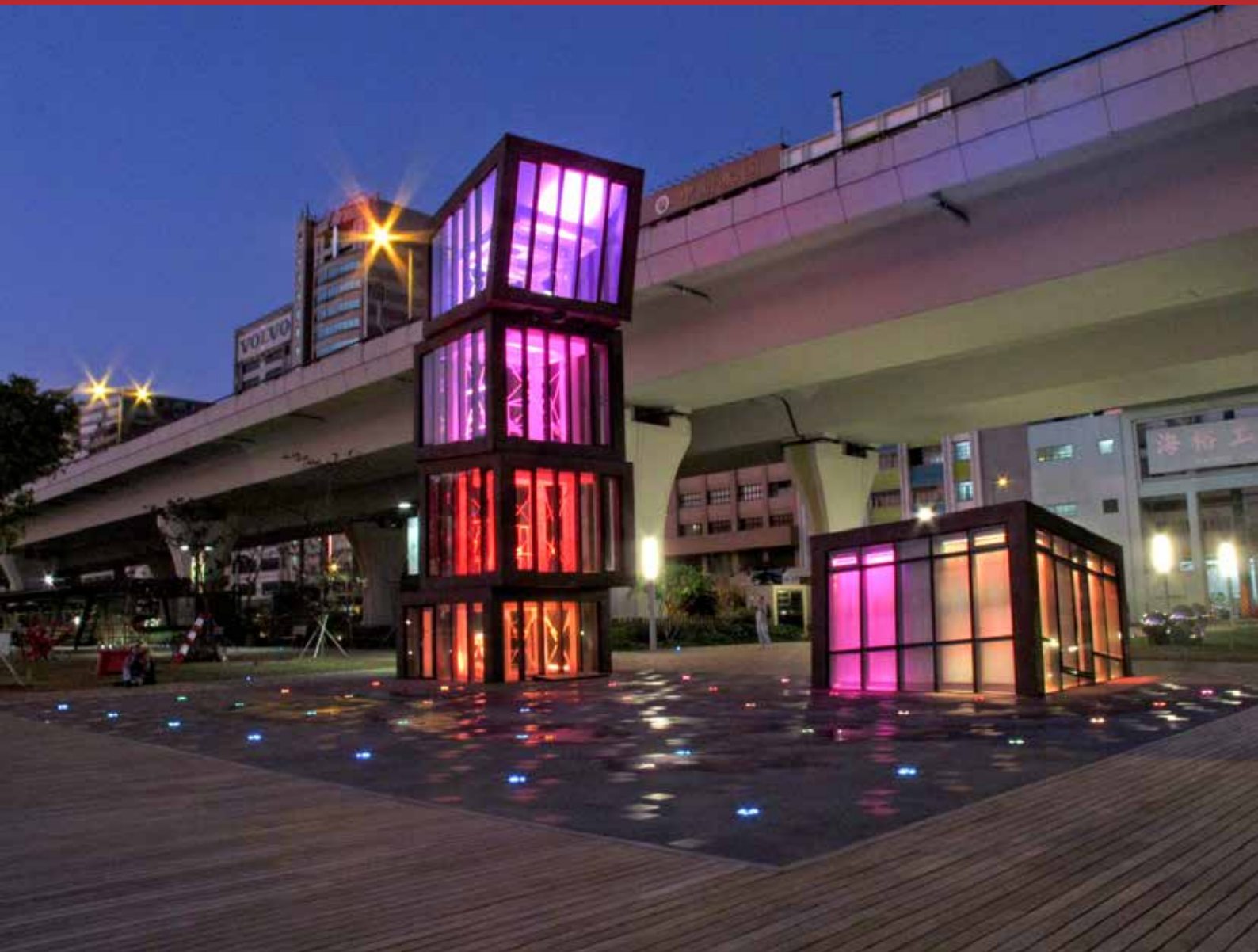




CITY LEVEL PROJECTS

**INNOVATIVE USES OF URBAN DERELICT SPACES
AND SCREENING OF URBAN UTILITIES**





सत्यमेव जयते

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”.



Delhi Urban Art Commission

Prof. Dr. P.S.N. Rao

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Organisations / Others

Ministry of Urban Development
Delhi Development Authority
Government of National Capital Territory of Delhi
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's and Area Councillors
Google Earth



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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.

December, 2020

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

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**Annexure 1 - Suggested List of Drawings, Materials, Documents & Information
To Be Submitted To DUAC for Screening**

Foreward



Urban and built utilities form the backbone of our city and built systems. But due to their form, design, and placement, they often become an eyesore and clutter the different planes of the built environment. Similarly, as the cities expand, vertical layers are added to the urban fabric. The underside of these layers is often left neglected and left to degrade and thus it deteriorates the surrounding environment in terms of safety, security and sanitation.

As the scale of infrastructure in cities continues to grow, it becomes imperative to frame set of guidelines to conceal the exposed utilities and design them in a way so as to camouflage with the surroundings and not overpower the essential architectural character. Alongside, the neglected spaces need to be designed and contemplated keeping in mind the context and need of the users in order to sustain and not become grounds for vandalism and encroachment.

These guidelines would cover various utilities/spaces services observed in various public and private areas and exemplify best practices and design interventions to address the above mentioned concerns. This document would serve as a guide to practitioners to resolve issues regarding screening of utilities and to suggest appropriate alternative uses to spaces under elevated structures.

December, 2020

Samir Mathur
Member, DUAC

PART - A

1 Introduction

1.1 Vision

1.2 Objectives

1.3 Terminologies

1.4 Classification

1.1 Vision

A comprehensive document suggesting guidelines for treatment of Utilities in the Urban Realm and Built environment and utilization of spaces under elevated structures.

1.2 Objectives

- To suggest appropriate functions, contextual to the surrounding areas, for the unused and decaying spaces in the city. (underspaces for elevated structures)
- To preserve the aesthetic quality of the urban and built fabric of the city by screening Urban and Building Utilities from the surrounding.
- To ensure Services and Maintenance of the screened utilities.
- To ensure suitable treatment of the utilities in compliance with the existing regulations or advise innovative mechanisms where such regulations are absent.
- To provide appropriate screening mechanism in addition/ alteration projects contextual to the essential character of surroundings.

1.3 Terminologies

For the purpose of this document, the following definitions shall apply:

- Alterations would be a change in any manner and includes restoration, renovation, repair or disturbance in an existing structure.
- Building complexes: Any 'public use' building/structure and its enclosure, which is owned privately or by the government or by a society or body corporate, with/without boundary and with/without access control, which includes residential, commercial, institutional, industrial, government, public and semi-public land use.
- Building Utilities: Services essential for functioning of a building which may include mechanical equipment like heating, ventilation and air-conditioning units, compressors, pumps, and other similar powered equipment and also non – mechanical equipment like pipes, vents, satellite dishes, chimney outlets, communication equipment's, access ladders and other non-powered equipment's.
- Elevated corridor: An elevated corridor/highway is a controlled-access highway that is raised above grade for its entire length.
- Screening: Mechanism to camouflage utilities with the surrounding built fabric/landscape with an appropriate material.
- Urban Realm: Includes streets, squares, parks, playgrounds, common shopping area plazas, open spaces and any other spaces which are publicly accessible. It also includes the space around, between and within buildings that are publicly accessible.
- Urban Utilities: Refer to set of interrelated systems servicing a city's needs composed of public projects such as Roads, Bridges, Electrical systems, Telecommunications etc.

1.4 Classification of structures/spaces to be considered for screening/ treating

Space/ utility	Sub-Components	Existing treatment
SPACES UNDER ELEVATED STRUCTURES		
Flyovers	-	
Elevated roads/ corridors	-	
URBAN UTILITIES		
Street Furniture	Public Toilet	
	Taxi Stands	
	Food Kiosks	
Sanitation related infrastructure	Dhalao / Garbage collection centres/ Multi Recovery Facilities (MRF)	
	Sewage Treatment plant (STP)	
Other Physical infrastructure	Overhead water tank	
	Communication towers	
	Electric Substations/ Feeder Panel	
Multi Level Car parking (MLCP)	-	
BUILDING UTILITIES		
Facade	Air Conditioning Units (Window, Split AC etc.), Kitchen Utilities & Geyser	Based on individual projects
	PHE Utilities (Plumbing Pipes, Sanitary Pipes)	
	Fire Services	
	Communication Utilities like Dish Antenna, other utility Cables	
	LPG and PNG Piped gas for kitchen	
Roof - top	Water Tank, Generators, HVAC Systems, Solar Panels, Service walkways etc.	
On-ground	Parking Lots	
	Garbage Collection Areas/ Dhalaos	
	Transformer Yards/ Substations	
	DG Sets and their Stacks	
	Exposed storage areas	
Public Toilets		
Retrofitting	Extension/alteration in building complexes	

 Treated but not satisfactory

 No treatment/screening

PART - B

2 Guidelines for treatment/ use of spaces under Elevated structures

2.1 Current use of spaces under Elevated structures

2.2 Existing Regulatory provisions

2.3 Best Practices and learnings

2.4 Design principles

2.5 Design interventions

2.1 Current use of spaces under Elevated structures

Existing spaces under elevated structures are in dismal condition as they are not designated any use, and are often encroached or left vacant to decay, leading to following:

- Encroachment by homeless as they become shelters protecting them from extreme weather conditions as they are shelterless.
- Encroachment by Car parking vendors/ individuals to park vehicles illegally
- Dumping of Garbage/Construction waste creating environmental hazards to the neighbouring areas.
- Other informal and dangerous activities raising safety issues for the surrounding areas



Unused spaces leading to dumping of garbage



Underspaces used as parking lots



Encroached as shelters by homeless

Existing initiatives for improvement and challenges associated

In the recent past, some initiatives by local authorities, demonstrated practices to improve the character of these spaces which include:

- Theme based sculptures and lighting - to improve the aesthetics
- Vertical gardens - to combat pollution and improve aesthetics
- Solar Panels – to generate power

In spite of various efforts by the local authorities, the spaces under elevated structures are not utilized to their full potential as:

- Multiplicity of authorities leads to scattered developments with limited context to the surroundings.
- Lack of maintenance leads to decay of these spaces.
- The spaces are designed for aesthetic purposes. thus become exclusive zones with no predetermined functional uses.
- Since these spaces do not have any programmed use, access to them is not defined or is absent in most of the cases.

2.2 Existing Regulatory provisions

Regulatory Provisions for spaces under elevated structures	
Regulatory body/ document	Provision
Delhi Development Authority, Master Plan Delhi - 2021	<i>Parking facilities for buses in DTC depots</i> Large public parking facilities, underside of flyovers, wide arterial roads and underused areas of the city should be permitted for use in off-peak hours for parking of public / private buses and commercial vehicles, chargeable at appropriate rates.
Indian road congress, IRC: SP: 56-2011, Clause 11 & 12.	<i>Universal Accessibility</i> As per clause 11,12 of IRC: SP: 56-2011 the entry/exit points shall be universally accessible with provisions of stairs, ramps, escalators and lifts etc.

2.3 Best Practices and learnings

2.3.1 Mumbai, India: Nanalal D Mehta Garden

Location : Under Tulpule Flyover, Matunga

Architect: Pallavi Doke

Mumbai's first garden-under-flyover was opened to public on 13th June, 2016; after the dedicated hard work of many Matunga residents.

Features/induced activities

- 600m long walking/ jogging track in the shape of river Narmada with plants and grass on the sides.
- The underside of the flyover lits up with appropriate LED lighting and ground lighting along the walkways.
- 300 lights and 11 rotatable CCTV cameras installed along the stretch along with 24/7 security to ensure safety.



Key plan depicting location of Tulpule Flyover, Matunga, Mumbai



Day-view of the designed underspace



Illuminated night-view of the garden



Learning:

- The project was initiated by the residents of Matunga who approached Brihanmumbai Municipal Corporation (BMC), to develop green spaces in their neighborhood.
- Upon implementation the project was a success as the locals (residents of Matunga) ensured cleanliness and 24x7 security, thus the stretch was maintained effectively. The public participation enabled the residents to adopt the space as their own thus enabling a sense of ownership. Also, its proximity to the residential neighbourhood enabled the residents to access it easily.

2.3.2 Hong Kong, China: T.S. Kwok Service Centre - The Headquarters of Hong Kong Federation of Women



Location : Lockhart Road, Wanchai, Hong Kong

Architect: Barrie Ho

The new Centre takes up an urban space once deemed inhospitable under the Canal Road flyover. The site is situated below the Canal Road Flyover; the single storey T.S. Kwok Service Centre .It extends to a length of approximately 80 metres to occupy a site area of some 9,500sq.ft,

Features/induced activities : Administrative areas, a multi-function room, a lecture hall and a display gallery.

Design Scheme



Design scheme of the facility



Exterior and interior views of the complex

Source: <https://www.archdaily.com/130190/the-hong-kong-federation-of-women-t-s-kwok-service-centre-barrie-ho>

2.3.3 Lima- Peru: Ghost Train Park



Location : Lima, Peru

Architect: Basurama

- An abandoned project for an electric train station in Lima has been turned into the Ghost Train Amusement Park.
- Located in the center of Lima's busy urban environment, the park has been built around neglected concrete columns, splashed with bright colors and strung with recycled materials to create rides and games.

Features/induced activities : Car tires, swings, climbing structures and a canopy line provide hours of fun for both local and visiting children.

Learning : Activities which were missing in the neighborhood were introduced in the underspace thus the development were welcomed and protected by the users (neighboring residents).



The decaying space converted into an amusement park with play areas and outdoor activities

2.4 Design Principles

Components	Parameters	Description
A) Accessibility	Safe Connections	As most of the spaces would be in the middle of the right of way, with fast moving vehicular traffic, it is imperative to provide safe pedestrian crossings and connections in accordance with appropriate regulatory provisions.
	Universal Accessibility	The designed spaces shall have provisions of universal accessibility as per appropriate regulatory provisions.
B) Programmed activities	Recreational a) Play area - Tot lots , Sports hub b) Recreational trails - pedestrians and cyclists	a)The designed spaces shall be induced with appropriate attractions which activate the space keeping in mind the surrounding context ie. type of neighbourhood, social character , safety & security and the accessibility options. b)The space shall be utilised keeping in mind the type of space available i.e. long linear corridor can be used for Biking related activities, wide corridors can be used for outdoor sports activities and their courts etc.
	• Landscape (Planting)	Native, drought tolerant, hardy species shall be used. No lawns shall be used on the underside as they require sunlight and high maintenance.
	• Social and Cultural a)Spaces which can be used for social gatherings, civic discourse b)Public Art	a)Open spaces which enable congregation with programmed activities to allow safe movement and options for seating. b) Contextual and interactive Public Art (where accessible) to be placed appropriately keeping in mind the safety of the motorists.
C) Utilities	Public Conveniences	Location shall be such that it does not disrupt pedestrian movement. But at the same time it shall be easy to locate by the users.
	Lighting	Appropriate energy efficient, light fixtures shall be installed to illuminate the dark undersides of the flyover in evening/ night.
	Signages	To ensure proper navigation through the designed spaces and also to ensure conveying safety measures including access, crossings etc appropriate signages shall be installed.
	Advertisements	Location and size shall be in accordance with appropriate regulatory provisions.
	Rain water harvesting	Appropriate spaces shall be earmarked for Rain Water Harvesting (RWH) to ensure maximum collection and storage of surface run-ff from flyovers, roads etc.
D) Smart features	Provision of Wi-Fi	Appropriately located Smart utilities would attract and benefit the users and enable integration with technology
	Smart Poles	
E) Stakeholders	Local authorities	Implementation and maintenance to be ensured by the respective Local authority.
	Private organisations (Projects as part of CSR or PPP)	As a part of CSR initiative, Private organisations can adopt spaces and maintain them as strips of public land, induced with various initiatives
	Local Public	The neighbourhood shall be consulted to understand the needs of the users to enable a participatory approach.
F) Maintenance	Roles and responsibilities	The upkeep/maintenance of the spaces shall be the responsibility of the respective Local authority.

2.4.1 Suggested use of spaces*

B

Recreational

- » Children's play area with equipments
- » Open gyms for different age groups
- » Jogging/ cycling trails and play courts

Social and Cultural activities

- » Open air theatre
- » Open exhibitions
- » Spaces for events and social gathering
- » Weekend Markets & vending zones
- » Night shelters

Utilities/Supporting infrastructure

- » Parking
- » City information centres
- » Food kiosks/ Police/ Taxi Booths
- » Public conveniences
- » Other public facilities like ATM, phone booth

Smart features

- » Rain Water Harvesting
- » Wi-fi Hot spots
- » Digital advertisements and city's guide map

* Notes:

- The above activities shall be planned keeping in mind the safety standards for accessibility (*Safe and Universal accessibility*).
- The context of the surroundings shall be kept in mind to ensure the efficient utilisation of the space.
- It shall be ensured that the spaces are managed by a dedicated authority/organisation to ensure they are not encroached upon / vandalised. The local residents/ RWA can play a major role in the upkeep/maintenance.
- The services of the elevated structure shall be accessible easily and at all times of the day.

Best Practices from India depicting effective use of spaces under Elevated structures



Walking Zone under Tulpule Flyover, Mumbai

(Source:) <https://www.thebetterindia.com/58845/matunga-flyover-garden-mumbai/>



Space under Flyover, IIM A-Vastrapur Flyover, Ahmedabad

(Source:) <https://www.hcp.co.in/project/iim-flyover-underspace-and-street-development>



2.5 Design Interventions

2.5.1 Under space of Andrews Ganj Flyover



The flyover is located at the intersection of Inner Ring road and Bhisma Pitamah Marg. It is a busy junction as it connects major localities including Andrews Ganj, South Extension and Defence Colony.

The design intervention is approached in two ways:

- As a Landscaped space with walking tracks
- Carved out spaces for socializing and children play
- Design principles including Safe and Universal connections, Socially carved out spaces etc. need to be supplemented to ensure a successful scheme.

Existing scheme



Section



*All dimensions in sections are in approximation only, shall not be referred in any other conjunction

Design option I



Planning Scheme

The space under flyover can be utilized as a walking trail / establish safe connections to the other side of the road.



Before



After

Design option II



Planning Scheme

A space carved out for social activities including Seating, play and gathering etc. acting as the Community space for the neighbourhood.

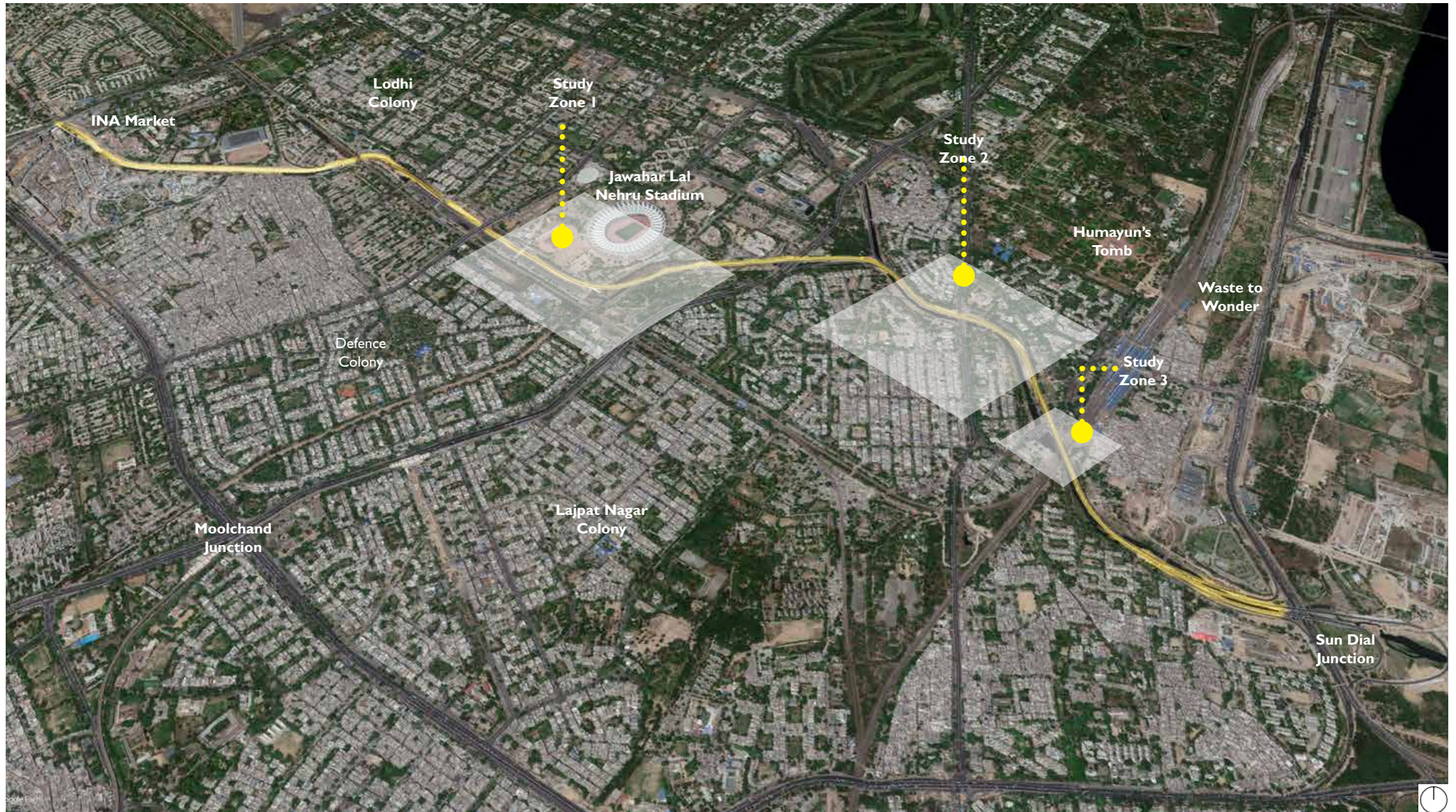


Before



After

2.5.2 Design intervention for underside of Barapullah Elevated Corridor under space design scheme

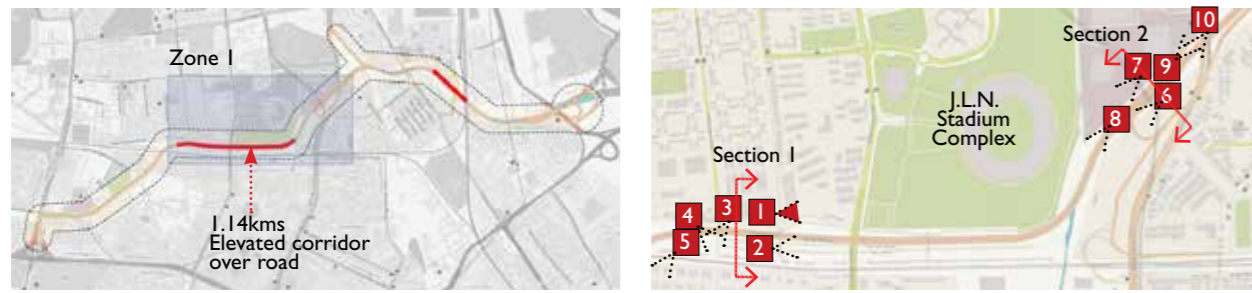


The 4 km stretch under phase I of the Barapullah elevated road, connecting Sarai Kale Khan and JLN Stadium has been operational since 2010 Commonwealth Games. In phase II, the corridor was extended by 2 km from JLN Stadium to INA market. Under phase III, a 3.5km stretch from Mayur Vihar Phase I to Sarai Kale Khan would be added.

Three study zones have been identified and detailed for design intervention for the underside of the Barapullah elevated corridor:

Source: <https://www.dnaindia.com/delhi/report-delhi-six-lane-barapullah-flyover-phase-ii-now-open-for-public-2642928>

Barapullah Elevated Corridor in context to Delhi



Key plan

Zone I

Large green areas are located within the two zones ie. 79.0 acres (approx). It forms a natural habitat for a variety of birds and other species.

The existing undersides of the Barapullah drain are being treated and revived to be used for Public purposes, as it forms a long continuous stretch of land .The initiative to clean the drain is a joint effort of the Union government's Department of Biotechnology (DBT) and Delhi Development Authority (DDA). Once, the surroundings are clean along with treatment of the drain, the reclaimed space can be used for a plethora of activities such as recreational trails for jogging, biking etc.

Source: <https://www.hindustantimes.com/delhi-news/marshland-of-sewage-near-barapullah-drain-turns-into-urban-forest/story-wgMC6dwE4uGpDUxEzI56ZN.html>



The underside of the flyover lying dysfunctional and underutilized



Key plan

Zone 2





View A



Once revived the underside of the drain can be converted to Recreational space for Public purposes with activities like jogging track, play areas, landscaped greens, temporary designed kiosks etc.

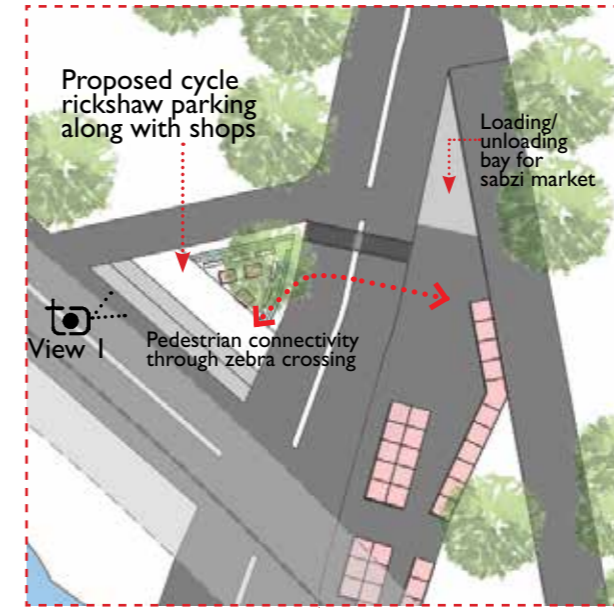
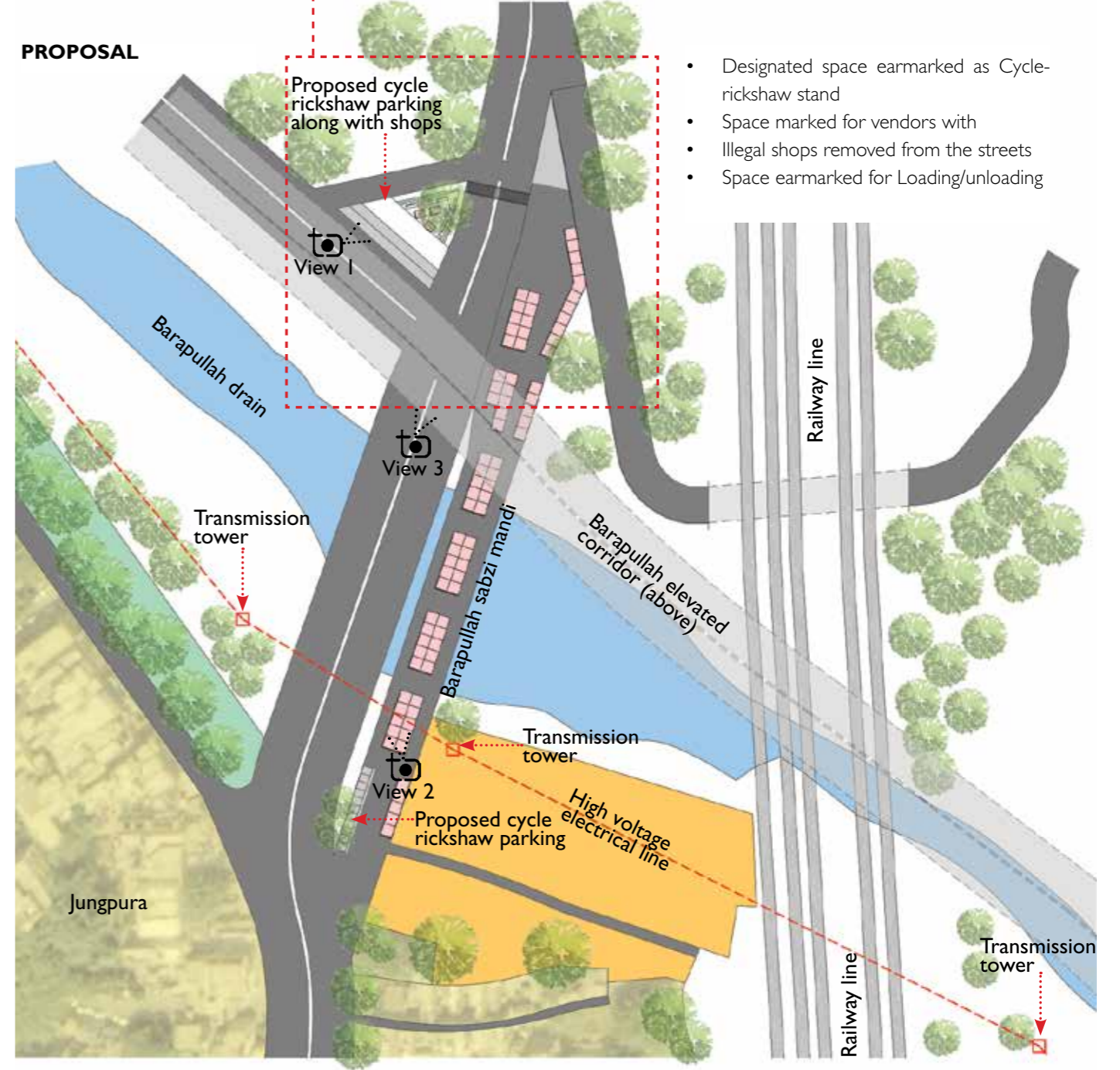
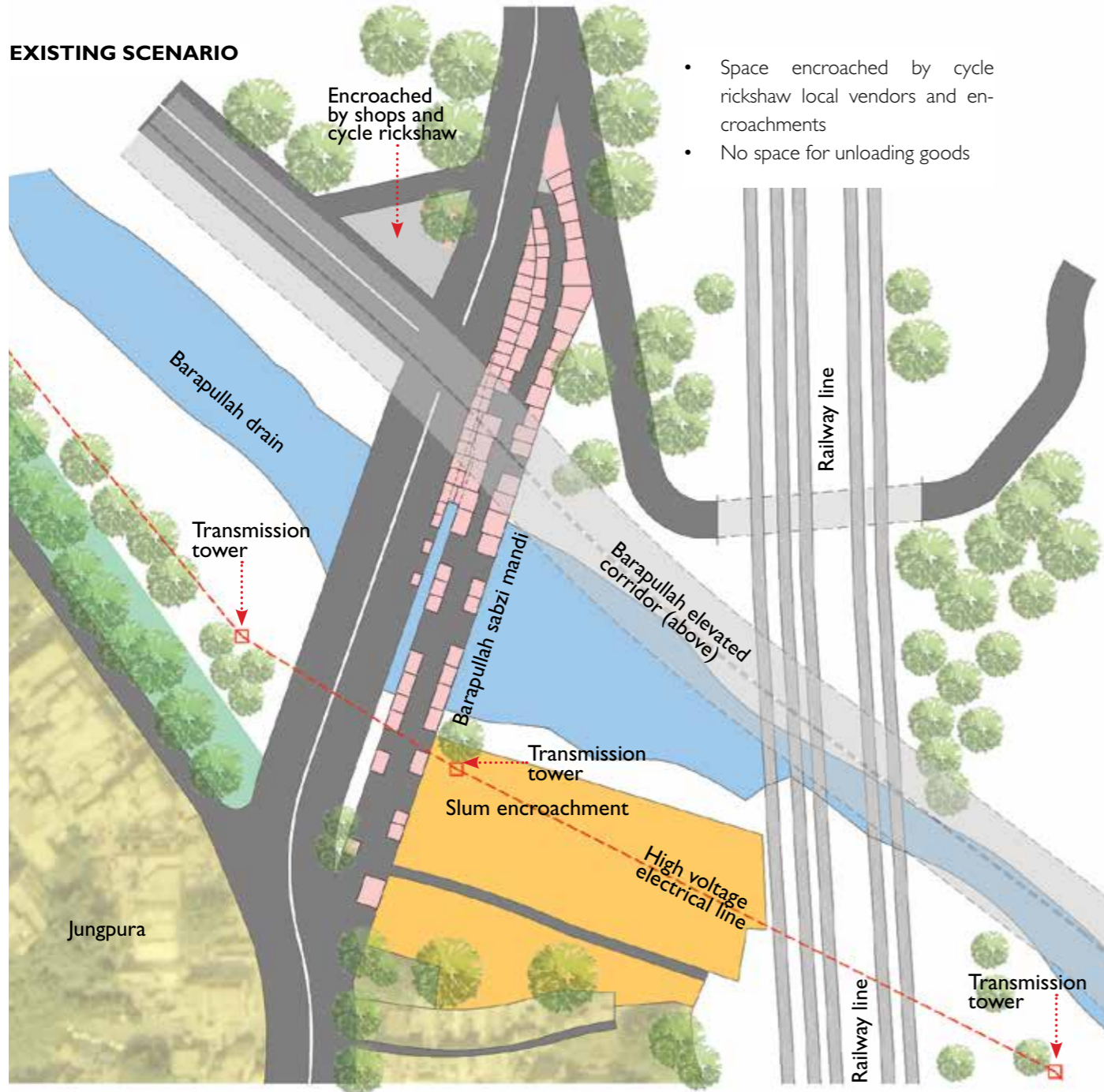
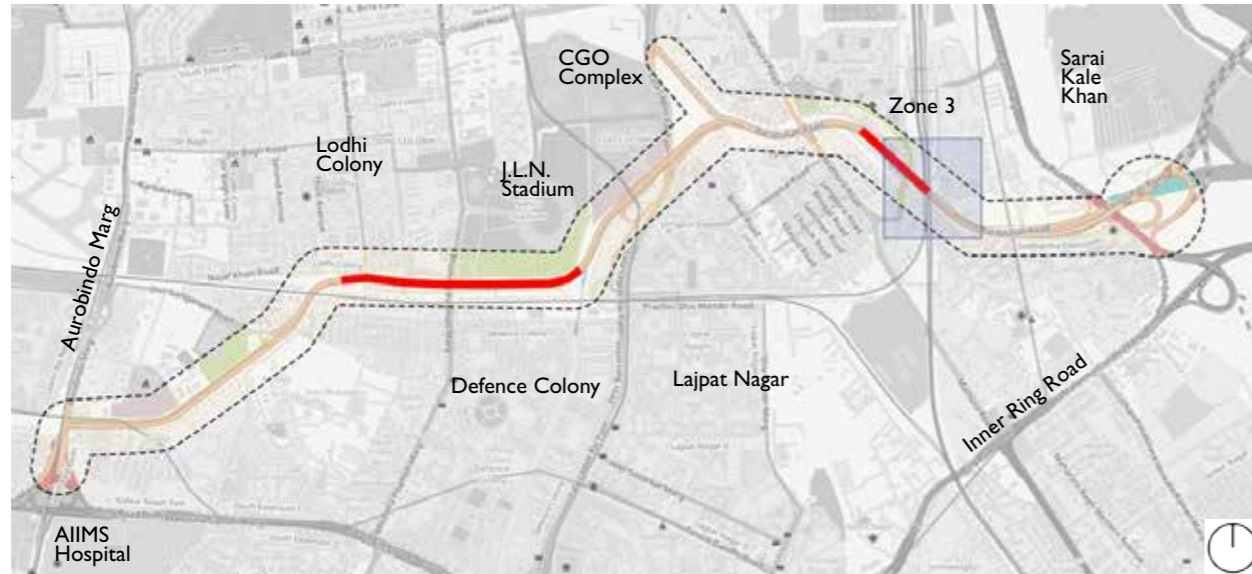


View B



Once revived the underside of the drain can be converted to Recreational space for Public purposes with activities like jogging track, play areas, landscaped greens, temporary designed kiosks etc.

Zone 3: Barapullah Sabzi Market



Proposed Design interventions



Proposed Cycle-rickshaw stand



Proposed Shed module for vegetable/ fruit market

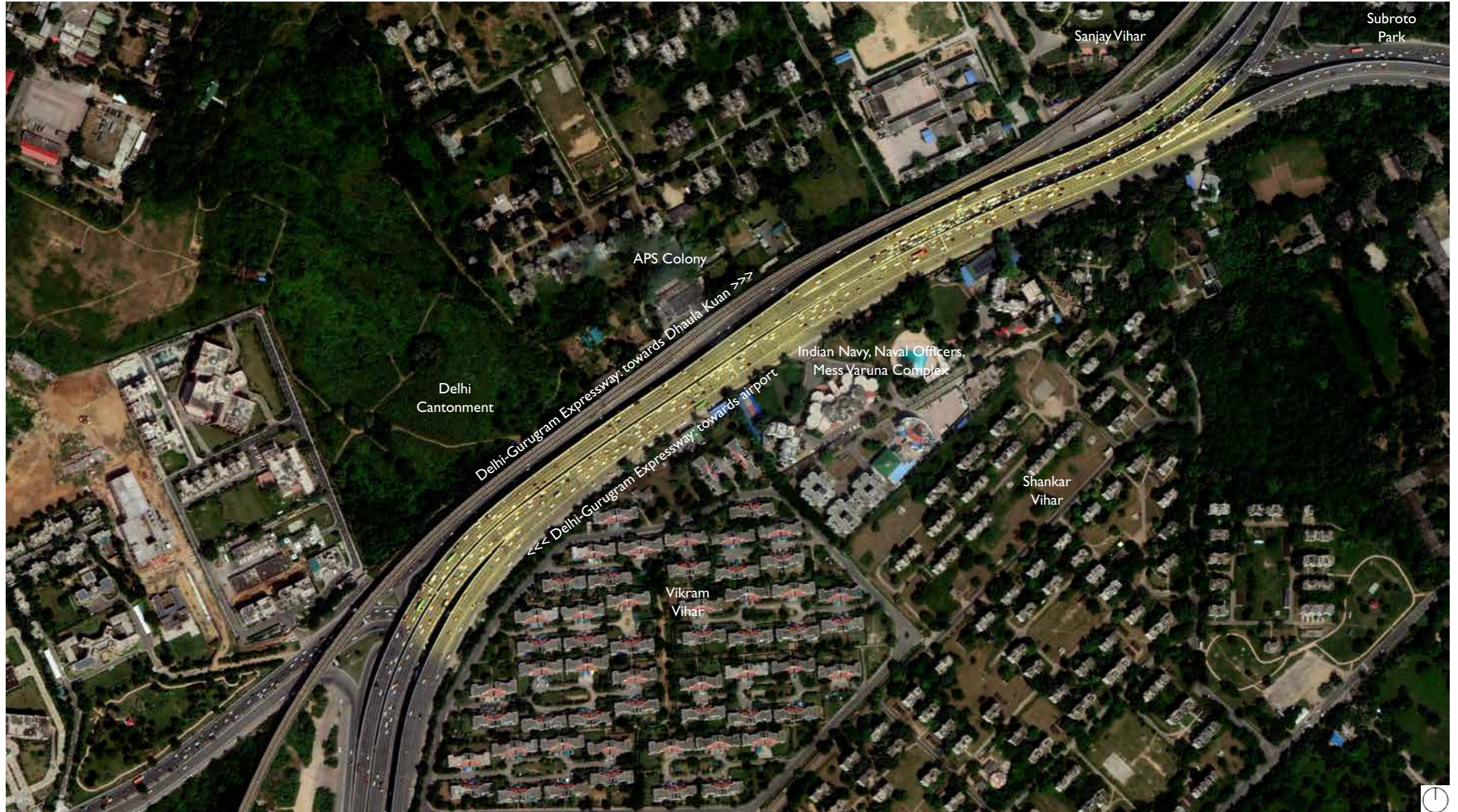


Intersection from Mandi side view

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2.5.3 Spaces under Delhi - Gurugram Expressway

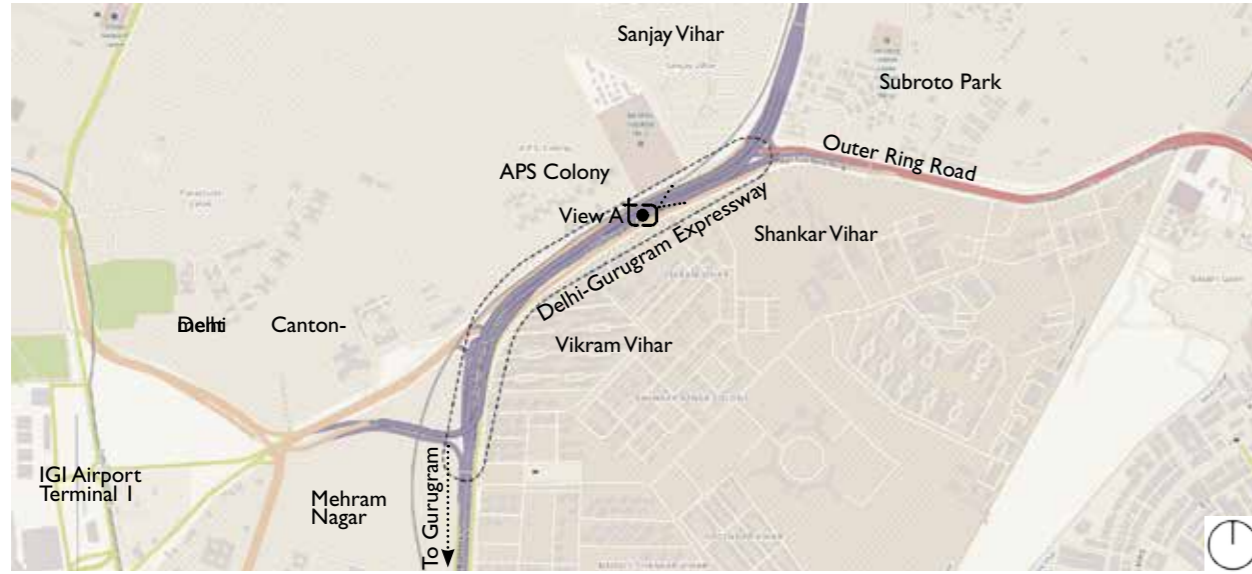
Near Outer Ring road intersection



Identified elevated stretch for Design intervention

The elevated road is located at the entrance of Delhi. The underside of the elevated road can be efficiently utilized as it is a long stretch with an average width of approximately 40.0m and approximately 1 km in length.

The proposed design scheme would provide open recreational activities for the neighboring areas including residential colonies like Vikram Vihar, Shankar Vihar etc.



Key plan

Stretch between IGI(TI) intersection and Outer Ring Road intersection is approx. 1.1km long. Almost 40m wide, 1km long space under elevated road is identified for the design scheme. It has the potential of exploring the underside of the elevated road for activities including Outdoor sports (Badminton ,Volleyball, Cricket practice nets etc).

Current Scenario



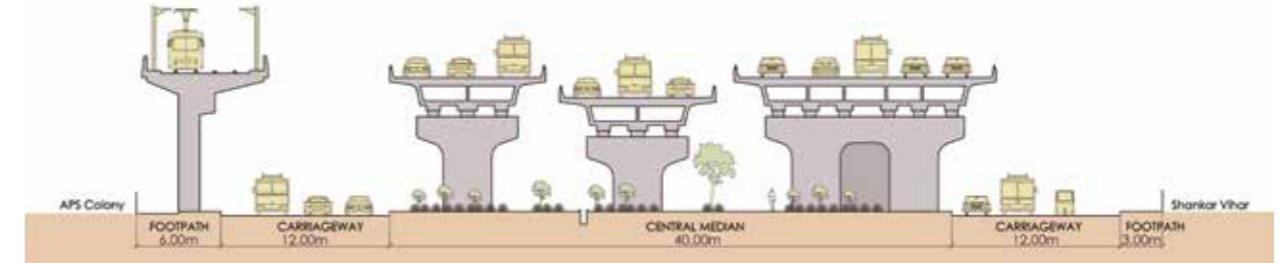
Key plan indicating the various sections of the elevated road with varied character



*Section 1



*Section 2



*Section 3

*All dimensions in sections are in approximation only, shall not be referred in any other conjunction

Interventions

Proposed activities: Outdoor play areas including Badminton ,Volleyball, Cricket practice nets etc.

The design apart from the proposed activities shall be envisaged keeping in mind the design principles (as mentioned in Clause 2.5 of the report) to enable success of the scheme.

Design principles: Priority shall be given to Safe connections, universal accessibility and wayfinding to ensure safety and comfort to the users.

Aerial view of existing scenario



Existing scenario of underside of Delhi Gurugram expressway

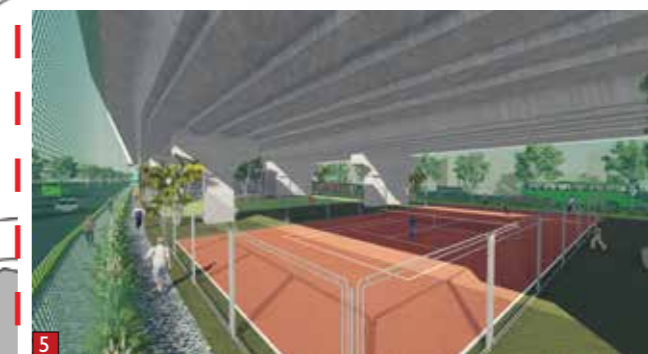
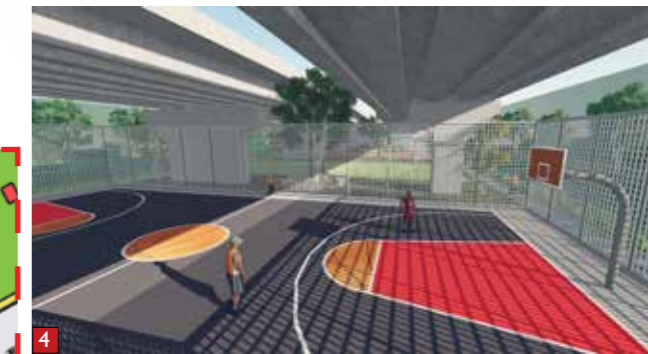
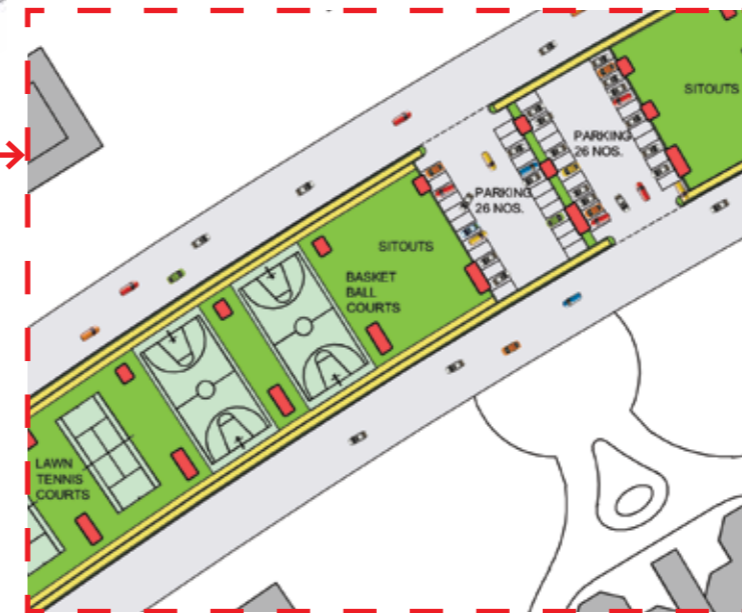
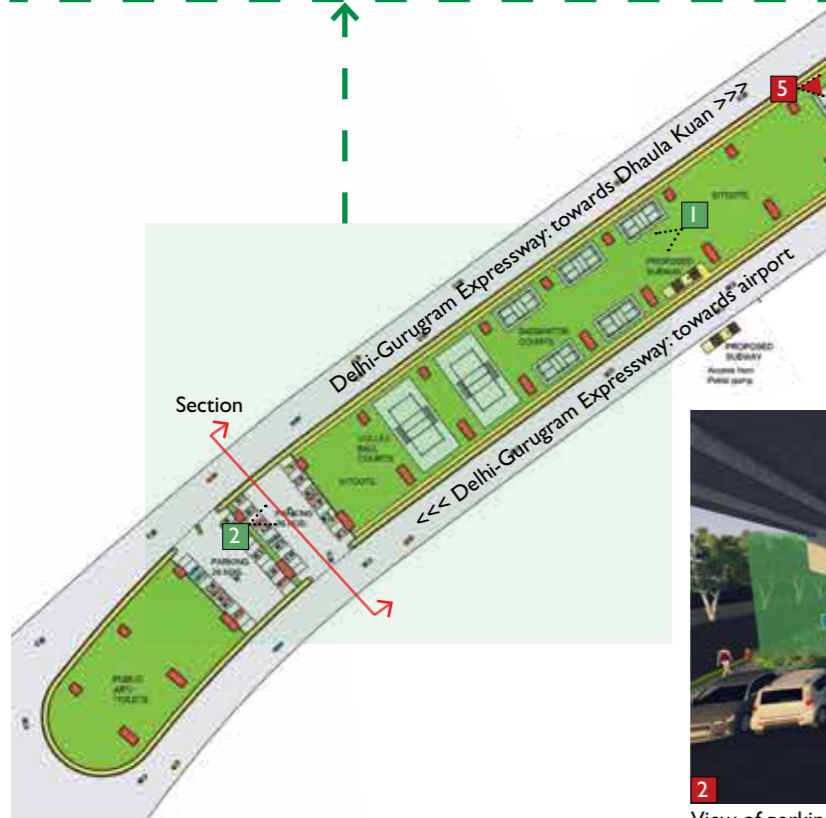
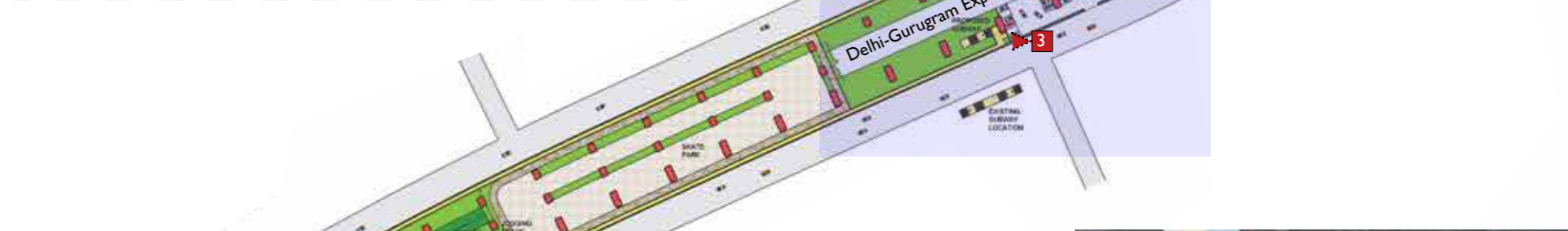
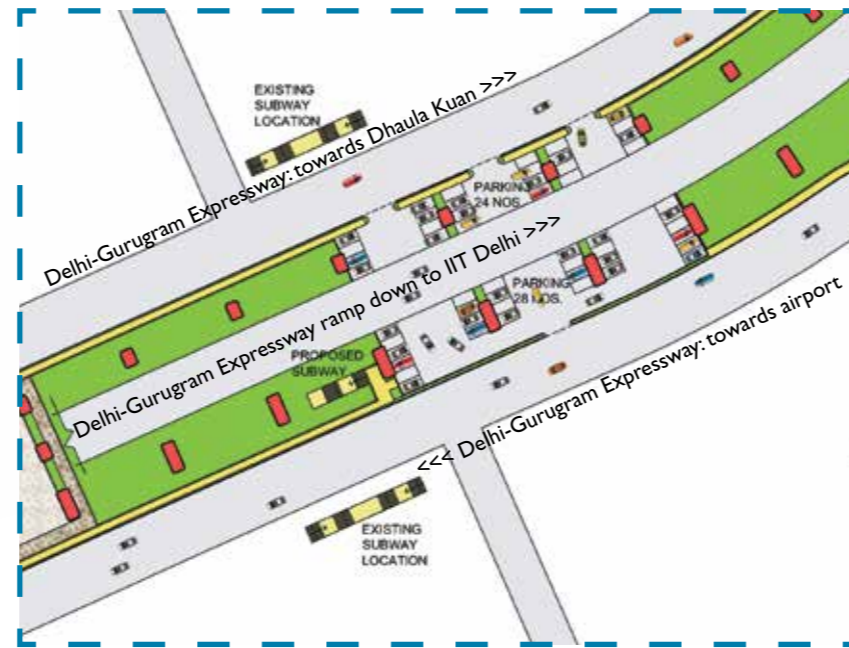
- Most of the median land is covered with rows of shrubs and herbs like Plumeria, Jasmine, Oleander, Ficus, Symgonium, Akalifa Hijau, Fire bush, bougainvillea, syzygium shrub etc.
- No other development exists under the elevated road.



Proposed scheme at the underside of Delhi Gurugram expressway

- The proposed design scheme takes advantage of the available median width (approx 40.0m) .
- It enables provision of various outdoor activities including Badminton , Volleyball, Cricket practice nets etc.
- Jogging track around skating park is also proposed.
- Provision of appropriate parking facilities with safe accessibility at regular intervals would be required to enable the success of the design scheme.
- Connections from the parking lot to the desired location shall be ensured by connected subways.
- Subways are proposed to ensure safe pedestrian crossings as the stretch experiences heavy traffic movement. These subways would open up at appropriate locations in the median to ensure safe connections.

Design scheme details



*Proposal in Section

*All dimensions in section is in approximation only, shall not be referred in any other conjunction

PART - B

3 Guidelines for treatment of Urban Utilities

- 3.1 Existing regulatory provisions for Urban Utilities
- 3.2 Proposed planning considerations for Treatment of Urban Utilities
- 3.3 Screening of Street furniture
- 3.4 Screening of Sanitation related infrastructure
- 3.5 Screening of Other physical infrastructure
- 3.6 Screening of Parking structures

3.1 Existing regulatory provisions for Urban Utilities

Existing regulatory Provisions for Urban Utilities		
Utility name	Regulatory body/document	Provision for screening/treatment
Communication Towers	-	No Provision
Overhead Water Tanks	-	No Provision
Electric Substations	The Indian Electricity Rules, 1956	Outdoor sub-station is except pole type sub-stations and outdoor switch stations shall (unless the apparatus is completely enclosed in a metal covering connected with earth, the said apparatus also being connected with the system by armoured cables) be efficiently protected by fencing not less than 1.8 metres in height or other means so as to prevent access to the electric-supply lines and apparatus therein by an unauthorized person.
DMRC Utilities	-	No Provisions but DMRC has made some efforts to screen utilities in some Metro stations.
Public Toilets	Unified Building bye laws 2016, DDA	Such complexes shall have provisions for outdoor signage, advertisements and space for public art with permission from the concerned agencies/local authorities.
Garbage collection centres/ multi recovery facilities / dhalaos	Solid Waste management Rules, 2016	The operator of the facility shall design and set up the facility as per the technical guidelines issued by the Central Pollution Control Board in this regard from time to time and the manual on solid waste management prepared by the Ministry of Urban Development.
Taxi Stands/Police Booths/ Food Kiosks	-	No Provision
Sewage Treatment Plant (STP)	-	No Provision

3.2 Proposed planning considerations for Treatment of Urban Utilities

3.2.1 Location & Placement of Utilities

- Location of the Urban Utility shall be planned keeping in mind their Function and Usage i.e. need to Conceal appropriately or make them visible for easy identification.
- Placement of the utility shall not obstruct the movement of the users in public spaces.
- All utility lines within new streets shall be underground.

3.2.3 Design and Maintenance

- The screening material surrounding the utility/treatment of the utility shall be in harmony with the neighbourhood in terms of material, colour etc.
- The treatment of the utilities shall be such that the utilities are serviceable for maintenance.
- The choice of materials shall be carefully deliberated so as to ensure minimum long-term maintenance specially in public spaces

3.3 Screening of Street Furniture

3.3.1 Police Booth/ Taxi Stands/Food Kiosks

EXISTING



Police Booth

(Source:) <https://www.indiatoday.in/mail-today/story/beat-revamp-to-give-delhi-police-a-shot-in-the-arm-290978-2015-08-31>



Taxi Booth

(Source:) https://www.justdial.com/Delhi/Dhillon-Taxi-Service-Near-Palika-Bhawan-R-K-Puram/011PXX11-XX11-131125205045-C1C5_BZDET/photos

- These facilities need to be easily identifiable and be accessed by the users.
- Innovative structures along with appropriate signage's / advertisements or Public Art shall be explored.
- Placement of these utilities shall not obstruct the pedestrian movement.

The roof of such structures can be utilized to mount solar panels to make them self sustainable. The same shall be concealed appropriately using appropriate design elements/materials.



Security/ Police Kiosk, New York

(Source:) <https://archpaper.com/2011/01/an-architectural-approach-to-security-in-downtown-brooklyn/11-metrotech-security-police-kiosk-by-wxy-architecture-urban-design-5/>



BEST PRACTICES

Taxi Booth With ATM Facility, Istanbul

(Source:) <http://www.bakarsanbeyoglu.com/proje-yi-tanimak-istiyoruz/detay/Popup/Taksi-Duraklari/125/319/0>



Taxi Station With Green Roof/Wall

(Source:) <https://newatlas.com/taxi-station/24133/>



Movable Container Food Kiosk With Solar Panels, Montreal

(Source:) <http://www.nytimes.com/how-to-design-a-restaurant-in-simple-way/small-outdoor-restaurant-design-ideas-with-shipping-container-concepts/>

3.4 Screening of Sanitation related infrastructure

3.4.1 Public Conveniences/ Dhalaos/Garbage Collection Center

EXISTING



Sulabh Toilet Complex
 (Source:) <https://scroll.in/latest/824906/google-maps-can-now-direct-users-to-public-toilets-in-delhi-ncr-and-madhya-pradesh>



Dhalao Along Roadside, EDMC
 (Source:) <https://www.cityspidey.com/news/4084/cctv-cameras-on-dhalaos-residents-deem-edmcs-plan-absurd/>

- Public conveniences need to be screened yet be visible to be located easily by the users.
- This can be efficiently achieved by appropriate placement of Advertisement panels or installation of Public Art with Social messages.
- These facilities can also be designed for provision of sustainable features like Rain water harvesting, solar power generation etc.

BEST PRACTICES



Public Toilet, New Delhi
 (Source:) <http://www.finnovation.co.in/news/80-locations-480-toilets-delhi/>



Eco Washrooms, Ontario
 (Source:) <https://windsorstar.com/news/eco-washroom-unveiled-at-holiday-beach>



Garbage Collection Centre, Haurte, Spain
 (Source:) <https://inhabitat.com/lime-green-garbage-collection-center-is-a-recycled-aluminum-urban-stomach/?variation=b>



Toilet With Public Art
 (Source:) <http://exeloo.com/gallery/203/jupiter-Triple-43AAD-1517-Retail-Chester-Hill/>

3.4.2 Sewage Treatment Plant

EXISTING



STP at Satya Sadan, New Delhi
 (Source:) <https://sandrp.in/2017/09/23/decentralized-stps-in-the-delhi-capital-region/comment-page-1/>



STP at Gole Market, New Delhi
 (Source:) <https://sandrp.in/2017/09/23/decentralized-stps-in-the-delhi-capital-region/comment-page-1/>

- STP Complexes require large space to accommodate their utilities. STPs when located in public areas like parks, playgrounds shall be visually screened by effective treatments like Public Art and use of Green features including Living Walls, Vertical gardens, creepers on the fences / boundaries etc.

BEST PRACTICES



Paris
 (Source:) <https://www.dezeen.com/2018/10/20/habitech-architects-taoyuan-sewage-works-taiwan-architecture/>



Asturias, Spain
 (Source:) <https://www.archdaily.com/872301/sewage-treatment-plant-of-san-claudio-padillanicas-arquitectos>



New Zealand
 (Source:) <https://www.stuff.co.nz/manawatu-standard/news/70844647/null>

3.5 Screening of Other Physical infrastructure

3.5.1 Overhead Tanks

EXISTING



Ill-Maintained Service Reservoir
(Source:) <http://tanknwon.us/water-tank-construction/>



Typical Circular Service Reservoir
(Source:) <http://addaonline.in/>

- Location of such tanks shall be such that it is not visible from the main road i.e. it lies one plot deep.
- These structures can be treated with public art or such structural designs which depict them as landmarks rather than an eyesore to the cityscape.
- These structures can be used for other functions like rain water harvesting, solar power generation, other activities etc. when integrated at design stage.

BEST PRACTICES



Overhead Service Reservoir, Mondeville, France
(Source:) https://en.wikipedia.org/wiki/Water_tower



Midrand Water Tower, Johannesburg
(Source:) <https://www.atlasobscura.com/places/grand-central-water-tower>

3.5.2 Communication Towers/ Pylons

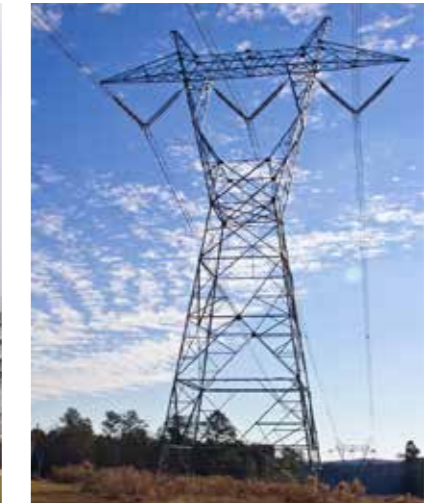
EXISTING



Mobile Towers in Residential Pocket
(Source:) <https://gadgets.ndtv.com/telecom/news/indias-mobile-towers-to-number-more-than-500000-by-2020-704628-phone-775945/>



Mobile Towers Over Rooftop
(Source:) <https://www.thehindu.com/news/cities/Hyderabad/Radiation-from-cell-towers-below-set-limits-BSNL/article16214262.ece-phone-775945/>



HT Line Pylon
(Source:) <https://www.flickr.com/photos/teegardin/5455824391-phone-775945/>

- Communication towers like TV, Radio, Mobile etc. and pylons distort the skyline of the city as they are mostly installed on the rooftops and rise above the urban landscape.
- Adhering to their installation as per Rules under DoT and EPCA Act 1986, provisions shall be made to design them innovatively so as to blend in the city fabric and become landmarks in certain cases, imparting identity to the city.
- Location of Communication Towers/ Pylons shall be avoided in Public spaces like Parks and Playgrounds due to safety hazards.

BEST PRACTICES



Tokyo Tower, Japan
(Source:) https://en.wikipedia.org/wiki/Tokyo_Tower



Art Work in Pylon, Germany
(Source:) <https://fototerra.net/2018/08/14/three-art-students-transformed-this-electrical-tower-in-hattingen-germany-into/>

3.5.3 Electric Substations/ Feeder Panels

EXISTING



Electric Feeder Pillar Placed on Footpath, Delhi
 (Source:) <https://exceedingsky.wordpress.com/2012/06/25/coolest-street-electrical-box-graffiti/>



Electric Substation
 (Source:) http://www.cea.nic.in/reports/others/god/dpd/guidelines_dtt.pdf

- Architecturally treated boundary wall / screen shall be provided to block direct view into the substation facility with min. screen ht. 1.8m (As per The Indian Electricity Rules, 1956)
- Innovative materials, public art, boundary details shall be explored to screen these facilities.

BEST PRACTICES



Electric Panel Box in Sacramento, California
 (Source:) http://www.susansilver.com/attachment_id=1711



Red Brick Clad Electric Substation, Greenwich Peninsula
 (Source:) <http://www.greenpen.london/blog/electricity-substation>



Architecturally Treated Boundary Wall, Substation-Florida
 (Source:) <http://www.kam-services.com/new-gallery-2/>

3.6 Screening of Parking structures

3.6.1 Multi-Level Car Parking (MLCP)/ Stack Parking

EXISTING



Multi Level car Parking, Nehru Place
 (Source:) <https://designwellindia.com/multi-level-car-parking-nehru-place/>



Multi Level car Parking, T3 Terminal, New Delhi
 (Source:) <http://bangav.blogspot.com/2011/06/dial-introduces-park-n-fly-car-parking.html>

- Integration of innovative design, material and technology for façade treatment shall be explored for effective aesthetics and uniqueness.
- Introduction of structural systems like prefabricated structures and Flat Slab systems allow flexibility in façade treatment.
- Green features such as vertical green wall shall be explored to conceal the parking facility.
- Terrace/Roof decks of multi-level car parking shall accommodate other functions like open play areas, open air galleries, landscape greens etc. to maximise space utilization.

BEST PRACTICES



Infosys, Pune
 (Source:) <http://www.trcww.com/my/>



557 Tower, Germany
 (Source:) <https://www.architecton.com/en/product/wohr-slimparker-557-tower/1282125>



Lincoln Road, Miami, Florida
 (Source:) <https://www.citylab.com/transportation/2012/10/16-parking-garages-worth-looking/3564/>



Millennium Car Park, Birmingham, UK
 (Source:) <https://www.buildingconstructiondesign.co.uk/projects/millennium-point-car-park-birmingham/>

3.7 Maintenance and Management

- Operation and maintenance is the key to enhance the sustainability of utilities since they fall in disrepair before completing their design life. A partnership approach between various stakeholders is required to keep the respective Public Utilities in good form.
- The maintenance funds shall be considered at the development planning stage i.e fund should be specifically allocated for future maintenance of public utilities to avoid degraded quality of material and workmanship.

Performance standards for screening
Utility name
Design details of the screening material.
Technology used (if any)
Cost of procurement of the material, year of manufacture and/or procurement, name of manufacturers and/or procurers.
Lifespan
Schedule of period of maintenance
Details of stakeholders in charge

PART - B

4 Guidelines for treatment of Building Utilities

- 4.1 Existing regulatory provisions for Screening of Building Utilities in Delhi
- 4.2 General design considerations
- 4.3 Information to be marked on building plans
- 4.4 Type of Utilities to be Screened (based on placement)
- 4.5 Approach for treatment/ screening of utilities
- 4.6 Suggested Screening Materials

4.1 Existing regulatory provisions for Screening of Building Utilities in Delhi

Unified Building Bye Laws 2016
Clause 7.19 - Height Exemptions
The following structures shall not be included in the height of building covered under Building Bye-Laws: • Screen wall up to the height of 1.8 m.
Clause 7.22 – Parapet
• Parapet walls and handrails provided on the edges of roof terrace, balcony etc. should not be less than 1.0 m. and more than 1.5 m. in height (shall not apply where roof terrace is not accessible by a staircase).
• However on terrace floor in the portion where DG Set, Water Tank and other services equipment's are installed, light weight screen shall be constructed to hide such equipment's etc.
• For buildings of height 24m and above, the parapet wall/railing shall be 1.8 m subject to approval of Fire Department
Clause 8.10 General features – free from FAR calculations
• Architectural feature on ground or any other floor including rooftops as approved by sanctioning Authority / concerned local body, Delhi Urban Art Commission and Delhi Fire Service.
• Services can be permitted on roofs/terraces with adequate screening for the same.
Clause 8.5.6 Gas Supply
Town Gas / L.P. Gas Supply Pipes – Where gas pipes are run in buildings, the same shall be run in separate shafts exclusively for this purpose and these shall be on external walls, away from the staircases. There shall be no interconnection of this shaft with the rest of the floors.

4.2 General design Considerations

- The screening material shall be in harmony with the building architecture in terms of material, colour etc.
- All the utility hardware installations shall be screened or painted so as to blend in the building or roof or the surrounding landscape.
- Significant heritage buildings shall have all rooftop equipment fully screened and/or integrated into the building in a way that respects and complements the building's heritage and architectural features.
- The design considerations shall be in compliance with:
 - Unified Building Bye laws 2016, Chapter 7 and 8
 - NBC 2016, Vol II, Part – 8
- The degree of visibility from all the public ways shall be examined and pedestrian should have minimum or no visibility to the utilities from the street level.
- Future development in the surrounding area should also be taken care and be integrated in the design.

4.3 Information to be marked on building plans: For Screening of Utilities for New buildings

(Submitted to DUAC for approval)

- An integrated plan incorporating building utilities layout along with screening element, at their respective floor levels, shall be provided.
- Proposed methods of screening shall be detailed. If independent or integrated screens are proposed, material and construction details shall be provided on building plans.
- The Sight line diagrams are required with building elevations. Diagrams shall show multiple views to proposed rooftop mechanical equipment from a 1.5 m height at the curb of the opposite side of the road from the property.
- The location of On ground mechanical and non-mechanical equipment shall be illustrated on the landscape plan and, if fencing is required, also on the site plan.

4.4 Type of Utilities to be Screened (based on placement)



4.5 Approach for Treatment/ Screening of Utilities

4.5.1 Facades

EXISTING



Exposed Outdoor Units in Elevation, Laxmi Nagar
(Source:) http://www.delhirealestateguy.com/wp-content/uploads/2015/11/20151104_134657.jpg



AC Units in Elevation, Netaji Subhash Place
(Source:) <https://www.propertywala.com/P1489474>

General considerations:

- There shall be provision for architectural enclosures/shafts etc in planning and design stage itself for air conditioning units including the split AC outdoor units, PHE and kitchen utilities, geyser, fire services, TV dishes, communication cables etc.
- Use of window AC shall be minimized by suitable design interventions.
- Shafts shall be appropriately screened but still be accessible for service and maintenance.
- Size of the shafts/ gap between utility and architectural screen shall be such that it allows any future maintenance or replacement works easily without any damage to the structure.

BEST PRACTICES



Shafts Enclosed by GRC Jali, EMAAR, Gurgaon
(Source:) http://www.maheshgrc.com/Multi_Story_Housing.html



Vertical Greens to Screen Utilities
(Source:) <http://www.aucklanddesignmanual.co.nz/sites-and-buildings/mixed-use/guidance/thebuilding/facadedesign>



Screening of balconies
(Source:) <http://www.aucklanddesignmanual.co.nz/sites-and-buildings/apartments/guidance/outdoor-spaces/balconies-private-outdoor-spaces>



Screening Utilities and Staircases
(Source:) <http://www.theglobalrealty.com/2019/08/04/dif-transfers-noida-mall-land-to-jv-firm-reduces-dues-to-rs-5500-0/architects-top-5-advantages-of-perforated-metal>



Perforated Metal to Screen Utilities
(Source:) <https://www.johnroccosales.com/news-blog/2015/9/10/architects-top-5-advantages-of-perforated-metal>



Second skin as a screen
(Source:) <https://www.supawood.com.au/idea/90-arthur-street-north-sydney/>

4.5.2 Roof Top

EXISTING



DG Set at Roof Top, Connaught Place
(Source:) <https://plus.google.com/+lakshaynagpal/posts/KHJ5S7J5nhZ>



Exposed Rooftop Equipments, Hotel Ambassador, Khan Market, New Delhi
(Source:) <http://thistimethatime.blogspot.com/2012/10/182-khan-market.html>

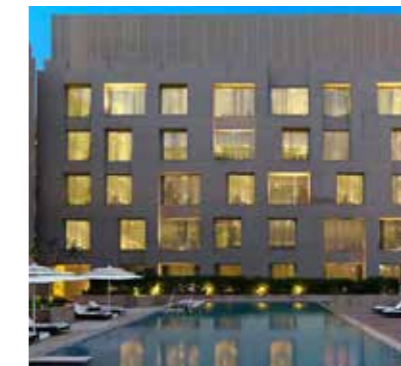
General considerations:

- Rooftop equipment should be clustered and located near the centre of the roof to minimize view from the adjacent streets.
- Provision of continuous Parapet, integrated into the building fabric is an ideal method of screening Roof-top utilities.
- The back sides of parapets and screening walls should be coloured the same as the front side when visible from public view.
- Screening Roof-Top utilities using elements of similar colour, texture as that of the enclosure to impart a cohesive appearance.
- Lift equipment rooms, Water tank etc. to be designed as Building elements so as to blend with the built fabric.
- For low-rise buildings (G+4), rooftop mechanical equipment shall be fully screened. For all high-rise (above 15 m) buildings, rooftop mechanical equipment shall be fully screened from the public view at street level.
- Rooftop equipment screening for high-rise buildings shall contribute to an attractive skyline and the view from surrounding buildings must be considered.

BEST PRACTICES



Continuous Parapet
(Source:) http://www6.mississauga.ca/onlinemaps/planbldg/UrbanDesign/FinalScreeningRoofTopMechanicalUnits_Sept2014.pdf



Enclosure
(Source:) http://www6.mississauga.ca/onlinemaps/planbldg/UrbanDesign/FinalScreeningRoofTopMechanicalUnits_Sept2014.pdf



Equipment Room
(Source:) http://www6.mississauga.ca/onlinemaps/planbldg/UrbanDesign/FinalScreeningRoofTopMechanicalUnits_Sept2014.pdf



Purvanchal Silver City, Noida
(Source:) <http://www.purvanchalconstruction.com/silvercity-features.html>



Princeton Estate, Gurugram
(Source:) https://tuffclassified.com/dif-princeton-estate-offered-residential-apartments-in-gurgaon_410760



ATS Greens Village, Noida
(Source:) <https://www.mouthshut.com/review/Noida-review-momprmmum>

4.5.3 On Ground Utilities

EXISTING



Exposed DG Set, Victory Crossroads, Noida
 (Source:) <https://www.hindustantimes.com/noida/in-a-first-noida-high-rise-to-run-diesel-gensets-on-png-fuel/story-mMmPUjRiu9TC1cnerEhHbN.html>



DG Set Along Compound Wall
 (Source:) http://www.sudhirpower.com/DG_Set_Installation_Guide.pdf

General considerations:

- Above ground utilities shall be consolidated wherever possible, to minimize visual impact.
- Potential locations of utility boxes, pedestals and pads should be coordinated with utility companies as early as possible in the site design process with proper access to each of the utility.
- Location of utility poles, meters, pull boxes, transformers and other utility fixtures and structures shall be coordinated with sidewalk and potential street tree locations.
- Landscape elements can be used for screening On-ground utilities, especially the garbage dumping areas, small generators etc.
- When using landscaping to screen utilities, plants should be arranged with a minimum of 50% opacity at the time of installation as with time they will grow to fully shield the equipment.

Storage areas
Open storage areas in the complexes draw user attention away from building aesthetics and therefore, shall be properly screened or there should be separate block designated for this function.
Solid Waste Management
<ul style="list-style-type: none"> * Solid Waste Management is an important infrastructure for every built complex. Garbage collection areas/ Sorting facilities shall be properly screened as these areas are visually unpleasant and create unhygienic conditions for the neighboring areas. * Garbage collection areas to be screened. Opaque wall/gate on all 4 sides with material that is compatible with architecture. Supplemental evergreen landscape material to be provided to soften visual appearance around enclosure walls, with a minimum 0.9 m height of evergreen plant material at the time of planting.
DG Sets and their Stacks
<ul style="list-style-type: none"> * Preferably, DG sets to be provided in basement with shafts to accommodate stacks. * In case where provision of DG sets is not possible in the basement/terrace, the location should be such that stacks can be placed along the building and then taken above the Terrace level.
Parking lots
Parking lots should be effectively landscaped to reduce the visual impact of glare, headlights, and parking lot lights, assist in the control of storm water runoff and to define rows of parking.

EXISTING



On Ground Utility Screening By Softscape
 (Source:) <https://www.anaheim.net/DocumentCenter/View/472/Aboveground-Equipment-Screening-Manual-PDF?bidId=>



On Ground Utility Screening By Louvers
 (Source:) <https://www.ametco.com/spotlight/>



DG Set Stack Concealing, Paras Dews, Gurgaon
 (Source:) Author



Temporary On Ground Screening
 (Source:) <https://www.alamy.com/stock-photo-art-installation-by-scott-king-near-tate-modern-london-19239640.html>

BEST PRACTICES

4.5.4 Retrofitting Utilities in Alteration Projects

- As the campus or building expands, the original utility system becomes outdated/ undersized. Thus, while installation/ expansion of new utilities, there shall be critical planning to ensure that no newly added utilities hamper the building aesthetics or its surroundings.
- Similarly, while adding green/ sustainable features to an existing building, suitable screening mechanism should be devised to conceal these services.
- In case of heritage buildings/ monuments, buffer space to view them shall be left unobstructive, from any utility i.e. they have to be very carefully sited so as not to appear obtrusive to visitors entering and leaving the building premises.
- Floodlight and luminaries can be positioned on nearby buildings or street furniture. Trees and shrubs shall also be considered to shield lighting poles.

4.5.5 Special Areas

- In the special areas like Lutyens Bungalow Zone, Heritage Zones and Central Vistas, all the exposed utilities shall be properly screened without impeding the special architectural character of that area.

4.6 Suggested Screening Material (Not exhaustive)



Steel Louvers

(Source:) <https://www.amgroup.com/gallery/australia/facade-ventilation-sunshades-screens/>



Cement Boards

(Source:) <http://www.americanfibercement.com/products/raw/minerit-hd/>



Glass Fibre Reinforced Plastic

(Source:) <https://www.speedhouse.com/glass-reinforced-plastic.php>



Wood Plastic Composite

(Source:) <http://www.ksquarearchitects.com/materials-used-facades/>



CNC Jali

(Source:) http://www.tictacdesigns.com/front_elevation.html



Stone Cladding

(Source:) <http://www.coxarchitecture.com.au/project/sir-zelman-cowen-centre-for-science/>



Creepers/Green Wall

(Source:) <https://www.jakob.co.uk/projects/view/curtain-wall/>



GRC Jali

(Source:) <https://www.99acres.com/M40310179#state=Photon&entity=proimages&index=0>

Annexure - I: Suggested list of Drawings, Materials, Documents & Information To Be Submitted To DUAC for Screening (DRAFT)

PROFORMA		
S.No.	Particulars	Remarks (to be filled by the proponent/architect)
1	Name of the Project	
2	Type of the Urban/Building Utility	
3	Location where the Urban/Building utility will be installed	
4	Detailed Drawings depicting screening utilities in a. Plans b. Elevation c. Section	
5	Treatment applied to the Public/Building utility a. Structural / Architectural innovation b. Green features c. Public Art d. Signages / Advertisements e. Others	
6	Specification of treatment applied to utilities a. Material b. Installation Details c. Technology (if any) and it's working details d. Lifespan e. Cost of maintenance	
7	Schedule of Maintenance	
8	Maintenance In-charge (Relevant Organisation details)	
9	Is the utility posing environmental hazard. If yes, then specify along with the type of damage	
10	Evaluating the performance of the treatment for respective utility	



Secretary

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