सत्यमेव जयते

CITY LEVEL PROJECTS

DESIGN CONSIDERATIONS FOR A SKYWALK ALONG RING ROAD

Along Inner Ring Road: South Delhi

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 likely to affect the skyline or the aesthetic quality of the surroundings or any public amenity provided therein".

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DELHI URBAN ART COMMISSION with gratitude duly acknowledges the valuable contributions of the following in making this report:

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
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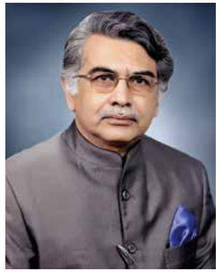
Preface



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 coexistence 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

Foreword

Safe and seamless pedestrian mobility has become a major concern in Delhi.The possibilities for efficient schemes for uninterrupted, safe pedestrian connections for zones that have a high vehicular volume, combined with a high pedestrian traffic flow, varied high intensity developments in close proximity, and availability of space in the right of way was considered in this study.

The stretch of Ring Road from Lajpat Nagar to Dhaula Kuan is a busy arterial road. New redevelopment proposals are planned all along this stretch. The redeveloped East Kidwai Nagar is already built. Sriniwaspuri, Nauroji Nagar, Sarojini Nagar and Netaji Nagar are in the process of being built. Andrewsganj, West Kidwai Nagar are slated for future. This is coupled with two of the largest hospitals in Delhi and a significant commercial area of South extension and a large Sub- Central Business District complex at Bhikaji Cama Place are already occupied for decades. Over time, spaces for pedestrians got subsumed in other requirements of utility services, service lanes, signage's, bus stops, parking and plating zones. It was evident that continuous pedestrian movement at ground level was unsafe and discontinuous. It was felt that segregated and defined elevated pedestrian networks which navigate the multiple layers and land-uses such arterial roads, commercial areas, institutions, high density residential development, parks, neighborhoods etc. could be an innovative strategy.

The study is an attempt to identify dedicated pedestrian corridors in the form of Elevated walkways running parallel to the existing infrastructure which link high-density neighborhoods to transit junctions and demonstrate their integration with the existing built infrastructure.

Innovative, sustainable and smart features are suggested to be embedded in these designs to make them self-sufficient in terms of energy and also to create comfortable, safe spaces for users.These design modules can serve as guides to such future developments in other parts of the city.

December 2020

Samir Mathur
Commission Member, DUAC

Contents

Summary

In today's fast paced world, where cities are urbanizing rapidly, and open spaces are consecutively shrinking, a dedicated, well connected pedestrian system is required to connect various neighborhoods seamlessly. It should also be noted that an efficient pedestrian system reduces carbon footprint and provides better linkages without compromising the experience of the users.

As per Delhi Traffic Police data (2016), out of 1415 killed in road accidents, 600 were pedestrians. The high fatality rate is due to a poor pedestrian infrastructure, which is either poorly designed or has maintenance issues. Thus, there is a pressing need to address these concerns and to provide robust pedestrian connections that safeguard pedestrian safety, security and comfort.

The study focuses on exploring elevated walkways along one of the major arterial roads of Delhi i.e. Inner Ring road. It intends to demonstrate the necessity of dedicated, functional pedestrian corridors, which can be replicated in other parts of the city. These pedestrian corridors add another dimension to the city fabric, they also have the potential to become parallel movement corridors in the future.

The study explores two sets of stretches along the Inner Ring Road, that cut through dense neighborhoods characterized by mixed land-use and prominent landmarks.

The study identifies nodes with high footfall in the stretches under observation. The proposed elevated walkway will connect these nodes to other supporting pedestrian infrastructure such as subways, foot over bridges etc., to enable smooth and seamless pedestrian movement.

The High Line, New York

Source: https://i3.wp.com/www.topinspired.com/wp-content/uploads/2016/08/The-High-Line.jpg | 23rd August, 2018

Chapter 1

Introduction

1.1 Elevated Walkways around the World

Project	Connaught Road Skywalk, Central , Hong Kong, China	Grand Road Skywalk, Mumbai, India	Bukit Bintang-KLCC Pedestrian Walkway, Kuala Lumpur, Malaysia	MG Road Skywalk-Bengaluru, Karnataka, India
Intent	• Initiated by a developer in Hong Kong, the project intended to connect the properties on two ends of Connaught Road Central, a semi-expressway characterized by heavy traffic.	• The Mumbai Skywalk Project is a series of skyways for pedestrian use in the Mumbai Metropolitan Region. • It connects Mumbai suburban railway stations and other highly concentrated commercial areas with various popular destinations.	• The Bukit Bintang - KLCC Pedestrian Walkway provides alternative routes for pedestrians who do not wish to walk between the congested roads of KLCC and Bukit Bintang. • It provides views of iconic locations.	• To ensure safety of pedestrians on the outer ring roads of the city, Bangalore Development Authority (BDA) plans to build a total of 25 skywalks under Public-Private-Partnership (PPP) and non-PPP models.
Challenges	• Although, the system has been extended by public and private parties and reaches distant parts of the city, it is constantly being re-evaluated for the right of access and the right of public to access retail stores and recreational facilities. • The city's high density provides enough pedestrian volume to sustain vibrancy in Central's multi-layered pedestrian system that links basement, 1st storey and 2nd storey.	• The project has a number of drawbacks, such as: 1. It is in close proximity to residential development, thus impinging on their privacy. 2. The spacing of exit points has not been distributed as per the need. 3. Due to lack of activity, it is unsafe for users, especially women travelling at non-peak hours. It has become a home to beggars ae well as drug addicts, thus making it unsafe.	• The walkways helps pedestrians to evade the challenging street environment prevailing in the city. • However the skywalk reduces the aesthetic quality of the street, blocks building facades and invades privacy when in proximity to a building.	• However these structures are facing criticism due to the following : 1. They are often planned near traffic signals, where provision for pedestrian crossing is already present. 2. They obstruct heritage structures. 3. These structures are not site specific, one prototype is implemented in the entire city without contextualizing it.
	Source: Centre for Liveable citied for Singapore, Elevated PedestrianLinkways — Boon or Bane?	Source: https://en.wikipedia.org/wiki/Mumbai_Skywalk_Project	Source: Centre for Liveable citied for Singapore, Elevated PedestrianLinkways — Boon or Bane?	Source: https://www.deccanchronicle.com/nation/current-affairs/130118/bengaluru-new-skywalks-fail-to-generate-footfalls.html

1.2 Vision Statement

Vision

To provide dedicated pedestrian connections by linking high density neighborhoods to transport systems and enabling uninterrupted and seamless pedestrian movement between destinations.

Objectives

Create an efficient pedestrian mobility corridor to ensure a comfortable walking experience with respect to the following parameters:

1. Prioritize pedestrians
- Prioritizing pedestrians before other modes of transport.
- Providing smooth and seamless pedestrian networks.

2. Provide a pleasant walking experience
- Utilizing the existing infrastructure i.e. footpaths, subways and foot over bridges with required retrofitting.
- Safety and security of pedestrians by providing essential elements like lighting, shaded walkways, wayfinding and seating facilities.
- Promoting public art in public spaces to create a sense of interest and curiosity.

3. Integrate all modes of transport
- Connecting the pedestrian corridor with various transit modes and hubs.
- Providing convenient access to transport modes like buses, feeder systems and metro network.

4. Create universal accessibility
- Ensuring universal accessibility leading to inclusive planning.

5. Reduce the carbon footprint
- Reducing carbon footprint in dense neighbourhoods of the city by encouraging walking.

Scope and Limitations

1. Design recommendations shall be proposed for the identified stretches only.
2. Volumetric and traffic characteristics study will not be part of this project.
3. The data collected for analysis is based on site observations.

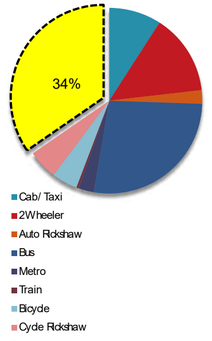
1.3 Existing Scenario of Pedestrian Mobility in Delhi

Transportation in Delhi

Master Plan of Delhi (MPD) 2021 notes that the period between 1981- 2001 and 2011 has observed a phenomenal increase in the growth of vehicles and traffic in Delhi. There has been a rise in per capita trip rate (excluding walking trips) from 0.72 in 1981 to 0.87 in 2001 and exponentially to 1.48 in 2017. Keeping in view the population growth, this translates into an increase from 45 lakh trips to around 118 lakh trips in 2001 and 144 lakh trips in 2008 (The Economic Times, 2018).

Delhi is currently facing poor air quality issues due to dependence on personal vehicles for work and other trips. This may also be related to the absence of adequate and efficient public transport services and poor walking facility.

Modes of Transport in Delhi




Encroached Footpaths


Low-maintained and poorly lit Subways


Broken Footpaths

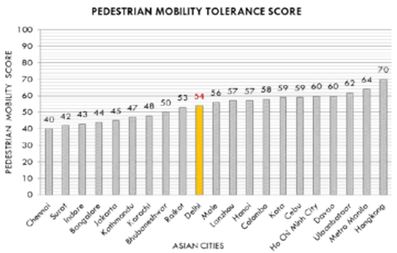

Unused pedestrian bridges

Walkability in the City

The share of pedestrian trips in Delhi is approximately 35% (refer table). This excludes the trips made to access public transport. Thus, the number of people walking in Delhi remains very high. Statistics show that more than 60% fatalities on road involve pedestrians. Therefore, an efficient pedestrian system needs to be in place to avoid such mishaps. As walking is an uncomfortable experience in Delhi (due to factors like design, maintenance, safety, lighting, etc.), majority of the users are forced to switch to private vehicles to make the desired trips. As a result, Delhi has more cars than the total number of cars in Mumbai, Chennai and Kolkata (The Wall Street Journal, 2018).

Modes of Transport	% of People		
Cab/Taxi	9.09	23	Motorized Private Transport
2Wheeler	14.07		
Auto Rickshaw	2.36	33	Public/ Para-Transport
Bus	27.12		
Metro	2.66		
Train	0.42		
Bicycle	4.46	44	Non motorized Transport
Cycle Rickshaw	5.16		
Walk	34.57 %		
Total	100	100	

Source: ADB, Walkability and Pedestrian Facilities in Asian Cities, Feb 2011



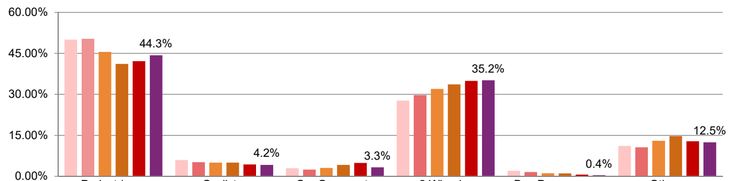
Source: Reinventing Walkability, Clear Air Asia, Manekshaw Centre, New-Delhi 6 December 2013

1.4 Pedestrian Fatalities in the last decade

Since 2007, accidents causing pedestrian fatalities and injuries have been the highest. According to Delhi traffic police report 2017, among 6673 accidents in Delhi, 1584 involved fatality and 6604 incurred injuries, affecting a total of 8188 people. Among the fatal road accident victims pedestrians are the most vulnerable.

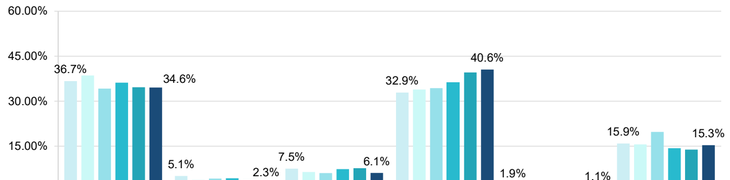
Of the road accidents reported during the year 2017, 44.3% were fatal and 34.6 % were incurred by pedestrians. On the other hand two-wheeler motorized vehicles riders incurred 35.2% fatalities and 40.6% injuries.

There is a slight difference between fatalities and injuries. Incidents among these two vulnerable groups occur due to pedestrians and two wheelers sharing the same road space. Since 2007, pedestrians and two-wheeler riders have been the most vulnerable groups in terms of fatalities, despite of the the continuous efforts to implement rules and regulations in order to facilitate road safety.



	Pedestrians	Cyclists	Car Occupants	2 Wheeler	Bus Passengers	Others
2007	50.05%	5.98%	2.99%	27.76%	2.06%	11.17%
2009	50.32%	5.20%	2.49%	29.72%	1.59%	10.67%
2011	45.55%	5.07%	3.13%	32.04%	1.18%	13.03%
2013	41.15%	5.05%	4.23%	33.68%	1.10%	14.78%
2015	42.17%	4.38%	4.93%	34.96%	0.68%	12.89%
2017	44.32%	4.23%	3.35%	35.16%	0.44%	12.50%

Percentage of road traffic fatalities by road user type in Delhi from 2007-2017



	Pedestrians	Cyclists	Car Occupants	2 Wheeler	Bus Passengers	Others
2007	36.72%	5.06%	7.52%	32.89%	1.92%	15.89%
2009	38.60%	3.76%	6.40%	33.88%	1.74%	15.61%
2011	34.22%	4.23%	6.06%	34.35%	1.38%	19.76%
2013	36.18%	4.30%	7.35%	36.25%	1.56%	14.36%
2015	34.66%	3.60%	7.65%	39.60%	0.64%	13.85%
2017	34.57%	2.33%	6.12%	40.58%	1.08%	15.32%

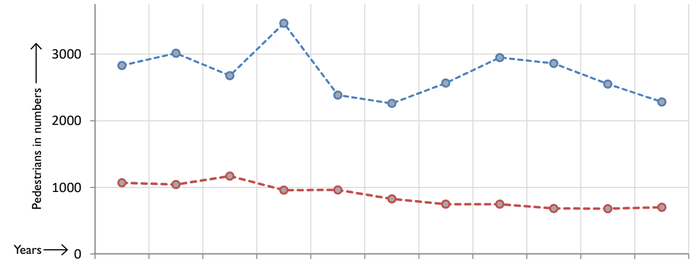
Percentage of road traffic injuries by road user type in Delhi from 2007-2017

Source: 'Victims of Road Accident-Road Accidents in Delhi'; Delhi Traffic Police, 2017 Report

Pedestrians continue to suffer the highest causalities in road accidents. During the year 2017, a total of 702 pedestrians lost their lives and 2283 were injured as compared to 682 pedestrian fatalities in 2016 and 2551 injuries. The predominant locations of fatal accidents are pedestrian crossings in residential areas.

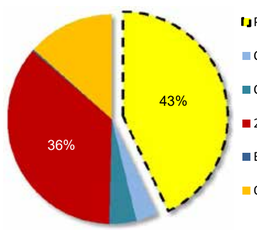
Additionally, the vicinity of educational institutions, market places, office complexes and hospitals are the sights of frequent accidents involving pedestrians. It is identified that lack of adequate number of pedestrian crossing, foot over bridges, non-continuous and intentionally encroached footpaths, along with the ignorance of road safety rules and disregard for other road-user's rights are major causes of road accidents involving pedestrians.

Consecutively complete segregation of pedestrians and motorized vehicles through elevated walkways is essential for convenient and safe pedestrian movement.

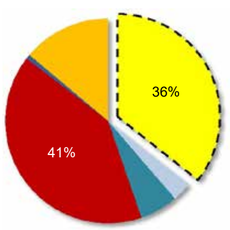


	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Killed	1071	1043	1170	960	961	828	749	749	684	682	702
Injured	2831	3015	2677	3465	2387	2261	2568	2949	2862	2551	2283

Statistics of pedestrian fatality & injury in Delhi from 2007-2017



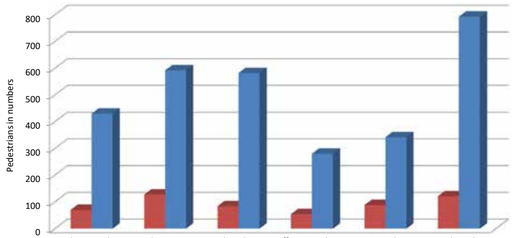
Pedestrians fatalities in Delhi (2016)



Pedestrians injured in Delhi (2016)

Source: 'Victims of Road Accident-Road Accidents in Delhi'; Delhi Traffic Police, 2017 Report

Location-wise pedestrians accidents in Delhi (2016)

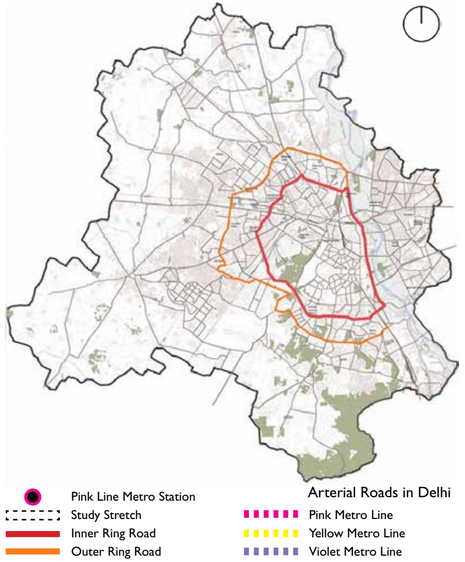


	Educational Institutions	Pedestrian Crossing	Market Place	Office Complex	Hospital	Residential Area
Killed	70	127	84	54	88	121
Injured	430	592	582	280	342	793

Chapter 2

Site Identification

2.1 Road Network : Linkages and Connections

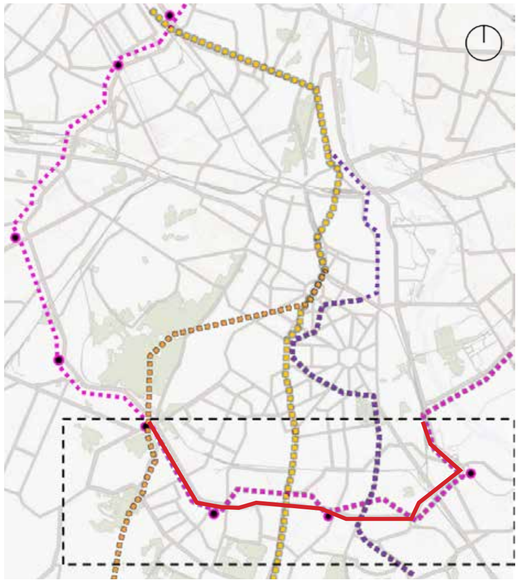


Inner Ring Road, Delhi

The Inner Ring Road connects parts of South Delhi, Central and North Delhi. It is one of the most widely used roads in Delhi. It is 51 kms long and has more than 25 flyovers to aid smooth movement of traffic and to avoid pause at traffic lights.

Source: http://www.discoveredindia.com/delhi/transportation-in-delhi/roads-in-delhi.htm | 6th August, 2018

Currently the ongoing construction work of the Pink Metro Line leads to traffic bottlenecks and snarls during peak hours.



Arterial Roads of Delhi

Two major ring roads encircle the city i.e. Inner and Outer Ring Road. But as the city is expanding, the Outer Ring Road no more encompasses the city boundary.
A new ring road is proposed to connect the outer parts of the city i.e. UER (Urban Extension Road).

Source: http://www.twenty22.in/2009/06/delhis-third-ring-road-snapshot.html | 6th August, 2018

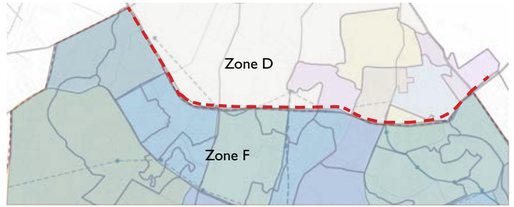
Source: http://4.bp.blogspot.com/_4o8KlvSUVEA/S9CVxWTcmI/AAAAAAAAGtQ/ykWg_VT_NLE/s400/IIIRR.jpg | 6th August, 2018

2.2 Zone Details

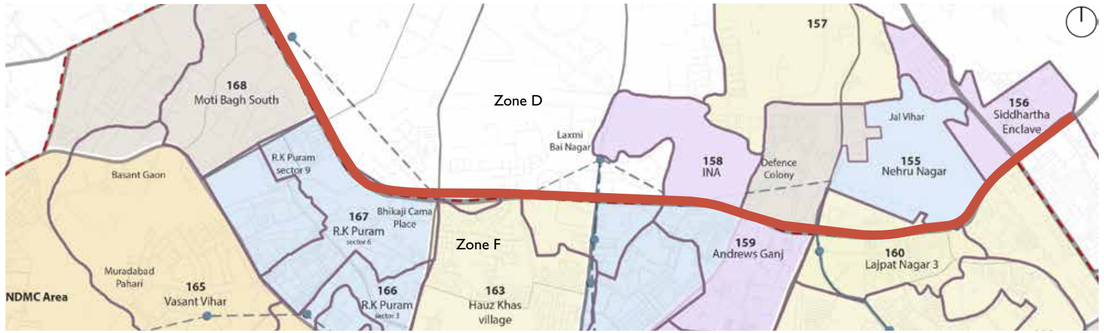
The National Capital Territory (NCT) of Delhi has been divided into 15 zones for the purpose of administration. They are from zone A to H and zone J to P. Eight of these zones are urban, one is in riverbed and remaining six are rural.

Source: http://delhi-masterplan.com/zonal-plans-mpd-2021/ | 6th August, 2018

The study stretch (Inner Ring Road) lies in between Zone D and F.



Key map highlighting the zones



Map showing various neighbourhoods around the study area

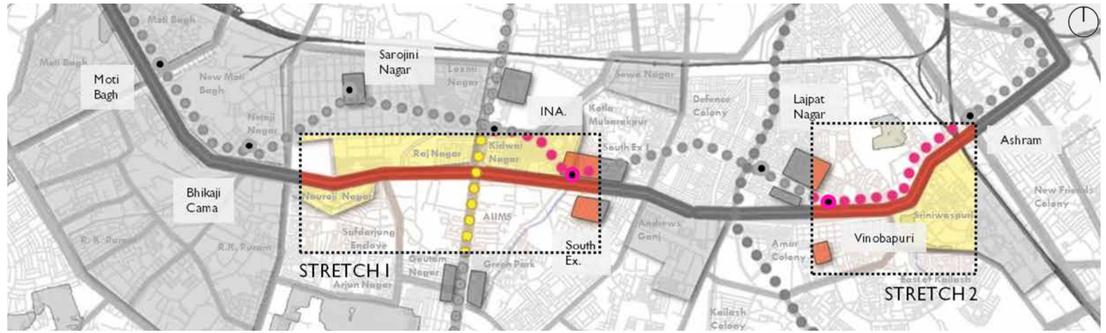
2.3 Stretch Identification

Two stretches have been identified for the study along the Inner Ring Road:
Stretch 1: South-Extension Metro station to Bikaji Cama Place Metro station
Stretch 2: Lajpat Nagar Bus stop to railway crossing near Ashram

This stretch has been identified for project demonstration as a series of residential projects are undergoing redevelopment along this stretch. As there is no vision plan to connect the pedestrian network a for this redeveloped region, this project can show a future direction. As these projects (East Kidwai Nagar, Nauroji Nagar, etc.) are under progress (design and construction stage), it would be easy to incorporate the proposed modifications.

The newly redeveloped GPRA projects and the existing transport systems (metro stations, bus stops, etc.) are considered to develop this pedestrian movement corridor.

Inner Ring Road
Pink Metro Line
Yellow Metro Line
Market Area
Existing Government Residential Colonies
Pink Line Metro Stations



Stretch identification along study area - Inner Ring Road

2.4 Defining the study area

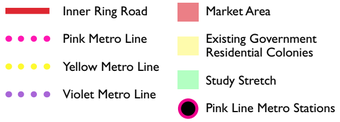
Major colonies around the stretch: The study stretch passes through several important areas of South Delhi like Lajpat Nagar, South Ex., AIIMS, Sarojini Nagar, Moti Bagh, etc. These areas are characterized by high commercial centres and thus encounter massive traffic jams on regular basis.

Metro network around the stretch: The upcoming Pink Metro Line is also known as the Ring Road Line. The Pink Line encircles the Inner Ring Road and connects areas to major markets and new developments in South Delhi.

Redevelopment proposals around the stretch: There are many ongoing redevelopment proposals along the Ring Road estimated to increase the number of habitats and cause population growth.

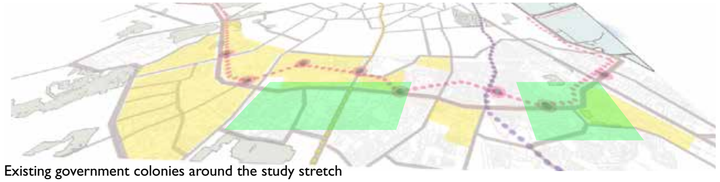
Residential colonies around the stretch: Many government residential colonies lie in this zone. These redevelopment projects (ongoing and proposed) are Sriniwaspuri, Andrews Ganj, Sewa Nagar, East and West Kidwai Nagar, Sarojini Nagar, Nauroji Nagar, Netaji Nagar.

Commercial areas around the stretch: The major commercial areas located around the stretch are South Extension I & II, Lajpat Nagar market and Sarojini Nagar market, etc.



Metro network around the study stretch

Metro stations around the study stretch



Existing government colonies around the study stretch

Existing commercial areas around the study stretch

Chapter 3

Stretch 01 (South Ex. to Bhikaji Cama Place)

3.1 Site Analysis

(Stretch 01: South Extension Metro station to Bikaji Cama Place Metro station)

Defining the study stretch:
It begins from Bhikaji Cama Place Metro station in the west to South Extension Metro station in the east.
Length - 3.3kms East-West.
Along the Aurobindo Marg crossing at AIIMS intersection, stretch extends from Dilli Haat in the north to AIIMS Metro Station in the south, i.e. approximately 750m North-South.

Redevelopment projects: East Kidwai Nagar and Nauroji Nagar (already under progress)

- **Nauroji Nagar** - Central Business District (CBD)
- **East Kidwai Nagar -** Residential and Commercial zone

Residential government colonies: Three residential colonies, Nauroji Nagar and East & West Kidwai Nagar are located along the Inner Ring Road within the stretch. Redensification of these colonies is proposed in the near future.
Private Colonies: Gautam Nagar, South Extension I & II, Ansari Nagar East & West, Sarojini Nagar, Netaji Nagar. Ansari Nagar is mainly occupied by institutions. AIIMS and Safdarjung hospitals are few of the popular landmarks in this zone.
Commercial Centres: South Extension Market and Sarojini Nagar Market
Recreational: Dilli Haat, a six acre market place, is a famous craft bazaar run by Delhi Tourism and Delhi Tourism & Delhi Transportation Development Corporation (DTTDC). It is a major tourist attraction.
Heritage sites: The important heritage sites include Kale Khan ka Makbara (behind South Ex. I. Market) and Darya Khan Tomb (East of East Kidwai Nagar residential colony).

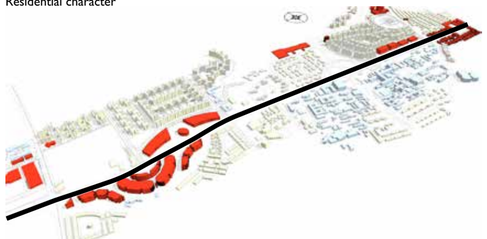
1. East Kidwai Nagar Residential Colony
2. Darya Khan's Tomb
3. South Extension-I Residential Colony
4. South Extension Market
5. South Extension Metro Station
6. Ansari Nagar East
7. AIIMS Campus
8. AIIMS Half Cloverleaf Interchange
9. Kidwai Nagar Commercial Complex
10. West Kidwai Nagar Residential Colony
11. Dilli Haat
12. Ansari Nagar West
13. Safdarjung Enclave
14. Nauroji Nagar Commercial Complex
15. Sarojini Nagar Commercial Complex
16. Sarojini Nagar Residential Colony
17. Bhikaji Cama Metro Station
18. Bhikaji Cama Place
19. Inner Ring Road

KEY MAP

Landuse plan of stretch 01

3.2 Zoning and Linkages

Residential character



Commercial character

Institutional character

Zoning

Major **residential zones** are located at the northern edge of the Ring Road, namely Sarojini Nagar, East & West Kidwai Nagar and South Extension 1.

Institutes are located on the southern edge of the Ring Road mainly in East & West Ansari Nagar.

Commercial zones are mostly found in east and west extremes of the stretch along the ring road.

Links on the Metro line (Pink Line and Yellow Line) improve the connectivity of the stretch to other parts of the city.

Around 17 bus stops along the stretch connect Inner Ring Road with other parts of the city.

South Extension Market

Dilli Haat - Craft Bazar

East Kidwai Nagar Residential Colony

Safdarjung Hospital

Road Linkages

Mahatma Gandhi Marg or Inner Ring Road, one of the major arterial roads, connects various important landmarks/ neighbourhoods/ roads including Africa Avenue and Sri Aurobindo Marg, which subsequently connects Inner Ring Road to Outer Ring Road. Other major connecting roads to Mahatma Gandhi Marg are:

- Rajmata Vijayraje Scindia Marg is the approach road to Sarojini Nagar residential area.
- Shri Vinayak Mandir Marg is a major connection to Sarojini Nagar Market in the north.
- Chaudhary Harsukh Marg is one of the main approach roads to Green Park. It has the hertitage sites: "Bagh-I-Alam ka Gumbad" and Hauz Khas district park
- INA, Dilli Haat, AIIMS and Safdurjung Hospital campus entries are from Sri Aurobindo Marg.
- Khatli Vikas Marg is the only approach road to Darya Khan's Tomb from Mahatma Gandhi Marg.
- Siva Road divides the two colonies i.e South Extension-II to the east and Ansari Nagar East to the west.

Traffic on Inner Ring Road is largely accommodated by Africa Avenue and Sri Aurobindo Marg . Thus, the proposal focuses on various nodes along this stretch. Various features for the walkway would be explored along these stretches to demonstrate efficient functioning and connectivity.

KEY MAP

1. Mahatma Gandhi Marg/ Inner Ring Road
2. Africa Avenue
3. Rajmata Vijayraje Scindia Marg
4. Shri Vinayak Mandir Marg
5. Chaudhary Harsukh Marg
6. Sri Aurobindo Marg
7. Khatli Vikas Marg
8. Siva Road

Arterial road Sub-arterial road

Map showing connecting roads around Stretch 01

STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

3.3 Existing- Walkability Scenario

KEY MAP

Presently, most of the stretch, i.e.55% is not suitable for smooth, uninterrupted movement. Around 4% of road stretch does not have provision for footpath due to unavailability of space (Barapullah's connection with AIIMS interchange, does not facilitate footpath connectivity). Thus, the desired infrastructure has to be developed.

1 Unsafe footpaths with broken or missing manhole covers

2 Insufficient space for walking

3 Haphazard tree plantation restricts movement of pedestrians

At-Grade Pedestrian Walkability

4 At certain sites, 100% blockage due to large existing trees

5 Most of the footpath width is encroached by hawkers and haphazard tree plantation

6 Existing sign boards and trees make it difficult for pedestrians to commute

7 100% blockage by existing foot over bridge

8 Bus stop covers the full width of the footpath

9 Space not appropriate

No Footpath exists | Foot Over Bridge | Smooth Pedestrian Movement | Difficult/ impossible Pedestrian Movement

A Refer picture no.'A' for existing scenario | B Refer picture no.'B' for similar existing scenario | C Picture no.'C' with supportive caption

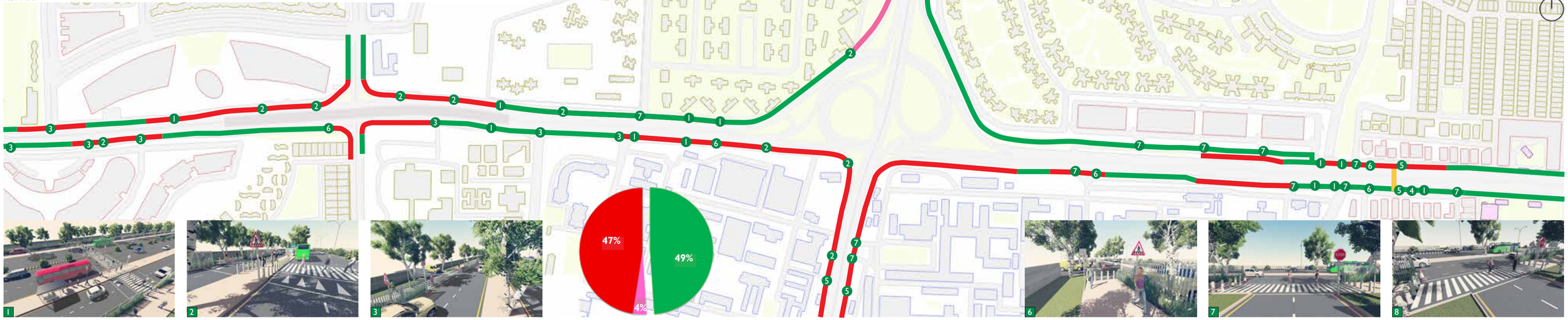
Source: Based on site observation

STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

3.4 Possibilities of Upgradation of existing Footpaths

KEY MAP

The scope to improve and accommodate pedestrian infrastructure into the existing set-up is only 8% due to the unavailability of space.
Thus, it is not recommended to upgrade existing footpaths.
Instead, elevated walkways would be the way forward.



1 Pedestrian crossing on ring road & its approach to the bus stand

2 Pedestrian crossing on service lane

3 Intersection between service road and local road

Proposed At-Grade Pedestrian Walkability

4 Proposed foot over bridge, located at a major obstruction such as a tree or a service block on median

5 Image showing pedestrians crossing Ring Road using foot over bridge equipped with proper signage for safe transit

6 Dedicated footpath for pedestrians with sign boards and planter zone

7 View of intersection from local road

8 Signage for pedestrian crossing

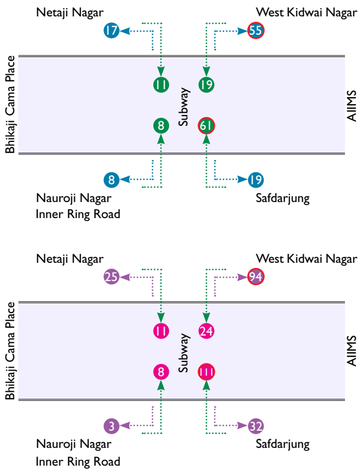
No Footpath exists | Foot Over Bridge | Smooth Pedestrian Movement | Difficult/ impossible Pedestrian Movement

(A) Refer picture no.'A' for proposed scenario

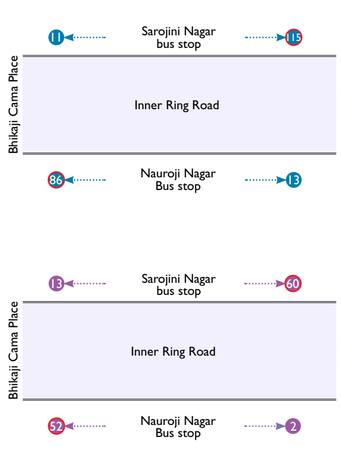
STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

3.5 Pedestrian Footfall Analysis

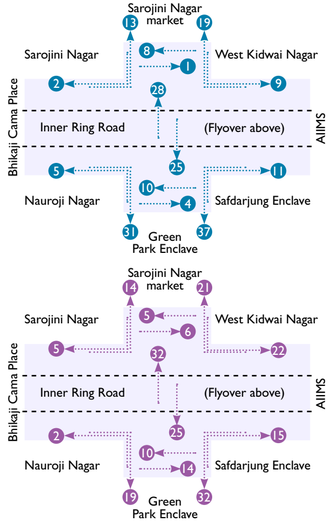
A. SUBWAY NEAR NAUROJI NAGAR



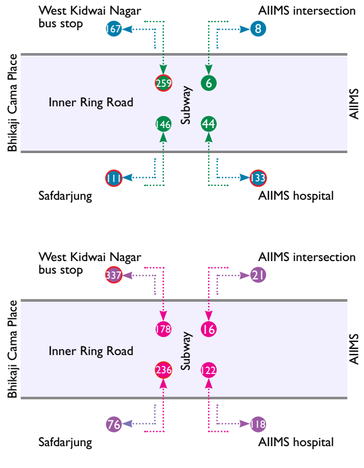
B. BUS STOP NEAR NAUROJI NAGAR



C. CROSSING NEAR SAROJINI NAGAR



D. SUBWAY AT SAFDARJUNG HOSPITAL



E. AIIMS METRO STATION & SUBWAY

Source: Based on site observation

On site observation

During regular peak hour, the pedestrian volume is low compared to off-peak hours, likewise for non-peak hours, majority of pedestrian movement from Nauroji Nagar bus stop towards Sarojini Nagar residential pocket is observed.
Additionally, pedestrian flow is observed from AIIMS (Nauroji Nagar side) to Sarojini Nagar residential pocket. Pedestrian movement towards Bhikaji Cama Place seemed negligible.

Note: Numerical figures mentioned represents number of persons for the designated movement pattern for duration of fifteen minutes, survey has been conducted between 9:00 am to 10:30 am and between 11:30 am to 12:30 pm, during peak hours and off-peak hours respectively.

There is minimal difference between the pedestrian volume during peak and non-peak hours, however majority of the movement is towards Sarojini Nagar Market and Green Park Enclave. Pedestrians crossing from Sarojini Nagar Market towards Green Park Enclave are approx. 200 pax, to and fro every hour. It is also observed that the pedestrian volume of approx. 372 pax/hr. during morning peak and 304 pax/hr during morning off-peak hour walk towards Green Park Enclave.

Pedestrian volume count at Safdarjung Hospital subway experiences heavy footfall ranging from 1800 to 2200 pax/hr. While major pedestrian movement is between Safdarjung Hospital and Kidwai Nagar West, majority of pedestrian movement consist of public-boarding and de-boarding at Safdarjung bus stop on both sides of ring road.

Pedestrian volume count at AIIMS hospital and Safdarjung Hospital varies between 10000 pax/hr. during morning peak and 8000 pax/hr. during morning off peak hours. The overall pedestrian movement at the site is similar throughout the day. Average 1200 pax use the subway to cross between Safdarjung Hospital and AIIMS hospital in an hour. There is high influx of pedestrians from metro gates namely gate 1,2 and 4 during morning peak hours while gate 1&3 observe high outflow of pedestrians to metro station during peak and non-peak hours.

More than 17000 persons per hour use the public infrastructure for pedestrian movement during morning peak hours in the study area and could be beneficiaries of the proposed elevated walkway project.

Peak inflow Peak outflow Off-peak inflow Off-peak outflow

STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

3.6 Major Nodes and Landmarks

Map showing potential nodes along Stretch 01

Source: Based on site observation

KEY MAP

The identified nodes account for a massive footfall due to their proximity to residential & commercial centres and easy access to public services such as bus stops, subways, entrances to public buildings, etc.

Pedestrian traffic from these nodes can be diverted to well connected elevated walkways. This will lower pedestrian-vehicular conflicts, segregate pedestrians and provide consistent vehicular movement and thus reduce congestion.

1. East Kidwai Nagar Residential Colony
2. Darya Khan's Tomb
3. South Extension-I Residential Colony
4. South Extension Market
5. South Extension Metro Station
6. Ansari Nagar East
7. AIIMS Campus
8. AIIMS Half Cloverleaf Interchange
9. Kidwai Nagar Commercial Complex
10. West Kidwai Nagar Residential Colony
11. Dilli Haat
12. Ansari Nagar West
13. Safdarjung Enclave
14. Nauroji Nagar Commercial Complex
15. Sarojini Nagar Commercial Complex
16. Sarojini Nagar Residential Colony
17. Bhikaji Cama Metro Station
18. Bhikaji Cama Place
19. Inner Ring Road

Subway Connections
Pedestrian Flow
Foot Over Bridge
Bus Stop
Prime Nodes

STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

3.7 Proposal - Connections along the Stretch

Proposed walkways for Stretch 01:

Phase I

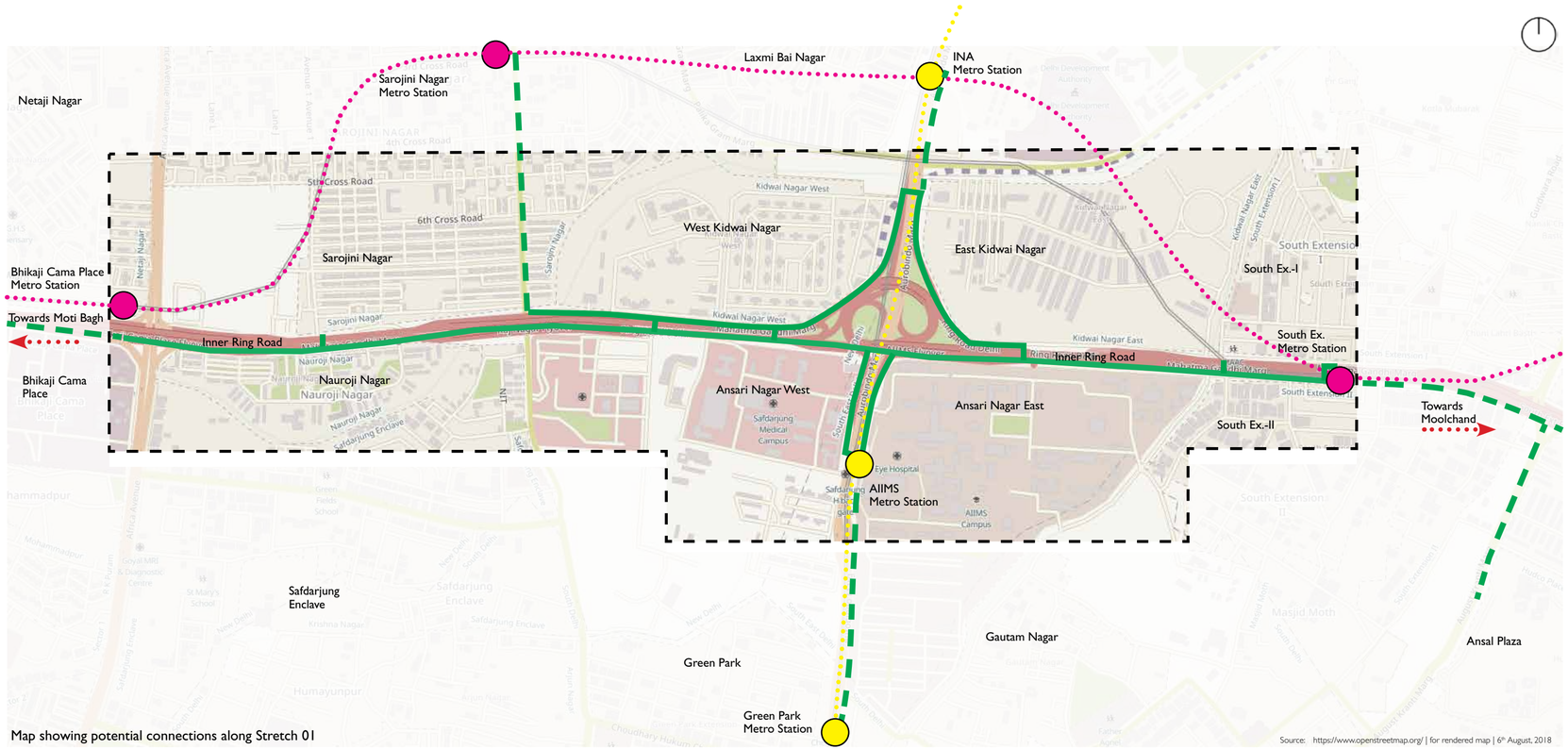
- **Ring Road** - South Extension metro station to Bhikaji Cama Place
- **Sri Aurobindo Marg** – Dilli Haat towards north and AIIMS metro station towards the south.

Phase 2

- **Ring Road** - Upto Moolchand metro station and Ansal Plaza in east and towards Dr Bhim Rao Ambedkar Park in the west.
- **Sri Aurobindo Marg** – Laxmi Bai Nagar and Sarojini Nagar market towards north.

The intent is to provide uninterrupted pedestrian movement from residential neighborhoods to transit stations and to ease the traffic congestion on busy routes.

Elevated walkways will provide safe connections to major commercial places and landmarks, with comfortable and guided access. Provision of elevated walkways will minimize the risk of pedestrian and vehicular conflicts, thus reducing pedestrian fatalities.



Map showing potential connections along Stretch 01

- Yellow Line Metro Station
- Pink Line Metro Station
- Yellow Metro Line
- Pink Metro Line
- Stretch Boundry
- Elevated Walkway Phase-I
- Elevated Walkway Phase-II

3.8 Proposed Elevated Walkway Footprint

KEY MAP

The proposed elevated walkway runs parallel to Inner Ring Road and connects prominent neighborhoods, namely:

1. South Extension I & II
2. East and West Kidwai Nagar (GPRA Redevelopment Project)
3. East and West Ansari Nagar
4. Safdarjung Enclave
5. Sarojini Nagar (GPRA Redevelopment Project)
6. Nauroji Nagar (Redevelopment Project)
7. Bikaji Cama Place
8. Netaji Nagar (Redevelopment Project - Residential and Institutional)

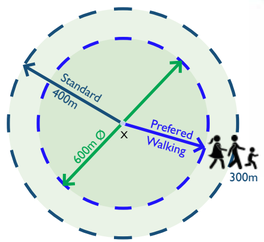
Elevated walkway footprint for Stretch 01

STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

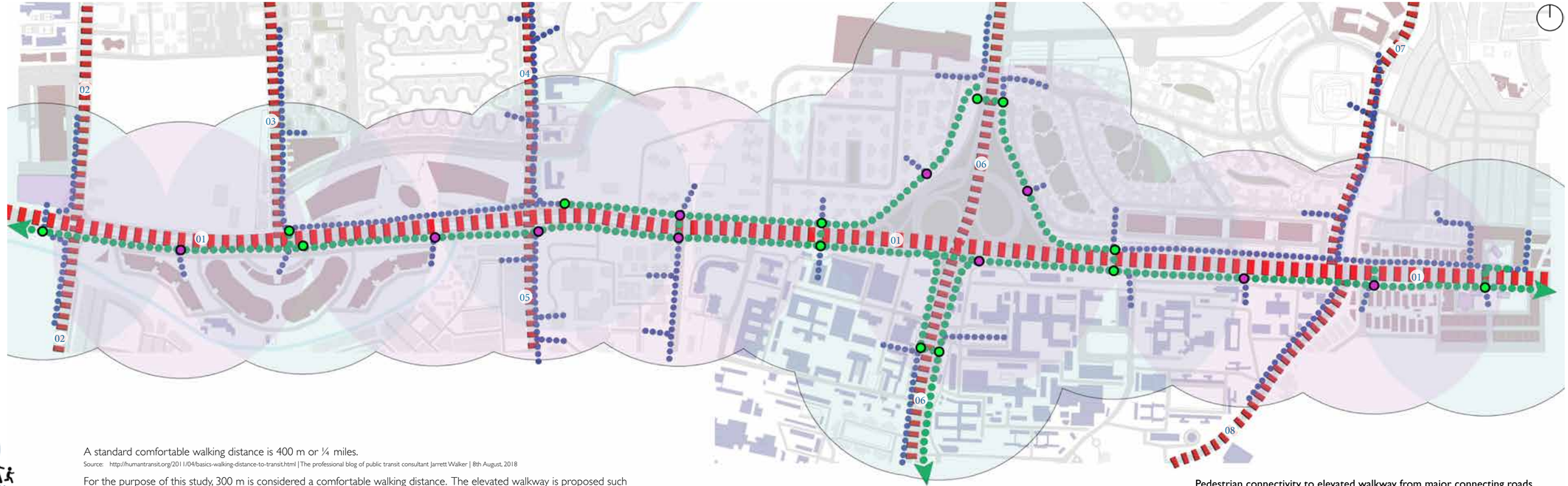
3.9 Major road connections and their influence zone

An elevated walkway is proposed along Inner Ring Road and extended towards Sri Aurobindo Marg leading to two metro stations, INA and AIIMS. Thus, the walkway serves a wide area.

The corresponding map depicts the pedestrian flow, highlighting the linkages from various routes to the proposed elevated walkway. It encompasses the entire expanse of the stretch, making it accessible for most of the connecting routes.



Walking range for pedestrians



A standard comfortable walking distance is 400 m or ¼ miles.

Source: http://humantransit.org/2011/04/basics-walking-distance-to-transit.html | The professional blog of public transit consultant Jarrett Walker | 8th August, 2018

For the purpose of this study, 300 m is considered a comfortable walking distance. The elevated walkway is proposed such that from any point 'X', the influence zone* covers major landmarks and residential neighbourhoods.

**Influence zone: From any Point 'X' a distance of 300 m (radius) is considered the influence zone i.e. the zone within which maximum activities are located.*

Pedestrian connectivity to elevated walkway from major connecting roads

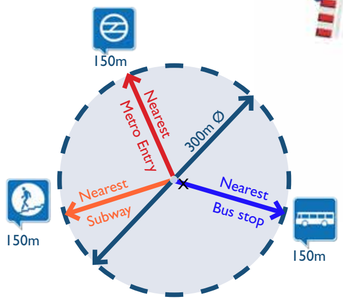
1. Mahatma Gandhi Marg/ Inner Ring Road
2. Africa Avenue
3. Rajmata Vijayraje Scindia Marg
4. Shri Vinayak Mandir Marg
5. Chaudhary Harsukh Marg
6. Sri Aurobindo Marg
7. Khatli Vikas Marg
8. Siva Road

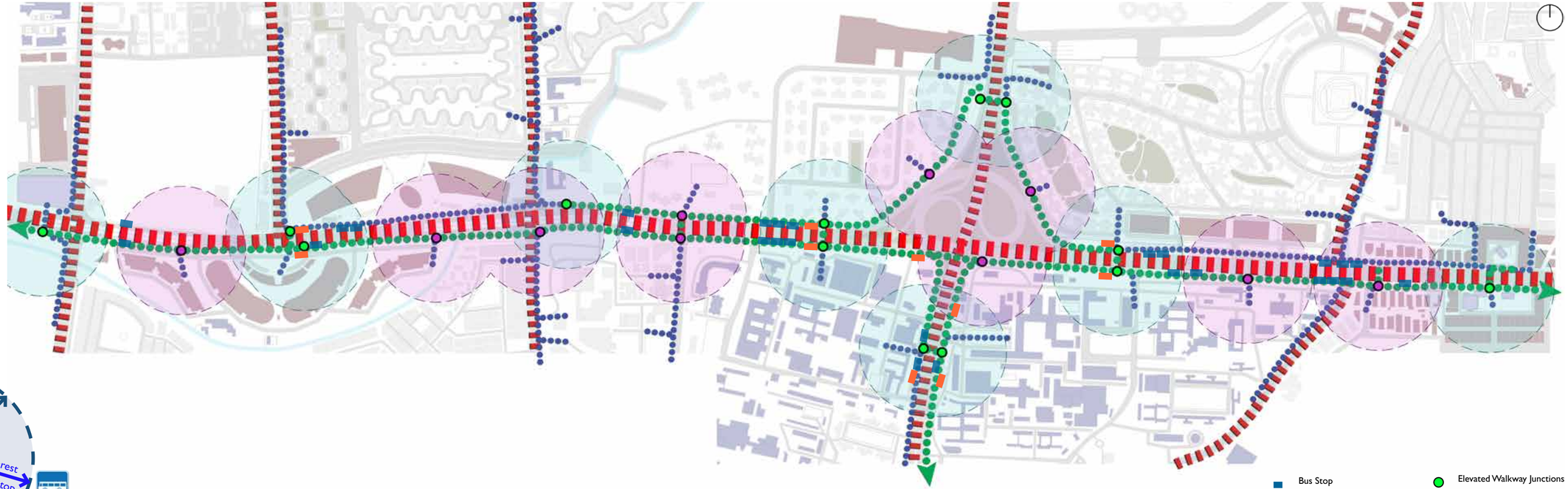
STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

3.10 Connecting to public transport

Majority of public transport systems lie within the influence zone i.e. within 150 m from the elevated walkway.

The following graphic demonstrates that any public transport system can be accessed comfortably from any point 'X' (i.e. junctions, pause points etc.) on the elevated walkway.



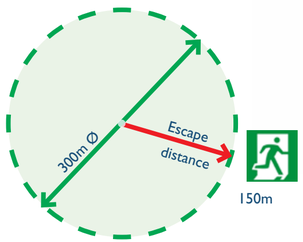


Map depicting access to nearest public transit system from various nodes along the elevated walkway stretch

STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

3.11 Emergency Escape

World wide standards for elevated walkway differ due to variations in site context, building regulations, local weather conditions, along with other factors. Various case studies were studied to draw inferences regarding the design and specifications, keeping in mind the current context.



Skygarden, Seoul is an example which "aims to regenerate and connect places near the main railway station that have been fragmented by roads and railway tracks. It takes a case of a dense urban precinct that was created without a great deal of concern for public space and pedestrian movement, and giving it qualities of walk ability, neighborliness, human scale and shared enjoyment of its places".

Source: https://www.theguardian.com/cities/2017/may/19/seoul-skygarden-south-korea-london-garden-bridge | 25th September, 2018

From the above study, 300 m center to center is adopted as the maximum distance between two emergency exits

STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

3.12 Potential junctions along the elevated walkway

Map depicting identified potential junctions along Stretch 01

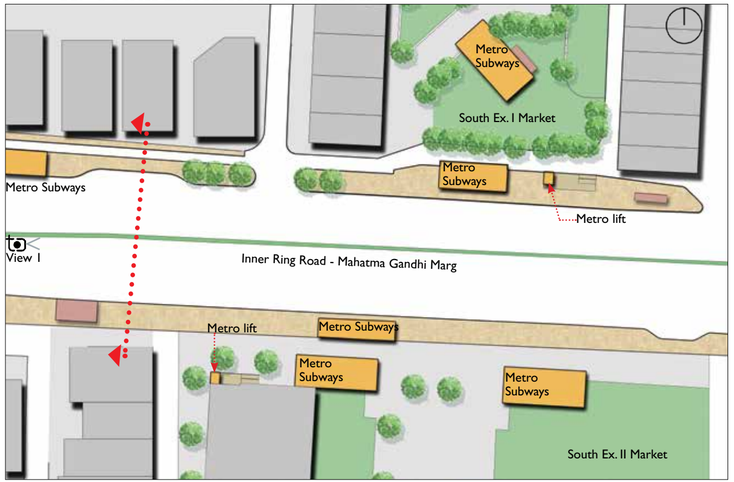
The following junctions were identified for design demonstration due to their proximity to residential neigbourhoods, commercial centres, transport hubs, etc. for maximum coverage:

1. Nauroji Nagar junction
2. Sarojini Nagar junction
3. Safdarjung junction
4. AIIMS Metro station
5. Dilli Haat junction
6. East Kidwai Nagar junction
7. South Extension junction

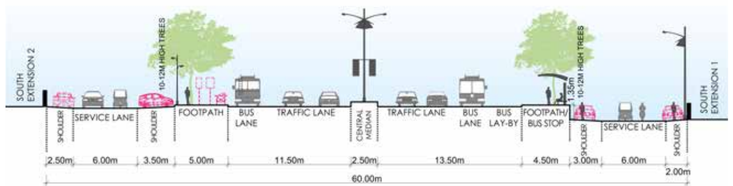
STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

3.13 Proposal along Junctions

A. South Extension Junction



Existing scenario of South Extension junction



Existing section through South Extension Market

Existing Scenario

South Extension I & II is one of the most busy junctions due to the presence of large high end commercial markets on either side of the Inner Ring Road. Subways for cross-over are proposed as part of the Metro line development. These markets experience a heavy footfall and cross-overs to either side of the ring road.

The neighbourhood lacks continuous pedestrian connectivity discouraging walking, it instead encourages residents to use vehicular transport for short trips.

At-grade crossings are a common practice and are often unsafe leading to pedestrian fatalities. The subway exit enables cross-overs but further movement remains restricted due to the lack of dedicated walkways for pedestrians. Also, the existing infrastructure lacks continuity and proper upkeep thus discouraging walking.

Key plan

1 View of the South Extension Junction

Proposal

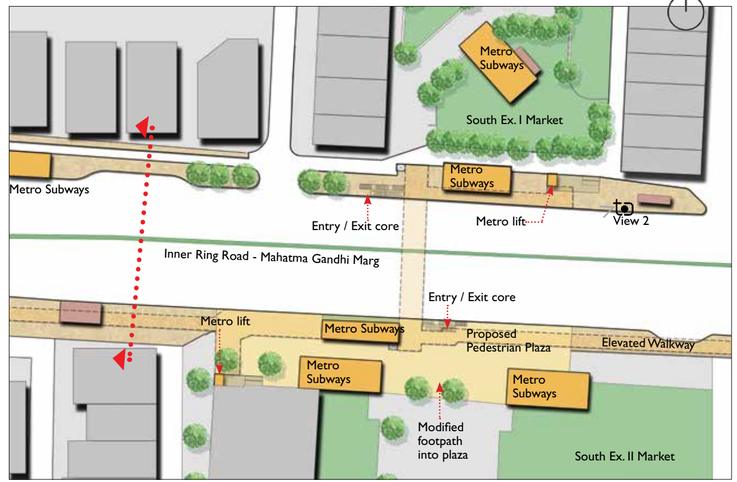
Due to its busy and prominent location, it is necessary to have safe and dedicated crossings and walkways for pedestrians at South Extension junction.

The upcoming Metro station (South Extension Metro station - Pink Line) has exits on either side of the arterial road, thus elevated walkways have been proposed to run parallel to Inner Ring Road. The walkway will connect to the existing subways seamlessly for uninterrupted movement of the users.

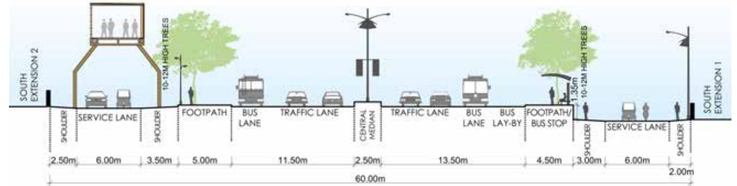
Also, a foot over bridge (as a connection from the elevated walkway) is proposed to connect South Extension I to South Extension II to enable safe cross-over.

- Footpath
- Road Median
- Buildings
- Informal Activity

2 Proposed schematic design of elevated walkway



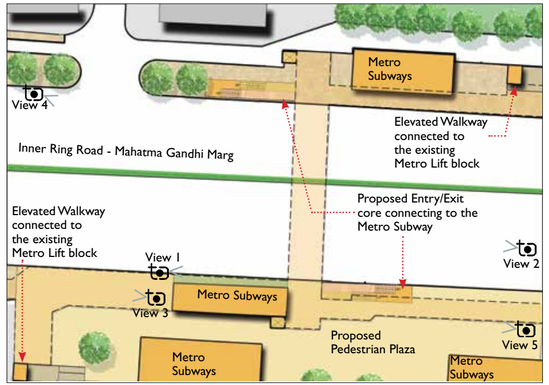
Proposed scheme of South Extension Junction



Proposed section through South Extension Market

STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

South Extension Junction - Proposed Floor Plans



Grade-level plan for South Extension junction

Walkway level Plan (Elevated)

Features of the elevated walkway

Various features have been proposed to make the space inviting and comfortable for its users.

Public Art installation - Entrances to the walkway to be marked by art work to make the entry more welcoming.

Provision for kiosks and seating areas at regular intervals to serve as pause points.

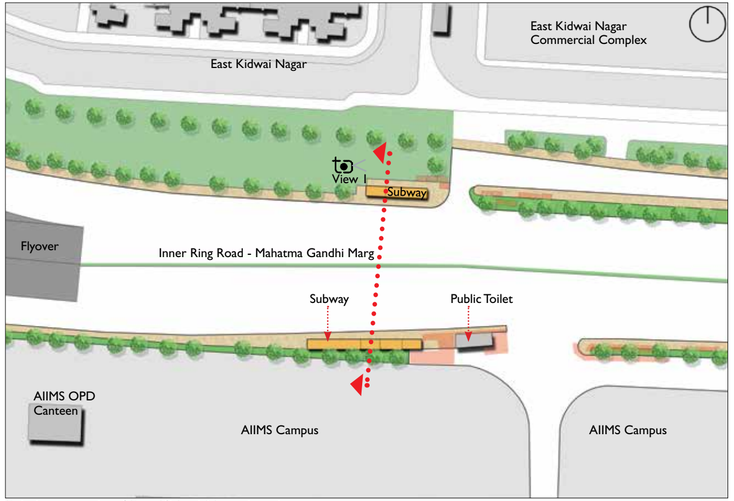
Landscape sections of the walkway to provide green relief and shading to the stretch.

Key plan

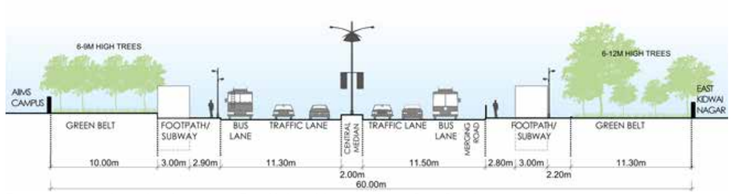
Schematic proposed views of South Extension Junction

View of proposed South Extension junction

B. East Kidwai Nagar Junction



Existing scenario of East Kidwai Nagar junction



Existing section through subway near East Kidwai Nagar on Inner Ring Road

Existing Scenario

The ongoing East Kidwai Nagar redevelopment project will house 4,608 dwelling units (134 DU/ Ha.) and introduce a huge commercial footprint. This will substantially invite more pedestrians. The existing street network does not have the capacity to cater to such a large population due to planning constraints. Also, the presence of AIIMS campus makes this junction all the more active and important.

Inner Ring Road being a high movement corridor is unsafe for pedestrian crossovers in the absence of designated at-grade crossings. The only available pedestrian crossings are in form of subways without adhering to universal accessibility principles.

Source: https://www.hindustantimes.com/delhi-news/at-delhi-s-east-kidwai-nagar-ornamental-trees-replace-years-old-ecosystem/story-GOm6qqvpb4LNxTlo26WuZJ.html | 26th September, 2018

Key plan

Existing green belt in front of East Kidwai Nagar

Proposal

The proposed elevated walkway will extend on either side of Kidwai Nagar junction and provide pedestrian connectivity at an elevated level.

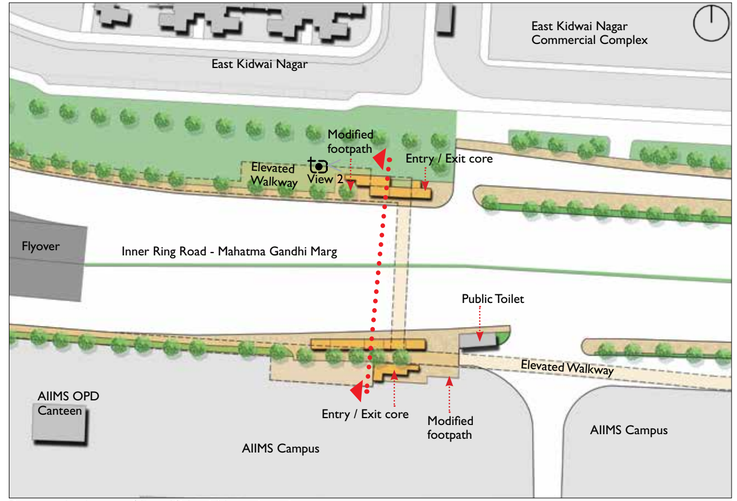
The entry/exit of the elevated walkway is proposed close to the location of the existing subway for easy access.

A foot-over-bridge enables uninterrupted pedestrian cross-over.

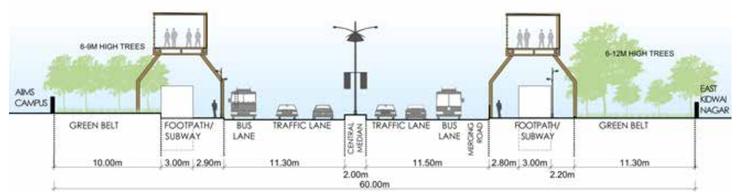
The existing encroachments on the footpath will be removed and the footpath widened to accommodate more pedestrians to move comfortably.

- Footpath
- Road Median
- Buildings
- Informal Activity

Proposed junction in front of East Kidwai Nagar

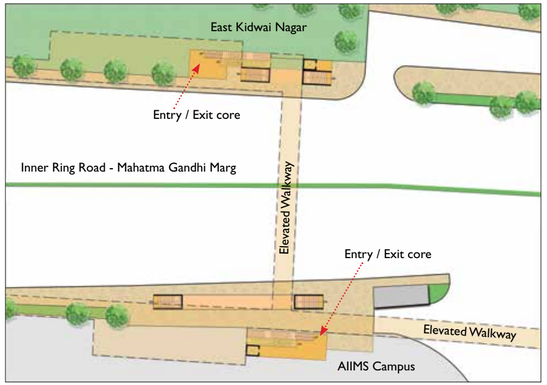


Proposed scheme of East Kidwai Nagar junction



Proposed section at East Kidwai Nagar junction

East Kidwai Nagar Junction- Proposed Floor Plans



Grade level plan- East Kidwai Nagar junction

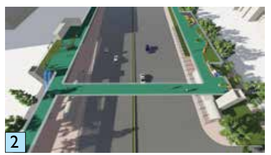
Elevated walkway level proposal for East Kidwai Nagar junction

Features of the elevated walkway

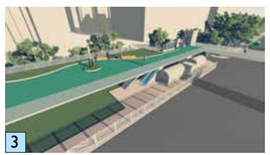
Various features have been proposed to make the space inviting and comfortable for its users.
Public Art installation - Entrances to the walkway to be marked by art work to make the entry more welcoming.
Provision for kiosks and seating areas at regular intervals to serve as pause points.
Landscape sections of the walkway to provide green relief and shading to the stretch.

Key plan

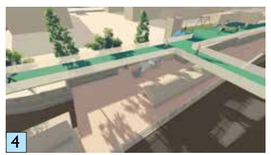
View from AIIMS flyover side



View from South Extension side



View I showing the greens



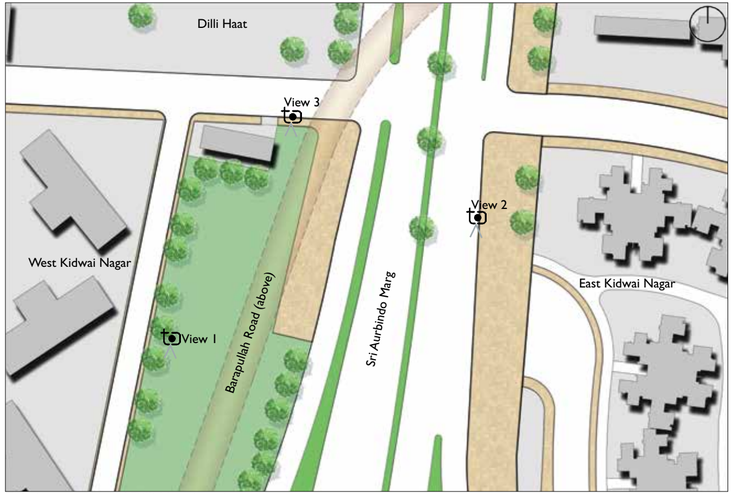
View II showing the greens

Proposed elevated walkway junction view on East Kidwai Nagar side

Proposed elevated walkway junction view on AIIMS campus side

STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

C. Dilli Haat Junction



Existing scenario of Dilli Haat junction

Existing Scenario

Dilli Haat junction is one of the busiest junctions around Inner Ring Road due to its proximity to popular destinations such as Dilli Haat, INA market and residential colonies of Kidwai Nagar and Laxmi Bai Nagar.

The junction lacks pedestrian continuity due to the presence of prominent transport intersections such as elevated Barapullah and the merging of the AIIMS flyover loop.

The existing pedestrian footpaths are not properly maintained and remain mostly deserted. Due to the absence of activity, 'eyes on the street', the footpath is unsafe.

Key plan

1 Green space along Barapullah

2 Area near East Kidwai Nagar entrance

3 Available space at grade level to connect elevated walkway

Proposal

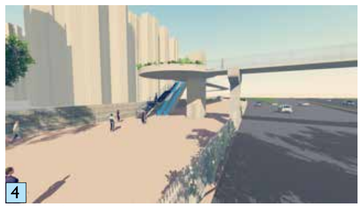
The proposed elevated walkway will extend to Sri Aurobindo Marg to connect Dill Haat and the neighboring areas.

The extent of the walkway has been restricted to approximately 370 m from Inner Ring Road due to the limited clear height available as Barapullah elevated road, Phase 2, runs over Sri Aurobindo Marg.

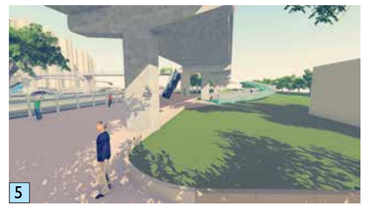
It connects East Kidwai Nagar to West Kidwai Nagar by a foot-over-bridge. It is proposed to provide defined pedestrian crossings at-grade (Dilli Haat to AIIMS flyover greens) to allow uninterrupted access to pedestrians.

- Footpath
- Road Median
- Buildings
- Informal Activity

Proposed scheme of Dilli Haat junction

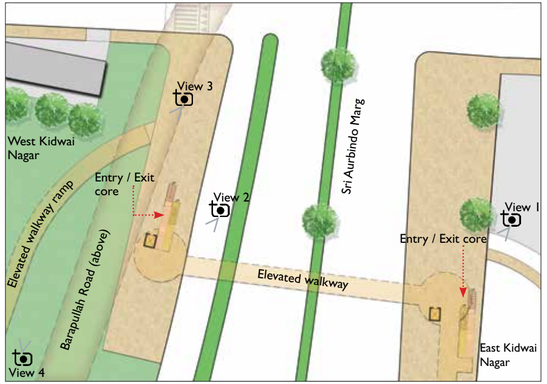


4 Proposed junction near entrance

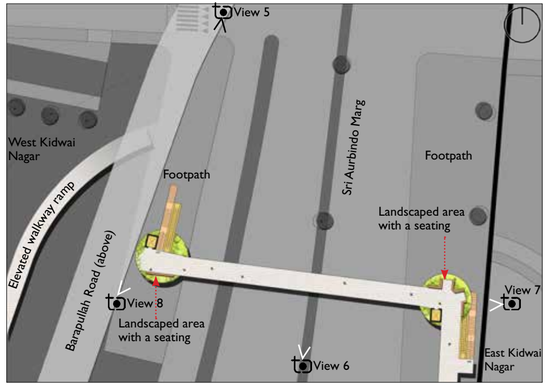


5 Elevated walkway ramp down to grade level

Dilli Haat Junction- Proposed Floor Plans



Grade level plan for Dilli Haat junction



Elevated walkway level plan for Dilli Haat junction

Features of the elevated walkway

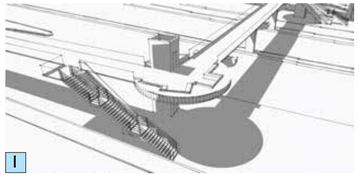
Various features have been proposed to make the space inviting and comfortable for its users.

Public Art installation - Entrances to the walkway to be marked by art work to make the entry more welcoming.

Provision for kiosks and seating areas at regular intervals to serve as pause points.

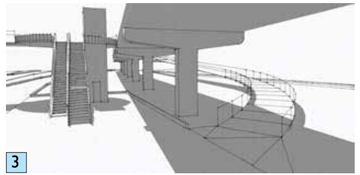
Landscape sections of the walkway to provide green relief and shading to the stretch.

Key plan



1 Sketches of the proposal (I)

2 Sketches of the proposal (II)



3 Sketches of the proposal (III)

5 View from Dilli Haat plaza

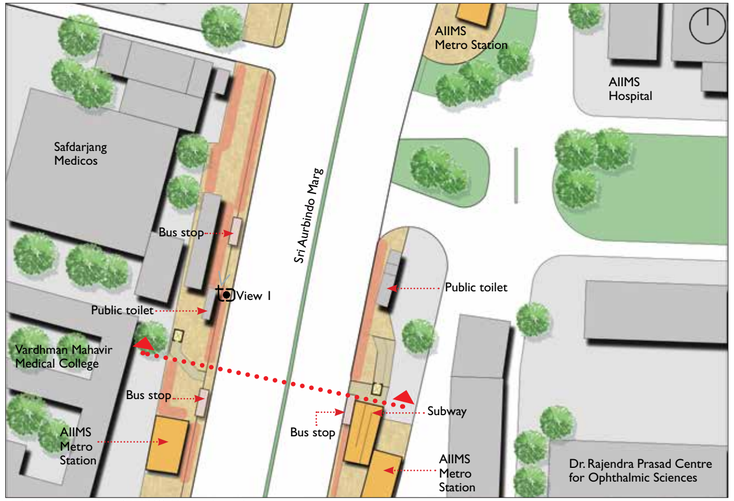
6 Overall schematic view of Dilli Haat junction

7 Junction near East Kidwai Nagar residential colony entrance

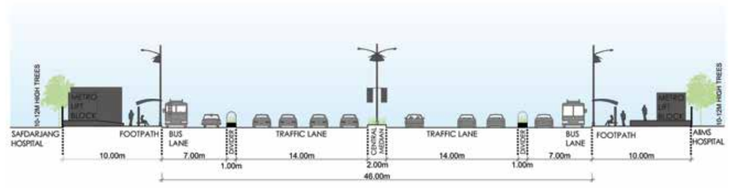
8 Junction near West Kidwai Nagar residential colony

STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

D. AIIMS Metro Junction



Existing scenario of AIIMS Metro junction



Existing section through subway at AIIMS Metro junction

Existing Scenario

Along Sri Aurobindo Marg, the AIIMS Metro junction is an important location due to the high pedestrian movement at the metro station, AIIMS hospital and the medical shops in its vicinity.

This pedestrian intensity and frequent cross overs often disturbs the vehicular traffic and also increases chances of pedestrian fatalities due to jaywalking, etc.

The existing subway entry/exit near AIIMS Metro station is often encroached by hawkers, thus making it difficult to access it. As this stretch is lined with medical shops, a large number of buyers frequent this place and park their vehicles along this stretch, this creates a bottle neck. This commercial stretch lacks effective footpath width.

Key plan

1 Excessive encroachment along the footpath leaves inadequate space for pedestrians

Proposal

The elevated walkway at AIIMS junction provides continuous, dedicated corridor for pedestrians movement.

A foot-over-bridge connects AIIMS hospital to Safdarjung hospital and medical shops along Sri Aurobindo Marg.

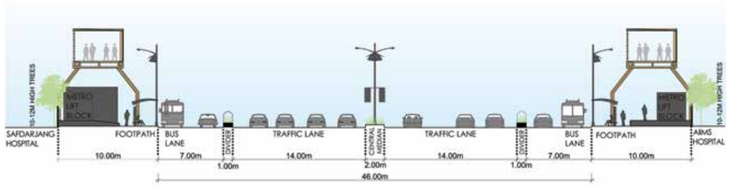
The walkway terminates at Vardhaman Mahavir Medical College but extends on the other side to AIIMS hospital and beyond.

The walkway will serve the large pedestrian population arriving at the metro station to access the facilities in the precinct.

- Footpath
- Road Median
- Buildings
- Informal Activity

2 Proposed view of AIIMS Metro junction

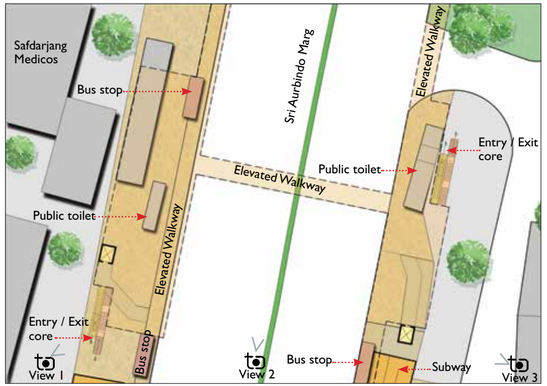
Proposed scheme of AIIMS Metro junction



Proposed section through subway at AIIMS Metro junction

STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

AIIMS Metro Junction- Proposed Floor Plans



Grade level plan for the AIIMS Metro junction

Elevated walkway level plan for the AIIMS Metro junction

Features at Elevated Walkway level

The elevated walkway will be lined with landscaped areas with seating options and kiosks to create a comfortable environment lined with essential needs.

Key plan

1 Safdarjung Hospital side junction

2 AIIMS junction from central median

3 Proposed schematic view of AIIMS Metro junction

E. Safdarjung Junction

Existing Planning

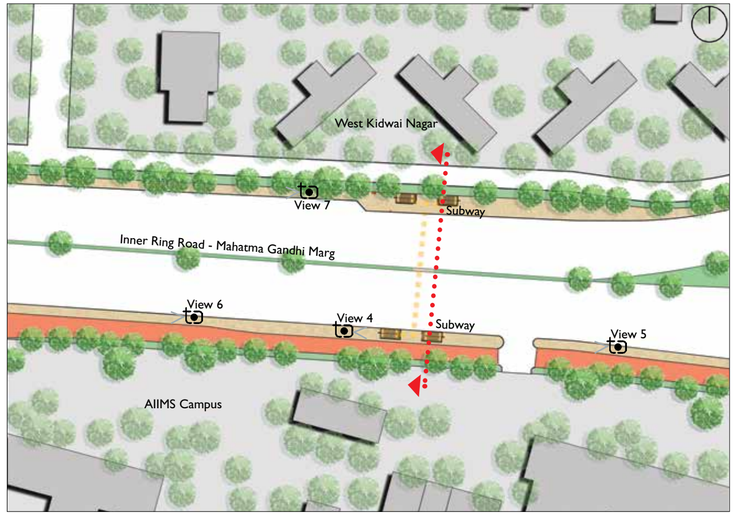
Safdarjung junction, faces high intensity footfall due to medical visitors but it lacks pedestrian comfort. It has encroached footpaths and inadequate sidewalk widths that make efficient movement a challenge.

All along the service lane, medical garbage is dumped and unauthorised car park occupies majority of the road space, leaving little space for the pedestrian movement.

At some points, cars are even parked on the footpath making it impossible for pedestrians to manoeuvre the stretch.

Footpath
Road Median
Buildings
Informal Activity

Key plan



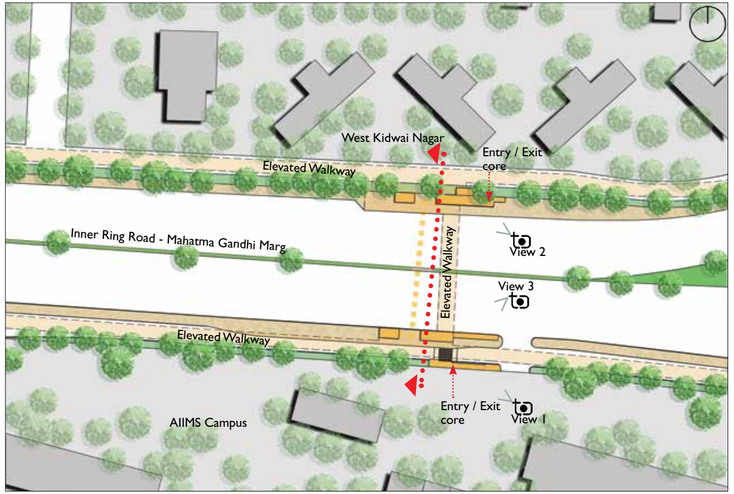
Existing scenario of Safdarjung junction

4 Medical waste dumped on service lane

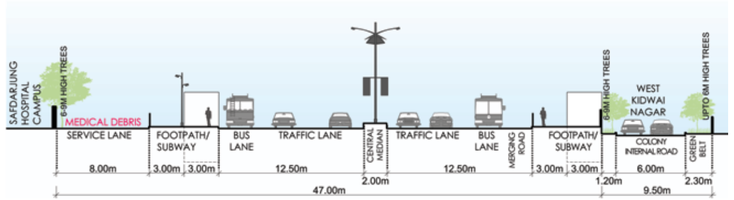
5 Blocked service lane

6 Parking on footpath

7 Bus stop at West Kidwai Nagar side



Proposed scheme at Safdarjung junction



Existing section at Safdarjung junction

Proposal

Elevated walkways are proposed to run parallel on either side of the stretch providing corridors for continuous movement for pedestrians.

The connections along this stretch will cater to the neighbouring areas of West Kidwai Nagar and AIIMS campus. A foot-over-bridge will connects to either side of the road.

Key plan

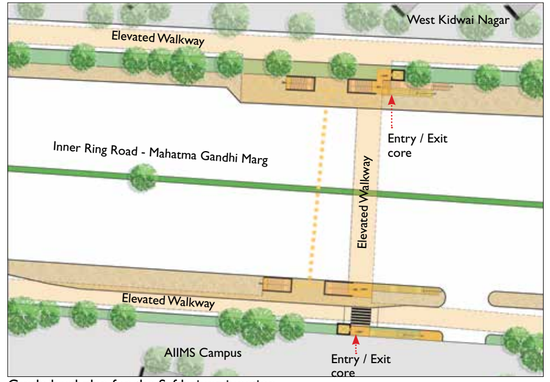
1

Proposed view I of Safdarjung junction

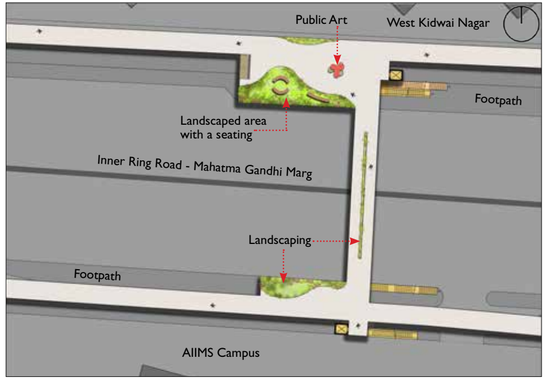
2

Proposed view II of Safdarjung junction

Safdarjung Junction - Proposed Floor Plans



Grade level plan for the Safdarjung junction

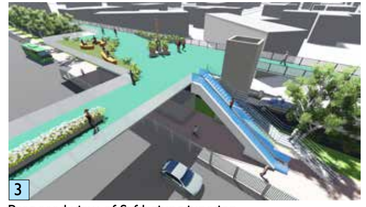


Elevated walkway level plan for the Safdarjung junction

Features at Elevated Walkway level

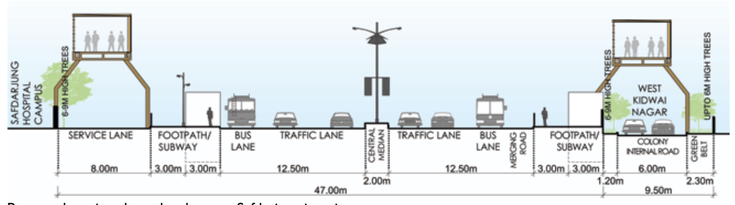
The elevated walkway will feature public art to create areas of interest. These pause points will bring vibrancy to the stretch and also develop a sense of unique identity. Few parts of the stretch will be landscaped with provision for seating, which will become resting points for relaxation. The shaded walkway will provide ample protection from harsh weather conditions specially during summers.

- Footpath
- Road Median
- Buildings
- Informal Activity



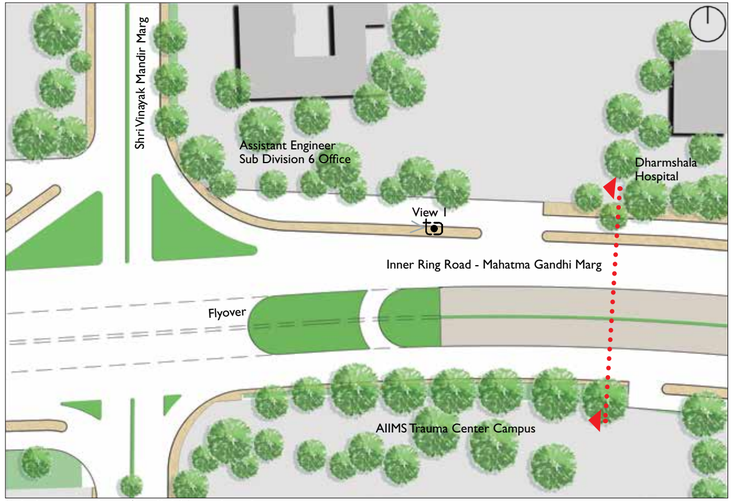
3

Proposed view of Safdarjung junction

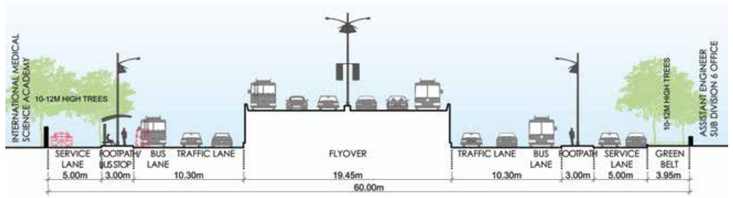


Proposed section through subway at Safdarjung junction

F. Sarojini Nagar Junction



Existing scenario at Sarojini Nagar junction



Existing cross section through flyover near Sarojini Nagar junction

Existing Planning

Sarojini Nagar junction has allied medical institutions on either side of the stretch.

Presently the junction does not have a subway for cross-over only at-grade crossing takes place.

The existing footpath is not maintained and remains deserted most of the day. A substantial part of the service lane is encroached by construction trucks, which remain parked throughout the day, thus reducing the effective width of the lane.

Key plan

1 Proposed site for Sarojini Nagar junction

Proposal

Due to the presence of the Sarojini Nagar flyover at the junction, the required clear height to construct a foot-over-bridge is not available.

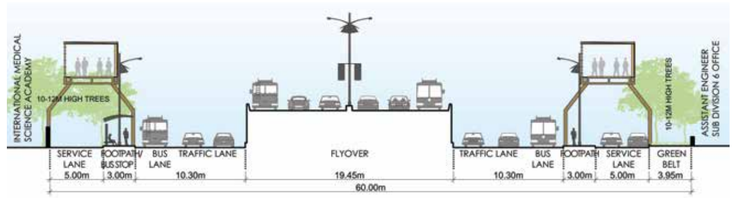
Thus, to maintain continuity, the elevated walkway is extended on both sides of the stretch.

To cross-over, the user has to access the existing crossing at the junction (at-grade) and use the walkway to connect further.

Proposed scheme of Sarojini Nagar junction

- Footpath
- Road Median
- Buildings
- Informal Activity

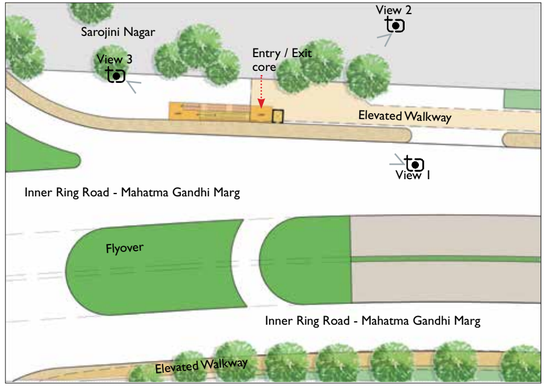
2 Proposed schematic view of Sarojini Nagar junction from flyover side



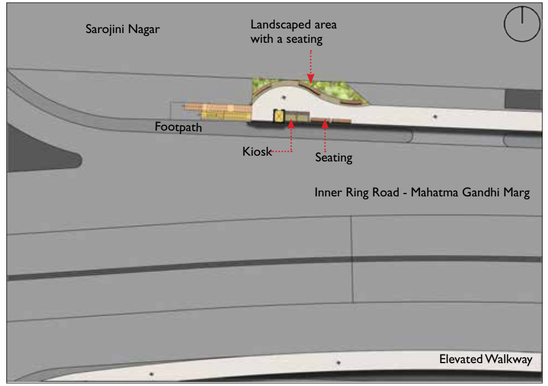
Proposed section along flyover near Sarojini Nagar junction

STRETCH 01 (SOUTH EX. TO BHIKAJI CAMA PLACE)

Sarojini Nagar Junction- Proposed Floor Plans



Grade level plan at Sarojini Nagar junction



Elevated walkway level plan at Sarojini Nagar junction

Features at Elevated Walkway level

The elevated walkway has been proposed with features like kiosks, seating and landscape areas for comfort and variety.

Key plan Sarojini Nagar junction

Proposed schematic views(1,2 and 3) at Sarojini Nagar junction

G. Nauroji Nagar Junction

Existing Planning

The existing junction is important due to its proximity to the upcoming large commercial hubs like Sarojini Nagar commercial complex and Nauroji Nagar commercial complex.

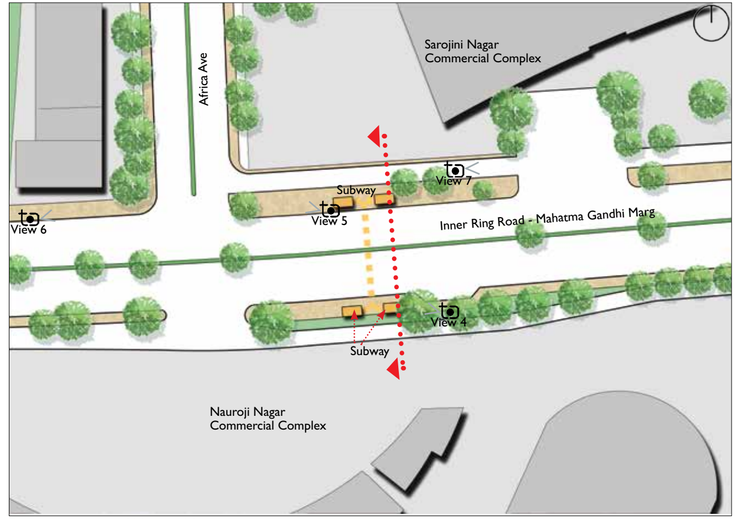
A subway connects either side of the street and allows for cross movement.

The subway entry is often blocked by features like existing trees and kiosks.

The existing footpaths are encroached by parked vehicles, which block the movement path for pedestrians.

- Footpath
- Road Median
- Buildings
- Informal Activity

Key plan Nauroji Nagar junction



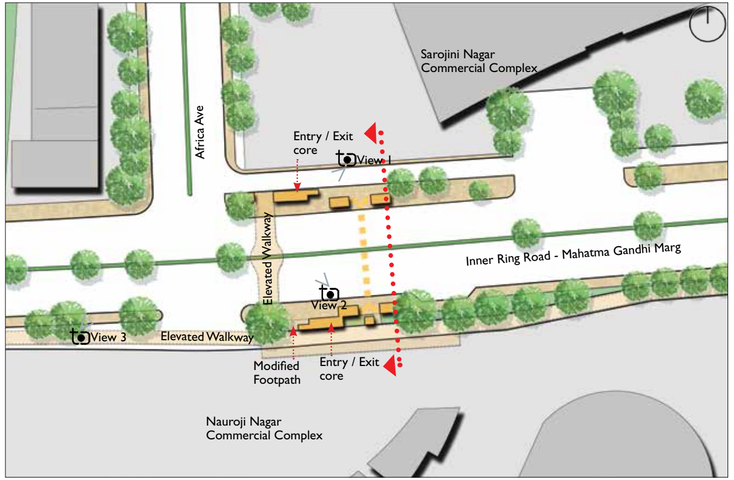
Existing scenario of Nauroji Nagar junction

Blocked entry to subway

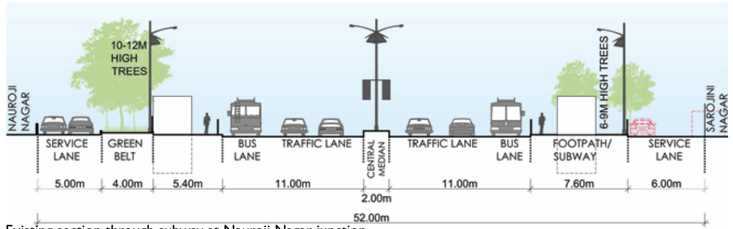
Proposed site for junction

Encroachment on footpath

Encroachment on footpath



Proposed scheme at Nauroji Nagar junction



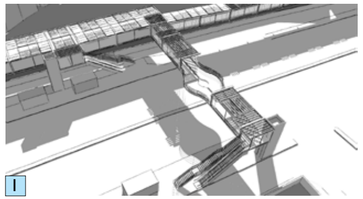
Existing section through subway at Nauroji Nagar junction

Proposal

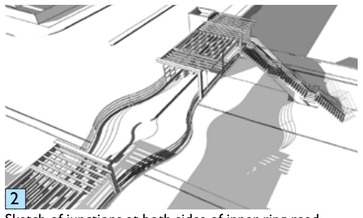
Elevated walkway has been proposed to connect the upcoming redevelopment projects of Sarojini Nagar and Nauroji Nagar.

A foot-over-bridge is proposed to provide seamless connection to users along the junction.

Key plan Nauroji Nagar junction

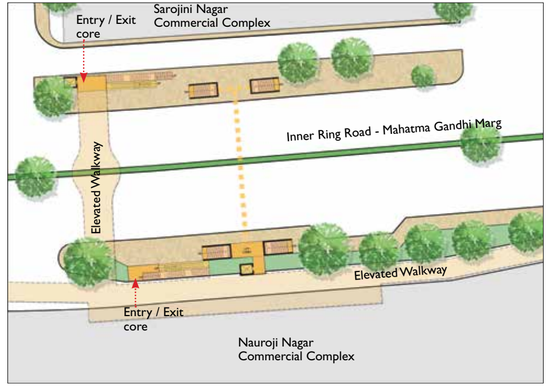


1 Sketch showing the foot-over-bridge



2 Sketch of junctions at both sides of inner ring road

Nauroji Nagar Junction - Proposed Floor Plans



Grade level plan at Nauroji Nagar junction

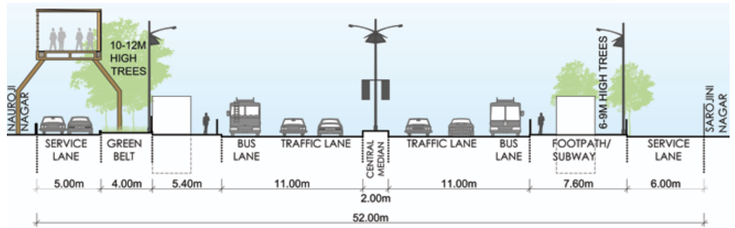
Elevated walkway level plan at Nauroji Nagar junction

Footpath
Road Median
Other Buildings
Other's Property
Informal Activity

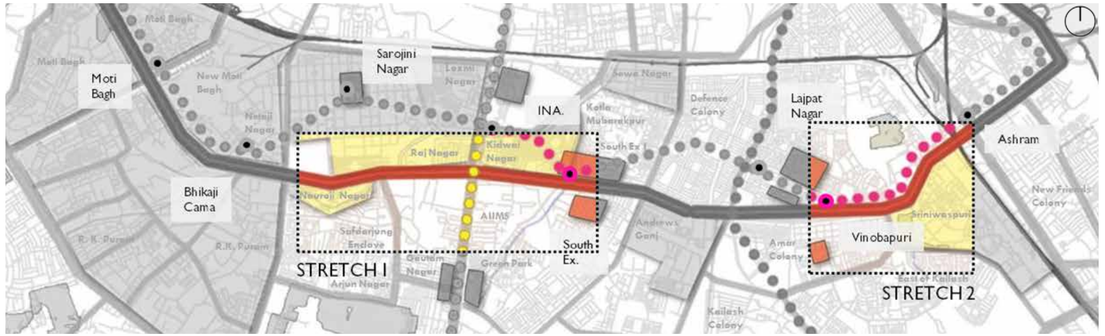
Features at Elevated Walkway level

The features proposed at walkway level include kiosks and landscaped areas with seating arrangement.

3 Proposed view of Nauroji junction with the pedestrian walkway



Proposed section through subway at Nauroji Nagar junction



Stretch 02 (Sriniwaspuri to Lajpat Nagar)

4.1 Site Brief

The study stretch: It lies between Lajpat Nagar bus stop(West) and railway crossing near Ashram (East).

Length: Approximately 2.2 kms east-west along Mahatma Gandhi Marg or Inner Ring Road.

Residential: The South- East corner of the study area is marked by Sriniwaspuri, a government colony.

Other residential colonies along the stretch are: Lajpat Nagar, Amar Colony, Vinobapuri and East of Kailash.

Commercial : Major commercial areas are located in Lajpat Nagar, namely Lajpat Nagar Main Market and Gupta Market.

Connectivity : The stretch is well connected to the upcoming metro stations on the Pink Line. i.e. Vinobapuri and Lajpat Nagar Metro station. The presence of eight bus stops along the stretch will benefit facilities for all pedestrians.

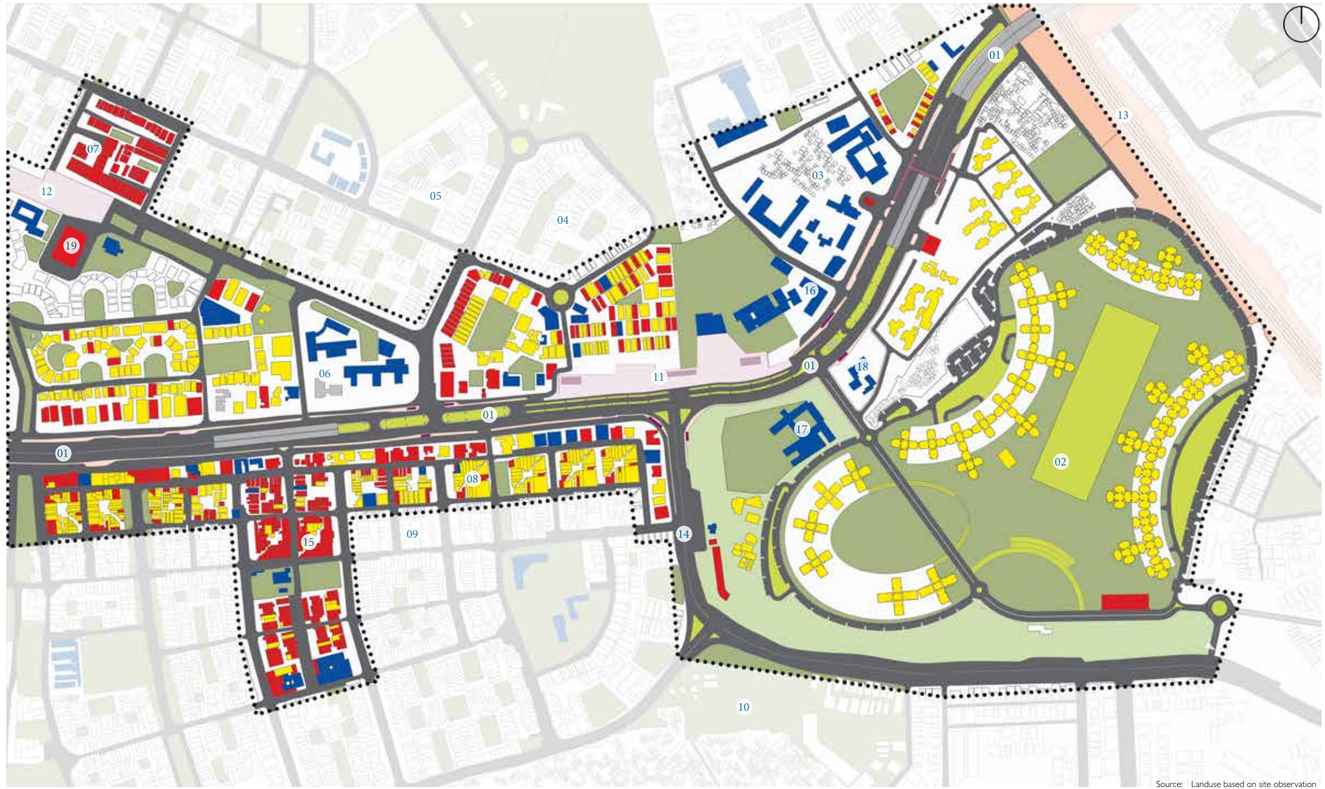
LABLES

1. Inner Ring Road
2. Sriniwaspuri Residential Colony
3. Nehru Nagar
4. Vinobapuri
5. Lajpat Nagar II
6. Lajpat Nagar III
7. Lajpat Nagar Market
8. Lajpat Nagar IV
9. Amar Colony
10. East of Kailash
11. Vinobapuri Metro Station
12. Lajpat Nagar Metro Station
13. Railway Line
14. Captain Gaur Marg
15. Gupta Market
16. PGDAV College, University of Delhi
17. Cambridge Public School
18. Delhi Public Library
19. 3C's Cinema

KEY MAP

LEGEND

Residential
Commercial
Institutional
Green Areas
Heritage Structure
Pink Line Metro Station
Road
Flyover



Source: Landuse based on site observation

STRETCH 02 (SRINIWASPURI TO LAJPAT NAGAR)

Residential Zones

Commercial Zones

Institutional Zones

Zoning

The western side of the study area is encompassed by **commercial areas**. **Government residential colonies** such as Sriniwaspuri are located towards South-East. **Institutional areas** are located towards North-East. These areas, owing to its institutional and residential landuse are largely covered in greens.

Vinobapuri Metro station provides connectivity to nearby institutions whereas the Lajpat Nagar Metro station connects the other parts of the city with the Lajat Nagar central market.

Central Goverment Nurse's Residential Complex, Srinivaspuri

Nehru Nagar Market

Railway Line near Ashram Chawk

PGDAV College

Source: http://www.du.ac.in/du/uploads/images/showtime/pgdav-eve/pgdav-eve.jpg | 4th September, 2018

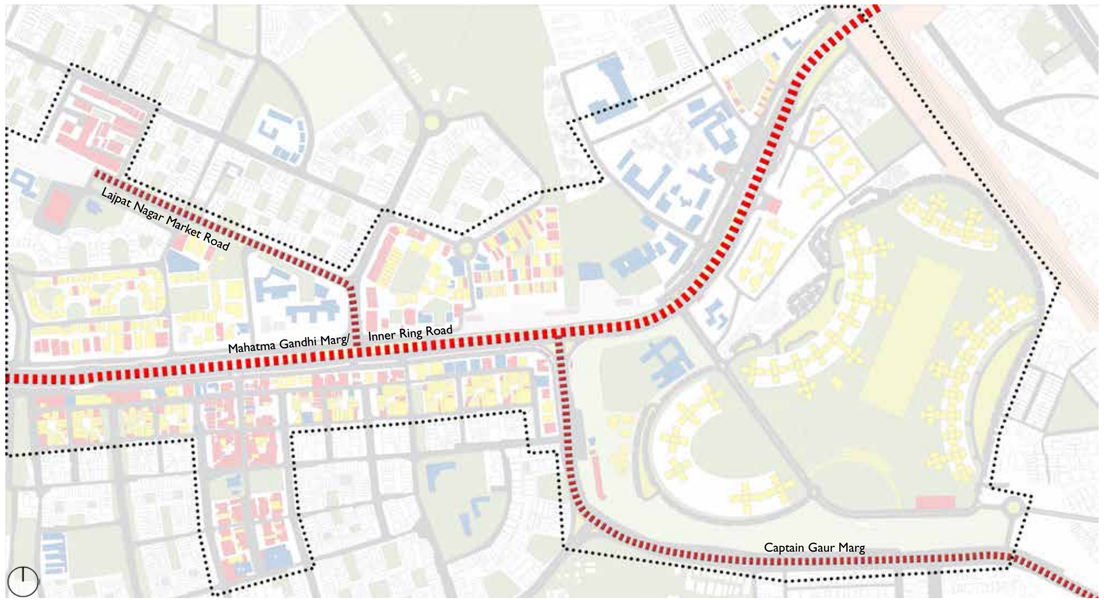
Major Roads Linkage

Mahatma Gandhi Marg or Inner Ring Road is the main arterial road of the study area. Other major roads connecting to it are Captain Gaur Marg and Lajpat Nagar Main Market road. Captain Gaur Marg is the only connection between Inner Ring Road and Outer Ring Road. Lajpat Nagar Market Road is an important connection to major commercial areas of the zone. Lajpat Nagar flyover on Inner Ring Road provides an alternate movement corridor for the site.

Arterial road

Sub-arterial road

KEY MAP



STRETCH 02 (SRINIWASPURI TO LAJPAT NAGAR)

4.2 Major Nodes and Landmarks

The study area is characterized by large commercial footprints (Lajpat Nagar central market and Amar Colony market) along with dense residential settlements such as Lajpat Nagar, Vinobapuri, and Sriniwaspuri. Due to the presence of Ring Road and its large span, the pedestrian cross-over to either side is difficult. Additionally, the available pedestrian network is often discontinuous and un-maintained, leading to discomfort to pedestrians and frequent accidents. Therefore, few nodes have been identified with a high footfall that need to be resolved to provide a comfortable walking experience.

LABLES

1. Inner Ring Road
2. Sriniwaspuri Residential Colony
3. Nehru Nagar
4. Vinobapuri
5. Lajpat Nagar II
6. Lajpat Nagar III
7. Lajpat Nagar Market
8. Lajpat Nagar IV
9. Amar Colony
10. East of Kailash
11. Vinobapuri Metro Station
12. Lajpat Nagar Metro Station
13. Railway Line
14. Captain Gaur Marg
15. Gupta Market
16. PGDAV College, University of Delhi
17. Cambridge Public School
18. Delhi Public Library
19. 3C's Cinema

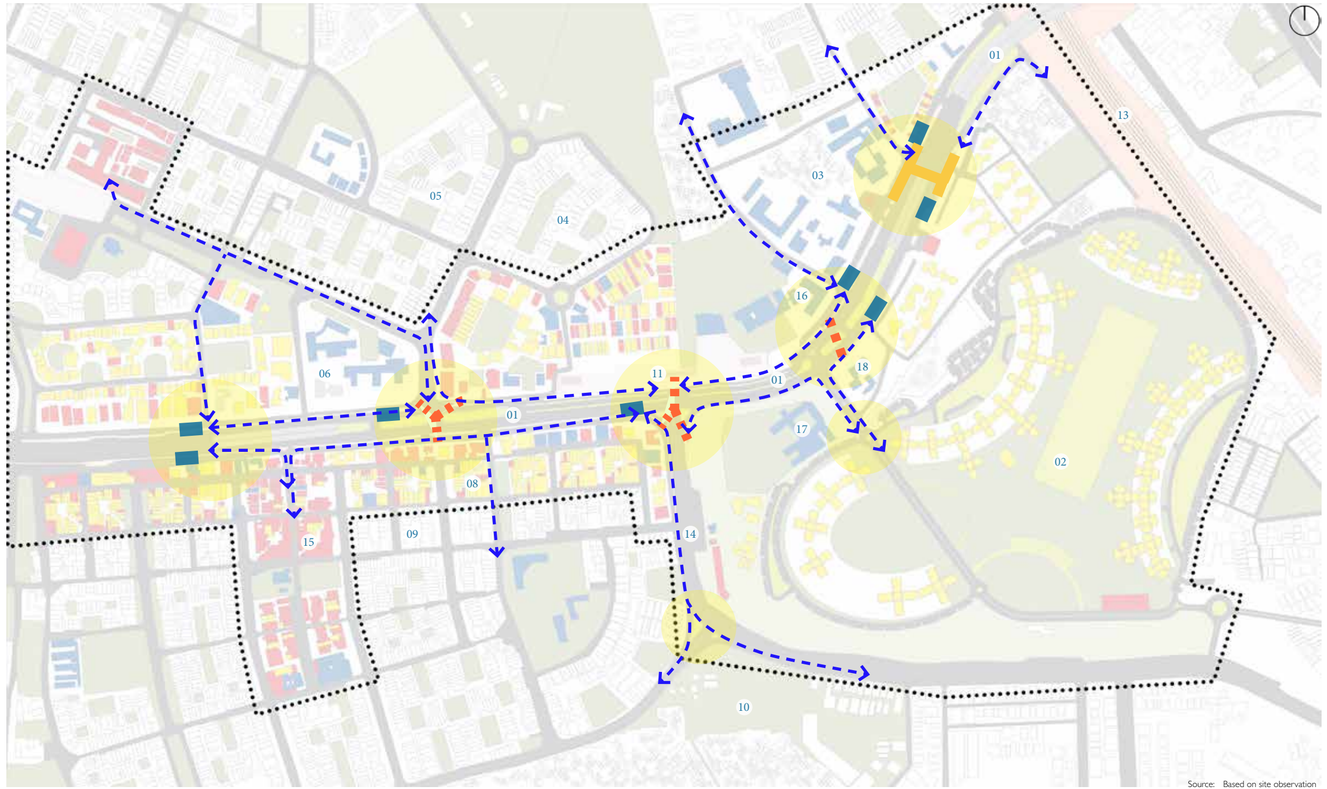
Opposite side of Vinobapuri Metro Station

Greenery below Lajpat Nagar elevated flyover

Lajpat Nagar main market

KEY MAP

Vinobapuri Metro Station



Source: Based on site observation

STRETCH 02 (SRINIWASPURI TO LAJPAT NAGAR)

4.3 Connections along the Stretch

The extent of proposed elevated walkway for Stretch 02 is as follows:

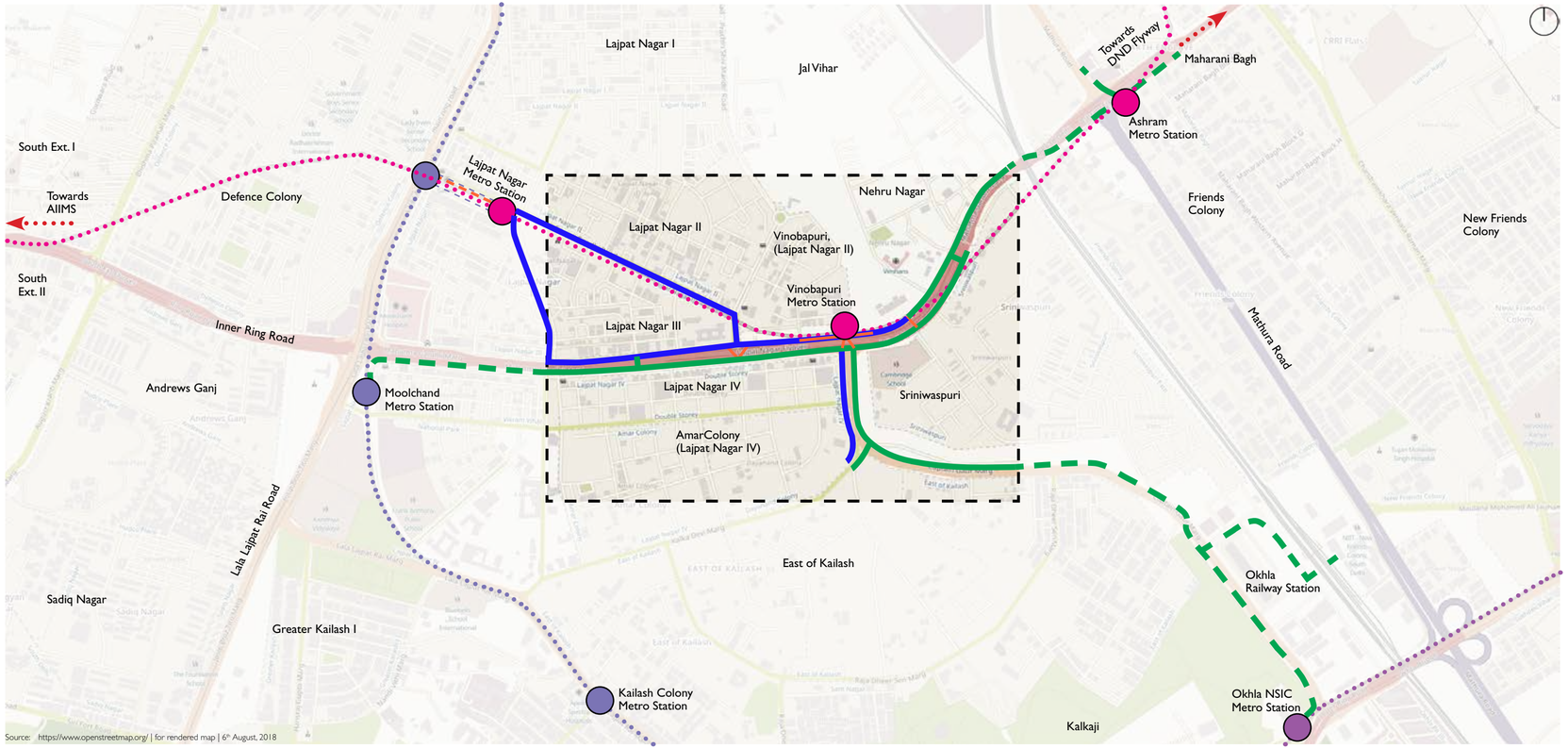
Phase 1 (Present study area)

- **Ring Road** - Nehru Nagar to Nirmal Colony
- **Captain Gaur Marg** - Vinobapuri to East of Kailash

Phase 2 (Future expansion)

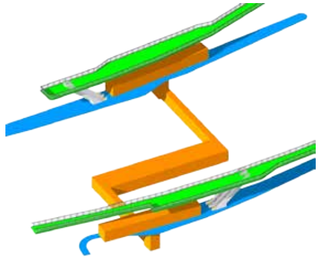
- **Ring Road** - extends upto Moolchand Metro station on one side and upto Ashram Metro station on the other.
- **Captain Gaur Marg** - From East of Kailash to Okhla NSIC metro station.

The elevated walkway intents to provide continuous walking opportunities from residential neighbourhoods to busy market places and institutional areas while creating safe connections throughout the stretch.

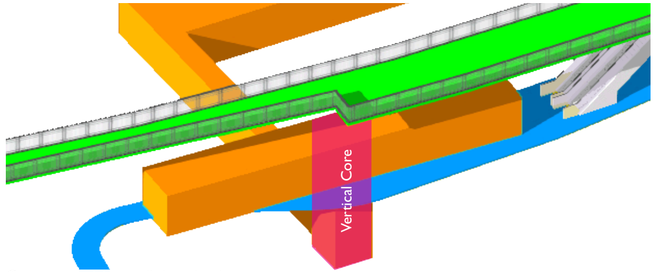


Source: https//www.openstreetmap.org/ | for rendered map | 6th August, 2018

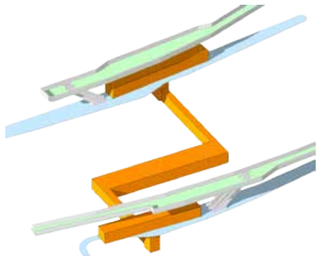
4.4 Elevated Walkway Footprint



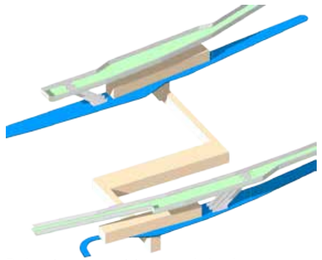
Pedestrian connectivity at all three levels



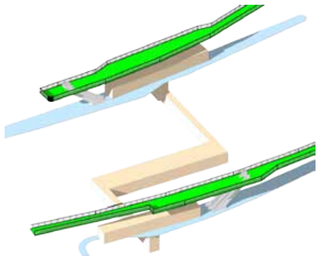
Core connectivity to all three levels



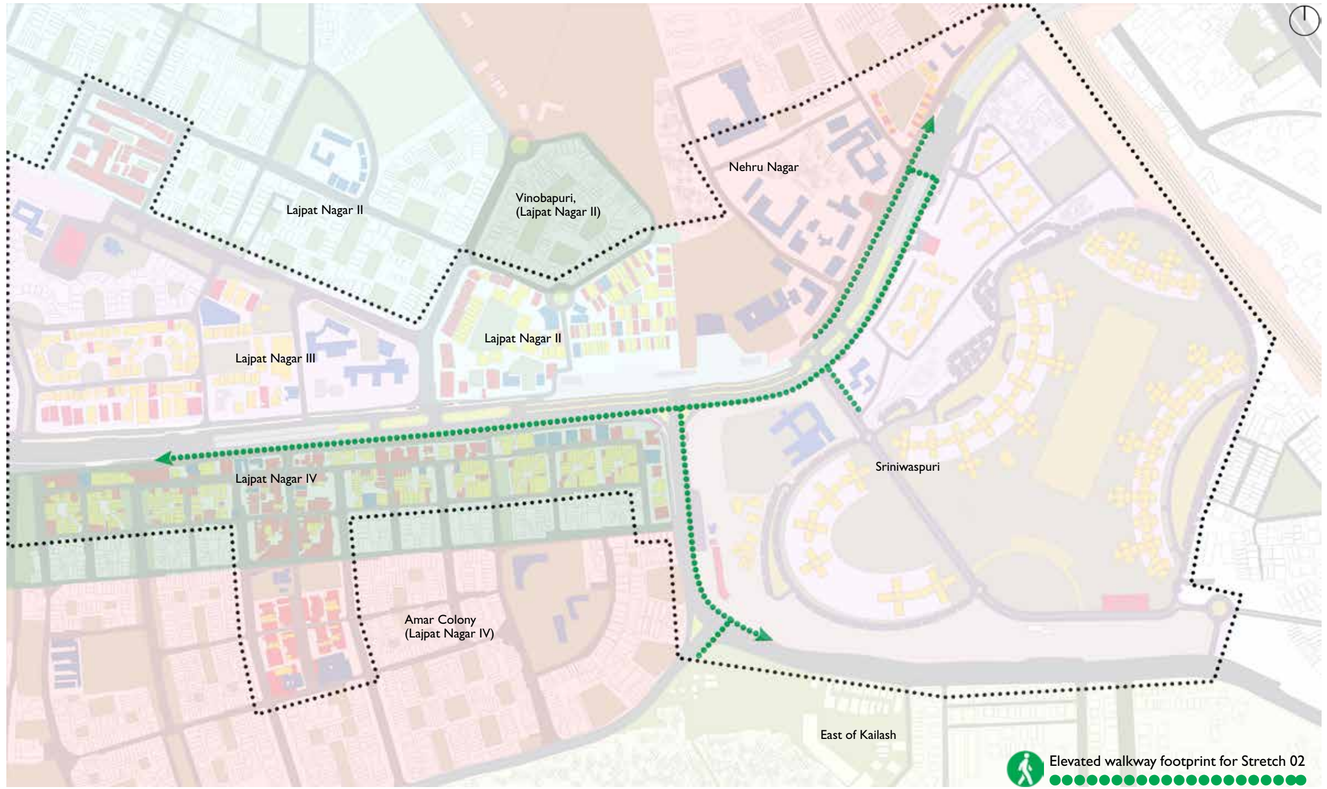
Pedestrian connectivity at subway level



Pedestrian connectivity at grade level



Pedestrian connectivity at elevated walkway level



STRETCH 02 (SRINIWASPURI TO LAJPAT NAGAR)

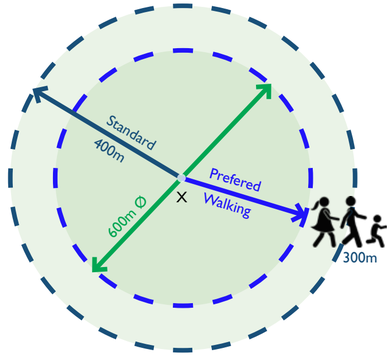
4.5 Major Road Linkages and Influence Zone

The elevated walkway will impact neighbouring areas especially parts of Lajpat Nagar, which are currently devoid of continuous pedestrian infrastructure. Institutional complexes like PGDAV college draw a high footfall, thus the elevated walkway will provide connectivity around it. A standard comfortable walking distance is 400 m or ¼ miles.

Source: http://humantransit.org/2011/04/basics-walking-distance-to-transit.html | The professional blog of public transit consultant Jarrett Walker | 8th August, 2018

Note: For the study, 300 m is considered a comfortable walking distance. The elevated walkway is so proposed, that from any point 'X', the influence zone* will cover major landmarks and residential neighbourhoods.

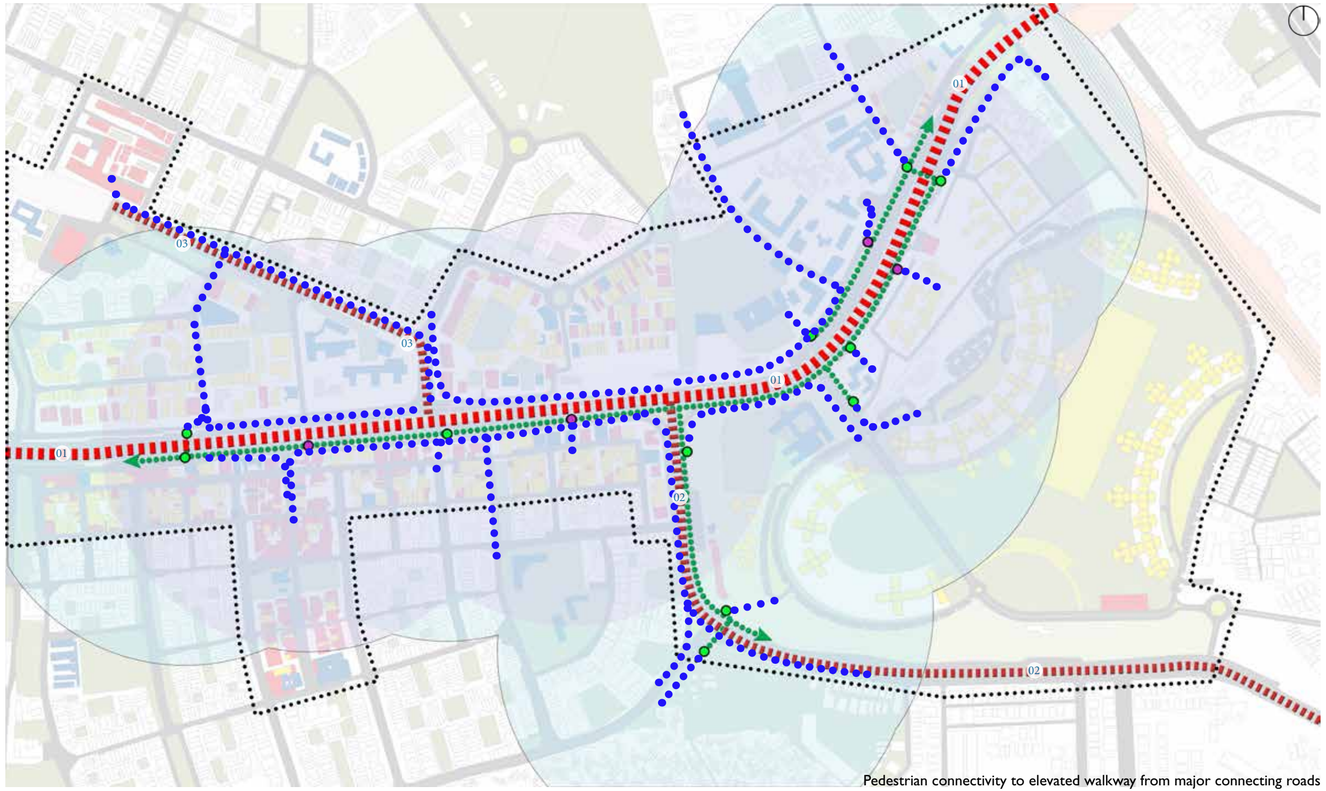
**Influence zone: From any Point 'X' a distance of 300 m (radius) is considered influence zone i.e. the zone within which maximum activities are located.*



Walking range for pedestrian

LEGEND

1. Mahatma Gandhi Marg/ Inner Ring Road
2. Captain Gaur Marg
3. Lajpat Nagar Market Road



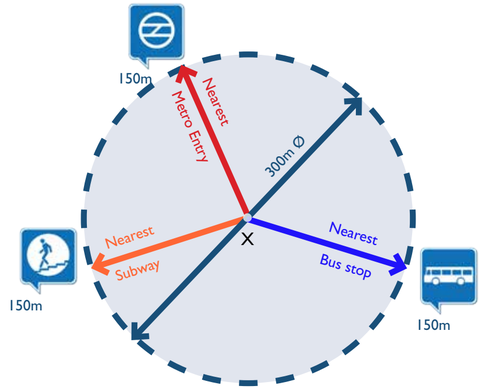
Pedestrian connectivity to elevated walkway from major connecting roads

STRETCH 02 (SRINIWASPURI TO LAJPAT NAGAR)

4.6 Public Transport Linkage

Majority of public transport systems lie within the influence zone i.e. within 150 m from the elevated walkway.

The following diagram demonstrates that any public transport system can be accessed comfortably from any point 'X' (i.e. junctions , pause points etc.) on the elevated walkway.



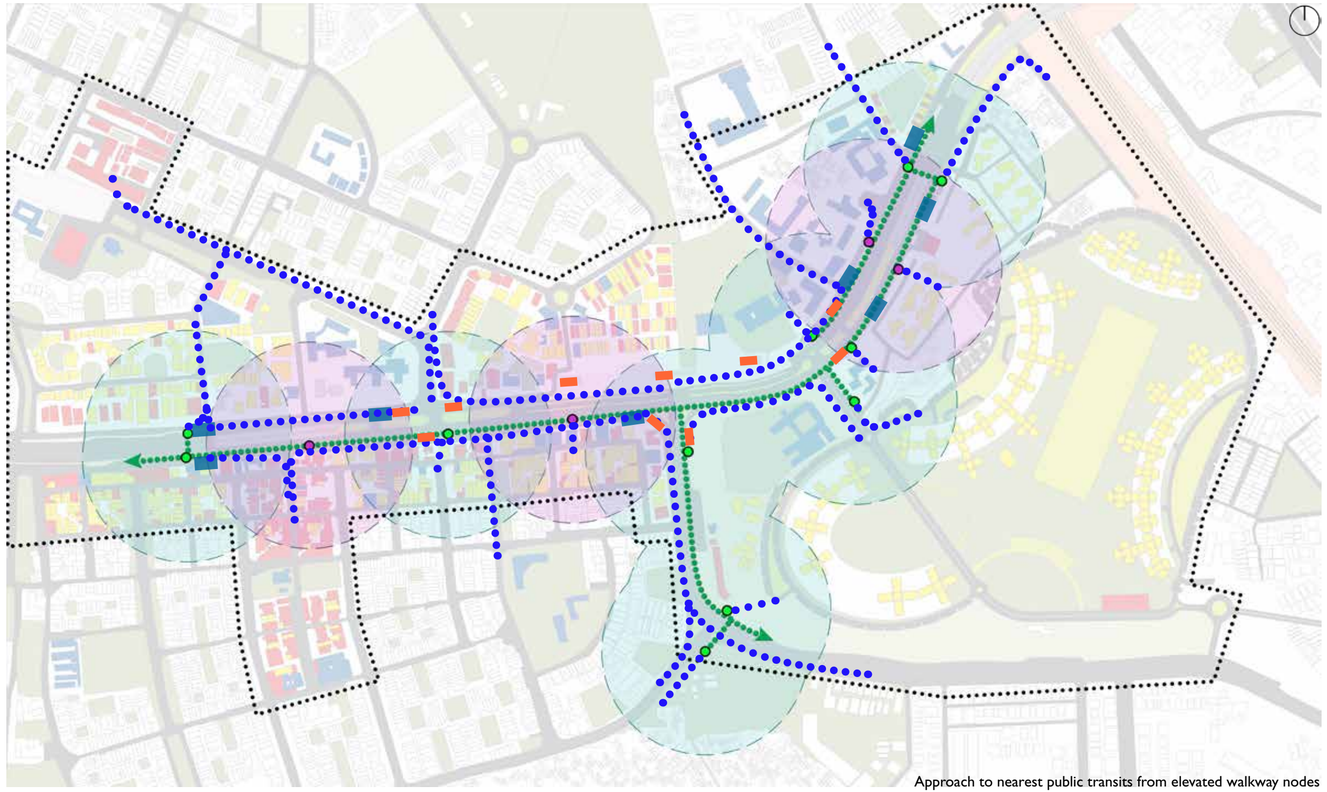

Bus Stop near Nehru Nagar junction


Subway near Sriniwaspuri intersection


Foot over bridge near Nehru Nagar


Crossing over railway line near Sriniwaspuri

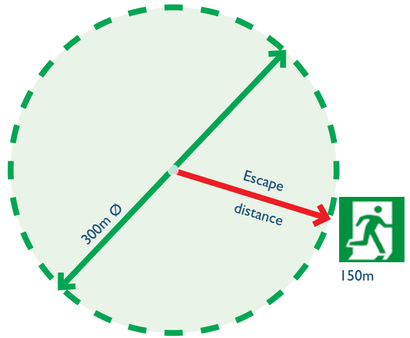
Bus Stop
Subway
Elevated Walkway Junctions
Pause Points
Elevated Walkway Corridor
Pedestrian Flow
Junctions range
Pause Points range


Approach to nearest public transits from elevated walkway nodes

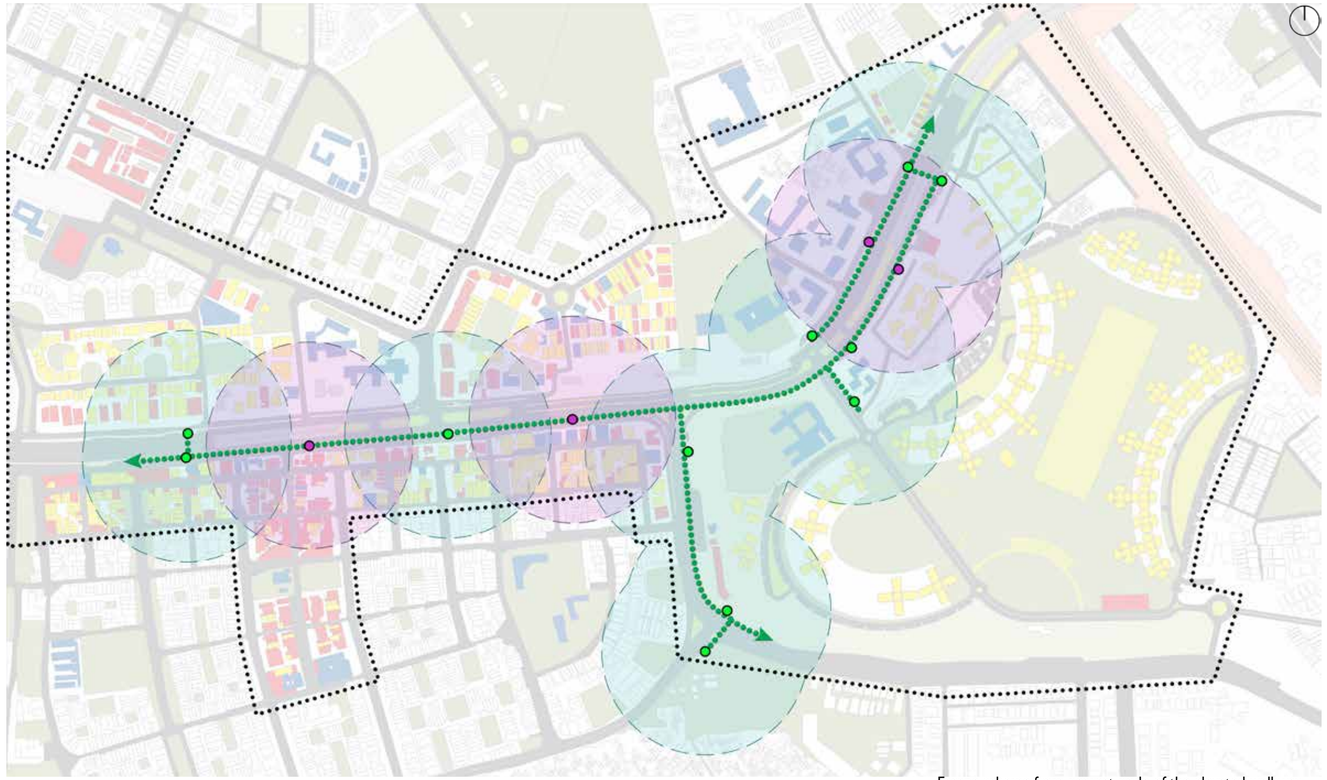
4.7 Emergency Escape

This study has adopted 300 m centre to centre as the maximum distance between two emergency exits. This reference is taken from the case study of Skygarden at Seoul.

Source: Refer study on page no. 38 for detail



Elevated Walkway Junctions
Elevated Walkway Corridor
Junctions range
Pause Points
Stretch boundaries
Pause Points range



Escape scheme from nearest node of the elevated walkway

4.8 Elevated Walkway with Potential Junctions

Nehru Nagar Junction

PGDAV Junction

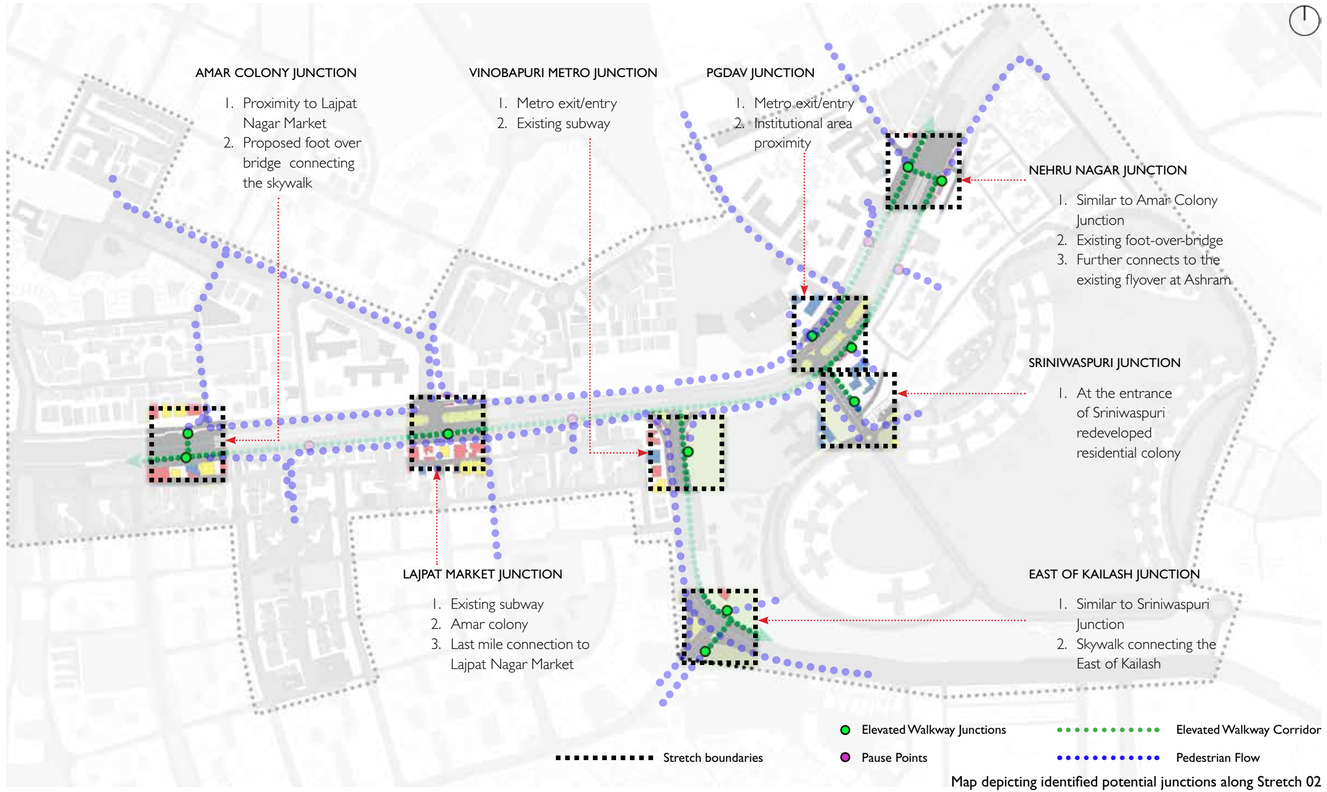
Sriniwaspuri Junction

Vinobapuri Metro Junction

East of Kailash Junction

Lajpat Market Junction

Amar Colony Junction



Map depicting identified potential junctions along Stretch 02

STRETCH 02 (SRINIWASPURI TO LAJPAT NAGAR)

Chapter 5

Design Proposal

5.1 Features

Sustainable Features

The walkway will house south facing solar power generators mounted on roof tops. These panels will generate more than 6360 KW/Km/day (enough to supply to 2120 households daily).

Source: World Energy Council - 2014 Data | 2nd August, 2018

Rainwater can be captured from the roof run-off of the elevated walkway and can be diverted to an underground reservoir for future usage.

Low voltage, in-built charging points provided at various pause points will provide charging facilities for users on the go. The tapped solar energy from the elevated walkway roof can be used for the same, thus utilizing local resources.

Green wall can act as a buffer to reduce noise pollution caused by the traffic on the road. Also, it acts as an aesthetic element and develops a comfortable microclimate.

Various native species of plants are planted along the walkway to provide shade from extreme weather conditions. It also adds to the aesthetics of the structure by interspersing it with greens.

Smart Features

Open Wi-fi is proposed to be provided throughout the elevated walkway stretch to enable uninterrupted digital connectivity to users.

Interactive wayfinding kiosks, help users to navigate their route and provide an opportunity to explore local areas. This will benefit local businesses and tourist attractions.

For universal accessibility, escalator, elevator and staircases are provided at regular intervals for equitable and intuitive use.

Vending kiosks and ATM facilities are proposed at all junctions for easy access. Eating joints and cafes are to be provided at pause points and junctions. Outdoor sports activities like gym, table tennis, air hockey, etc., can also be provided as recreational facilities in collaboration with private sponsors.

Braille, tactile paving to be used to facilitate navigation, especially for differently-abled users.

Safety and Security Features

Panic alarm button to be installed at a regular interval of 50 m.

In case of emergency, 150 m should be the maximum distance a person has to traverse to exit the walkway.

Source: Inference from the case study of Skygarden, Seoul. Refer page no. 38

Emergency calling booths (SOS Box) to be installed at intervals of 100 m

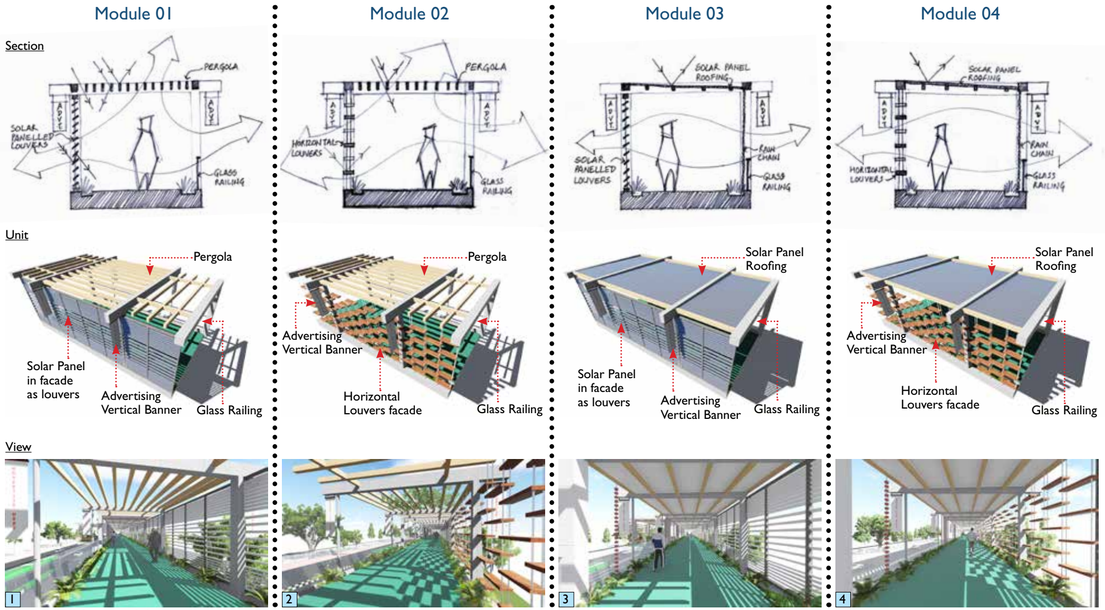
Adequate lighting: Well lit areas enable safety and ensure a sense of openness. They are inviting, lively and create a welcoming ambience.

Complete stretch of walkway will be under CCTV camera surveillance.

5.2 Elevated Walkway Design

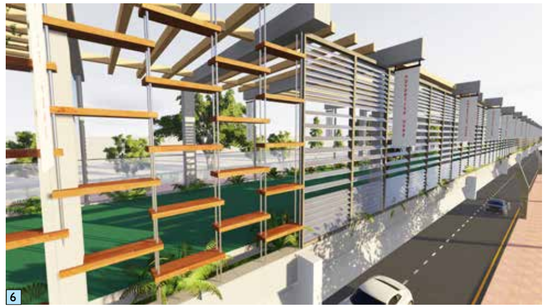
The entire walkway is a combination of four modules. Each module is derived by blending various design features. These modules when used alternatively, resemble a continuous façade. The variety of design elements make the walkway aesthetically appealing.
The modules can be interspersed with smart features like solar panels mounted on the roof to provide shade and to generate power to serve the local need. Pergolas, as a roof element, give a sense of openness and at the same time allow natural light and ventilation.

Landscaping features such as creepers add to the soft scape, providing much needed green relief. Perforated vertical facades enable controlled visual experience, which creates an interesting walking experience dispersed with a play of light and shadow.



Views of all four modules in elevated walkway corridor

5 Pause points acting as resting and interactive spots on the elevated walkway



6 View showing two screens on the south facade

7 View showing an emergency exit

8 View from south side of the elevated walkway

DESIGN PROPOSAL

View of elevated walkway showing the combinations of roof elements

5.3 Few Alternative Facade Elements

Concrete Facade | Apartment building in Helsinki, Finland | Huttunen Lipasti Pakkanen Architects

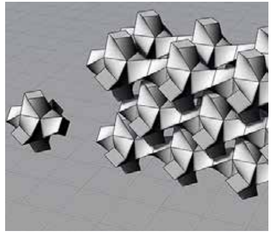
Source: http://www.archiexpo.com/prod/rieder-smart-elements-gmbh/product-65431-1430003.html | 2nd August, 2018

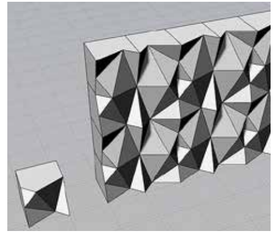
Perforated Metal Panels

Source: https://laurenalbanese.com/30028/perforated-metal-in-architecture-exterior-interior-and-furniture-design/decorative-metal-panels-perforated-metal-panels-exterior-design-ideas-modern/ | 2nd August, 2018

Kinetic Facade | Ned Kahn Brisbane Airport

Source: http://www.perforated-plate.com/perforatedplate/perforated-kinetic-facade.html | 2nd August, 2018





Parametric Facade

Source: http://www.designcoding.net/parametric-wall-student-works/ | 2nd August, 2018

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