th amendments in the Constitution of India. These amendments give greater power to the Urban Local bodies such as the Municipal Corporations, as well as the Municipal Councillors, Residents Welfare Associations (RWAs) of the area, NGOs functioning in the area and the residents of the area.

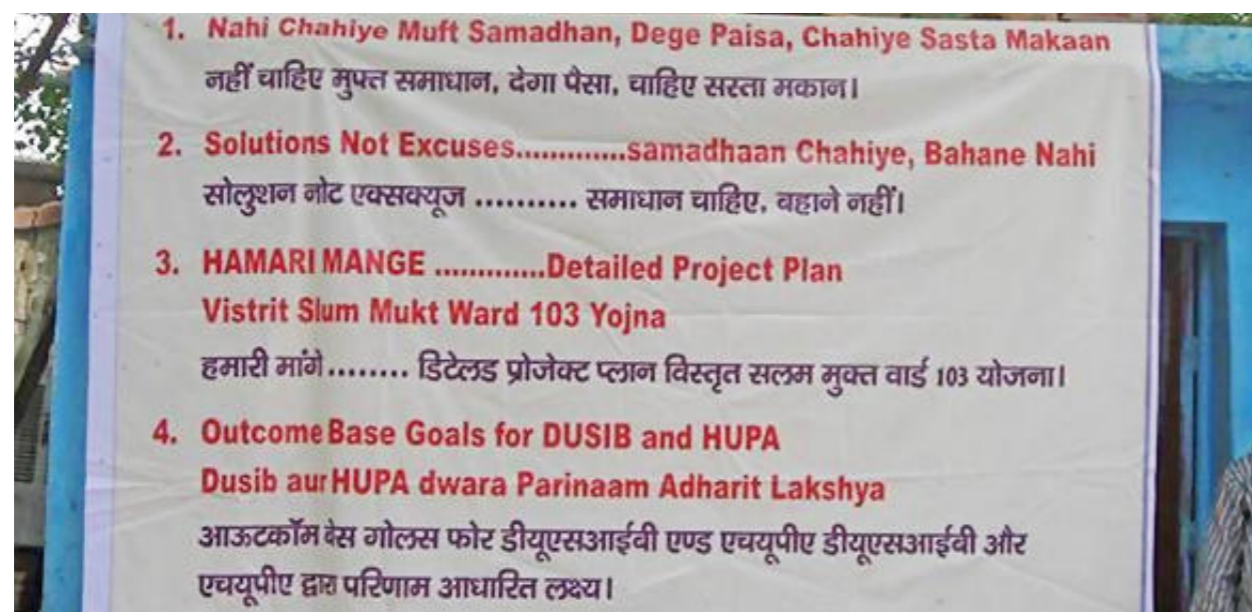
Public interaction during site studies with stakeholders, Ward Councillor and RWA heads were spread over many discussions and meetings during the preparation of this Local Area Plan for the ward. The Ward Councillor, Mrs. Satwinder Kaur Sirsa, not only gave a holistic overview of the area, but also of the problems at large and suggested possible solutions. While the RWAs suggested ways of improvement of services and infrastructure, the residents were helpful in bringing forward the day-to-day issues of the area.

Development Initiatives Identified in the Ward

- Sanitation of streets
- Herbal garden transformation project
- Improve horticulture in the ward
- Develop a system to deal with the horticulture waste
- Slum free ward
- Cleaning of Najafgarh Nullah



Facebook page for Ward 103



Existing initiative for slum free ward



Herbal Garden transformation project



Ward Councillor's involvement in ward initiatives

5.2 Public Participation: Stakeholders Suggestions

1. Slum free ward

Slums dwellers along with the Ward Councillor and shadow Ward Councillor are actively working on making this ward slum free.

2. Sanitation

The ward, in a letter to the Commissioner of South Delhi Municipal Corporation, stated that Punjabi Bagh ward should be chosen for implementation of the Private Public Participation for sanitation services, in order to ensure that the ward gets the best of the services.

3. Water Supply

- In a discussion with the shadow Councillor it was observed that the area needs complete rehabilitation of the water supply and sewerage system.
- The area has adequate water supply, however the quality of water is not good. Water-borne disease are prevalent in the area. It was suggested that water testing should be done immediately and once the system is rehabilitated, fortnightly sampling of water should be done and a report should be given to RWA office.
- In discussions, the RWAs mentioned that the metring in many houses in the area is old. Their suggestion was that DJB should modernize the metring system so that the revenue can be collected efficiently. This will improve the revenue collection by DJB. It was also recommended as per Central Ground Water Board and DJB guidelines that rainwater harvesting should be done for open and built areas.

4. Sewerage System

- Sewerage system is very old and at some places, it is overloaded due to increased floor area ratio and population.
- There is need to refurbish the sewer system so that it is adequate for the next 30 years as per CPHEEO Guidelines of the Ministry of Urban Development. It should have enough room for expected growth in the area.

5. Stormwater

- It has been noted that at many places the stormwater drainage system has been connected to the existing sewer system which is not permissible under the law.
- Because of this, in many houses, there is a backflow of sewage mixed with stormwater during the monsoon. It was suggested that the drainage should be disconnected after detailed study, and that MCD/PWD should be made to disconnect the same and follow the bye-laws for stormwater management.
- At present the ward has no provision for recycling and reuse of water in park and green belt areas. An irrigation pipeline from Kesho Pur Treatment Plant (which is nearby) can be planned for irrigation of parks and green belt areas.

6. Transformation of Herbal Garden

An initiative that the ward has taken is related to the transformation of the Herbal Garden in consultation with a landscape architect. Work has already been started on it.

7. Revitalization of Greens

One of the existing development initiatives of the ward is to transform the existing greens and to treat the horticulture waste within the gardens. Strategy adopted to transform existing greens:

- Listed all parks in the ward.
- Involved the residents to score the parks.
- The weighted average of all park scores reflects the park score of the ward.
- Each park would be adopted so that maintenance is also taken care of by the adopting committee.

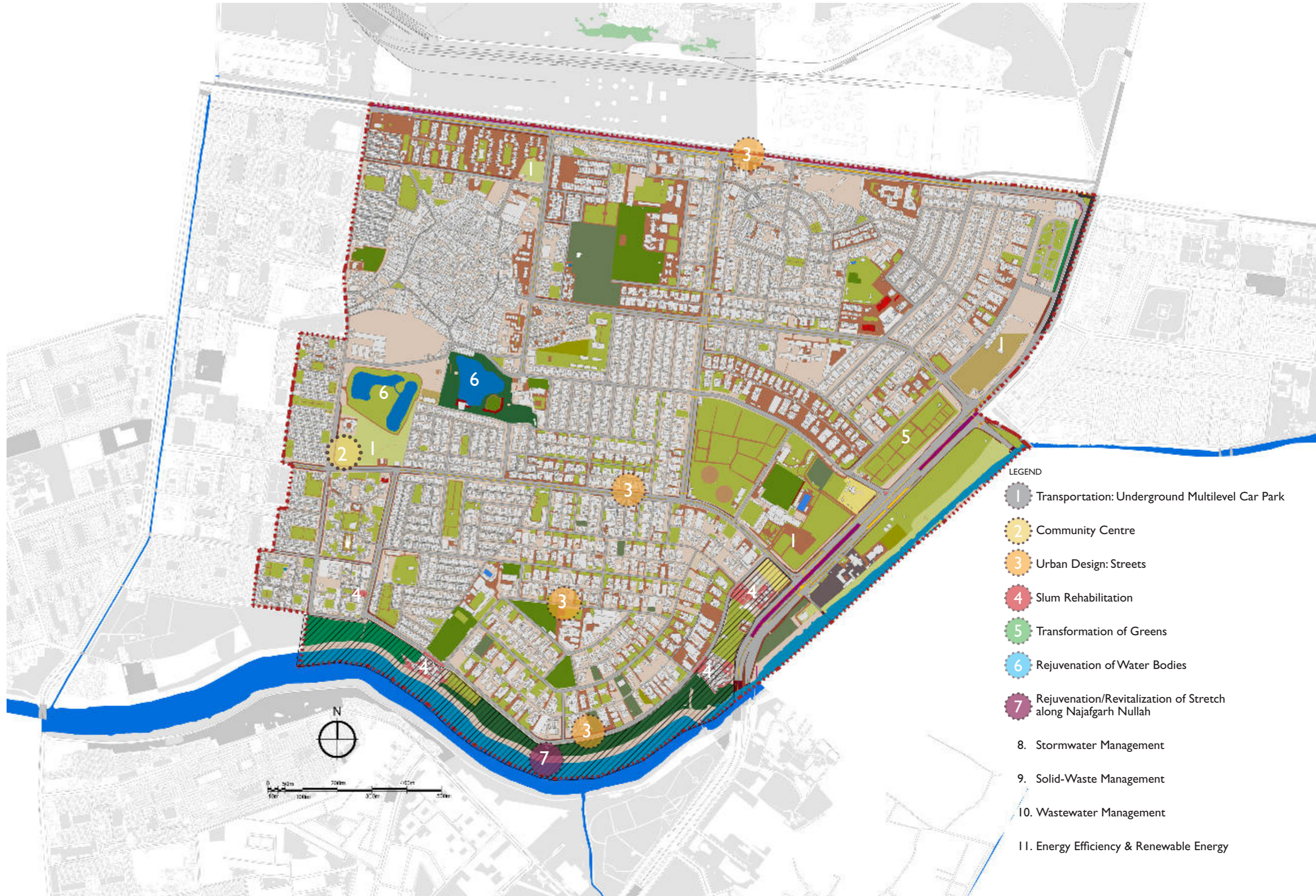
8. Rejuvenation of Lakes

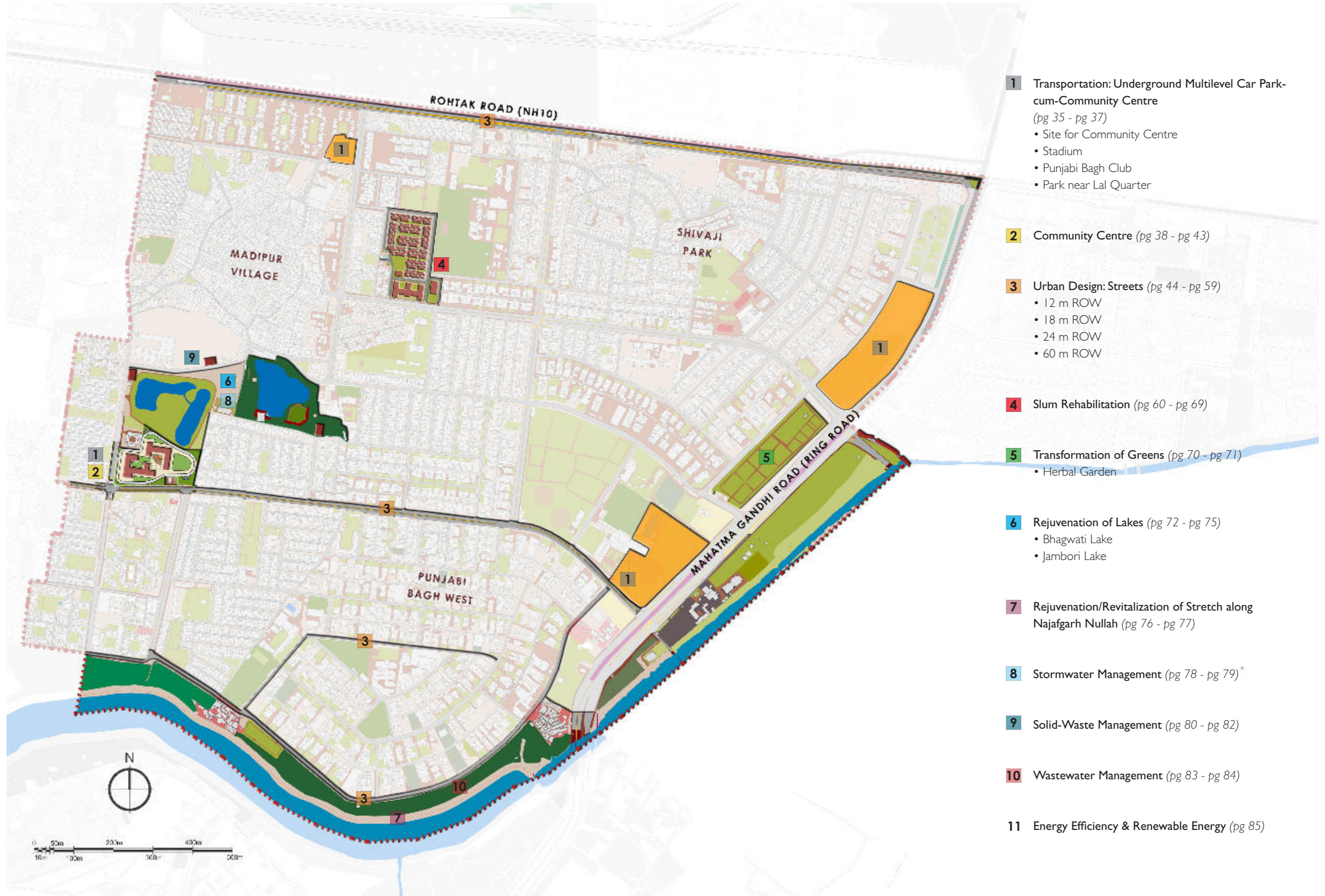
Bhagwati and Jambori Lakes have been studied and the conclusions can be adopted by the ward. Stormwater from the catchment area will be collected to fill water in the lakes to reduce the dependence on the underground water.

9. Rejuvenation of Stretch along the Nullah

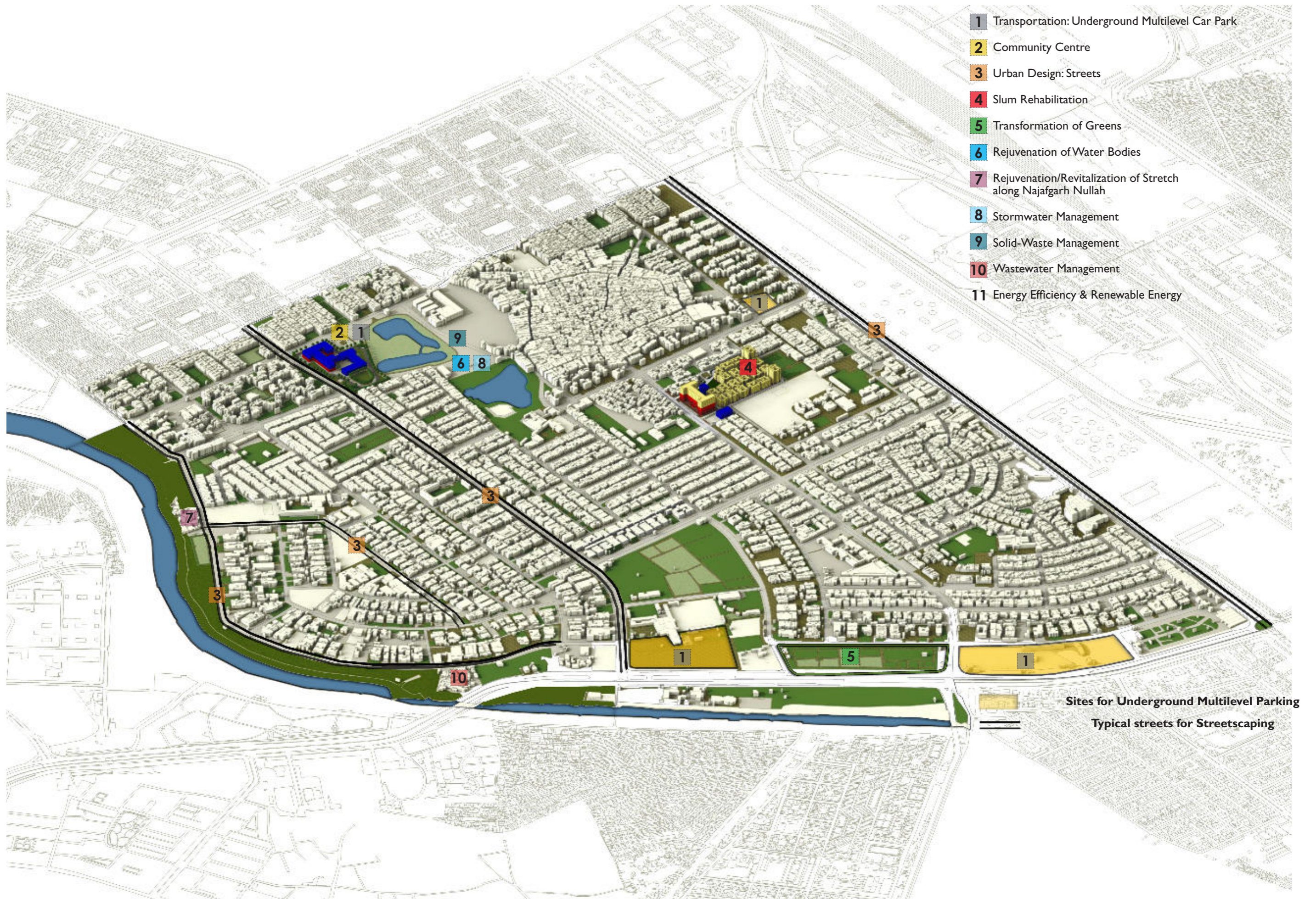
In the discussion it was proposed that Najafgarh Nullah, which forms part of the ward, should be developed for recreational activities, with well designed ghats, green community spaces, cycling tracks, walking paths, kiosks, etc.

5.3 Potential





- 1** Transportation: Underground Multilevel Car Park-cum-Community Centre (pg 35 - pg 37)
 - Site for Community Centre
 - Stadium
 - Punjabi Bagh Club
 - Park near Lal Quarter
- 2** Community Centre (pg 38 - pg 43)
- 3** Urban Design: Streets (pg 44 - pg 59)
 - 12 m ROW
 - 18 m ROW
 - 24 m ROW
 - 60 m ROW
- 4** Slum Rehabilitation (pg 60 - pg 69)
- 5** Transformation of Greens (pg 70 - pg 71)
 - Herbal Garden
- 6** Rejuvenation of Lakes (pg 72 - pg 75)
 - Bhagwati Lake
 - Jambori Lake
- 7** Rejuvenation/Revitalization of Stretch along Najafgarh Nullah (pg 76 - pg 77)
- 8** Stormwater Management (pg 78 - pg 79)*
- 9** Solid-Waste Management (pg 80 - pg 82)
- 10** Wastewater Management (pg 83 - pg 84)
- 11** Energy Efficiency & Renewable Energy (pg 85)



6.1 Transportation

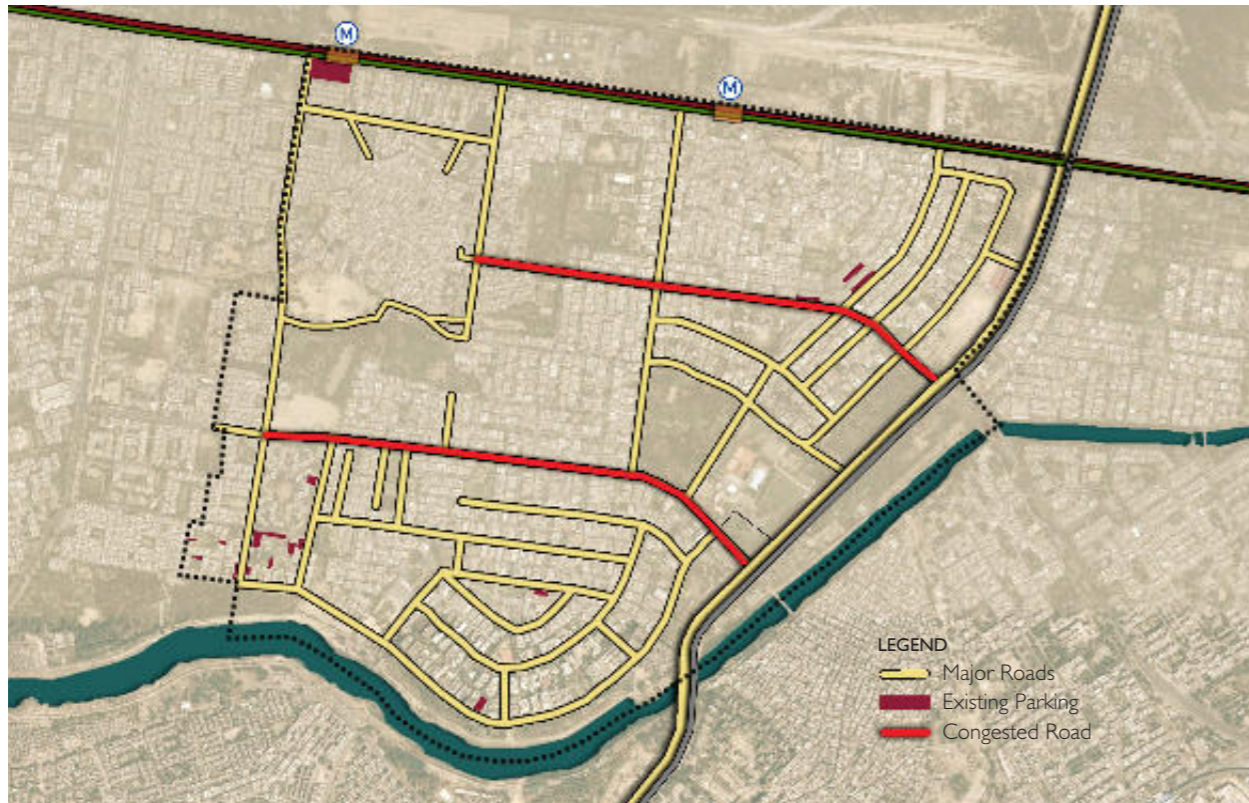
6.1.1 Issues



Traffic congestion due to unplanned mixed-use



No designated place for auto stands



Map showing the most congested roads in the ward



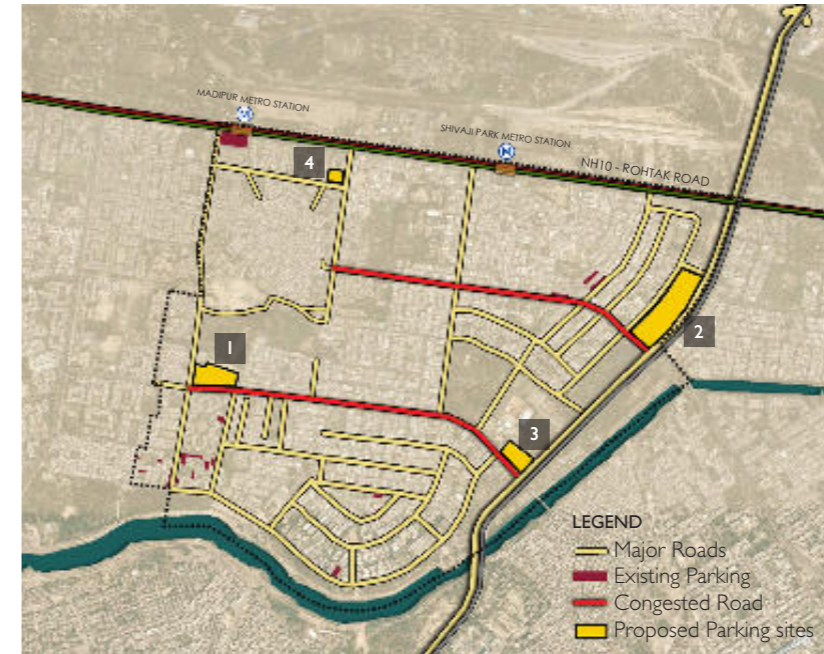
Obstructed footpaths



On-street parking causes congestion in peak hours

- Insufficient designated parking lots in the ward.
- Main streets congested during peak hours due to on-street parking.
- All streets are encroached upon, on-street parking reducing the Right of Way.
- Lack of designated taxi and auto stands adds to the chaos.

6.1.2 Sites Identified for Multilevel Underground Parking



Location of Four Identified Sites for Underground Multilevel Parking

Underground multilevel parking is proposed at four sites:

1. Site for Community Centre (as per MPD 2021).
2. Stadium (currently used for parking private buses and for marriage functions).
3. Punjabi Bagh Club.
4. Park near Lal Quarter.

Facilities to be provided in underground parking:

Toilets, drinking water facility, car wash and mechanic facilities, integrated taxi/auto stand, cycle stands, electric charging points for electric cars and cafeteria.

Benefits of underground parking: Clearing the streets for pedestrians and cyclists, protection of vehicles from harsh weather and security.

Last Mile Connectivity & Multi-modal Integration:

1. Multi-modal integration plan for Metro stations and identified parking sites.
2. Pedestrian crossing facilities at vulnerable/accident spots.
3. Standard typical crossing design.
4. Synchronization of signals, signage and road markings, etc
5. Street design guidelines.
6. Cycle sharing and other Intermediate Public Transport (IPT).

S. No.	Site	Image	Location in Ward	Area (sq m)	No. of Cars in Double Basement*
1	Site For Community Centre			16278	793
2	Stadium			36740	1961
3	Punjabi Bagh Club			5649	249
4	Near Lal Quarter			3731	3003

*Considering area of basement excluding 6 m setback and 32 sq m per car including services & ramps
Total of about 6000 cars can be accommodated in four chosen sites.

6.1.3 Pedestrians & Cyclists

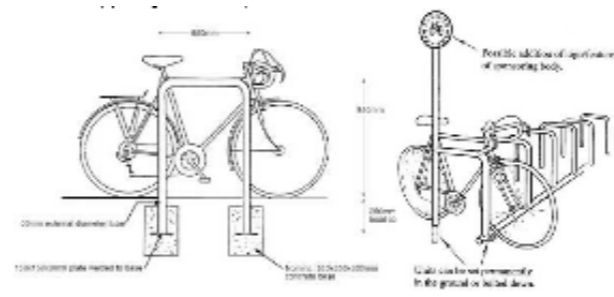
Part of the proposal was considered to make Ward 103 cyclable and pedestrian friendly. The red dots visible in the plan shown below represent the streets that can be made cyclable, while all streets will have pedestrian walkways.

Cycles are a very desirable, affordable and environment friendly private mode of transportation. To encourage their usage, safe and secure cycle tracks must be provided. The cycle parking must also be secure.

It was recommended that cycle stands should be provided at all Metro stations, markets, huge parking lots (underground multilevel parking lots) and near green areas.

Long-stay parking: cycle parking lots must be enclosed, ticketed (like car parking lots) and shaded from weather. Short-stay parking should be open to view and close to entrances of destinations.

Provision can also be made for residents to be able to take cycles from one stand at minimal rental and drop it at the other stand near the destination.



Standards for cycle parking



Short-stay cycle parking

CYCLE
72% of the ward will be cyclable and walkable



Map showing the identified possible network of roads for cycling and walking

6.1.4 Efficient Public Transport System



Advertisement Boards

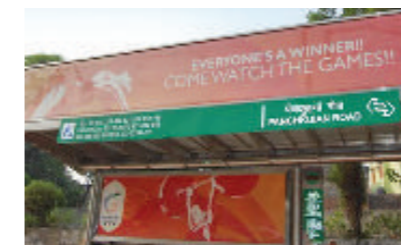
A well designed, bilingual "Local Area Map" should be displayed at all bus stops, showing local roads and important civic destinations.



The public transport system in the ward needs attention. At present passengers are clueless about arrival of buses and they tend to take private transport which is expensive and also leads to traffic congestion.

Intelligent Transportation System (ITS) is one way to make public transport facilities more efficient and safer by the use of information, communications and control technologies.

ITS showing bus route and current location of bus approaching the stop



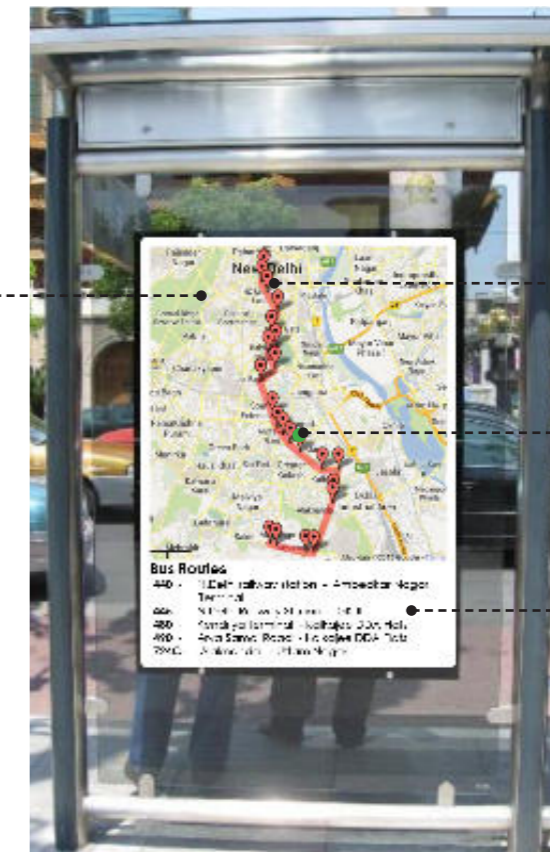
Bus Stops in Delhi: advertisement boards



Bus Stop in Punjabi Bagh



Integration of cycle stands with bus stop



Intelligent Transport System (ITS) showing bus route and current location of bus approaching the bus stop

Current location of bus approaching the bus stop

Bus Numbers for this bus stop (with origin and destination)

This system will provide commuters with precise information of arrival and departure of buses at bus stops. This apart, the passengers can avail service details on their mobile phones by sending SMS. This will cut down waiting time of passengers at bus stops.

It will also help officers to track movement of buses, like driving speed and delay in departure of buses from bus stand, on real-time basis.

Information about bus routes and timing must be displayed on all bus stops in the form of static signage as well.

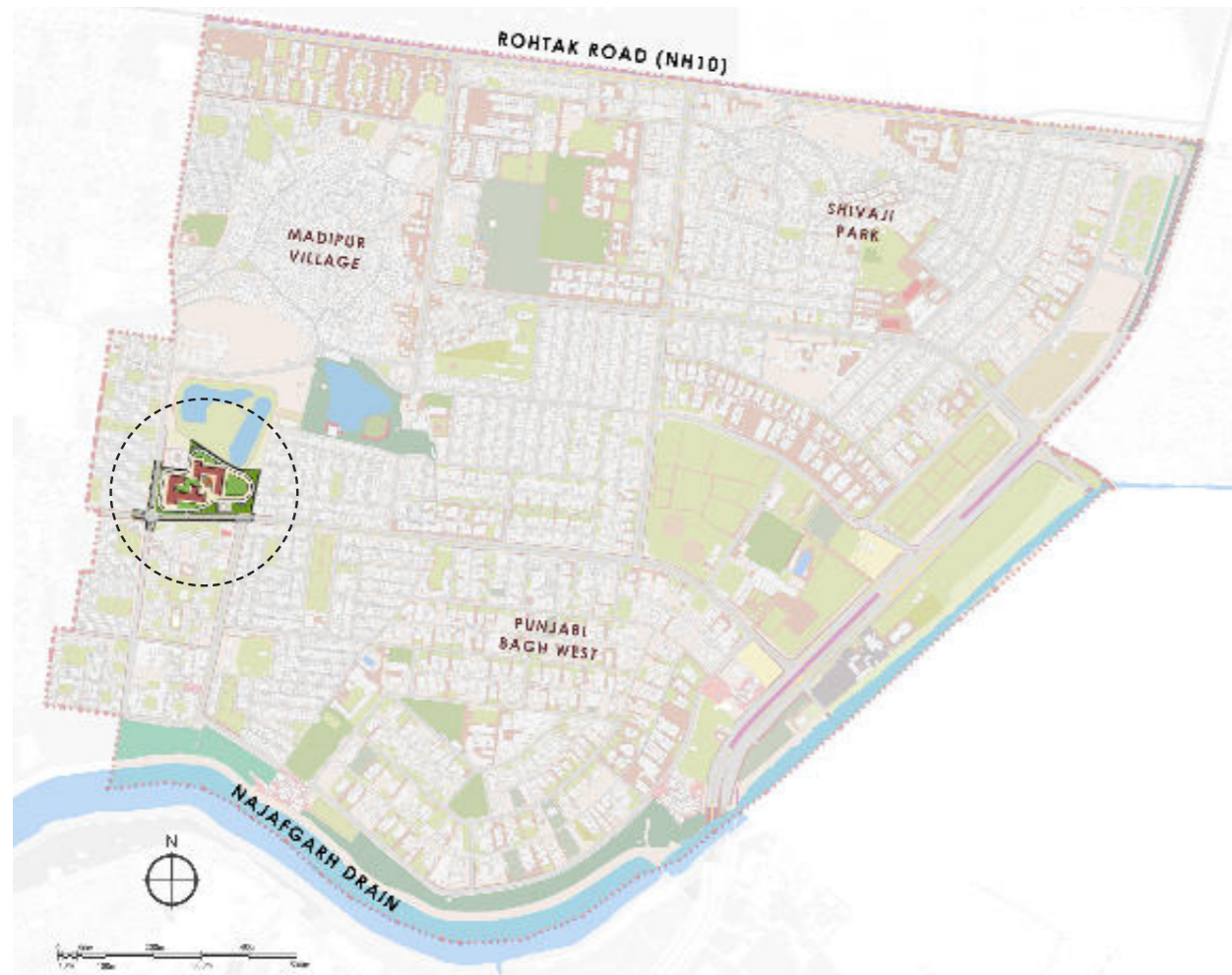
For the assistance of residents and visitors in the ward, bus stops should also display a bilingual Local Area Map showing local roads and important civic destinations.

The remaining panels on the bus stop should be used for advertisements.

6.2 Community Centre

6.2.1 Issues

- According to the Zonal Plan of Ward 103, there is a proposal for a Community Centre here.
- The approach to site is from Club Road.
- The area of the site is 20,084 sq m approximately.
- The site is lying vacant and is being used for dumping garbage on the edges and also for holding marriage ceremonies, Dussehra, Diwali melas, etc.
- One edge of the site has already been encroached upon by potters.
- Double basement Multilevel Car Parking (MLCP) has been proposed on the site.
- The site will be able to accommodate approximately 1255 cars if double basement MLCP is provided.



Location of Community Centre



Current status of proposed site



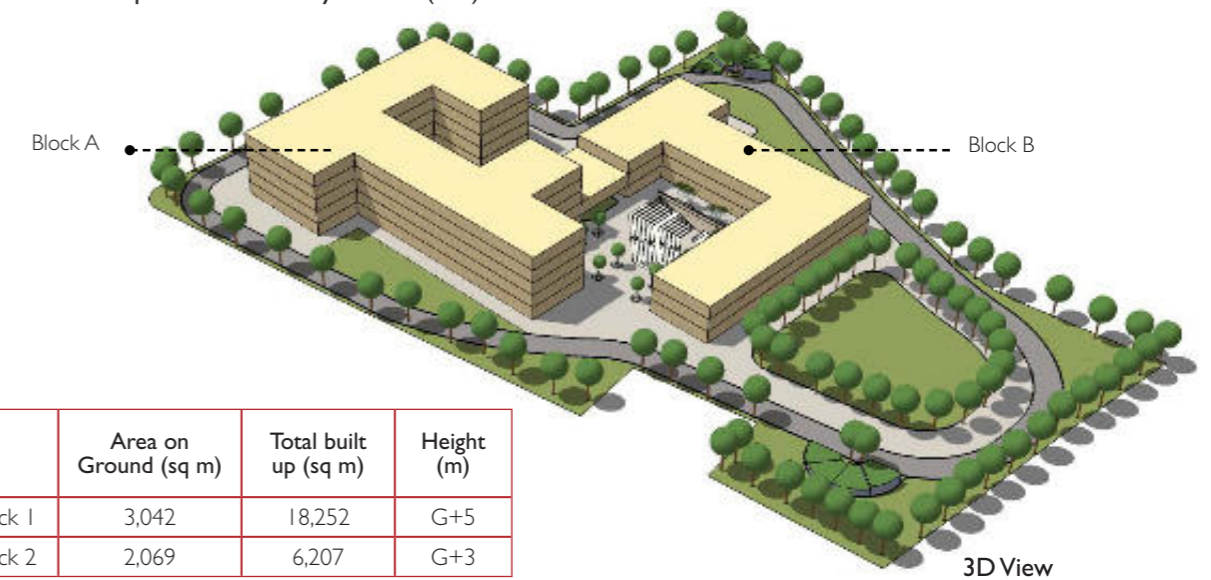
Encroachment on periphery of vacant site

6.2.2 Design

This particular junction was chosen as a model for the revitalization of a defunct urban space. The Master Plan/Zonal Plan has proposed that this vacant site should be used for a community centre. The surrounding road cross-sections have been detailed and the roundabouts have been redesigned keeping in mind safety, aesthetics and streetscaping guidelines.

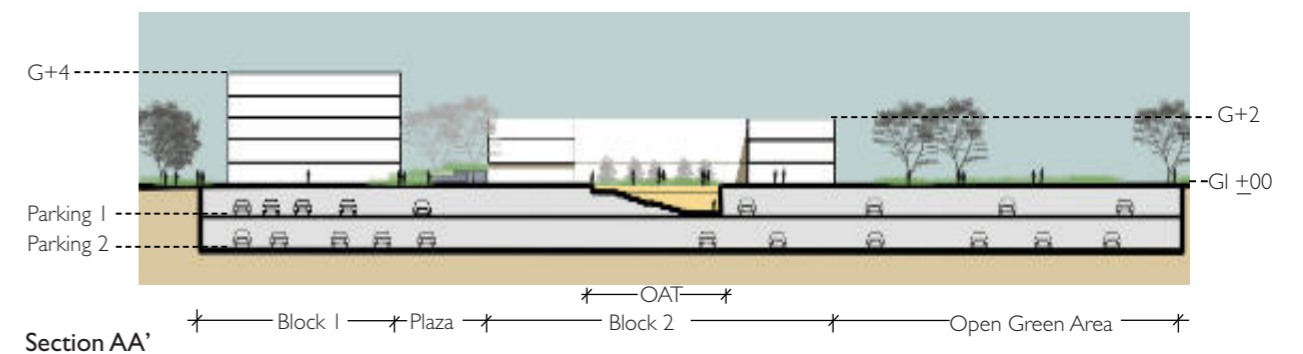


Site Plan for Proposed Community Centre (CC)



	Area on Ground (sq m)	Total built up (sq m)	Height (m)
Block 1	3,042	18,252	G+5
Block 2	2,069	6,207	G+3

Total Built-up = 24,459 sq m



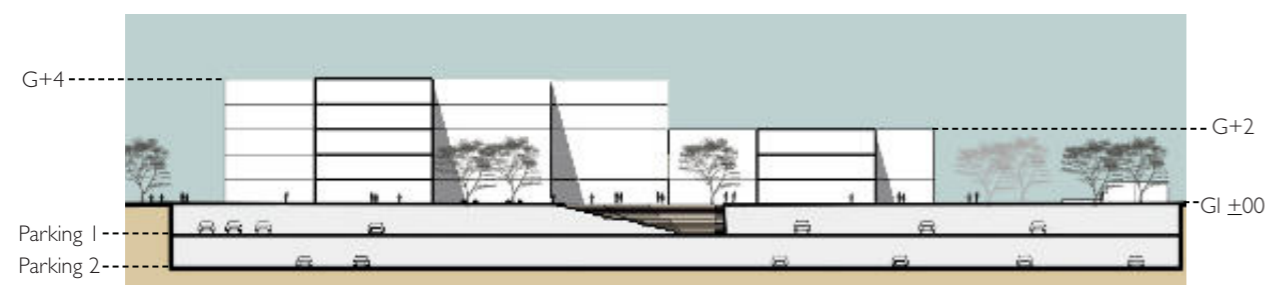
Section AA'



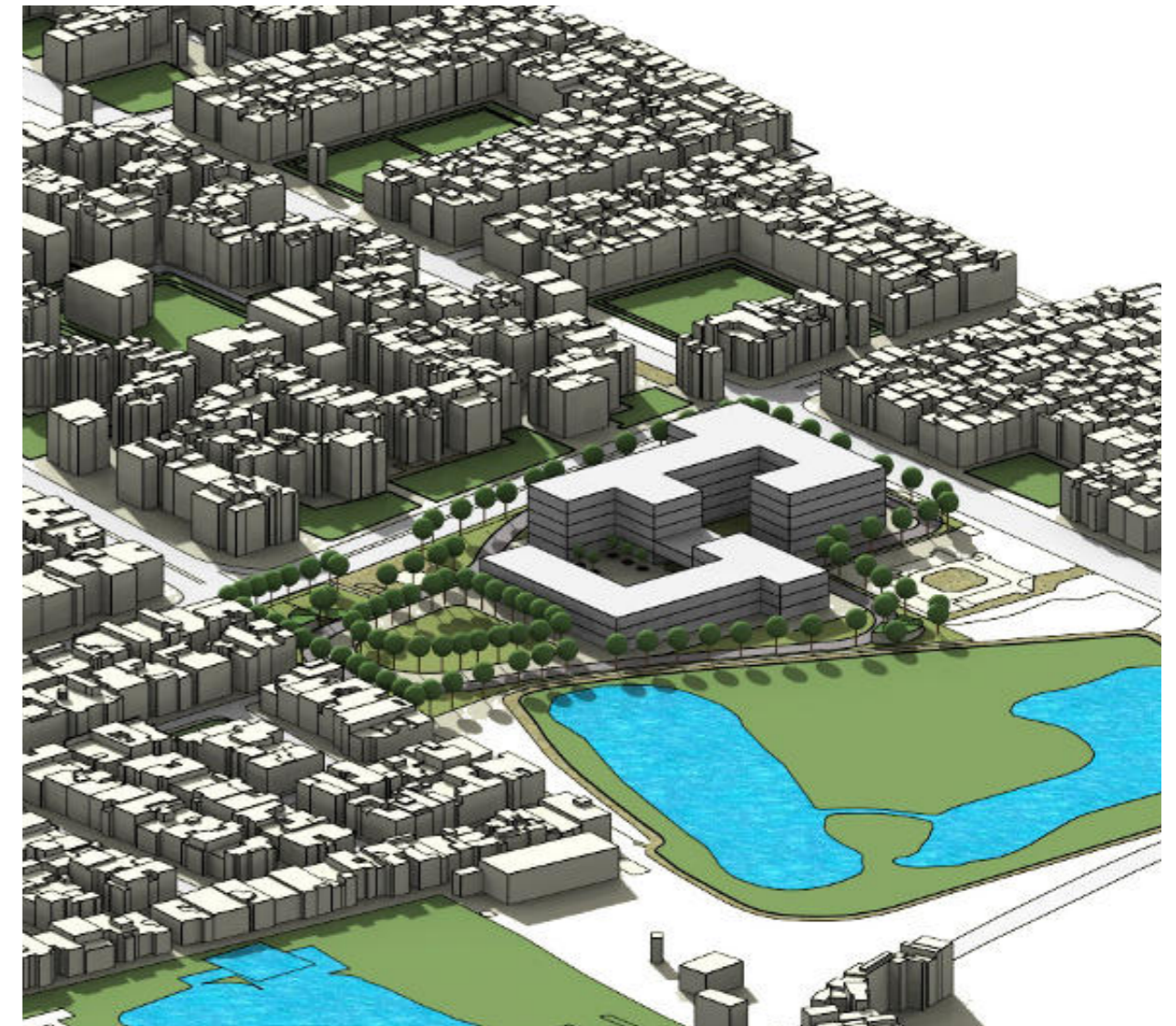
Location of Community Centre



3D View



Section BB'



3D View



Double Basement Parking below CC

Block A will be a G+5 structure in which the first two floors are planned to be used for commercial activities, whereas rest of the floors will be used as an institutional area (offices, institutes, etc).

Block B will be a sociocultural wing dedicated to recreational/sports activities, etc. It is so designed that large gatherings (indoor) such as marriages, conferences, etc. can be organized in this block.

Open Air Theatre is the connecting factor between Block A and Block B.

A large part of land in the rear has been left, and will be developed as an landscaped garden for outdoor activities.

793 cars in 2-floor underground parking below community centre on the proposed site.

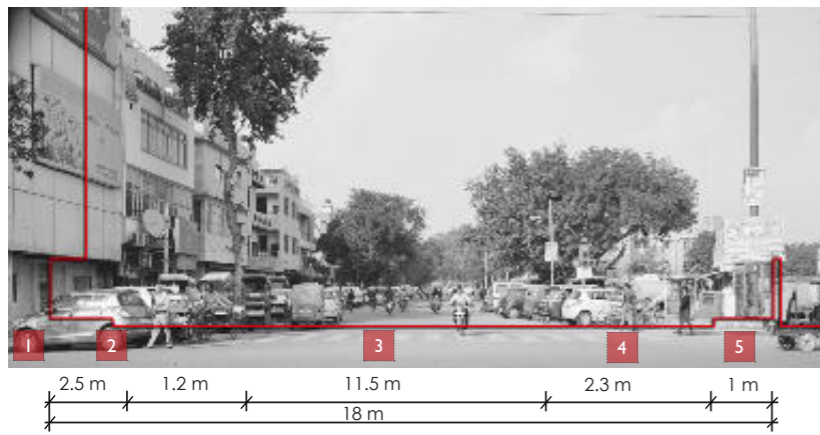
6.2.3 Redesign of Community Centre Traffic Junction



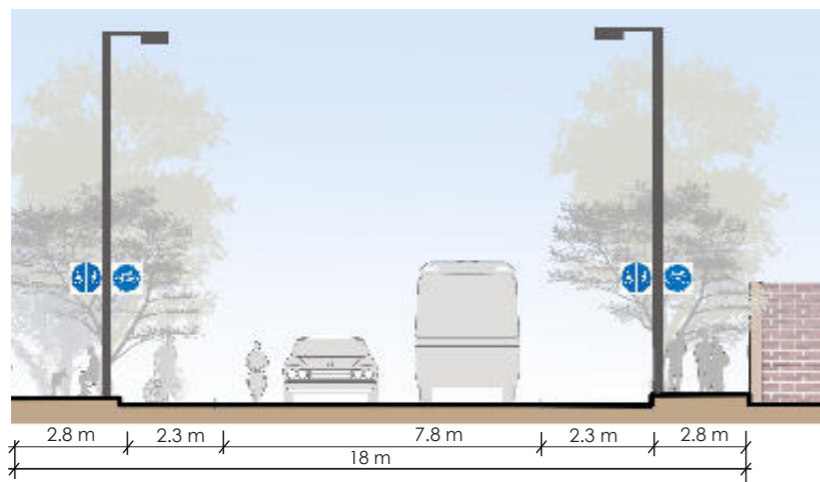
Location of Community Centre Traffic Junction

Issues

- Regular traffic jams occur at the junction due to poorly planned and designed junction and cross section.
- No proper lane division.
- No proper space for pedestrian movement due to encroachment on ROW by squatters.
- Encroachment by auto drivers, rickshaw pullers – due to lack of designated space for parking.
- About 2 m of road width on each side of the road is consumed by on-street parking.
- The garbage from dhalaos spill over on to streets causing unhygienic conditions for residents.



Existing condition of the junction adjacent to proposed community centre site



Proposed section for junction adjacent to proposed community centre site

- 1 Pedestrian pathways are crowded with parked cars which leave no place for pedestrians to walk.
- 2 The adjoining space is occupied by rickshaw pullers, vendors, etc.
- 3 11.5 m of the ROW is left for motorized and non-motorized vehicles to move about, which is further divided because it is a two-way lane.
- 4 The very next space is consumed by auto-rickshaw drivers or cars for parking.
- 5 Pedestrian pathways are packed with parked cars which leave no place for pedestrians to walk.



Existing



Proposed

6.3 Urban Design

6.3.1 Issues

The ward is facing a lot of issues in relation to the urban design of streets. Thorough analysis of the ward resulted in a few observations regarding the status of streets. The issues that came across as a result of the analysis have been listed below:

- Encroachment on Right of Way (ROW) as mentioned in Master Plan.
- Lack of proper lane division for motorized and non-motorized vehicles leading to traffic jams.
- Inadequate and unkept footpaths.
- Inadequate parking areas which result in vehicles being parked on footpaths hindering pedestrian movement.
- No specified time for loading and unloading of merchandise leading to congestion on street.
- Encroachment on footpath by vendors and hawkers.
- Absence of facilities for the disabled and elderly.
- Absence of dedicated lane for cyclists.
- Lack of proper signage.
- Absence of wastebins at regular intervals.
- Absence of grating at base of trees.
- Lack of street furniture.



No proper lane division



Unkept footpath

For the purpose of analysis four typical streets have been carefully chosen and the same have been depicted in the key plan shown below. The designated streets have been selected on the basis of their Right of Way (ROW) and their function. The typical streets are as follows:

1. 12 m ROW
2. 18 m ROW
3. 24 m ROW
4. 60 m ROW (NH 10)



Encroachment of ROW: on-street parking



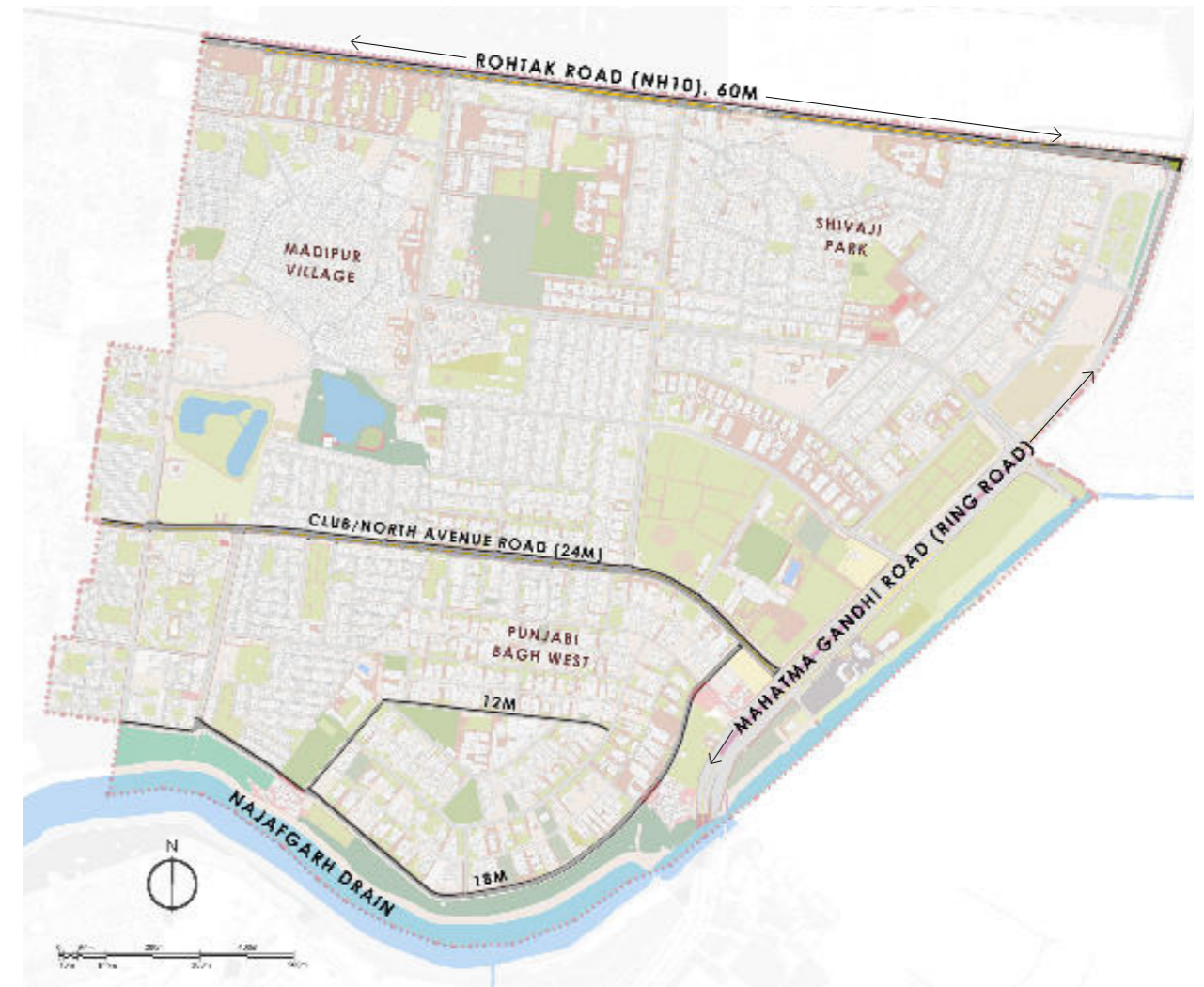
Obstructed footpaths



Loading and unloading during daytime obstructs movement

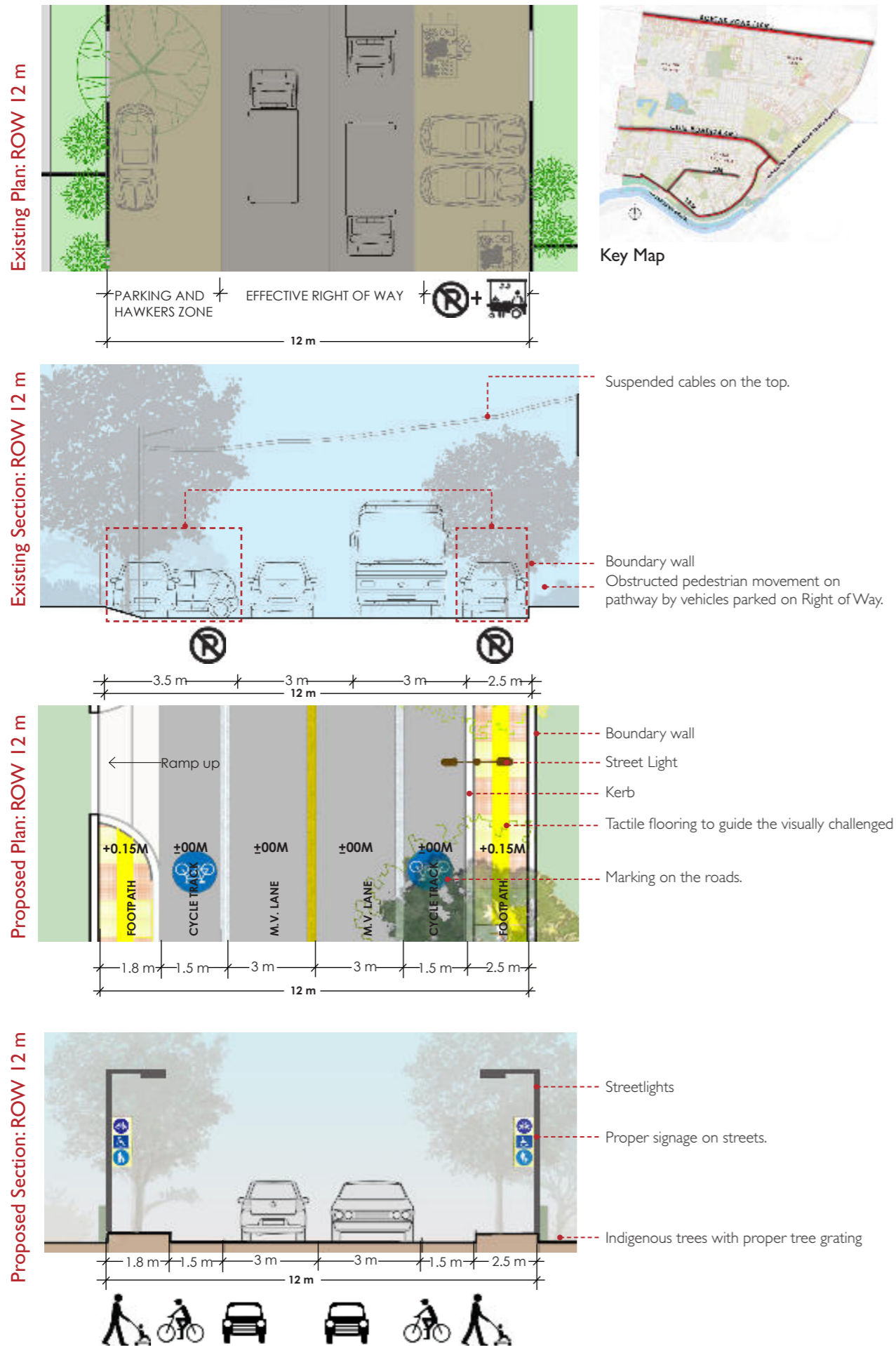


Lack of tree grating



Typical Streets

6.3.2 Typical 12 m-Wide Street



Existing

Encroachment on Right of Way

Encroachment on Right of Way



Proposed

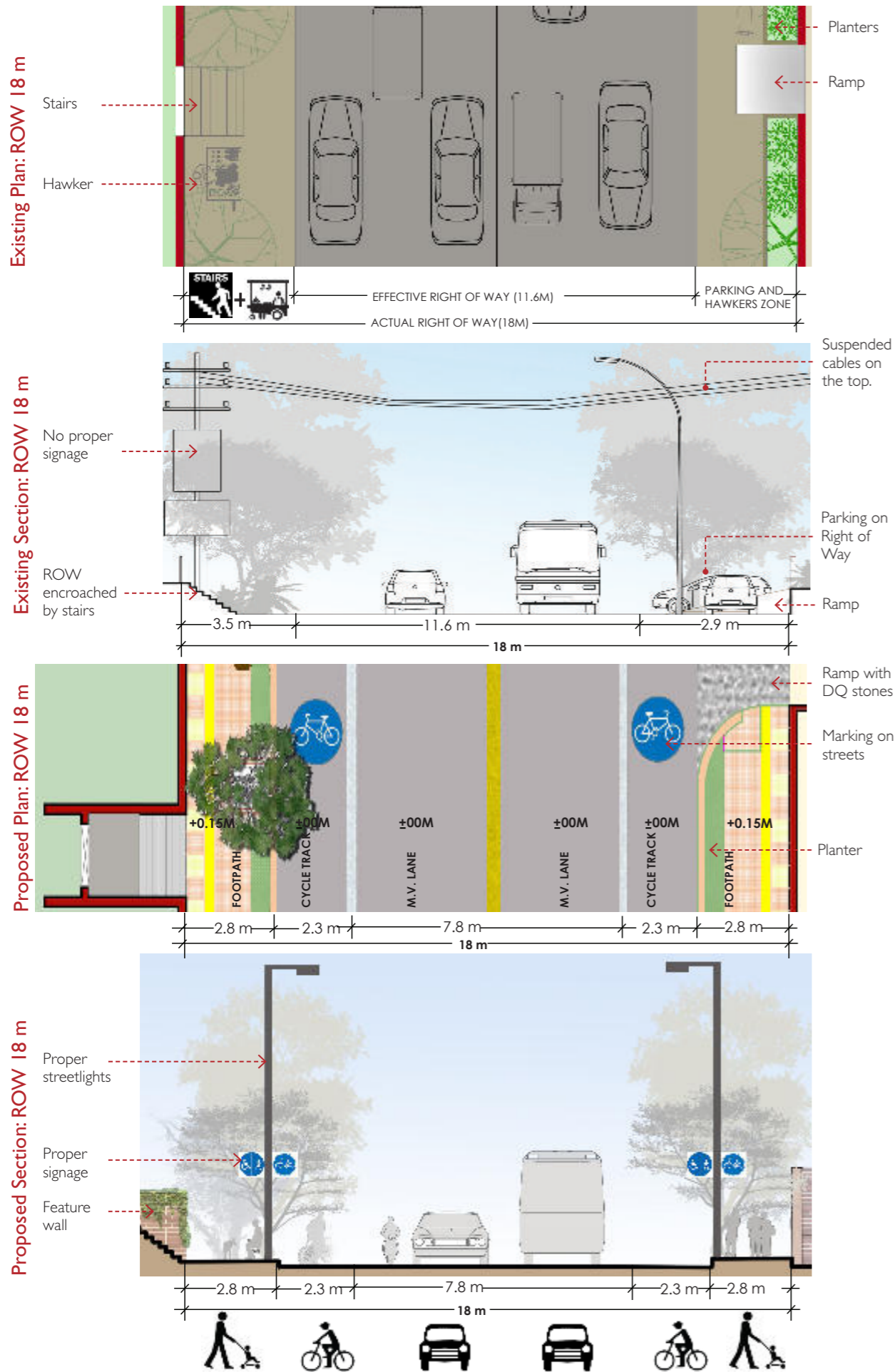
Indigenous trees with proper tree grating

Marking on streets

Streetlights with signage

Aesthetically appealing boundary wall

6.3.3 Typical 18 m-Wide Street

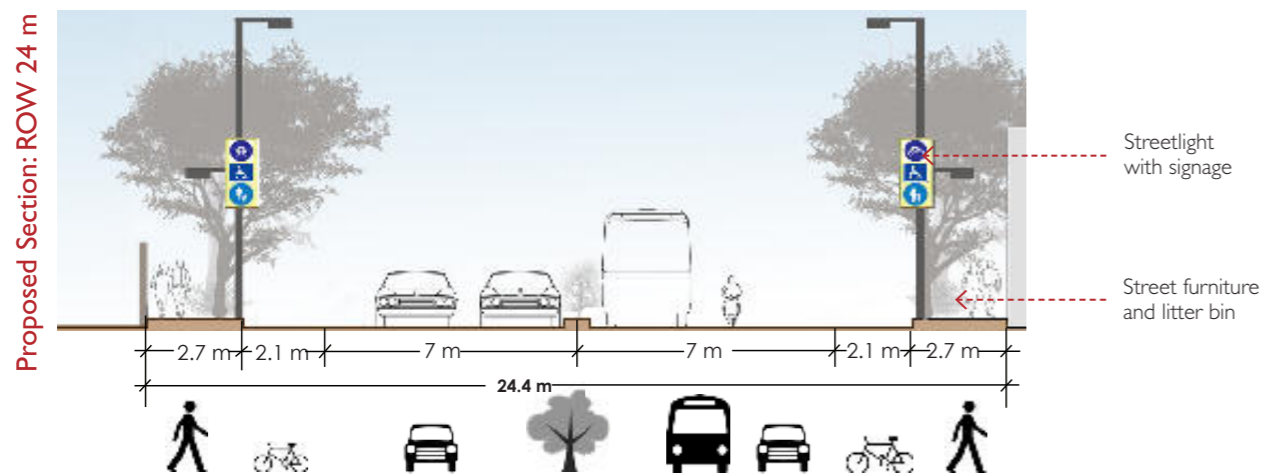
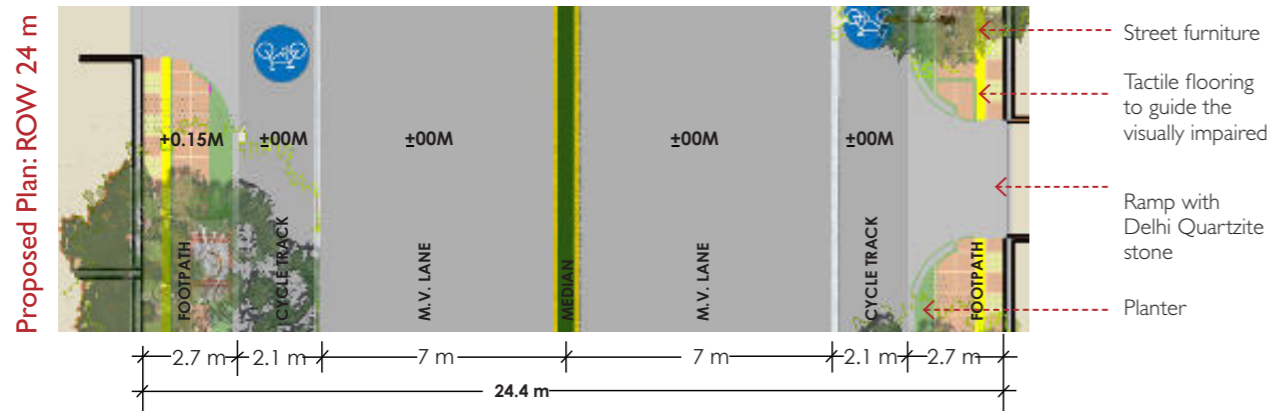
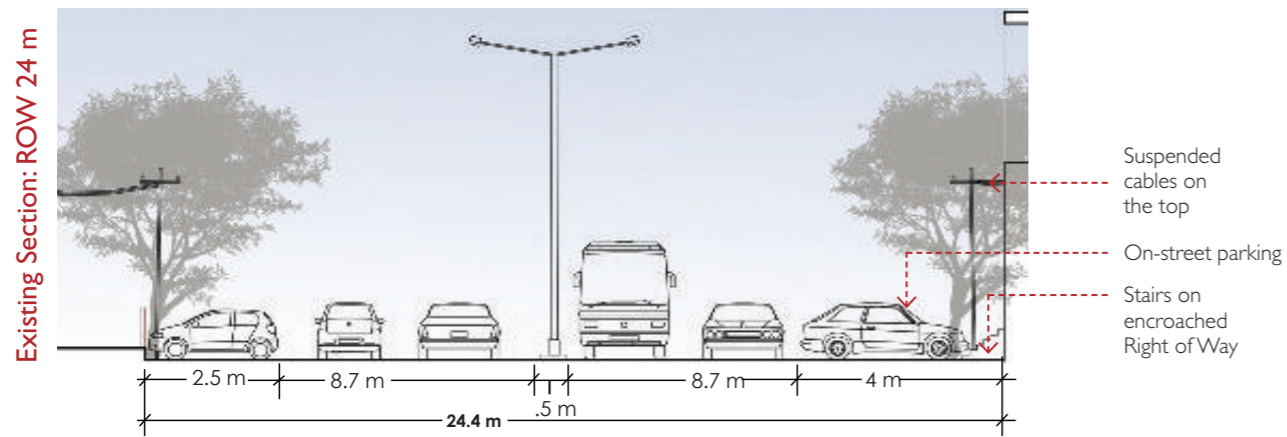


Existing



Proposed

6.3.4 Typical 24 m-Wide Street



Existing



Proposed

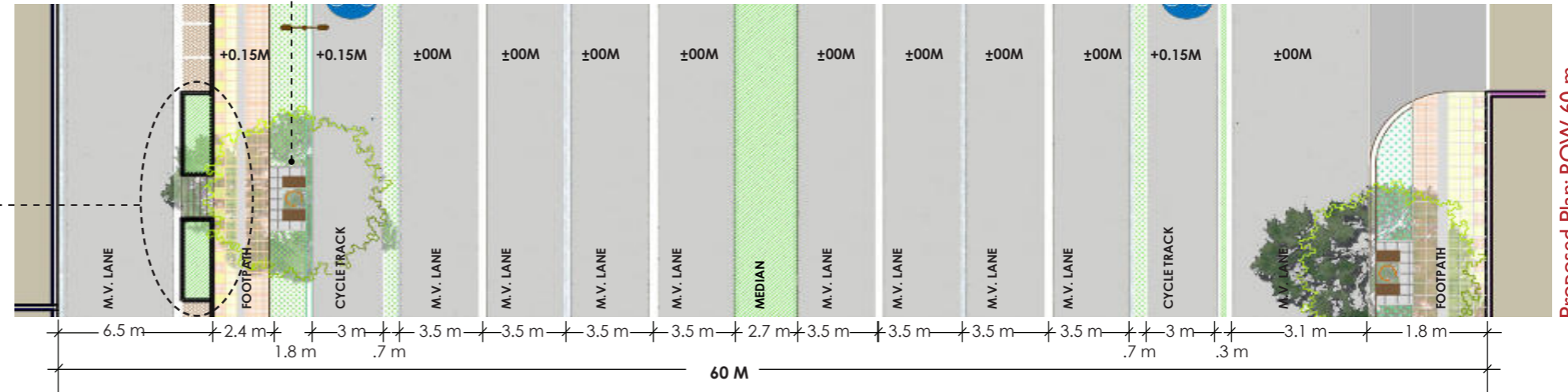
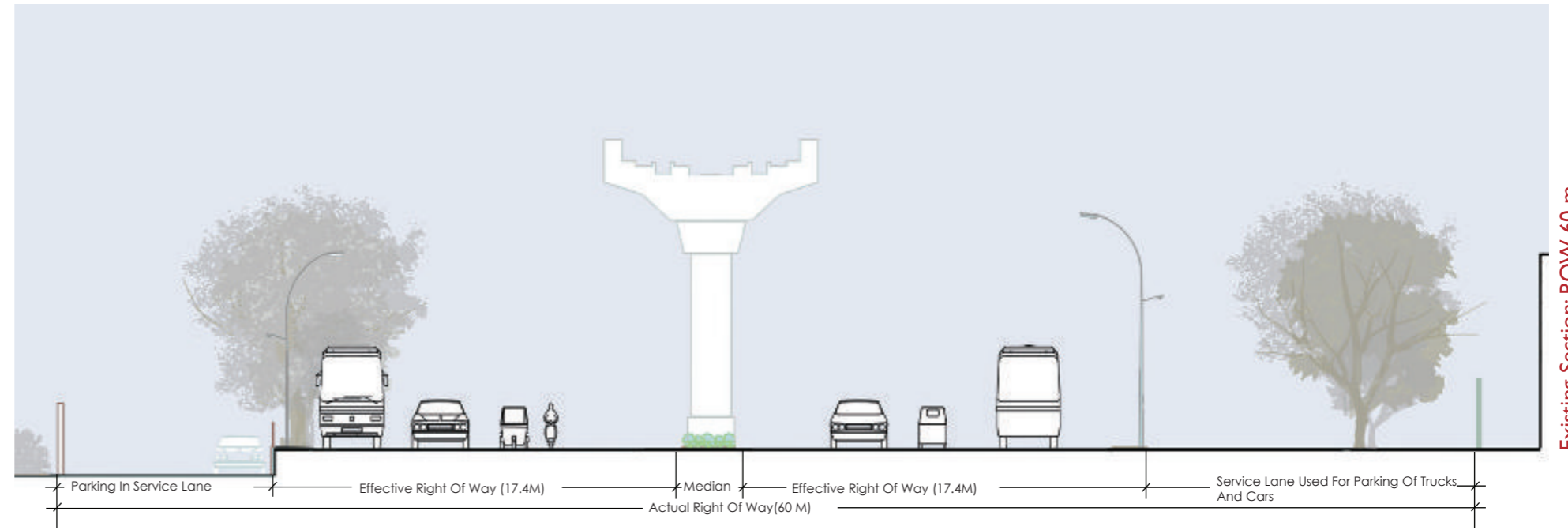
6.3.5 60 m-Wide Street



Key Map

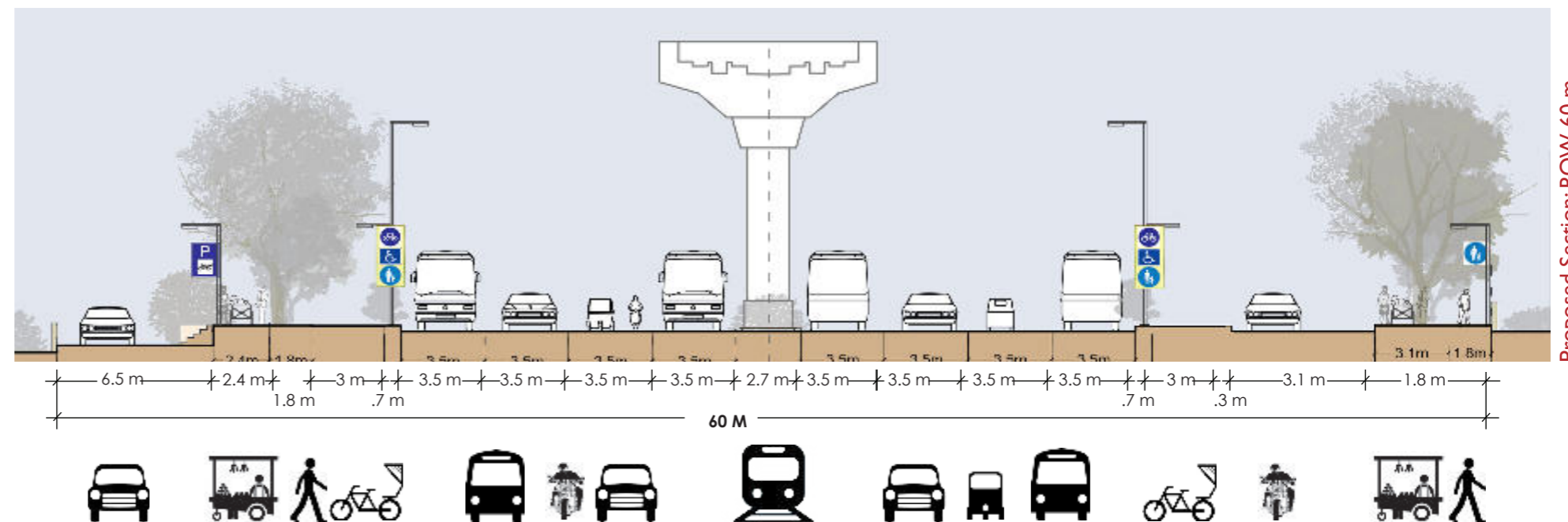


Part Detail of Service Lane



Streetscaping Features for 60 m ROW include the following:

- Designated space for hawkers so as to reduce the travel speed delays and reduce the congestion on road.
- Designated parking space for three-wheelers and rickshaws.
- Separate cycle and pedestrian lane.
- Street furniture along with the pedestrian pathways.
- Planting beds and trees with tree grating along pedestrian pathways.
- Demarcation of non-motorized and motorized vehicles.
- Tactile flooring/paving on pedestrian pathways for easy movement of the visually impaired.
- Proper signage on both the edges of the road.
- Green belt under Metro line.
- Green belt along the pedestrian and cycle tracks.
- Streetlights on both sides of the road.



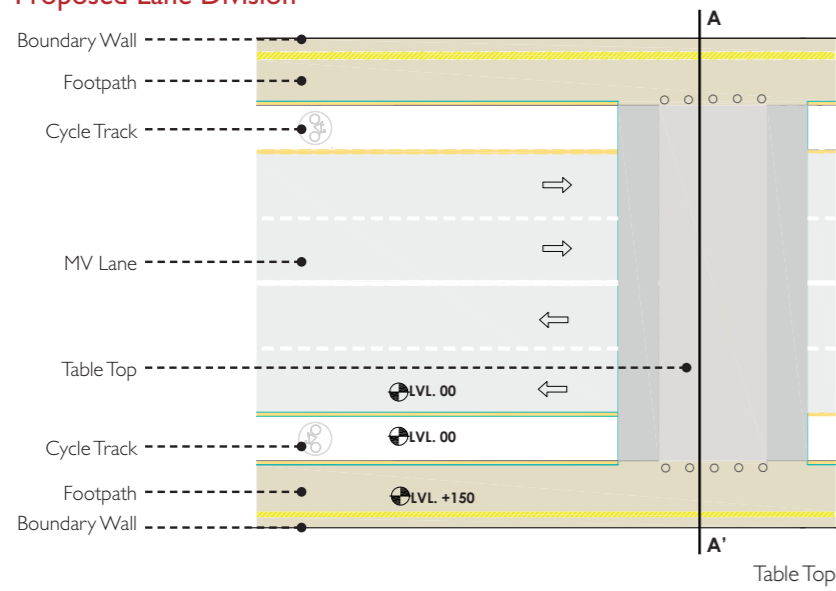
Three Dimensional Views of 60 m-wide street



6.3.6 Details

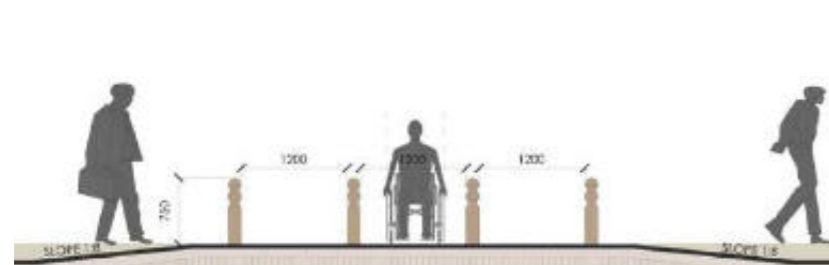
The details applicable in the streetscaping of the ward are depicted below:

Proposed Lane Division



Tactile paving on footpath
(Source: UTTIPEC Streetscaping Guidelines 2010)

Table Top

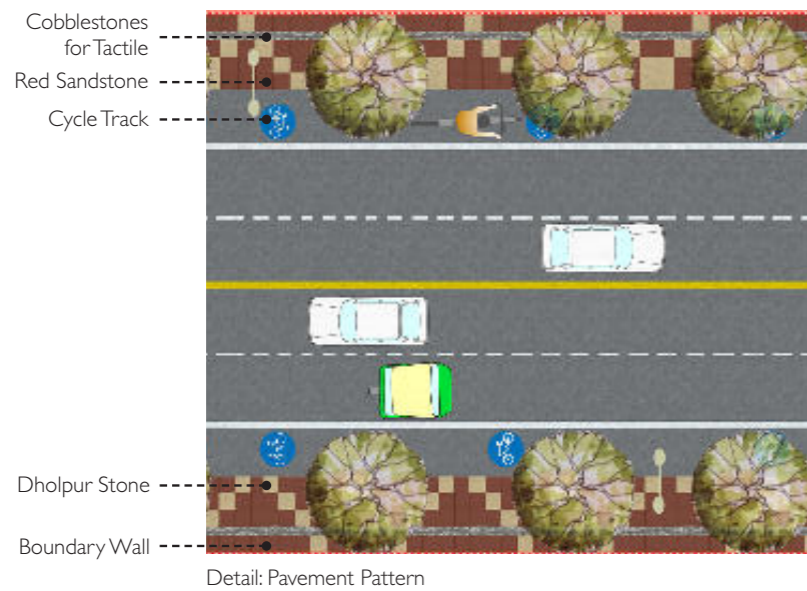


Section: Table Top
(Source: UTTIPEC Streetscaping Guidelines 2010)



Table Top
(Source: UTTIPEC Streetscaping Guidelines 2010)

Pavement Materials



Consideration has also been given to materials to be used on the pavement.

The pavement pattern will be a combination of red sandstone and Dholpur stone. A tactile path has been designed for assisting the visually impaired. The same will be made of cobblestones. The kerb stone will be in red sandstone. The pavement pattern detail is depicted in the image on the left.

Street Elements



Streetlight
Street Furniture
Bollards
Entry Ramp
Kerb Stone

Street Furniture & Pavement



Detail of street furniture



Detail of footpath

Junction Detail



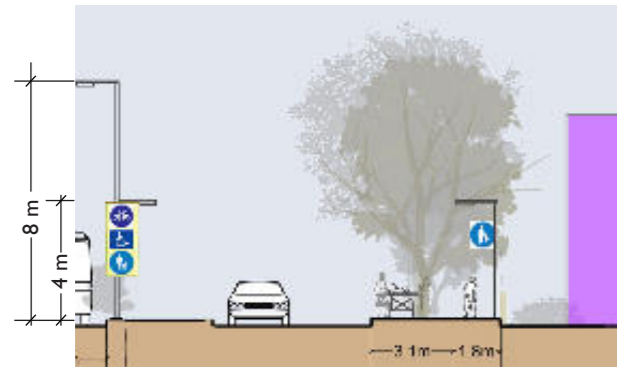
Plan



View

Signage and Streetlighting

a Designated hawker zones must be located in areas where pedestrians tend to wait or congregate, i.e. street intersections and near bus stops or major civic destinations, public offices, etc.



Section



b Public toilets should be located near every alternate bus stop and definitely at each Rapid Transit station (Metro/BRT). The location of toilets should be after every 500-800 m (approximately).

c Bus stops with route maps must be universally accessible, and located at every 800-1000 m (approximately). Auto and cycle-rickshaw stands and raised table top

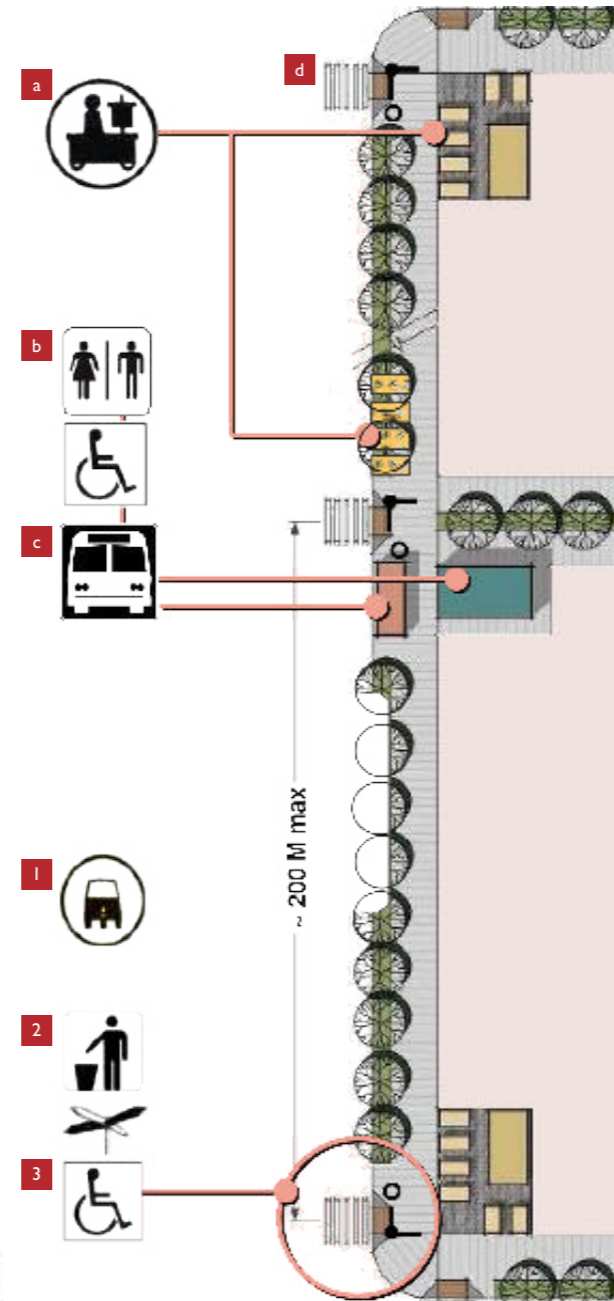
d Crossings should be at all mid-blocks or T-junctions, in absence of a full traffic signal.

At every intersection a set of 3 signages must be provided for pedestrian way finding:

- 1** Auto-rickshaw stand
- 2** Public amenities and street directional signage
- 3** Universal accessibility features



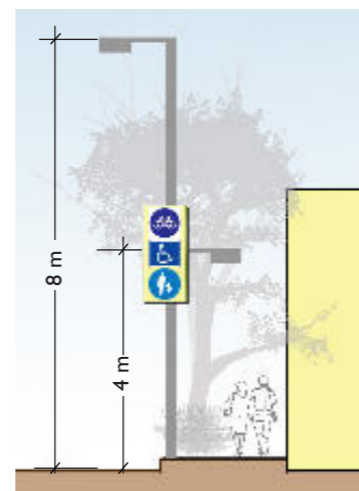
Mandatory Signages, (Source: UTIPEC Streetscaping guidelines, 2009)



Existing



Proposed



Streetlight in section

Common Utility Duct



View of fully accessible CUD (Source: UTIPEC Streetscaping guidelines, 2009)

Common Utility Ducts (CUD) are being proposed for the ward. These are tunnels designed to carry all services such as electric and communication cables, water supply and irrigation lines, firefighting services, water sewers, etc. The idea is to remove the ugly eyesores that dot the area and also to put an end to the need for digging up roads to lay down new cables and pipes, etc.

Landscaping on Streets



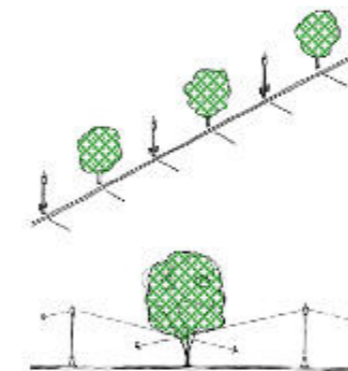
Kachnar

Arjun

Tesu

Imli

Kusum



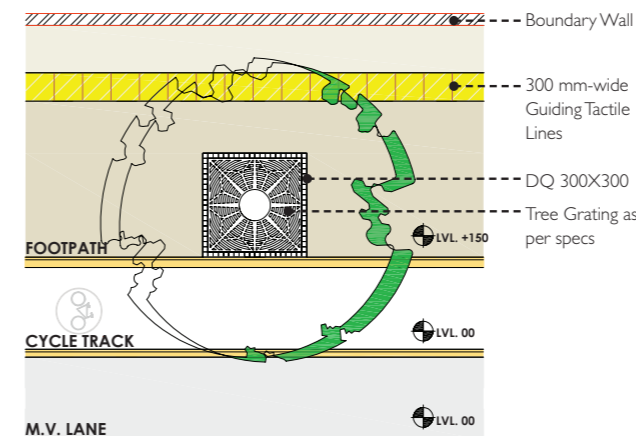
Tree & Street Light Spacing, (Source: UTIPEC Streetscaping guidelines, 2009)

The location of trees and streetlights have been designed in conjunction so that the tree canopies do not obstruct light.

Whenever applicable, narrow "columnar" trees will be used in case of limited pavement space. Trees should be "pruned bottom up" regularly to allow vision clearance. Deciduous trees will be used to allow access of sunlight to streets in winter.

New and additional trees will only be of native species in order to minimize irrigation requirements and for prolonged tree life.

Trees and plants like Eucalyptus, Australian Acacia, Lantana, Lucena, Mast (false Ashoka) should be avoided. Avenue and accent trees like Arjun, Kusum, Imli, Chikrassy, Mahua, Kachnar, Barna, Tesu, Tota, etc. should be planted.



Precast cement concrete tree grate



Precast cement concrete tree grate (Source: UTIPEC Streetscaping guidelines, 2009)

6.4 Slum Rehabilitation

6.4.1 Socioeconomic Status of Slum Dwellers

There are four slums in Punjabi Bagh namely Laxmi Camp (552 sq m), Mahatma Gandhi Camp (6920 sq m), Rajiv Gandhi Camp (5552 sq m), Din Dayal Camp (6419 sq m). The socioeconomic status of the slum dwellers has been presented below:

Demography:

- Total Population: 6750
- Total number of houses: 1500

Socioeconomic Condition

- Status of houses: **Jhuggi/Jhopari**
- Size of dwelling units: **10x10 sq ft**
- Profile of residents: **Economically weaker section**
- Occupation: **Labourers, small business, household help, drivers, hawkers, etc.**
- Average income of a household: **Rs6000 to Rs9000**
- Vehicles owned: **Cycle, 2-wheeler, 4-wheeler**

Physical Infrastructure

- Status of streets: **Kacha as well as pucca streets**
- Average width of streets: **2 m to 4 m**
- Condition of streets: **Unsatisfactory**

Water supply

- Source of water supply: **Delhi Jal Board lines & boring water**
- Quantity of water supply: **Unsatisfactory**
- Timing of water supply: **6-9am & 6-10pm**
- Quality of water: **Unsatisfactory**

Drainage

- Type of drainage: **Uncovered**
- Condition of drainage: **Unsatisfactory**
- Maintenance: **NGO**

Sewerage

- Type of sewerage: **Covered**
- Condition of sewerage: **Unsatisfactory**
- Maintenance: **NGO**

Solid-waste Management (SWM)

- Condition of SWM: **Satisfactory**
- Maintenance: **None**
- Availability of dhalao: **None**
- Status of dustbins: **Below unsatisfactory**

Social Infrastructure

- Condition of electricity: **Unsatisfactory**
- Power cut: **4 to 6 hours in summer**

Electricity

- Health infrastructure: **NGO**
- Educational infrastructure: **Anganwadi**
- Community infrastructure shopping: **Not available**
- Shopping: **Madipur (1.5 kms from slums)/Moti Nagar (4 kms from slums)**

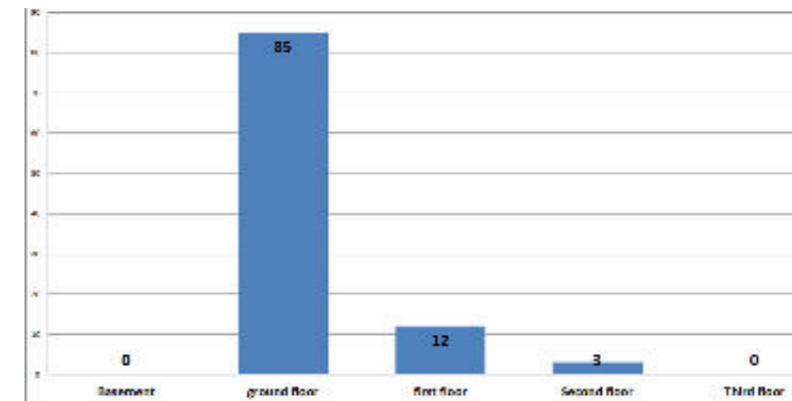
* Above data is based on information provided by Slum Pradhan in an informal interview conducted by DUAC Consultants in September 2013



6.4.2 Issues



Location of Slums



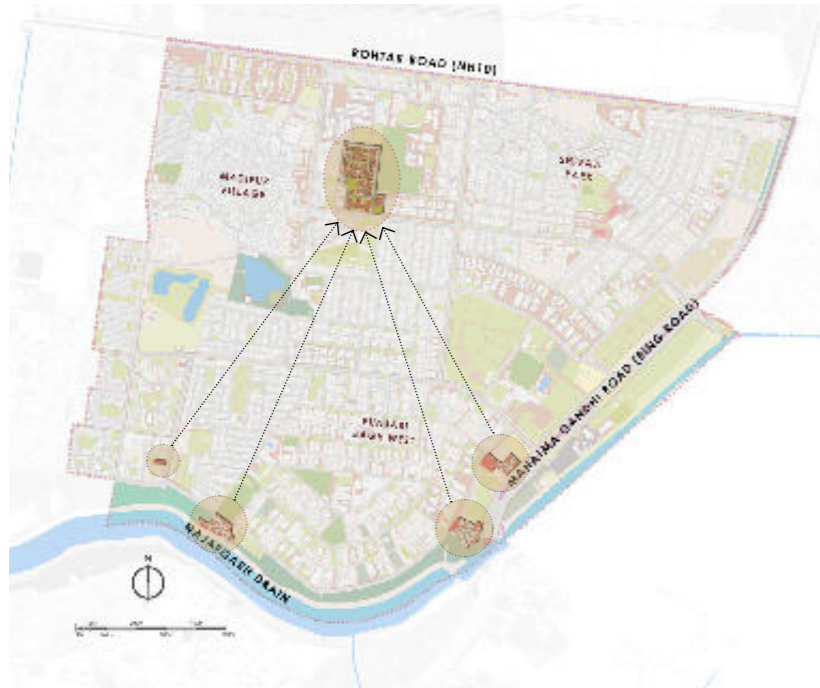
Building heights in slums



- Total area of four slums is 1.96 ha.
- Slums are located along the Najafgarh Nullah.
- Total number of dwelling units: 1500.
- Total population: 6750.
- They lack basic amenities like water supply, sewage disposal, solid-waste collection system and proper drainage system.
- 85% of the structures in the slums have construction up to ground floor.
- Only 12% of the structures have a height of G+1.
- The structures are of semi-pucca nature.
- Basti Vikas Kendras located in MG Camp and Rajiv Gandhi Camp, which should be open for slum dwellers, are mostly closed.
- There is no clinic or medical centre in and around the slums in case of emergency.
- There is an absence of any community/open space within the slum.
- There is no planned commercial shopping complex in the immediate vicinity.

Condition of slums

6.4.3 Site for Slum Rehabilitation Scheme



Proposed Location for Slum Rehabilitation

As the slums are located along the Najafgarh Nullah, in-situ redevelopment is not possible as the nullah can flood. A site within the ward has been identified by the Ward Councillor for rehabilitation of slum dwellers.

As per development norms, a mixed-use/commercial component up to 10% of permissible FAR will be provided in the residential portion of the land; a senior secondary school of 2000 sq m (per 10000) population will also be accommodated in the ward.

The following facilities will be clubbed in a composite facility centre (500-1000 sq m):

- (i) Multi-purpose community hall – 100 sq m
- (ii) Basti Vikas Kendra – 100 sq m
- (iii) Religious site – 100 sq m
- (iv) Police Post – 100 sq m
- (v) Health Centre – 100 sq m
- (vi) Park/Shishu Vatika – 200 sq m



Proposed Location of Slum Rehabilitation



Site for slum rehabilitation



Entry to site



Proposed Site

6.4.4 Development Details

The Shelter Policy of Master Plan of Delhi 2021 stipulates the need to carefully calibrate the equation between Floor Area Ratio (FAR) and density for optimum land utilization. It has been observed that in the first two Master Plan periods, housing areas have not fully delivered the envisaged FAR, leading to underutilization of infrastructure. In general the stipulated FAR for housing is 200, but MPD 2021 also recommends enhancement of FAR by 50% in sites located in the vicinity of Metro corridors and significant road corridors. Due to the small unit size in the case of EWS housing, meeting the target FAR is usually a challenge notwithstanding the higher permissible ground coverage. This is in keeping with the felt need that EWS housing must be low-rise, i.e. 2 to 3 floors, as the connection with the ground is crucial because of the small-unit size. This leads to the question of how to have higher FAR which ensures optimization of the value of urban land and creates livable high-rise spaces for the EWS community.

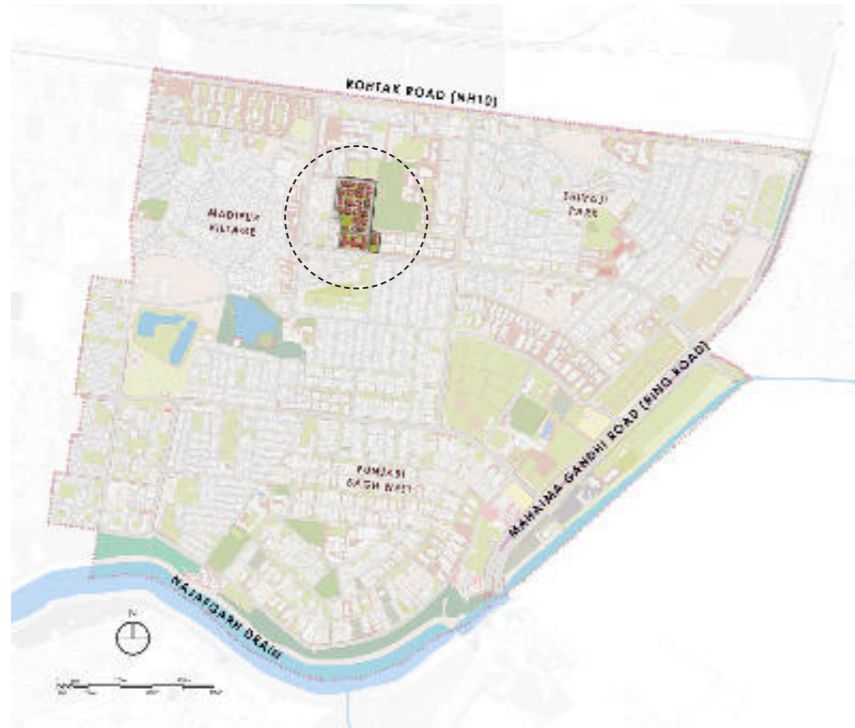
Plot Details

1	Permissible density	900 ± 10% dwelling units per hectare
2	Permissible FAR	Maximum of 400
3	Shelter size	25 – 30 sq m built-up area
4	Ground Coverage	No limit but setbacks shall be maintained.
5	Parking Norm	No norms available for parking

Shelter Details

1 Heights		
1.1	Building height	Maximum of 15 m for low-rise development with staircase; lifts to be provided for buildings beyond 15 m.
1.2	Habitable room	Minimum of 2.6 m
1.3	Kitchen	Minimum of 2.6 m
1.4	Bath/WC or combined	Minimum of 2.1 m
1.5	Corridor	Minimum of 2.1 m
1.6	Staircase	Minimum of 2.1 m
2 Room Size		
2.1	Habitable room	A minimum of 12.5 sq m in a one-room shelter unit
		Where there are 2 rooms, the first room shall be a minimum of 9.5 sq m (minimum side 2.5 m) and the second a minimum of 6.5 sq m (minimum side 2.1 m)
2.2	Kitchen	Minimum area of 3.3 sq m with minimum side of 1.5 m
2.3	Water closet	Minimum area of 0.9 sq m with minimum side of 0.9 m
2.4	Bath	Minimum area of 1.2 sq m with minimum side of 1.0 m
2.5	Combined bath and WC	Minimum area of 1.8 sq m with minimum side of 1.0 m
2.6	Balcony	Minimum of 0.9 m width to a maximum of 1.2 m width and not to overhang on roads
3 Staircase		
3.1	Flight width	Minimum of 0.9 m for 3 storeys and above
3.2	Riser	Maximum of 200 mm
3.3	Tread	Minimum of 250 mm

6.4.3 Slum Rehabilitation Scheme



Key Plan

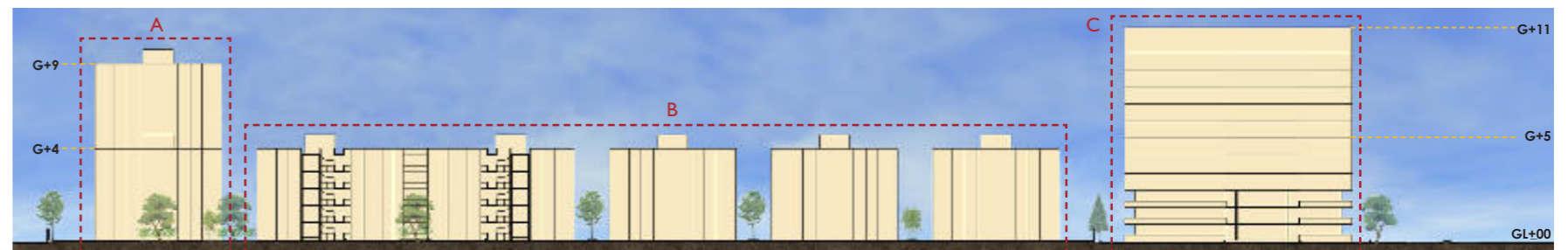
This predominantly low-rise high density scheme for 1200 dwelling units is designed as low cost, affordable housing for the slum dwellers of Punjabi Bagh. It segregates pedestrian and vehicular movement and provides interlinked green spaces of varying scales for recreational purposes.

- A: High-rise** high density residential blocks are placed only at two corners to meet the requirement of 1200 dwelling units.
- B: Low-rise** high density residential blocks
- C: Mixed-use Block** is located between the existing development and the proposed scheme so that it can be used by both. It has a commercial component (lower 6 floors) as well as a residential component (upper 6 floors). The latter includes 2 and 3 BHK apartments. This block has been provided as an incentive for the developer of the slum rehabilitation scheme.
- D: Senior Secondary School**
- E: Common Facility Block** includes multipurpose community hall, Basti Vikas Kendra, religious site, police post, health centre, park/Shishu Vatika, etc.

1	Total number of EWS units	1202 units (as per requirement)
2	Total site area	2.88 ha
3	Floor area ratio	227
4	Ground coverage	38.06%
5	Parking	2 underground multilevel parking spaces
6	Amenities on-site	Affordable housing for all, services, green areas, commercial, common facilities as per MPD 2021



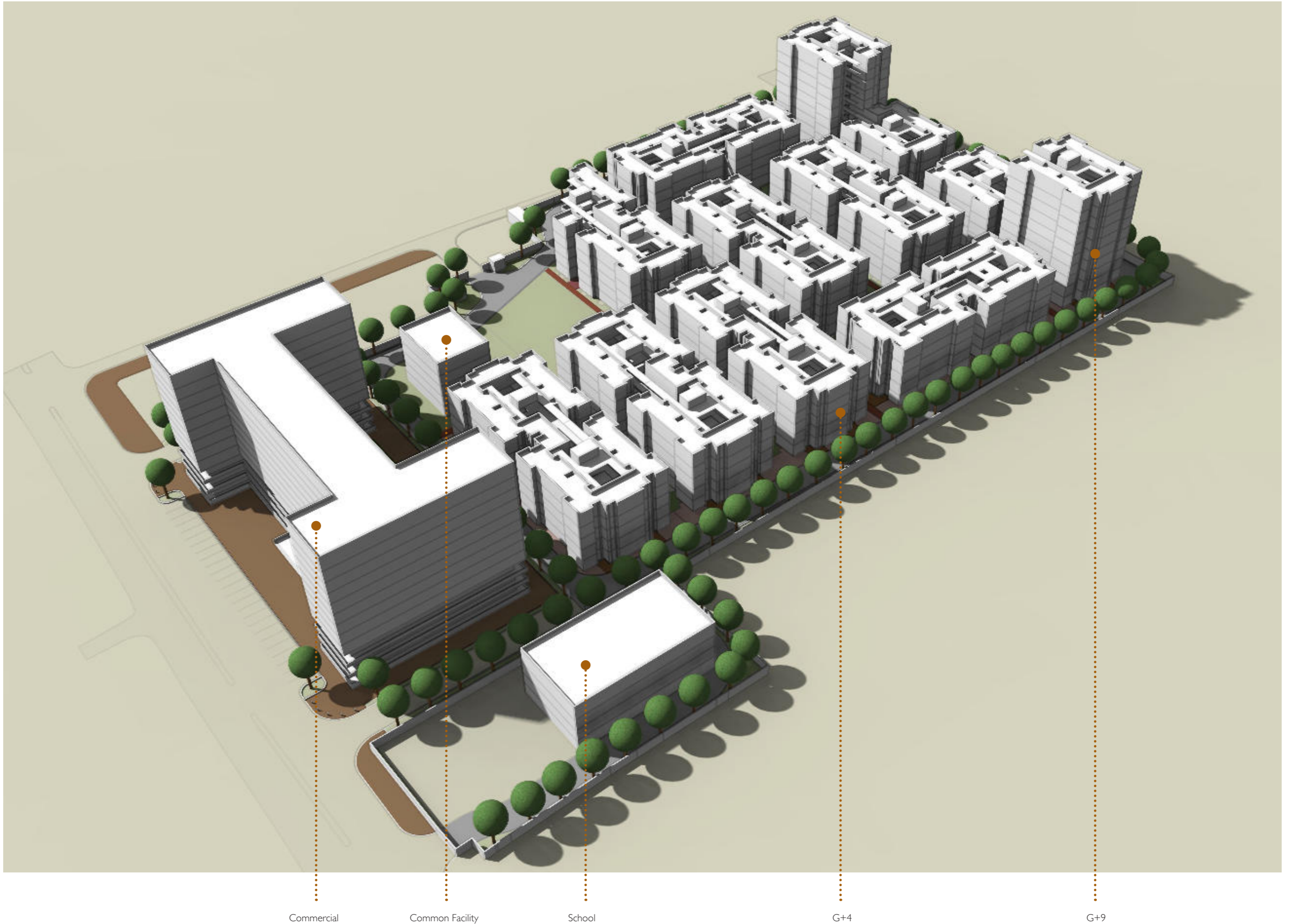
Proposed Site Plan



Proposed Section



Proposed Building Use Section





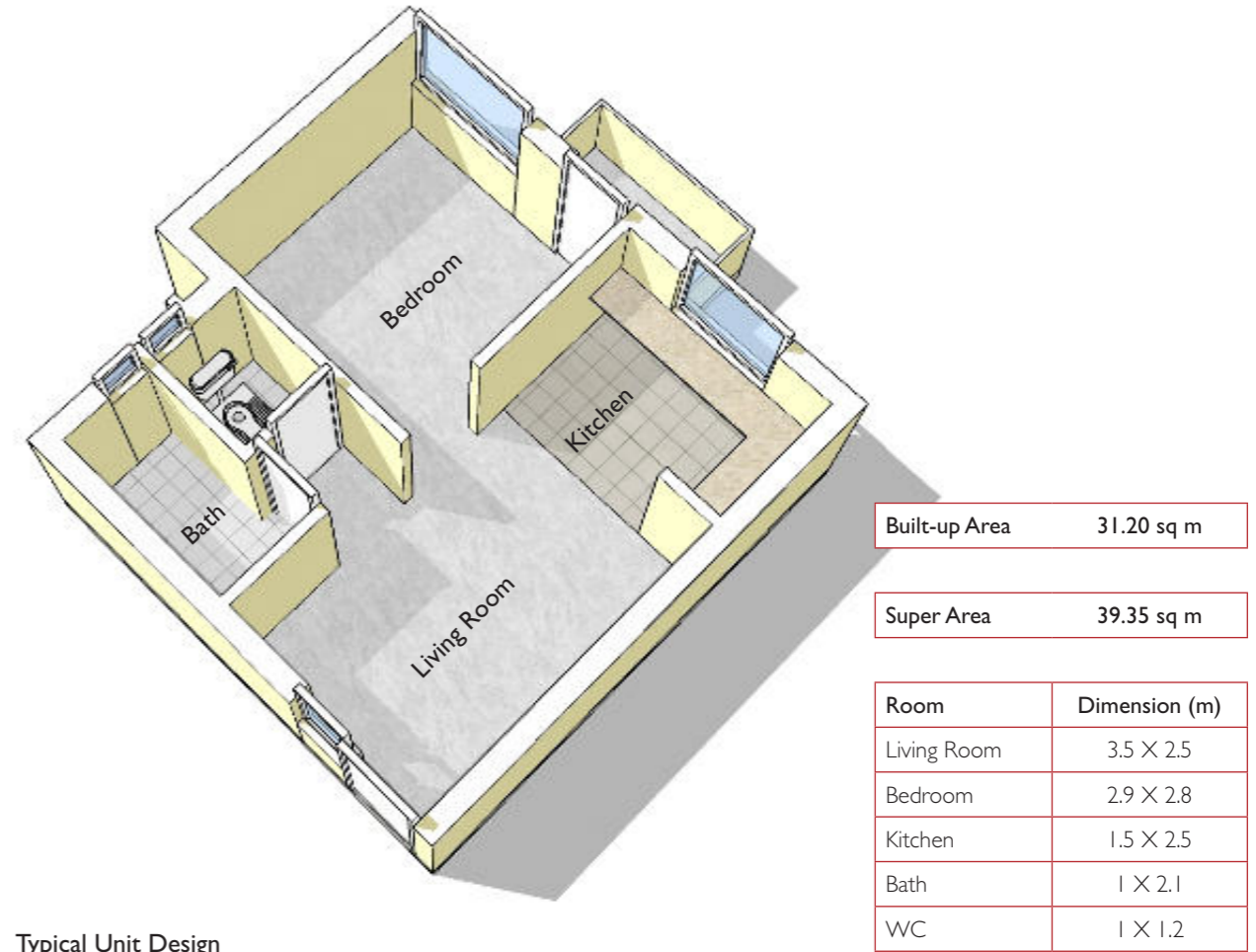
View 1: Internal Green Spaces



View 2: Pathway

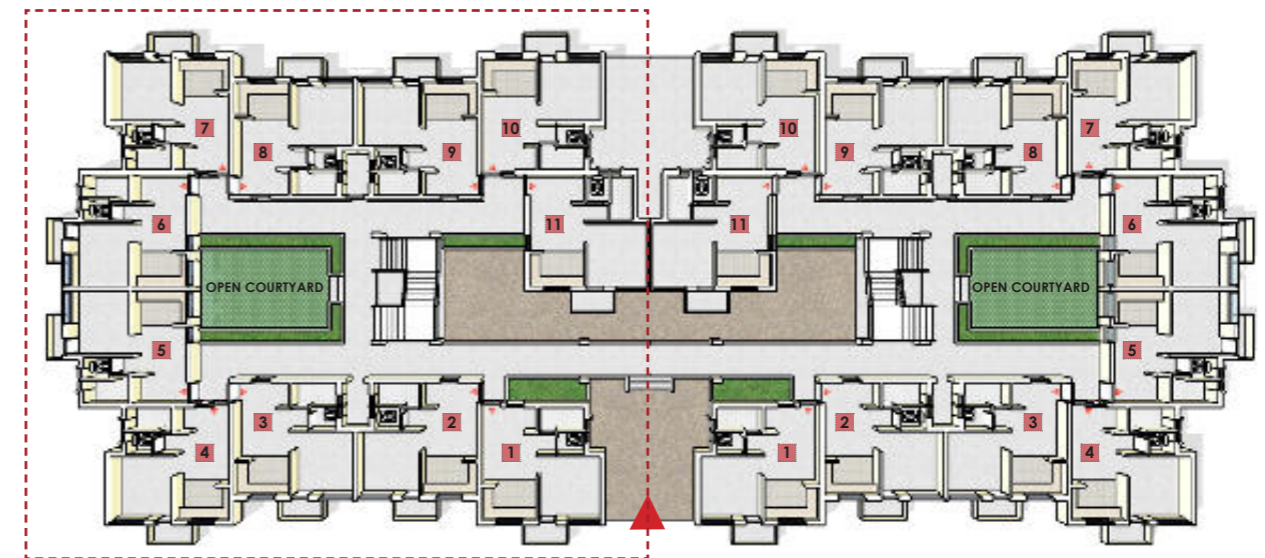
6.4.3 Typical Cluster and Unit Details

The built-up area of a typical dwelling unit in this slum rehabilitation scheme is 31.20 sq m while the super area is 39.35 sq m. The unit comprises a living room, kitchen, bedroom, bathroom and a separate WC. The bedroom has an attached balcony. Each unit is well lit and naturally ventilated.



Typical Unit Design

The compact cluster design includes 11 dwelling units, an open courtyard with peripheral planters and a connection to the next cluster of 11 dwelling units.



Typical Cluster Design

6.5 Transformation/Rejuvenation of Greens

There are a total of 75 parks in Ward 103. One of the present development initiatives of the ward is to transform the existing greens and to treat the horticulture waste within the greens so that compost produced from the treatment process can be used for landscaping within the ward.



Location of Herbal Garden

A strategy has been worked out for transformation of existing greens in Ward 103. The process involves the residents of the ward as they are the actual users of these green areas. As part of the transformation process, a list of all parks in the ward was prepared. Each park had to be rated based on its appearance, cleanliness and security. The residents were encouraged to rate them as per the score card shown below:

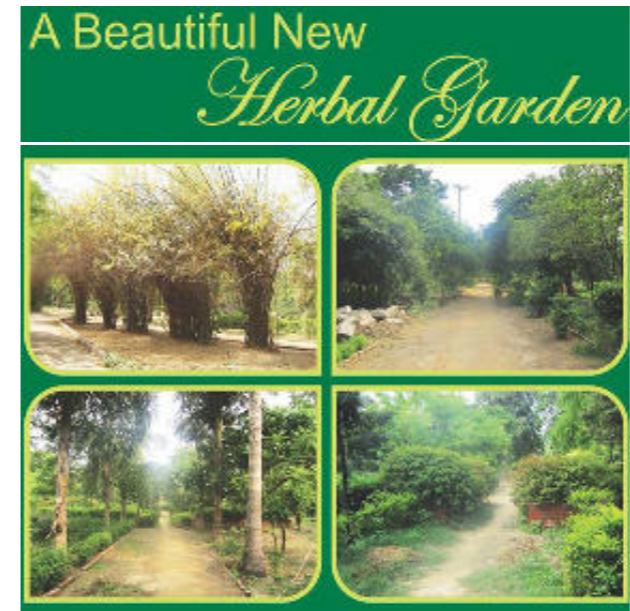
Name of the Park	Category	Score
Traffic Training Park	Ornamental	1.5
Herbal Garden	Herbal	2

Example of Park Score

Score is based on the following:

- 5 - Park is world class
- 4 - Park is nice
- 3 - Park is acceptable but needs work to make it nice
- 2 - Park is not a dump but needs major improvement
- 1 - Park is a dump

The weighted average of all park scores reflects the park score of the ward. Each park would then be put up for adoption, so that the maintenance is also taken care of by the adopting committee.



Existing development initiative:
Herbal Garden transformation project

Herbal Garden

The Herbal Garden is one of the largest green areas in the ward. It was thus selected by the residents to be the pilot project for the transformation of green areas in the ward.

The garden has been adopted by the Gurudwara Samiti. Studio EN, a landscape architecture firm, is redesigning it and a local nursery has been given the contract for plantation.



Lotus pond at Herbal Garden

Horticulture Waste

Composting pits are to be provided in all parks so that horticulture waste can be taken care of within the park. As each park will be maintained by the adopting committee, the above can be easily implemented (which is presently an issue).

However, it is recommended that Biogas plants should be provided instead of composting pits as the electricity produced can be utilized in garden lighting. Compost is a byproduct in this process.



Herbal Garden transformation: work in progress



Composting pits



Biogas plant

6.6 Rejuvenation of Lakes

6.6.1 Issues



Area of Jambori Lake = 1.24 ha
 Area of Jambori Lake along with park = 2.85 ha

Area of Bhagwati Lake = 1.23 ha
 Area of Bhagwati Lake along with park = 3.4 ha

Location of Lakes



Bhagwati Lake



Jambori Lake



February' 2014

Bhagwati Lake is a natural lake whereas Jambori Lake is a man-made lake (developed by DDA). Both lakes have ghats along their periphery which are used for religious purposes during festive occasions. The area along the lakes is used for recreational purposes. There are proper jogging tracks, garden furniture, swings, etc. along both lakes. Although the area around the lake is maintained, the lakes are very dirty and unkept. Most occupants of the ward, except the residents of Madipur Village, are unaware of the existence of these water bodies in their ward.

Groundwater is pumped to fill both these lakes. Bhagwati Lake is filled throughout the year whereas Jambori Lake is filled only for two months – October and November, during Chhath Puja. For the lakes to become usable for the ward occupants as well as for tourists, they need a proper cleaning and maintenance plan.



Land Use



Figure Ground Relationship



Transportation



Water and Stormwater pipelines



Section AA'

6.6.2 Methodology for Rejuvenation of Lakes

Lake ecosystems are very important life-savers for Urban Regions as they:

1. Recharge groundwater
2. Filter water
3. Aesthetically pleasing
4. Recreational activities
5. Prevent floods
6. Sediment retention
7. Religious and cultural significance
8. Stabilizes climate, rich in resources like water, fish, and aquatic flora.

Urban lakes: under constant threat:

A. Degradation of quality

1. Undertreated sewage discharge
2. Solid-waste disposal
3. Eutrophication
4. Floating vegetation

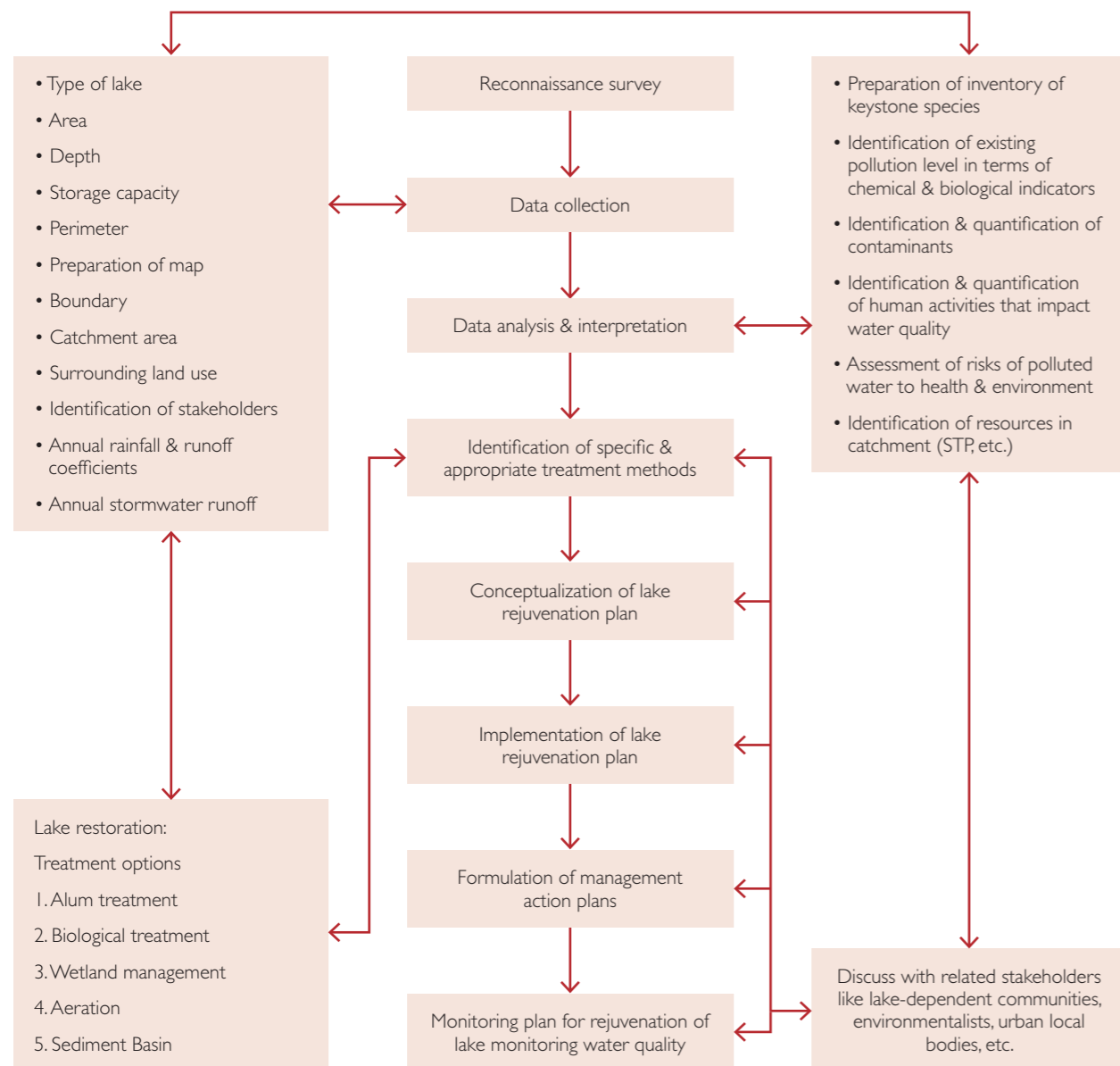
B. Degradation of quantity

1. Abstraction of water for variety of uses
2. Encroachment
3. Drainage & alternate land use
4. Silt influx from degradation of catchment area.

Prevent:

- Municipal and/or industrial effluent disposal
- Solid-waste disposal
- Idol immersion
- Encroachments
- Over-exploitation of resources like fish, water
- Catchment area degradation
- Slope instability

The following flow chart represents the complete process for lake rejuvenation starting from initial data collection, treatment options to maintenance plan.



Methodology for Rejuvenation of Lakes

6.6.3 Rejuvenation of Bhagwati and Jambori Lakes



Location of Lakes

Rainwater harvesting for recharge and reuse:

- Instead of using precious groundwater to fill these lakes, stormwater can be directed into the lakes.
- As Bhagwati Lake needs to be filled throughout the year, it can be lined with a waterproofing layer. To recharge the groundwater reserve, recharging pits can also be provided.
- Jambori Lake does not need waterproof lining as the stormwater will fill the lake during the monsoon season (June-Sept) and it will not recede until spring.

Total Annual Rainfall in Delhi: 850 mm

May	40 mm
June	90 mm
July	180 mm
August	200 mm
September	130 mm

Total rainfall in monsoon months in Delhi: 640 mm

The following plan depicts the catchment zones for both lakes. It also shows the apt location for recharging pits in Bhagwati Lake.



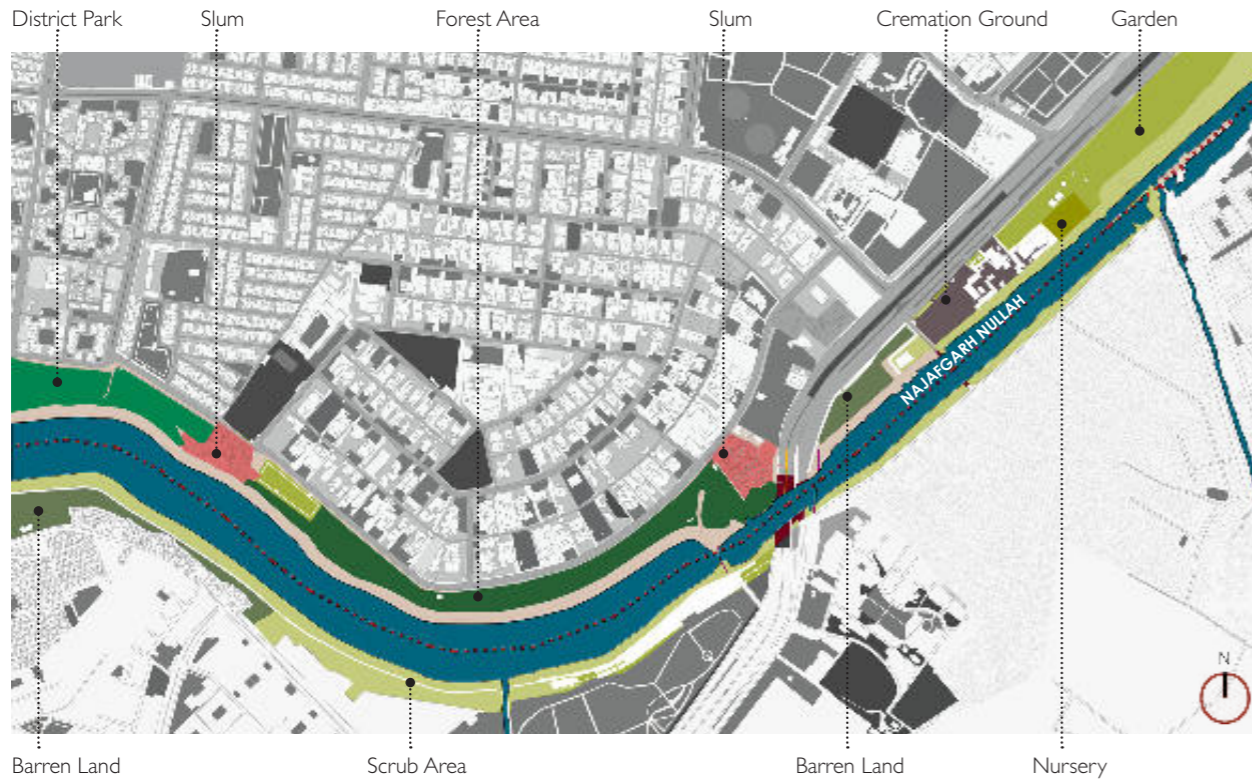
Catchment Zones for Lakes

6.7 Rejuvenation/Revitalization of Stretch along Najafgarh Nullah



Location of Stretch along Nullah

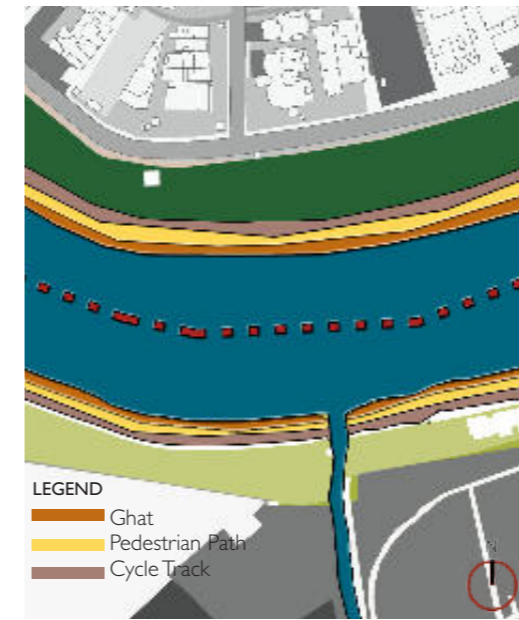
The southern edge of the ward is delineated by Najafgarh Nullah. The nullah is fenced by a high boundary wall as it is an eyesore for the area. It is dirty, unkept and a breeding ground for mosquitoes. The Public Works Department is therefore planning to construct a 26.9 km, six-lane elevated corridor over the nullah, connecting Kakrola Mor to Wazirabad over Outer Ring Road. However, this approach seems to be unsustainable, hence a proposal was prepared where the defunct area around the nullah can be transformed into an interactive public space by introducing functions like ghats, pedestrian walkways, cycle tracks, neighbourhood parks, informal shopping area, nursery, etc.



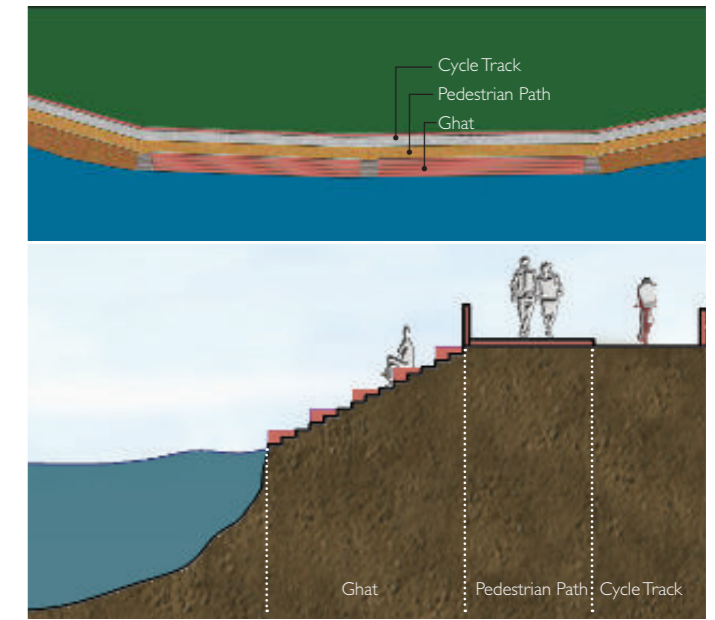
Existing conditions along Najafgarh Nullah – Plan



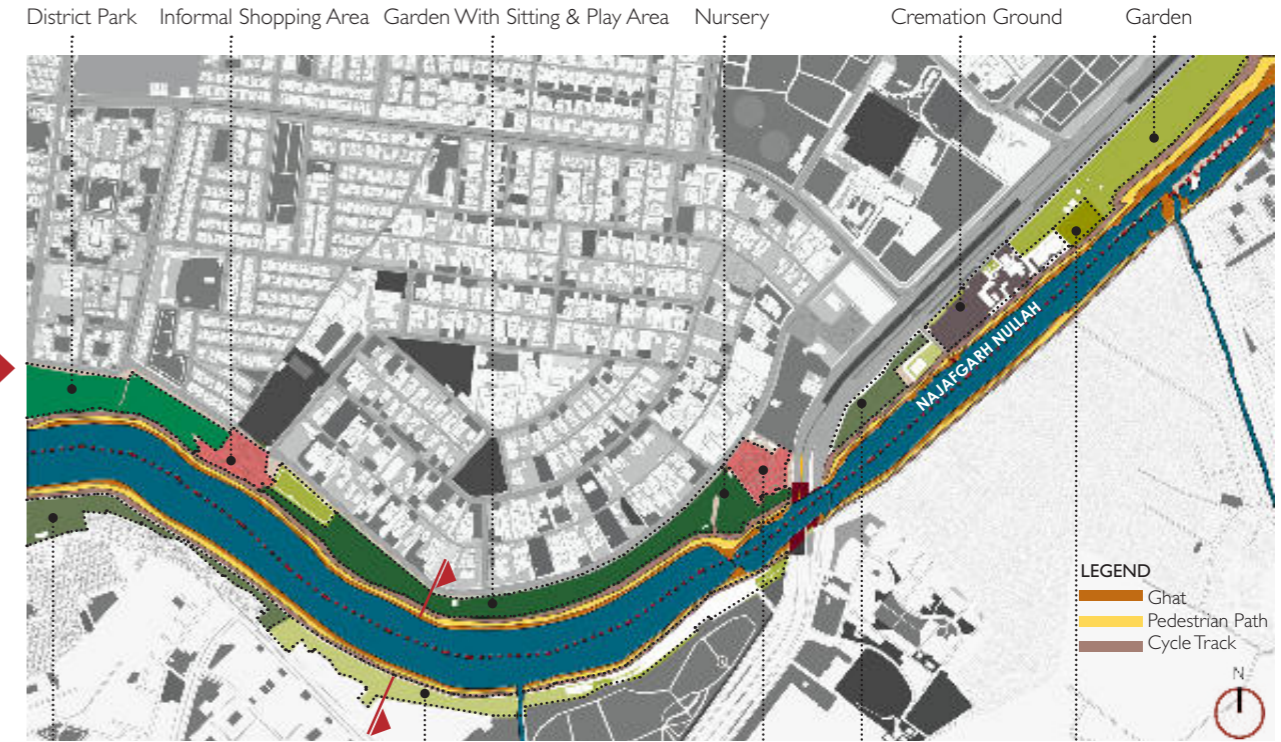
Existing conditions along Najafgarh Nullah



Detail Plan of Proposal



Detail Section



Proposal for Stretch along Nullah – Plan



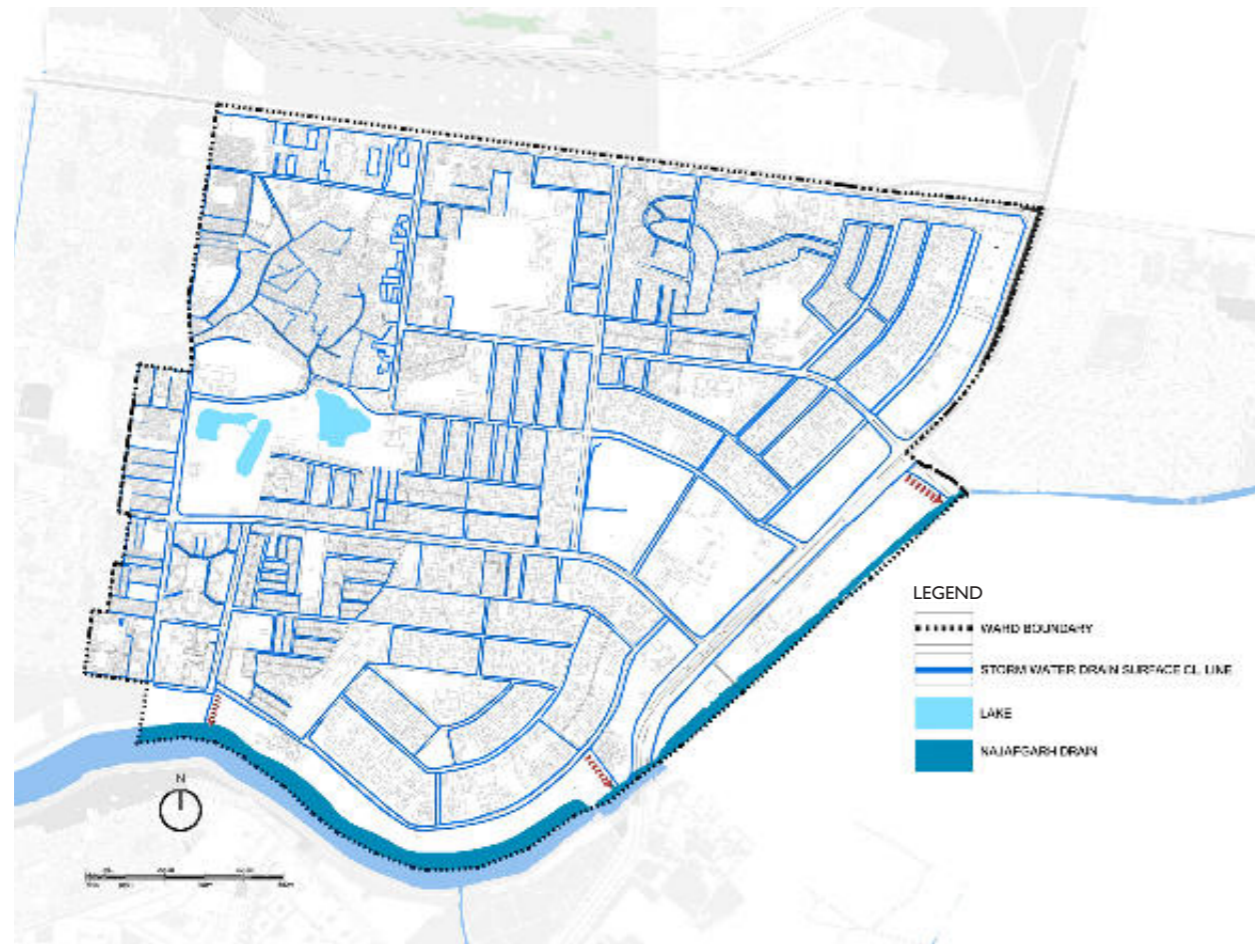
Proposal for Stretch along – Section

6.8 Stormwater Management

Thorough analysis of the stormwater management system in the ward was conducted. As part of the existing strategy, stormwater from all hard surfaces flows into the ward level stormwater drains which further connect to the city level drains.

As there are no gratings on drain inlets and de-silting chambers, silt, leaves and a lot of garbage flow directly into the stormwater drains. These drains get clogged due to garbage and silt and results in water overflowing on to streets. Cleaning these drains is a tedious process as it involves the cleaning of the whole length of the drain.

As is visible from the images below, the drains in the ward are in a very bad state. They are not being maintained and cleaned regularly. Also, as they are not cleaned before the monsoon season, there is a major problem of waterlogging on the streets which causes traffic jams and accidents. The condition of the drains can also result in health problems.



Stormwater Drains: Connection to Najafgarh Drain



Clogged stormwater drain



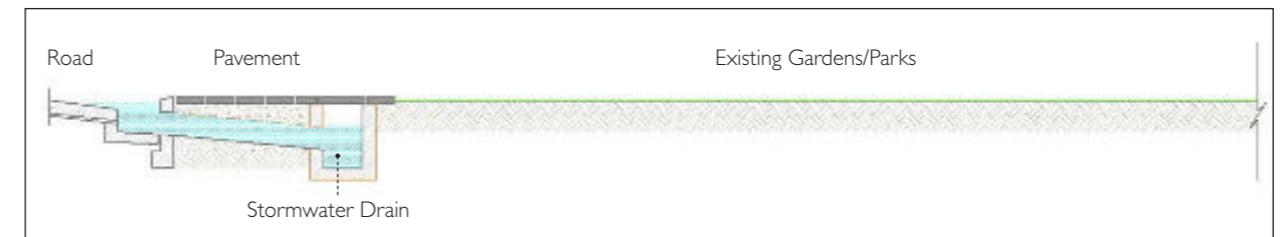
Condition of stormwater drain



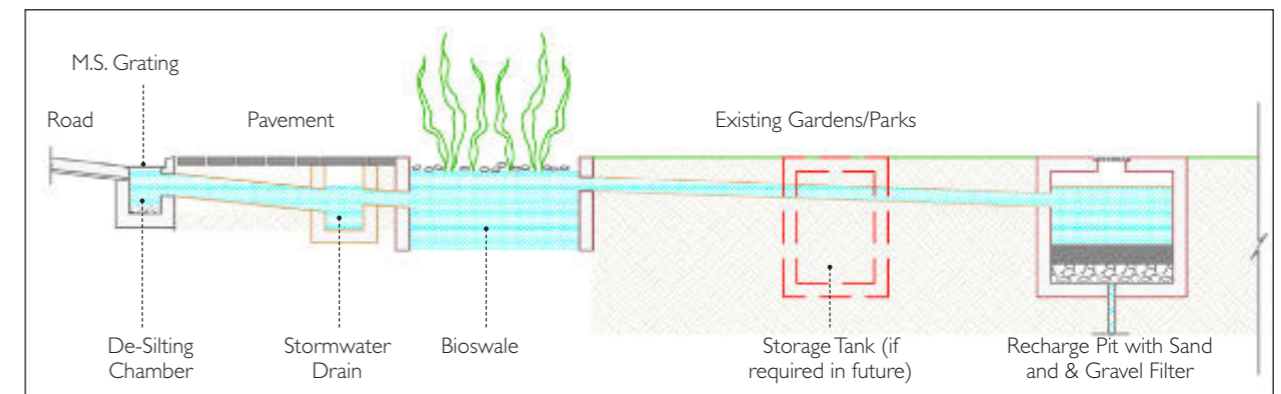
Water overflowing on to streets

Strategy for stormwater management in the ward:

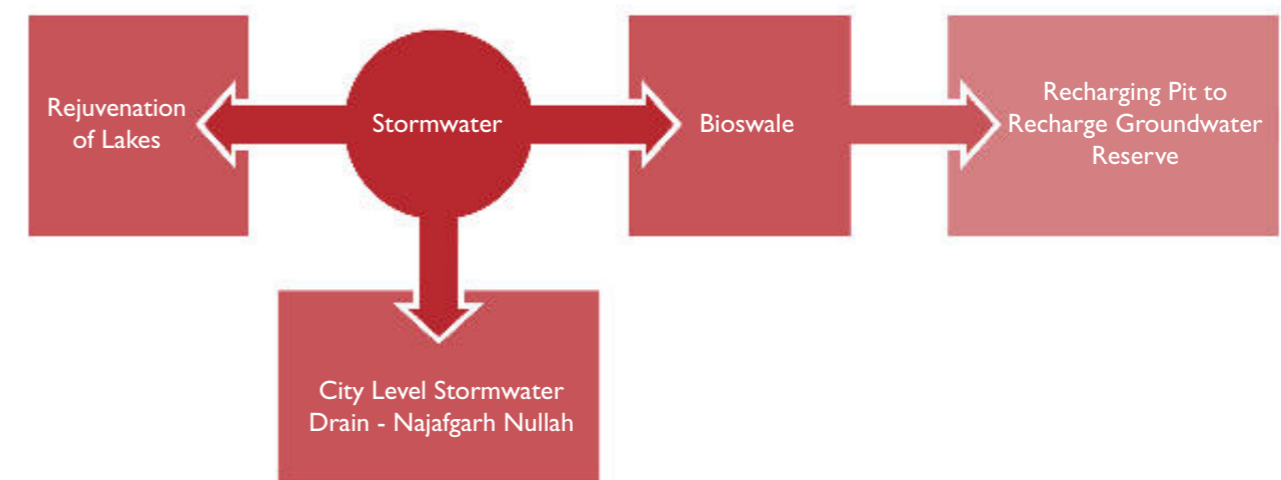
- Based on natural topography, catchment zones will have to be identified.
- The parks and green strips in the ward can have bioswales and recharging pits which will receive water from all hard paved areas in the ward.
- The stormwater will flow into the de-silting chamber with grating, where the silt settles down and can be easily cleaned regularly. As the chamber has a grating over it, the other waste like leaves, etc. will not enter the drain.
- From the stormwater drain, the water will flow into a bioswale (located in parks and green strips), where it will be retained and infiltrated.
- This water can then be recharged into the ground.
- In case of space constraints, the water from the drain can directly flow into the recharging pit.
- This would allow stormwater to be managed within each locality of a ward, thus ensuring complete stormwater management within a ward.



Existing Strategy for Stormwater Management



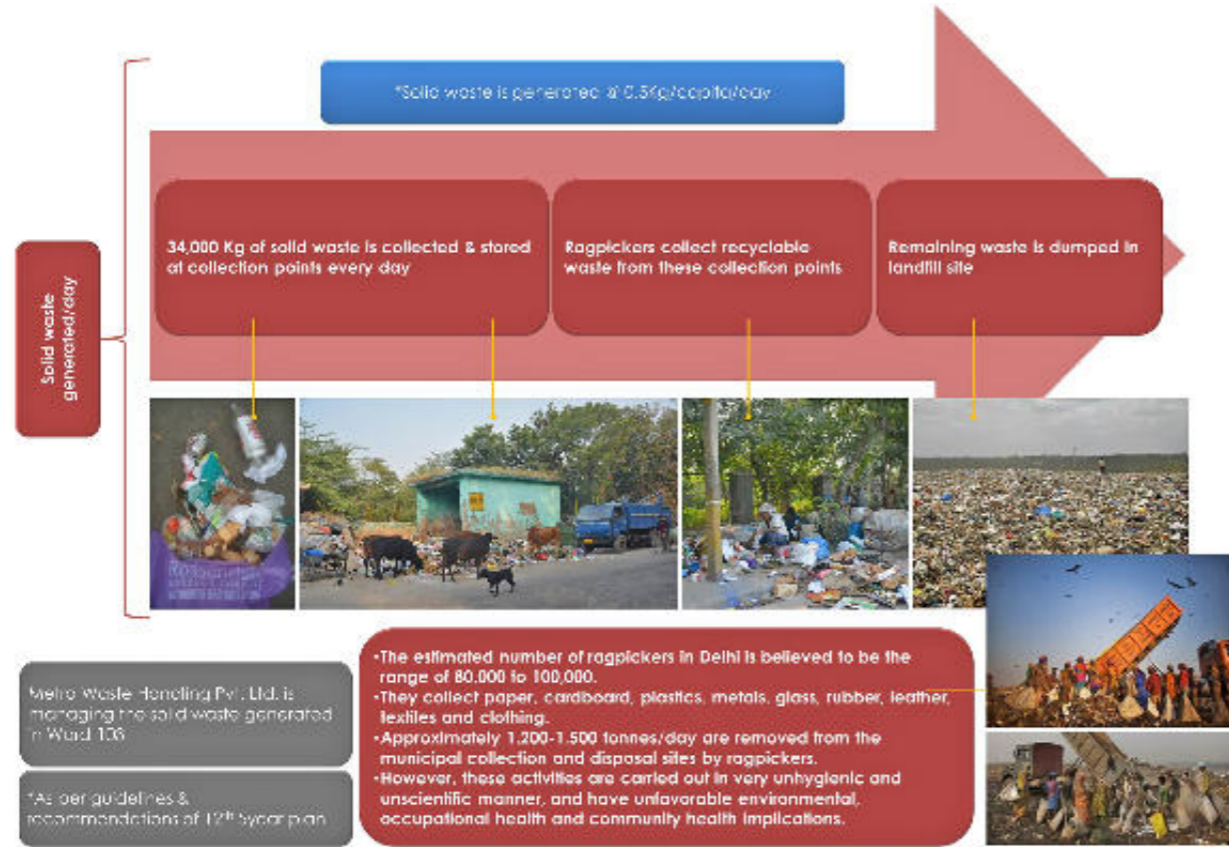
Proposed Strategy for Stormwater Management



Proposal Flow Chart

6.9 Solid-Waste Management

About 34,000 kg of solid-waste is collected from all households in Ward 103 and stored in dhalaos/dustbins. The stored waste is transferred from these collection points to a nearby landfill site. The flow-chart shown below depicts this existing strategy of solid-waste disposal in the ward.



Existing Strategy for Solid-Waste Disposal in Ward 103



Location of Bhalswa Landfill Site with respect to the ward

Condition of dhalaos in Ward 103



Proposed strategy for solid-waste disposal



Steps involved in proposed strategy for solid-waste disposal

The proposed strategy for solid-waste management will be based on the principle of 3 Rs – Reduce, Reuse, Recycle.

Solid-waste management is a step-by-step process and each step holds equal importance.

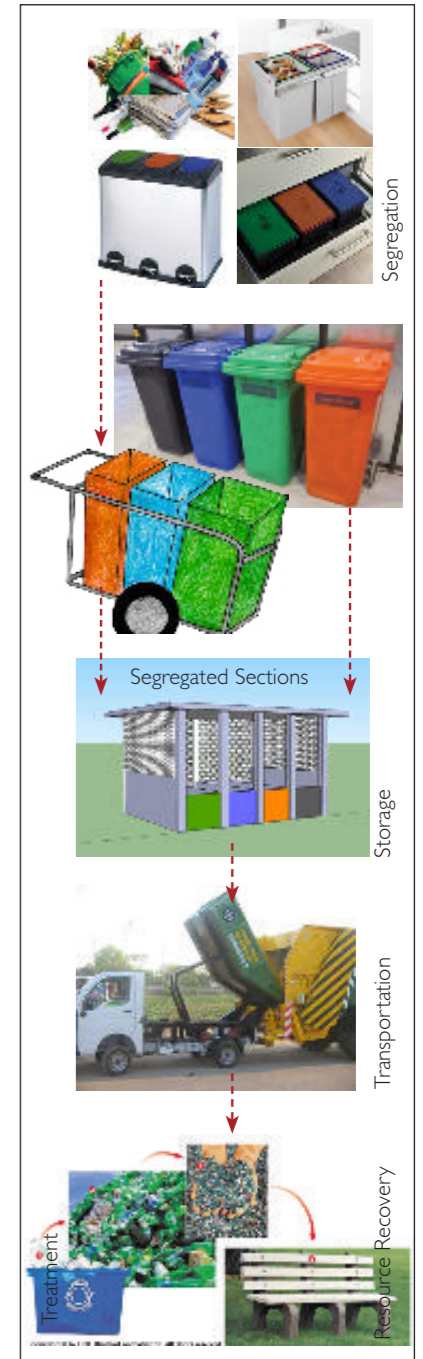
As the first step, it is essential to reduce waste generation. Various ways in which waste reduction can be achieved is depicted in the images on the right.

The next step is to segregate waste which can be achieved by keeping colour-coded segregated wastebins. Storage and collection of this waste from households should be done in segregated chambers. The waste can then be transported and treated to be reused or recycled according to its category.

The complete process from segregation to resource recovery is depicted in the image on the extreme right.



Reduce waste generation



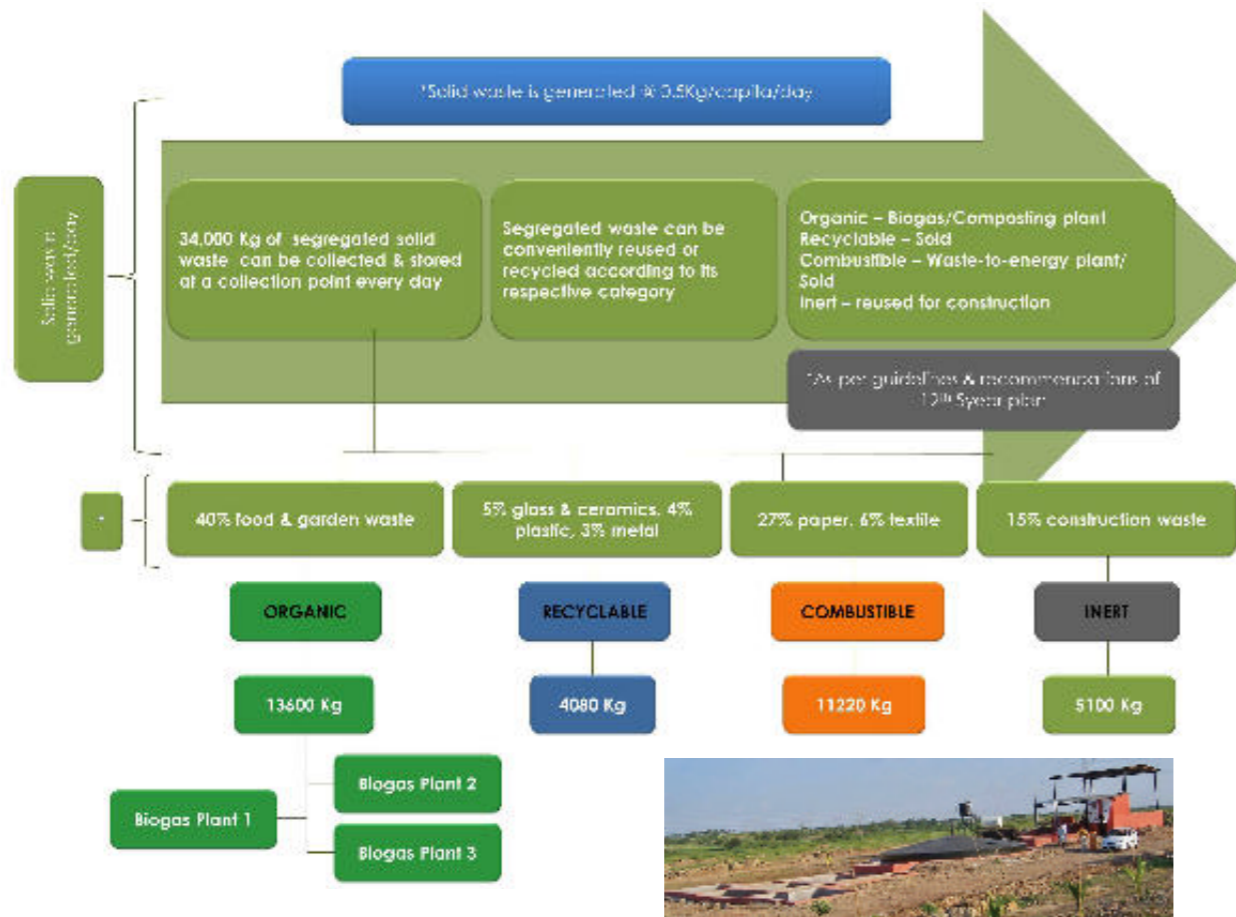
Proposed process for solid-waste disposal



Waste Category



Resource Recovery



Proposed Strategy for Solid-Waste Disposal in Ward 103

The flow chart shown above depicts the proposed strategy for solid-waste disposal in the ward. The waste will be segregated at source, collected and stored in separate chambers in the dhalao. This segregated waste can be conveniently reused or recycled according to its respective category. The recycled waste can be sold in the market, combustibles can be sent to waste-to-energy plants and the inert can be reused for construction.

For treating the organic waste generated in the ward, three biogas plants are being proposed in the ward itself. The energy generated can be used for street lighting in the ward, while compost, a byproduct, can be used for landscaping.

In Pune, five pilot biogas plants are already operational and twenty more are being implemented around the city. Each plant takes 5 TPD of organic waste and converts it to 400 M³ of biogas, i.e. 400 kwh of energy. Each plant requires 6,000 sq ft for installation.



Proposed Location of Biogas Plants

6.10 Wastewater Management

At present, all wastewater generated in the ward flows into Timarpur city level Sewage Treatment Plant (STP). It is possible that some of the wastewater generated in the ward can be treated in the ward itself and can be used for landscaping, washing roads, car washing, etc.



Sewage Treatment Plant with respect to Ward 103

Interceptors being built along Najafgarh Nullah

Interceptors being built along Najafgarh Nullah



Sewerage Lines

A treatment plant is being installed in the ward, on the green belt along the nullah, which is going to divert the treated water into the Yamuna River. It is recommended that this treated water be diverted to the ward instead of the Yamuna, to fulfill the water requirement for landscaping (gardens and parks).

Treated wastewater that can be generated from all dwelling units = 3,011,942.40 lit.
 Area of gardens, parks & playgrounds = 289,471.89 m²
 Water required for landscaping (@ 5 lit./m²/day) = 1,447,359.47 lit./day
 Adding 10% extra for other requirements = 1,592,095.42 lit./day
 For meeting the above water requirements, 53% of the wastewater needs to be treated in the ward itself.

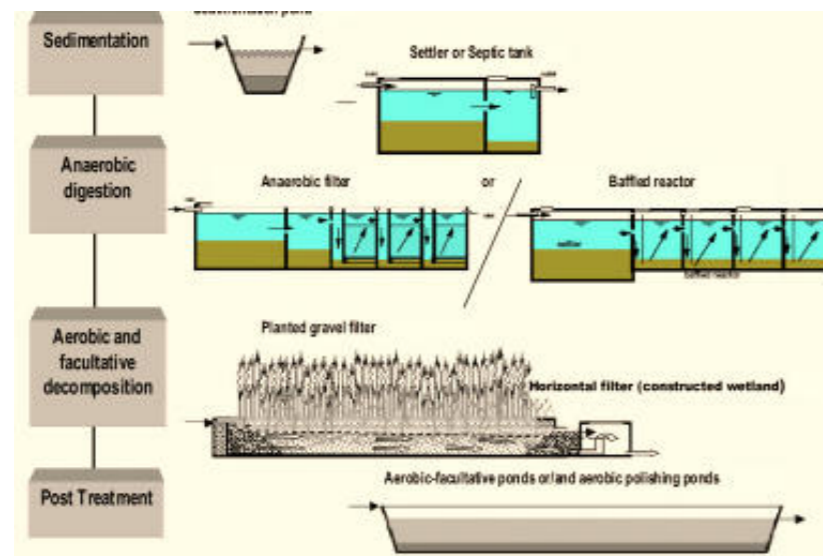
Instead of mechanically treating the wastewater of the ward, it is also possible to install five decentralized wastewater treatment systems on-site so that each of them can treat approximately 318.42 m³ of wastewater.

Area requirement for each STP (@ 7 m²/m³ of wastewater) = 2228.93 m²

These treatment plants can be located in the green areas or along the Najafgarh Nullah.



Proposed Location of DEWATS on Stretch along Nullah



Decentralized Wastewater Treatment Systems

Decentralized Wastewater Treatment Systems (DEWATS) which are self-sustainable, easy to maintain and run systems are proposed in the ward. The working of the system is as follows:

The wastewater first goes into a two-chamber settler. After the primary treatment the wastewater goes to the Anaerobic Baffled Reactor which is a nine-chambered system. Then it flows to the planted gravel filter. Finally to the polishing pond. From the polishing pond the treated wastewater can be reused for landscaping of urban greens within the ward, for flushing in public toilets and for cleaning roads.

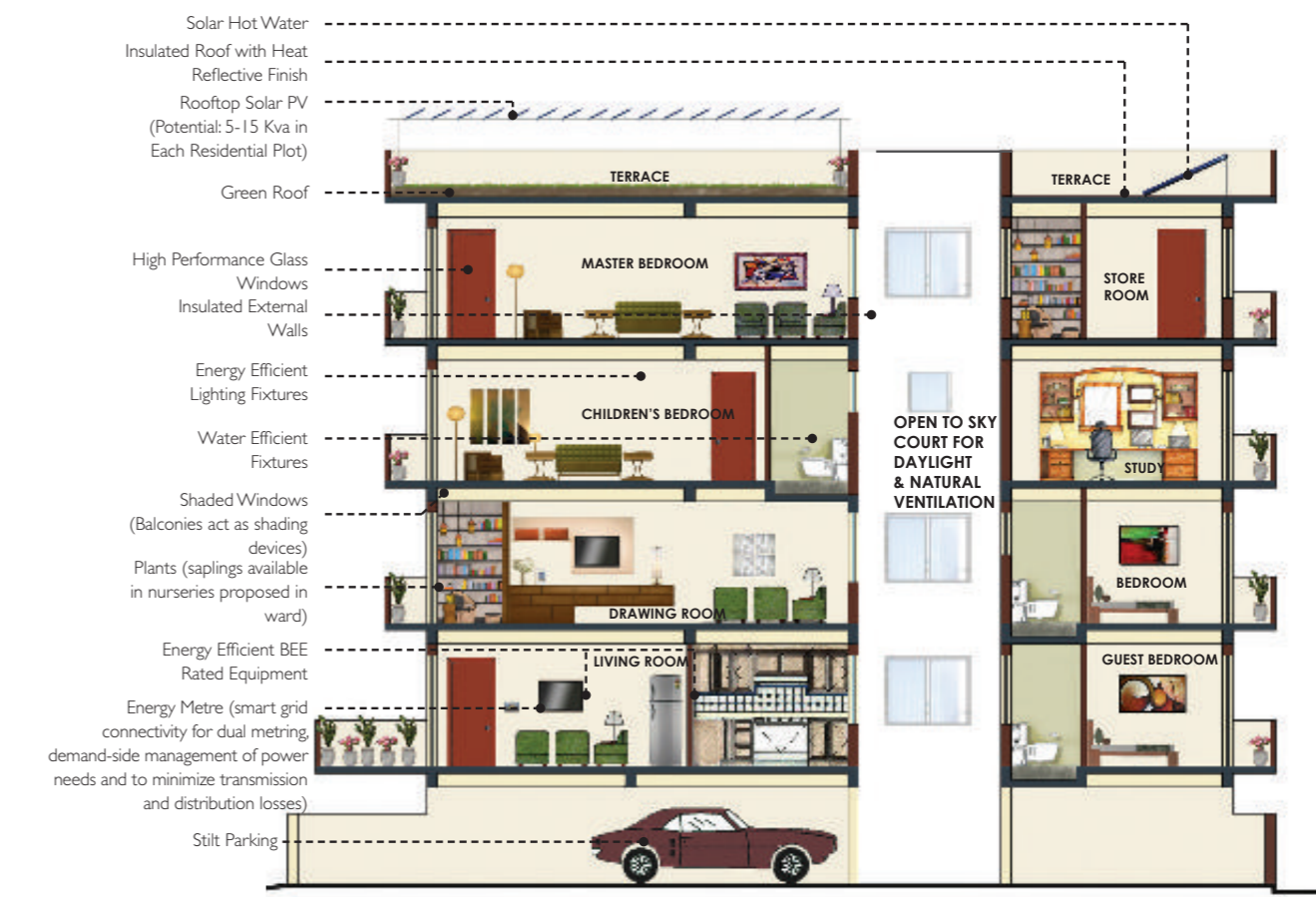
6.11 Energy Efficiency & Renewable Energy

It is proposed to adopt energy efficiency and renewable energy at household levels.

Whenever residents of Ward 103 either build from scratch or renovate their houses, basic green building guidelines should be followed.

The images on the right show the various elements that help in reducing the load of the building, thus making it energy efficient.

The image shown below depicts the typical section for the proposed residential buildings in the ward. These buildings will be compliant with energy efficiency codes and mandates.



Typical Section for Proposed Residential Buildings in Ward (Compliant with Energy Efficiency Codes & Mandate)

7.1. Urban Environmental Accords

Signed on occasion of United Nations Environment Programme World Environment Day, June 5 2005, in San Francisco, California

Energy: Renewable Energy | Energy Efficiency | Climate Change

- Action 1** Adopt and implement a policy to increase the use of renewable energy to meet ten percent of the city's peak electrical load within seven years.
- Action 2** Adopt and implement a policy to reduce the city's peak electric load by ten percent within seven years through energy efficiency, shifting the timing of energy demands, and conservation measures.
- Action 3** Adopt a citywide greenhouse gas reduction plan that reduces the jurisdiction's emissions by twenty five percent by 2030, and which includes a system for accounting and auditing greenhouse gas emissions.

Waste Reduction: Zero Waste | Manufacturer Responsibility | Consumer Responsibility

- Action 4** Establish a policy to achieve zero waste to landfills and incinerators by 2040.
- Action 5** Adopt a citywide law that reduces the use of a disposable, toxic or non-renewable product category by at least percent in seven years.
- Action 6** Implement "user-friendly" recycling and composting programs, with the goal of reducing by twenty percent per capita solid-waste disposal to landfill and incineration in seven years.

Urban Design: Green Building | Urban Planning | Slums

- Action 7** Adopt a policy that mandates a green building rating system standard that applies to all new municipal buildings.
- Action 8** Adopt urban planning principles that advance higher density, mixed-use, walkable, bikeable and disabled-accessible neighbourhoods which coordinate land use and transportation with open space systems for recreation and ecological restoration.
- Action 9** Adopt a policy or implement a program that creates environmentally beneficial jobs in slums and/or low-income neighbourhoods.

Urban Nature: Parks | Habitat Restoration | Wildlife

- Action 10** Ensure that there is an accessible park or recreational open space within half-a-kilometer of every city resident by 2015.
- Action 11** Conduct an inventory of existing canopy coverage in the city; and then establish a goal based on ecological and community considerations to plant and maintain canopy coverage in not less than fifty percent of all available sidewalk plating sites.
- Action 12** Pass legislation that protects critical habitat corridors and other key habitat characteristics (e.g. water features, food bearing plants, shelter for wildlife, use of native species, etc.) from unsustainable development.

Transportation: Public Transportation | Clean Vehicles | Reducing Congestion

- Action 13** Develop and implement a policy which expands affordable public transportation coverage to within half-a-kilometer of all city residents in ten years.
- Action 14** Pass a law or implement a program that eliminates leaded gasoline (where it is still used); and that phases down sulfur levels in diesel and gasoline fuels, concurrent with using advanced emission controls on all buses, taxis, and public fleets to reduce particulate matter and smog-forming emissions from those fleets by fifty percent in seven years.
- Action 15** Implement a policy to reduce the percentage of commute trips by single occupancy vehicles by ten percent in seven years.

Environmental Health: Toxics Reduction | Healthy Food Systems | Clean Air

- Action 16** Every year, identify one product, chemicals, or compounds, that is used within the city that represents the greatest risk to human health and adopt a law to provide incentives to reduce or eliminate its use by the municipal government.
- Action 17** Promote the public health and environmental benefits of supporting organic foods. Ensure that twenty percent of all city facilities (including schools) serve locally grown and organic food within seven years.
- Action 18** Establish an Air Quality Index (AQI) to measure the level of air pollution and set the goal of reducing by ten percent in seven years the number of days categorized in the AQI range as "unhealthy" to "hazardous."

Water: Water Access & Efficiency | Source Water Conservation | Wastewater Reduction

- Action 19** Develop policies to increase adequate access to safe drinking water, aiming at access for all by 2015. For cities with potable water consumption greater than 100 liters per capita per day, adopt and implement policies to reduce consumption by ten percent by 2015.
- Action 20** Protect the ecological integrity of the city's primary drinking water sources (i.e. aquifers, rivers, lakes, wetlands and associated eco-systems).
- Action 21** Adopt municipal wastewater management guidelines and reduce the volume of untreated wastewater discharge by ten percent in seven years through the expanded use of recycled water and the implementation of a sustainable urban watershed planning process that includes participants of all affected communities and is based on sound economic, social, and environmental principles.

7.2. Existing Frameworks for Streetscaping - NUTP, MPD 2021

Source: UTTIPEC Streetscape Guidelines 2010

A. National Urban Transport Policy 2006 recommends ensuring safe, affordable, quick, comfortable, reliable and sustainable access for the growing number of city residents to jobs, education, recreation and other such needs within our cities. This is sought to be achieved by:

- Incorporating urban transportation as an important parameter at the urban planning stage rather than being a consequential requirement.
- Encouraging integrated land use and transport planning in all cities so that travel distances are minimized and access to livelihoods, education and other social needs, especially for the marginal segments of the urban population, is improved.
- Improving access of business to markets and the various factors of production.
- Bringing about a more equitable allocation of road space with people, rather than vehicles, as its main focus.
- Encourage greater use of public transport and non-motorized modes by offering central financial assistance for this purpose.
- Enabling the establishment of quality focused multi-modal public transport systems that are well integrated, providing seamless travel across modes.
- Establishing effective regulatory and enforcement mechanisms that allow a level playing field for all operators of transport services, and enhanced safety for the transport system users.
- Establishing institutional mechanisms for enhanced coordination in the planning and management of transport systems.
- Introducing intelligent transport systems for traffic management.
- Addressing concerns of road safety and trauma response.
- Reducing pollution levels through changes in travelling practices, better enforcement, stricter norms, technological improvements, etc.
- Building capacity (institutional and man power) to plan for sustainable urban transport and establishing knowledge management system that would service the needs of all urban transport professionals, such as planners, researchers, teachers, students, etc.
- Promoting the use of cleaner technologies.
- Raising finances through innovative mechanisms that tap land as a resource for investments in urban transport infrastructure.
- Associating the private sector in activities where their strengths can be beneficially tapped.
- Taking up pilot projects that demonstrate the potential of the best possible practices in sustainable urban transport.

B. Current Indian Road Congress for pedestrian and cycle track design provides basic standards for pedestrian and cycle design, but needs more augmentation.

C. Master Plan of Delhi 2021 specifications:

- All roads should be made pedestrian, disabled and bicycle friendly.
- Provision of adequate pedestrian facilities.
- Removal of encroachments from sidewalks.
- Provision for introducing cycle tracks, pedestrian and disabled friendly features in arterial and sub-arterial roads.
- In urban extensions, cycle tracks should be provided at the sub-arterial and local level roads and streets.
- In specific areas, like the Walled City/Chandni Chowk/Sadar Bazar/Karol Bagh/Lajpat Nagar/Trans-Yamuna area, the use of cycle-rickshaws as a non-motorized mode of transport should be consciously planned along with pedestrianisation.
- On all roads the ROW greater than 30 m, exclusive bus lanes will be planned to implement the Bus Transit System (BRTS) in a phased manner to cover the whole city.

D. EPCA, Supreme Court directive on increased use of Public Transport in Delhi.

"Over the years, it has become clear that each city is fighting a losing battle against air pollution and growing congestion – because of the growing numbers of vehicles. Economic progress of our cities will depend on their environmental health. A turnaround is only possible when cities recognize the need for transition to public transport and adopt it."

7.3. Principles of Road Designing

1. Safety

Roads should be safe for users. They should have slow zone for pedestrians and in smaller roads, entire roads can be slow zones.



Safety



Mobility



Pedestrian accessibility

2. Mobility

Larger roads can have mobility zones for faster vehicle movement. They should be physically separated from slower zones for pedestrians and cyclist tracks. Dedicated bus lanes are an added advantage.



Liveability



Sensitivity to local context



Creative use of street space

3. Pedestrian Accessibility

All streets need to have continuous footpaths or safe shared spaces with minimal grade differences. These should have adequate clear width for pedestrian movement.

4. Liveability

Elements such as tree lines landscaping, and furniture enhances a street's slow zone, creating space for relaxation, vending, and other activities.

5. Sensitivity to Local Context

Street design should factor on local street activities, patterns of pedestrian movement, and nearby land uses.

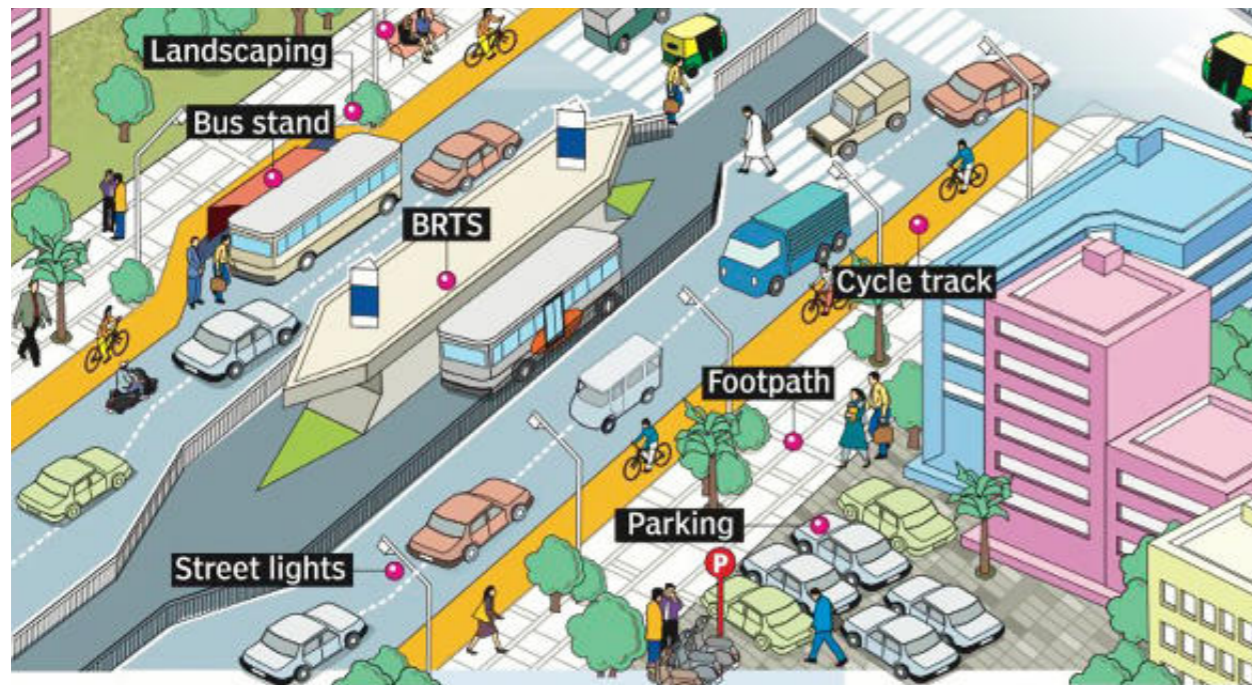
6. Creative Use of Street Space

For example, the width occupied by a parking lane can accommodate occasional bulb-outs for street vending or street furniture.



Elements of Street Design

Footpaths, cycle tracks, carriageway, stormwater drainage, Bus Rapid Transit System, bus stop, street vendor, pedestrian crossing, underground utility, street furniture, median, service lane, traffic calming element, parking, landscaping and streetlights.



(An ISO 9001 : 2008 Certified Organisation)

Delhi Urban Art Commission

The Delhi Urban Art Commission was set up by an Act of Parliament in 1973 to “advise the Government of India in the matter of preserving, developing and maintaining the aesthetic quality of urban and environmental design within Delhi and to provide advice and guidance to any local body in respect of any project of building operations or engineering operations or any development proposal which affects or is like to affect the skyline or the aesthetic quality of the surroundings or any public amenity provided therein”.



(An ISO 9001 : 2008 Certified Organisation)

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