DELHI NORTHWEST DISTRICT ROAD SAFETY REPORT APPENDIX

TRANSPORT DEPARTMENT
Government of NCT of Delhi
सत्यमेव जयते

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Report by:

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Data support by:

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Bloomberg Philanthropies | Initiative for Global Road Safety

TRIP CENTRE

SGA sustainable mobility solutions

HumanQind

ACKNOWLEDGMENTS

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Data encoding, analysis and report writing was done collectively by the Transportation Research and Injury Prevention Centre ((TRIP Centre) at IIT Delhi, Vital Strategies and the BIGRS embedded staff with inputs from BIGRS partners.

The report covers detailed proposals and budget estimates for 3 high risk locations and 1 school zone for the district. In collaboration with TRIP centre, proposals with budget estimations for selected high-risk locations have been prepared by SG Architects under the leadership of Dr. Sandeep Gandhi. Under the leadership of Ruchi Varma, HumanQind Design Foundation (HumanQind) is the lead partner of TRIP Centre, IIT Delhi to pilot the Safe School Zone Initiative with school road safety clubs in each district. HumanQind has prepared the detailed proposal and budget estimates for the school zone location.

The report was edited and compiled by Ishan Gogoi (Vital Strategies) and co-authored by Rahul Goel (TRIP Centre, IIT Delhi), Shivanshu Singh (SG Architects), Ruchi Varma and Aastha Khatri (HumanQind) under the leadership of Prof. Geetam Tiwari (TRIP Centre, IIT Delhi).

Rohit David, Divya Jindal, Kirori Lal Yadav and Farhan Shaikh from BIGRS Delhi and Archana Singh and Shyla Basu from TRIP Centre, IIT Delhi supported throughout the process.

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

INTRODUCTION

There has been an increase of road crash fatalities in Delhi since the easing of pandemic mobility restrictions. Vulnerable road users such as pedestrians, two-wheeler occupants and three-wheeler occupants are most at risk of severe injuries and - in worst case scenarios - death in a road crash. This risk which hinders the basic right of mobility for the road users warrants that effective and evidence-based road safety interventions and programs must be implemented regularly and systematically to mitigate the effects of road crashes.

In the year 2023, the Transport Department released the 'Data to Action' report which analysed 2019-2021 data and identified high-risk locations for each of the districts in Delhi. The report provided detailed maps, general analysis, and recommendations for each district. This has been presented to the District Road Safety Committees (DRSCs) to guide them in implementing road safety interventions and address the most urgent road safety risk factors in their jurisdictions. The DRSCs take the lead in drafting the district road safety plan, are instrumental in planning road safety interventions for district high-risk locations, implement interventions on the ground, and disburses the road safety fund.

To continue analysing road crash data and addressing the risks in crash-prone locations, the Transport Department are producing these highly customised district specific road safety reports (DRSR) for the District Road Safety Committees. These reports include detailed findings on crashes in specific districts and recommendations to reduce the crashes. The purpose of these DRSR is to guide DRSCs in implementing evidence-based interventions to reduce crash fatalities in high-risk locations. The report aims to provide detailed infrastructure designs which can be readily implemented on ground. Finally, it seeks to inform and train the DRSCs on how they can replicate the investigation and analyses used in the report on their own in the future.

METHODOLOGY

DATA SOURCE

The District Road Safety Report (DRSRs) focused on road crash fatalities' data in the National Capital Territory (NCT) of Delhi from 2019, 2021 and 2022. The data source for this report is police crash data records from the Motor Accident Claims Tribunal (MACT) cells of the districts. In addition, this data is supplemented by the FIR lists from the Delhi Traffic Police. The dataset was compiled, digitised, and cleaned at the Transport Department.

DATA ANALYSIS

The digitised datasets were compiled and analysed using MS Access to produce descriptive statistics and mapped using Quantum Geographic Information Systems (QGIS) platform, to identify high-risk locations including high-risk corridors in each district. Similar process will be followed for producing district road safety reports for the remaining districts.

ON-SITE INVESTIGATION OF HIGH-RISK LOCATIONS AND CORRIDORS

An in-depth and on-site investigation was conducted for the identified high-risk locations. At the site, both qualitative and quantitative data were collected which informed the design of the interventions. The data collection process includes the following activities:

- Inspection of the road infrastructure and land use
- Identification of hazards and conflict points
- Assessment of the type and quality of enforcement
- Observations on road user behaviour and accessibility of vulnerable road users
- Identification of types of road users and traffic mix, etc.

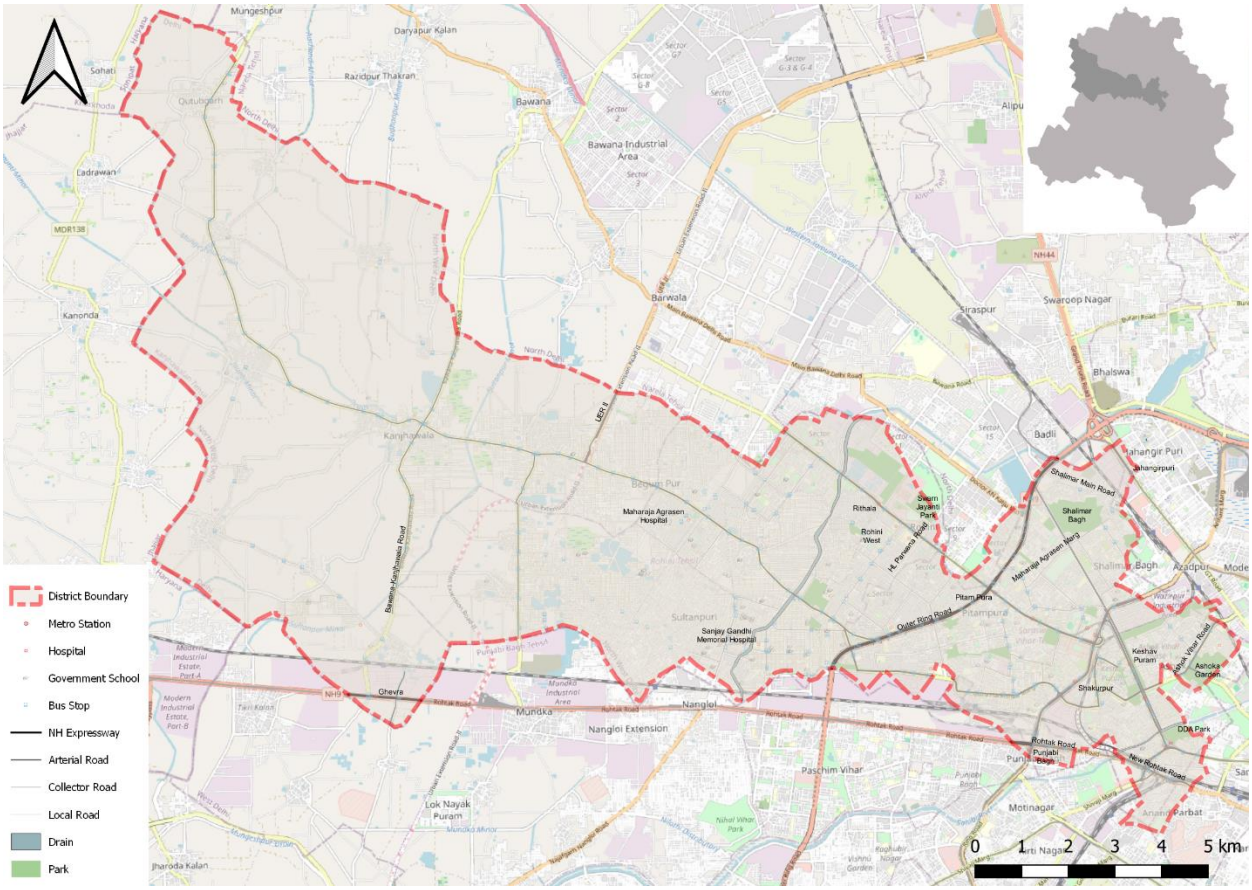
These data points were collated and presented for the chosen high-risk sites and informed the design of the interventions.

REPORT STRUCTURE

Each district will have their own customised report. There will be a total of 11 reports - one for each district in Delhi. The report is divided into three parts. The first part is the introduction of road safety in the context of the district, and methodology followed to produce the report. The second part covers the discussion on the road safety situation in the given district. Finally, the last part of the report provides detailed investigation and recommendations for the selected high-risk sites in the district.

ABOUT THE DISTRICT

North West Delhi is bounded by the
1) Yamuna River on the North East,
2) Districts of North Delhi to the East and Northeast,
3) West Delhi to the South,
4) Jhajjar district of Haryana state to the west,
5) Sonipat district of Haryana to the northwest and north and,
6) Bagh pat district and Ghaziabad district of Uttar Pradesh state to the northeast across the Yamuna.



AREA (IN SQM/ SQ KM): 442.84 sq km (170.98 sq mi); **ELEVATION:** 213 m (699 ft)

MAJOR ROADS: Outer Ring Road, Mahatma Gandhi Marg.

A ROAD SAFETY SITUATION AND TRENDS:

A.1: ROAD CRASH DEATH TRENDS

A.1.1 : FATAL ROAD CRASHES

There were 150 fatal road crashes in North West district of Delhi in 2022 with 152 persons killed in these crashes. This is a 12% increase compared to the previous year, 2021 (129, and 134 respectively). One person is killed in road crashes in the North West district every three-to-four day.

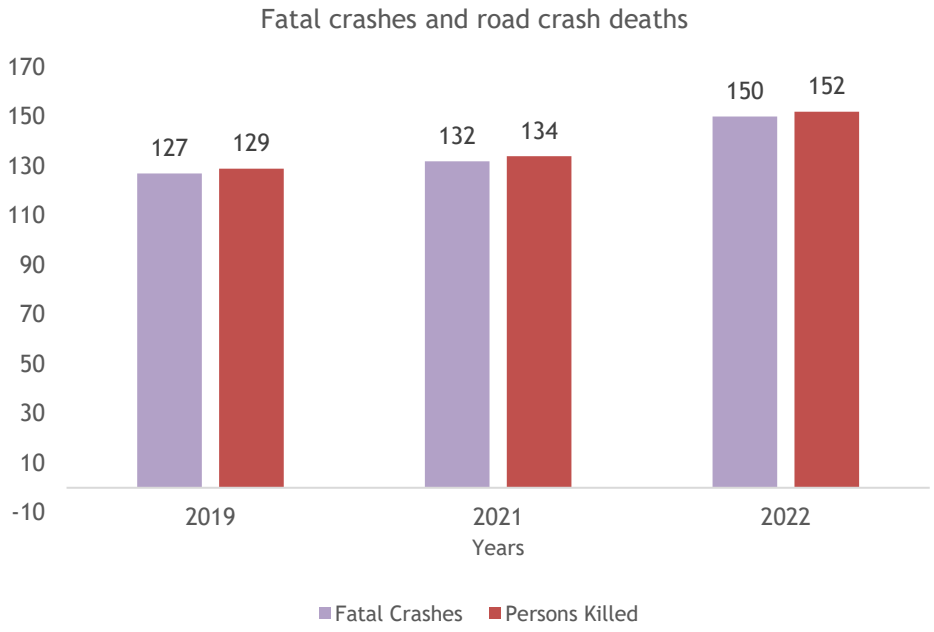


Figure 1: Fatal Road crashes and road crash deaths

A.1.2 : ROAD CRASH DEATHS BY ROAD USER TYPE

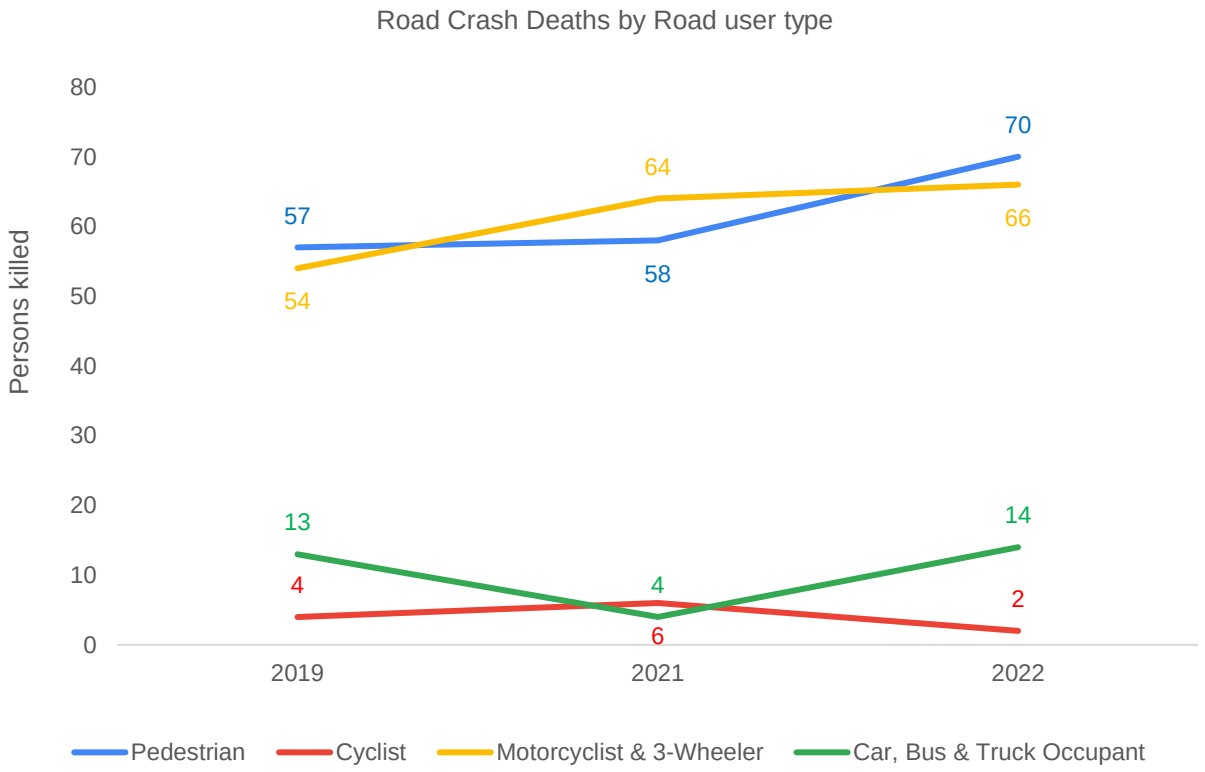


Figure 2: Road crash deaths by road user type

*Note: 3- Wheelers include Auto rickshaw and E-rickshaw

Motorcyclists, auto rickshaw occupants and pedestrians formed a majority of persons killed in road crashes in the North West district across all three years. Between the highlighted three categories, the pedestrian fatalities surpassed motorcyclist & auto rickshaw occupants' fatalities in 2019 and 2022.

A.1.3 : ROAD CRASH DEATHS BY MONTHS

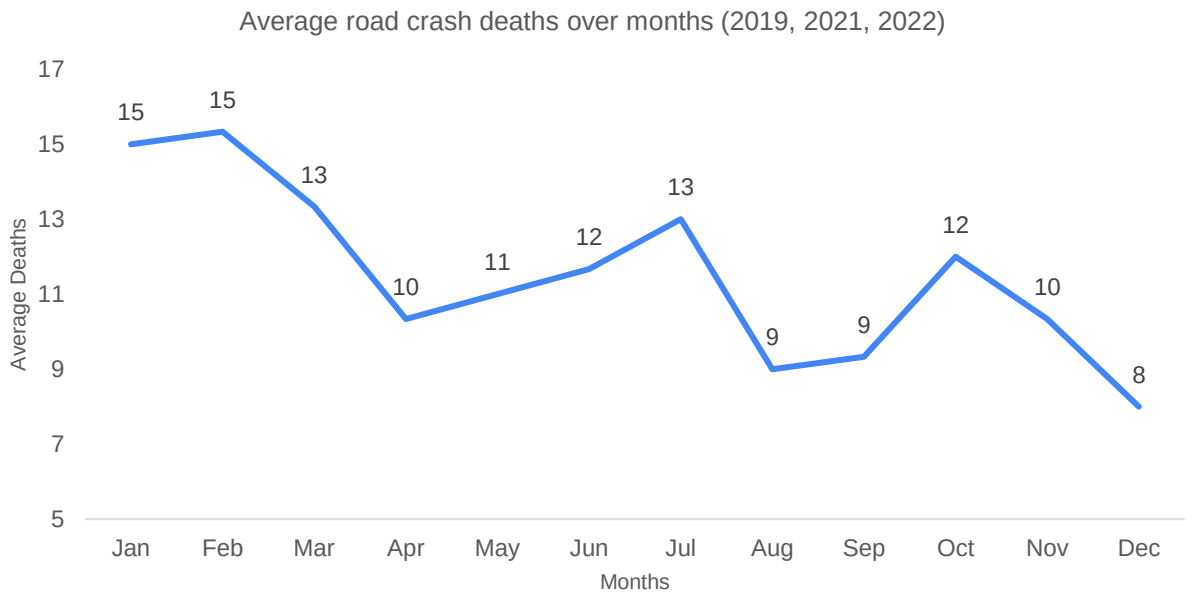


Figure 3: Average Road crash deaths over months

January and February witnessed the highest number of persons killed followed by March and July however, there is no discernible pattern of fatalities by month.

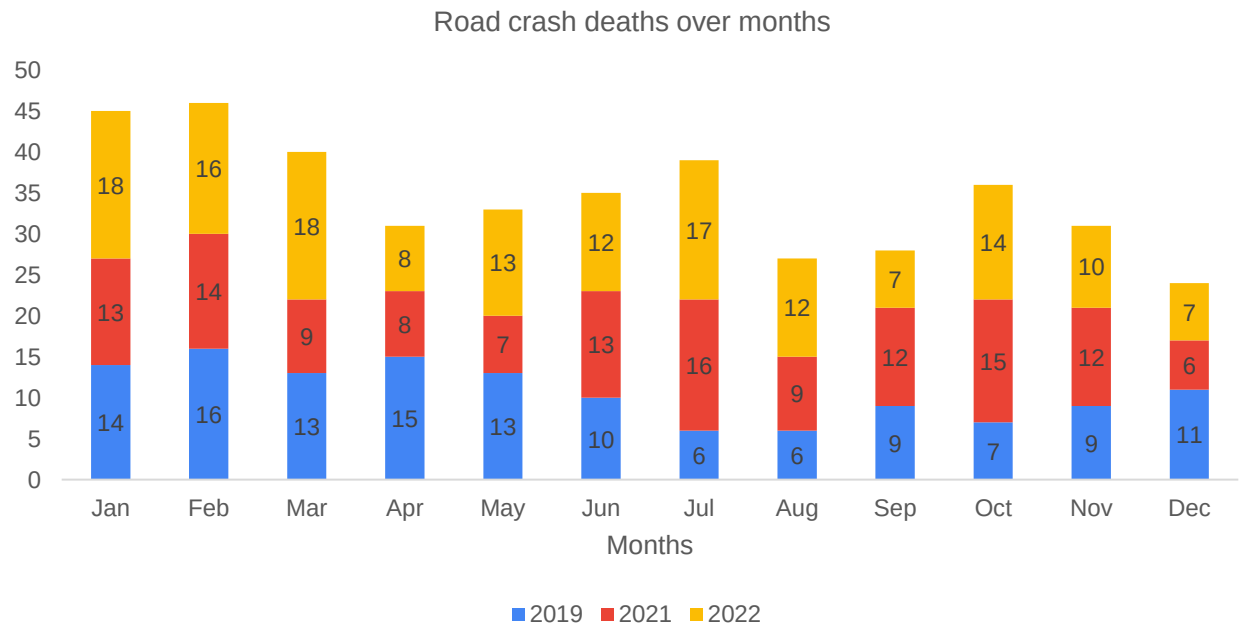


Figure 4: Road crash deaths over months

A.1.4 : ROAD CRASH DEATHS BY TIME AND DAY OF WEEK

Hour of Crash	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
00:00-00:59	4	4	3	6	5	6	3	31
01:00-01:59	2	4	2	5	1	2	3	19
02:00-02:59	2	0	0	1	1	1	0	5
03:00-03:59	1	2	0	2	4	3	2	14
04:00-04:59	1	1	1	3	0	3	3	12
05:00-05:59	1	2	0	2	3	4	1	13
06:00-06:59	6	3	1	2	1	3	2	18
07:00-07:59	0	4	2	2	1	2	0	11
08:00-08:59	3	1	3	2	3	2	4	18
09:00-09:59	1	4	2	0	2	2	2	13
10:00-10:59	1	2	2	3	1	2	5	16
11:00-11:59	3	0	1	1	2	3	3	13
12:00-12:59	1	1	5	3	2	1	0	13
13:00-13:59	1	3	2	3	0	1	0	10
14:00-14:59	2	3	1	3	2	5	2	18
15:00-15:59	2	3	2	1	1	2	1	12
16:00-16:59	2	4	4	2	3	7	3	25
17:00-17:59	2	1	0	1	2	1	2	9
18:00-18:59	1	1	2	1	5	1	1	12
19:00-19:59	6	2	0	5	2	2	2	19
20:00-20:59	1	3	3	4	2	0	2	15
21:00-21:59	6	2	6	4	5	6	2	31
22:00-22:59	5	2	5	12	3	4	6	37
23:00-23:59	3	2	7	7	2	4	6	31
Total	57	54	54	75	53	67	55	415

Table 1: Road crash deaths by time and day of week

Twenty-eight percent of the total road crash deaths occurred at night between 10:00 pm to 2:00 am. Similarly, 34% of the total deaths occurred either on Thursdays or on Saturdays.

A.2: ROAD CRASH DEATHS BY AGE AND GENDER

A.2.1 : ROAD CRASH DEATHS BY GENDER

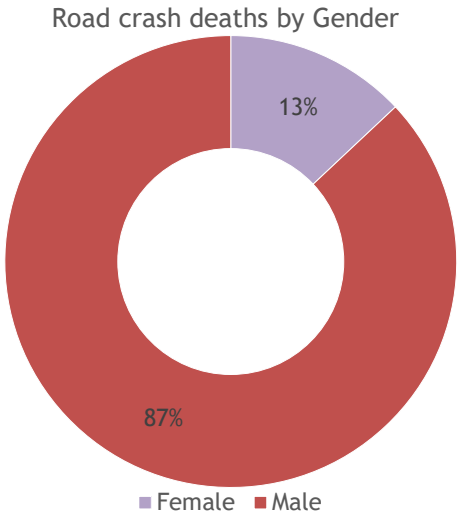


Figure 5: Road crash deaths by gender

A.2.2 : ROAD CRASH DEATHS BY AGE AND GENDER

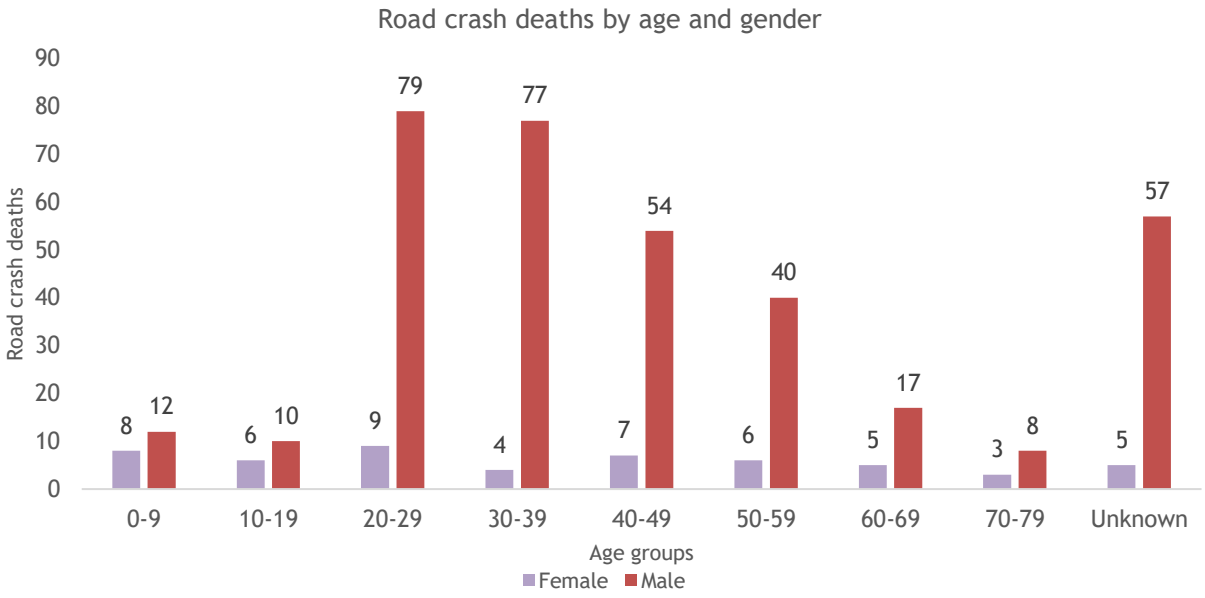


Figure 6: Road crash deaths by age and gender

Males had a higher number of fatalities (87%) compared to females. Among males, the fatalities were observed to be highest in the age group 30 to 40 years (37%), followed by those in the age group 15 to 29 years (30%).

A.3: ROAD CRASH DEATHS BY ROAD USER TYPES.

A.3.1 : TOTAL ROAD CRASH DEATHS BY ROAD USER TYPES (2019,2021,2022)

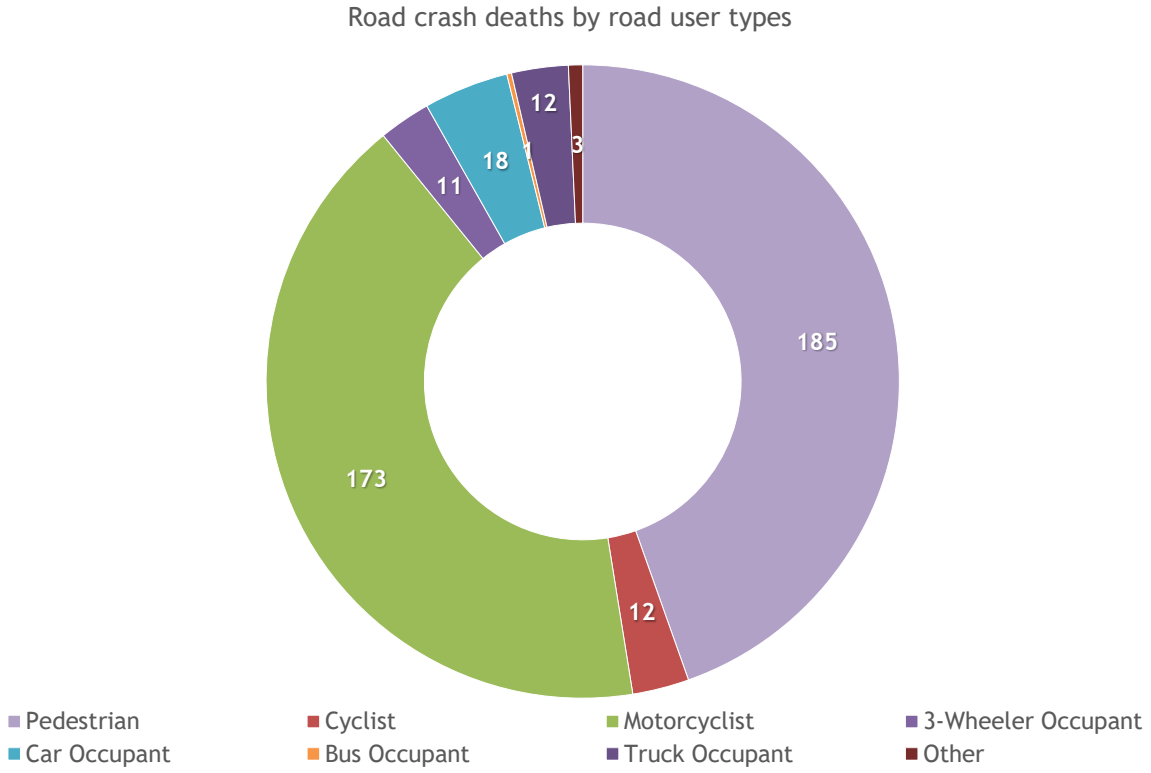


Figure 7: Road crash deaths by road user type

Note: Others include bus, cycle rickshaw and unknown vehicle occupants

Ninety percent of fatalities were among vulnerable road users (i.e., pedestrians, motorcyclists, cyclists, and auto rickshaw occupants). Out of this, forty four percent of road crash deaths in the North West district were among pedestrians, followed by motorcyclists (41%).

A.3.2 : WHO-HIT-WHO MATRIX

Victim Road User	Impacting Vehicle								
	Motorcycle	3-Wheeler	Car	Bus	Truck/ Tractor	Single Vehicle Crash	Other	Unknown	Total
Pedestrian	18	4	22	4	29	0	5	103	185
Cyclist	0	0	4	0	4	0	0	4	12
Motorcyclist	7	2	32	12	38	16	1	65	173
3-Wheeler Occupant	1	0	3	1	4	1	1	0	11
Car Occupant	1	0	5	1	5	4	0	2	18
Bus Occupant	0	0	0	0	0	0	1	0	1
Truck Occupant	0	0	2	1	5	2	1	1	12
Other	0	0	3	0	0	0	0	0	3
Total	27	6	71	19	85	23	9	175	415

Table 2: Who-hit-whom matrix

Among crashes where the impacting vehicle was known, pedestrians were found to be the most vulnerable category of road users. They were often hit by trucks or tractors followed by cars and motorcycles. Similarly, motorcyclists (the second most affected vulnerable road users) were often killed by trucks and cars. Hit-and-run crashes dominate both the categories of cases where the impacting vehicle was not known for 175 crashes.

A.4: HIT-AND-RUNS IN FATAL ROAD CRASHES

A.4.1 : PERCENTAGE OF HIT-AND-RUN AND NON-HIT-AND-RUN CASES

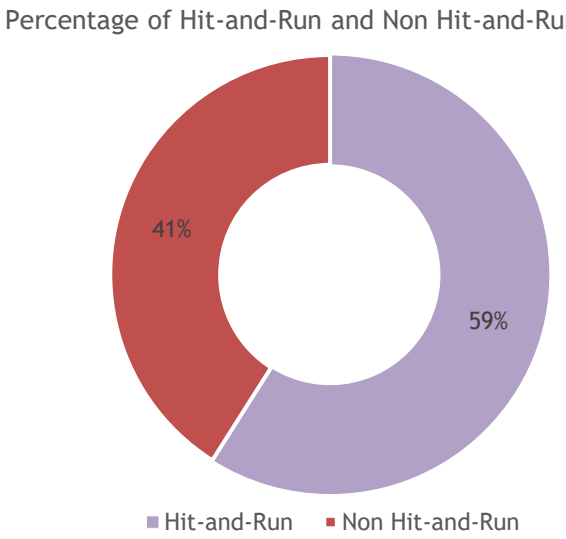


Figure 8: Percentage of hit-and-run and non-hit-and-run cases

Overall, three out of five crashes are hit-and-run cases. The high rate of hit-and-run cases is indicative of non-reporting of accused vehicles as well as non-reporting of crashes by the public.

A.4.2 : HIT-AND-RUN ROAD USER TYPES

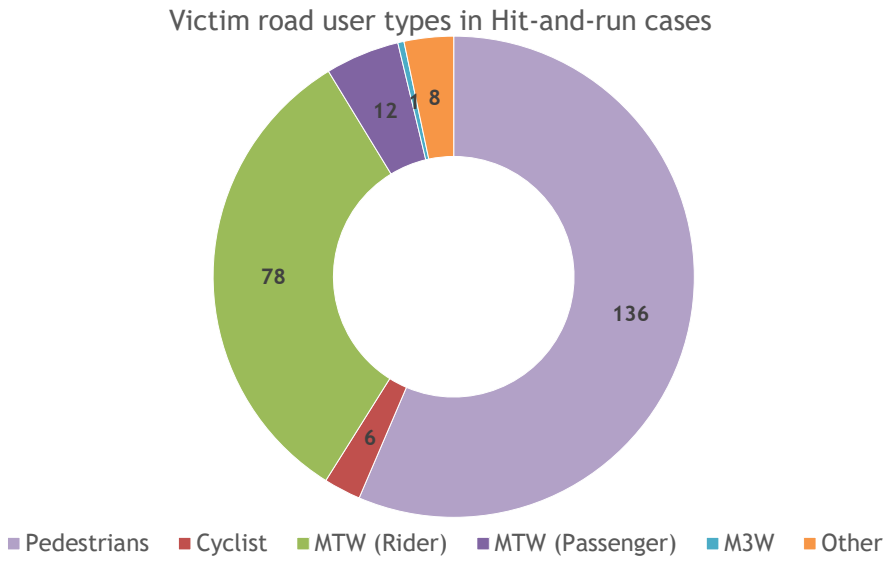


Figure 9: Victim Road user types in hit-and-run cases

A.5: ROAD CRASH HEATMAPS

A.5.1 : HEATMAP OF ALL ROAD CRASH DEATHS

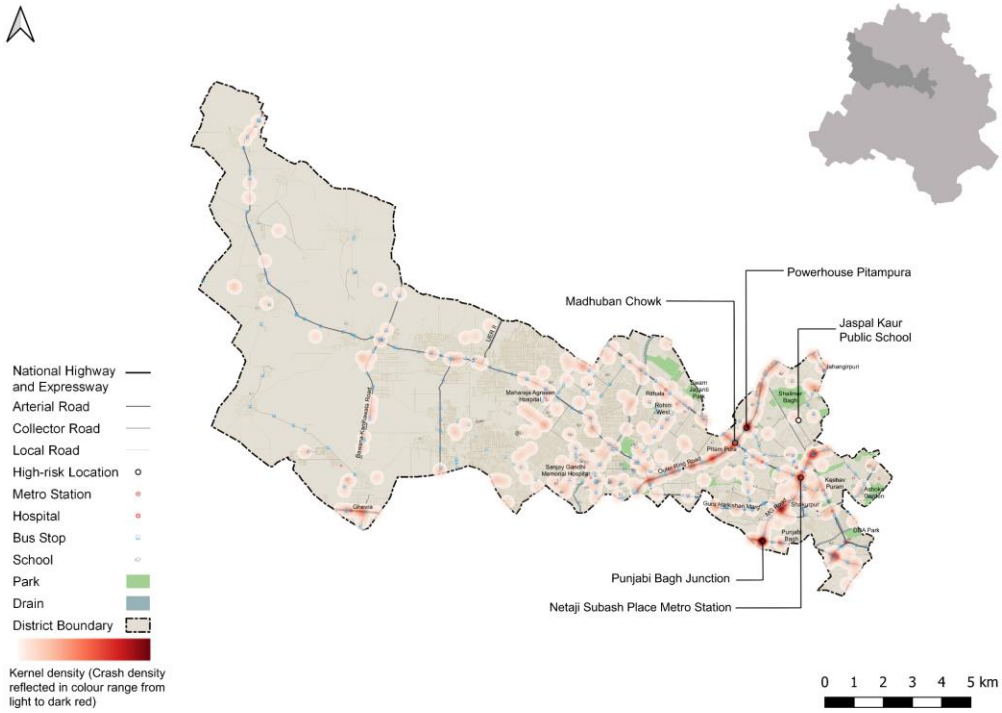


Figure 10: Heatmap of all road crash deaths

A.5.2 : HEATMAP OF ALL PEDESTRIAN DEATHS IN FATAL ROAD CRASHES

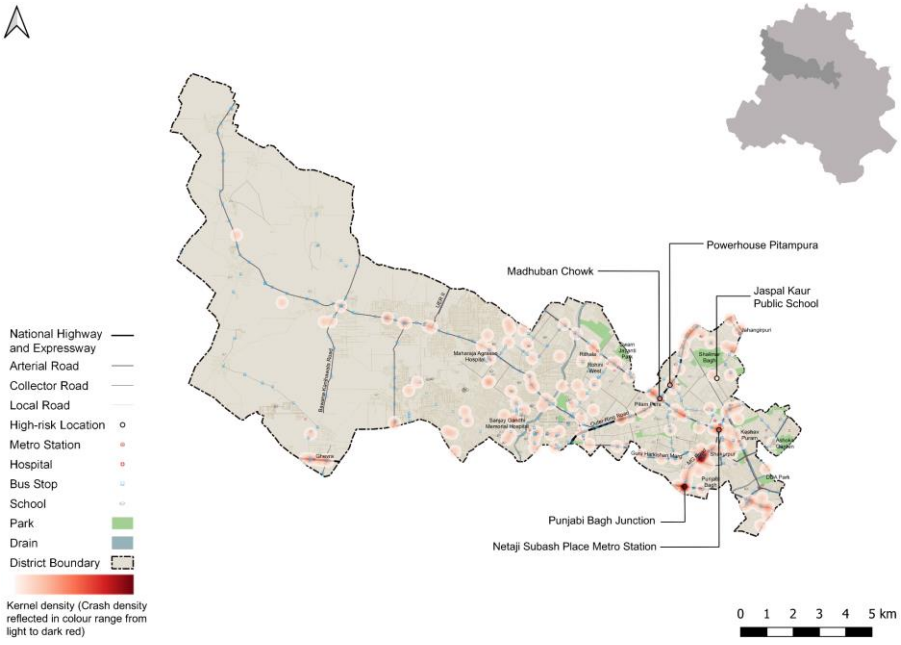


Figure 11: Heatmap of all pedestrian deaths in fatal road crashes

A.5.3 : HEATMAP OF ALL MOTORCYCLE (RIDER + PILLION) RELATED DEATHS

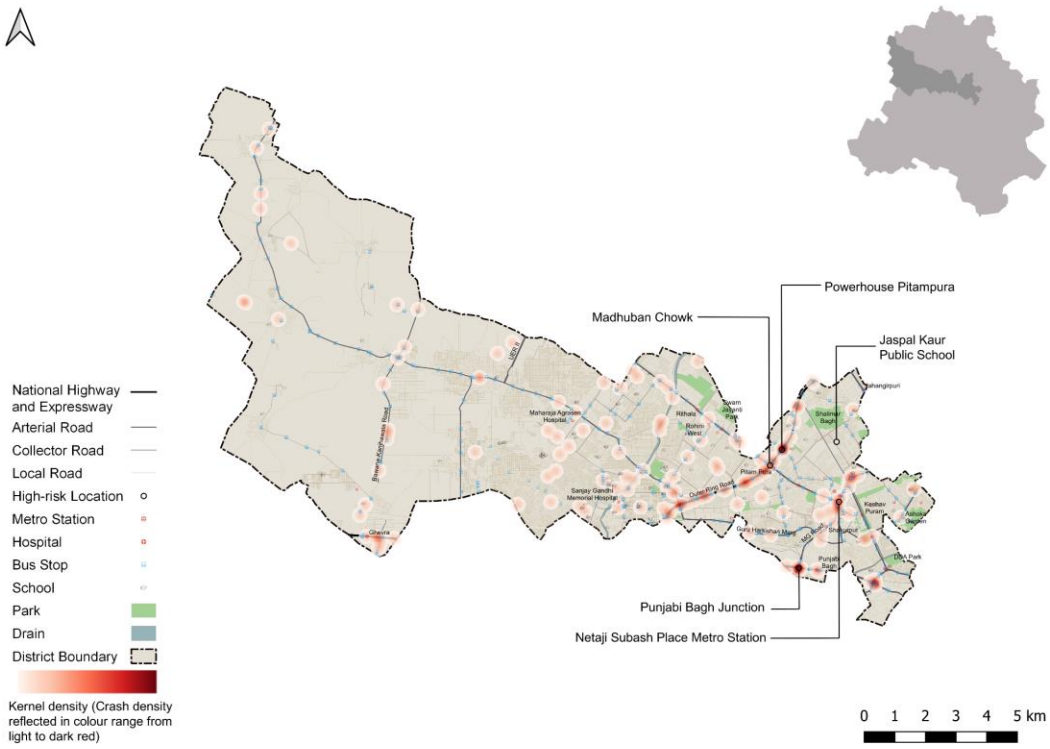


Figure 12: Heatmap of all motorcycle (rider pillion) related deaths

A.6: HIGH-RISK LOCATIONS

A.6.1 : LIST OF HIGH-RISK LOCATIONS

The following is a list of high-risk locations in the North West district which include the number of fatal crashes, hit-and-run crashes, and deaths. Punjabi Bagh Metro Station has the highest in all the three metrics out of all the identified locations. This is followed by Netaji Subhash Place Metro Station.

High Risk Location	Total fatal crashes	Total hit and run fatal crashes	Total persons killed
Punjabi Bagh metro station	16	9	16
Netaji Subhash Place Metro Station	10	7	10
Madhuban Chowk	10	7	10
Powerhouse Pitampura	8	4	8

A.6.2 : MAP OF ALL HIGH-RISK LOCATIONS

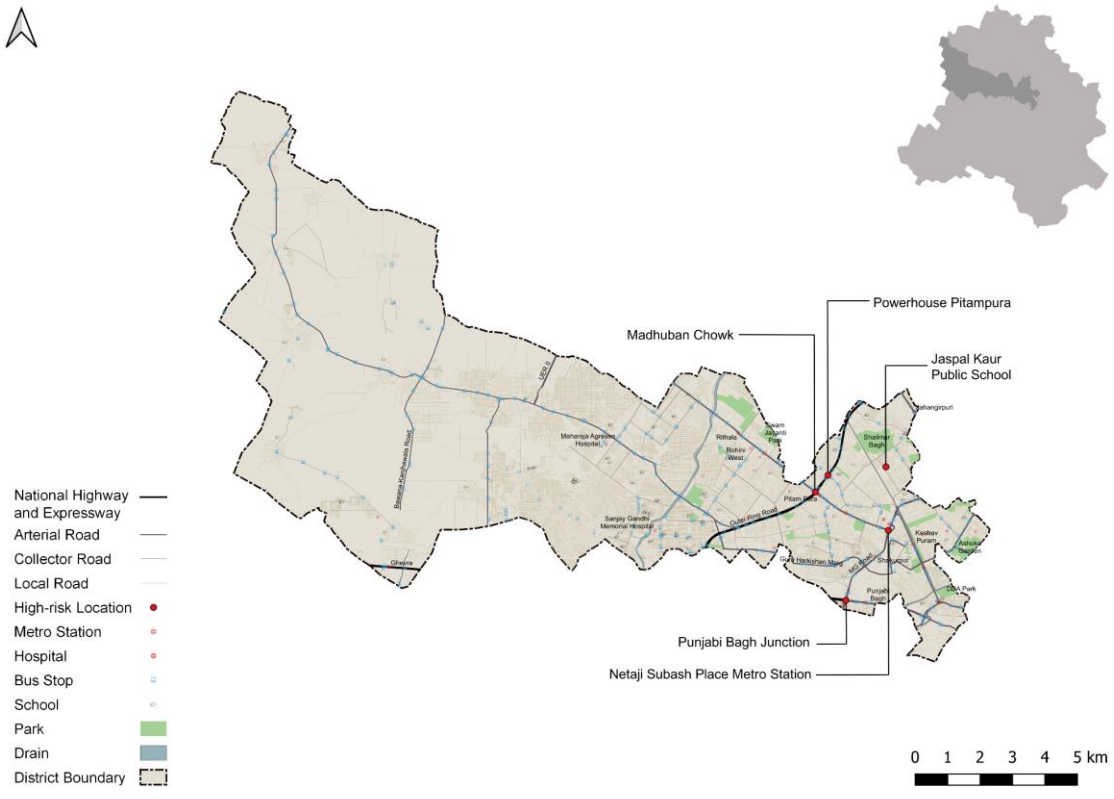


Figure 13: Map of all high-risk locations

A.6.3 : HIGH RISK CORRIDORS

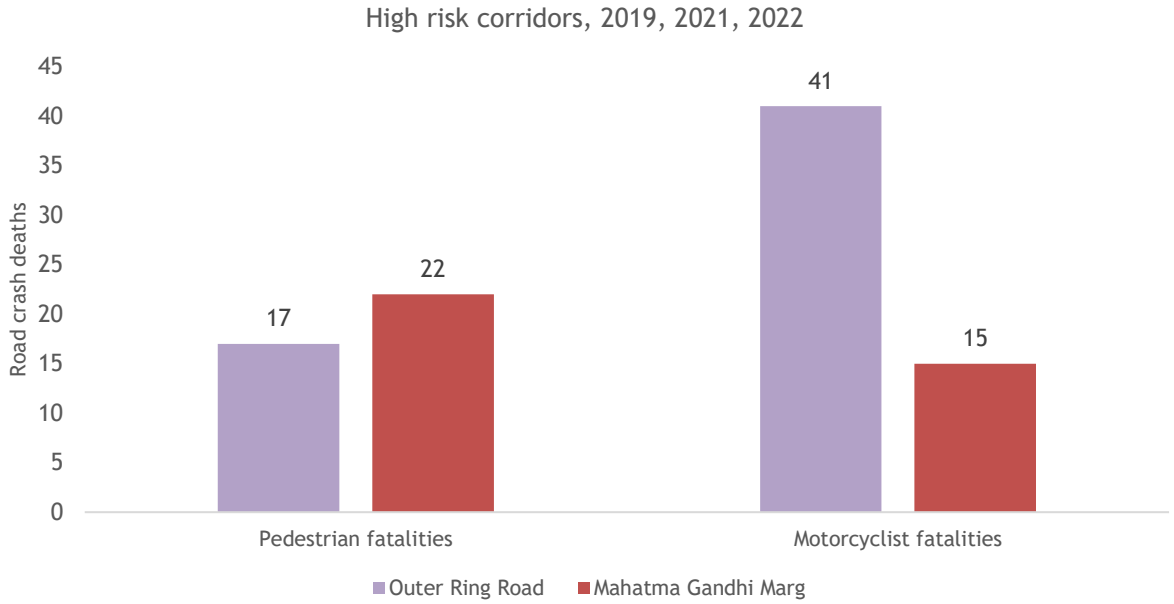


Figure 14: High risk corridors (2019, 2021, 2022)

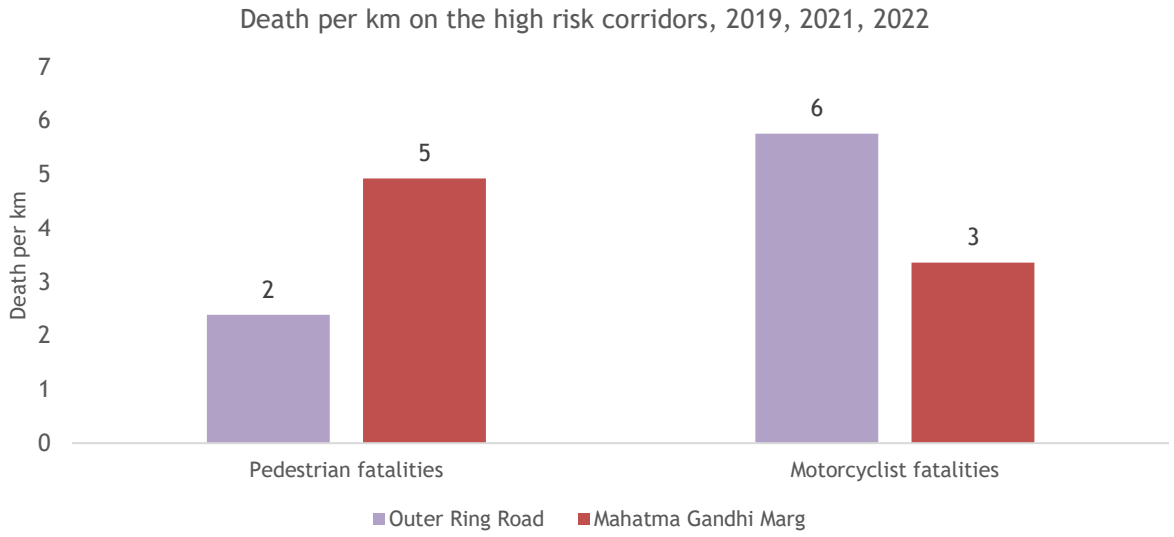


Figure 15: Deaths per km on the high risk corridors (2019, 2021, 2022)

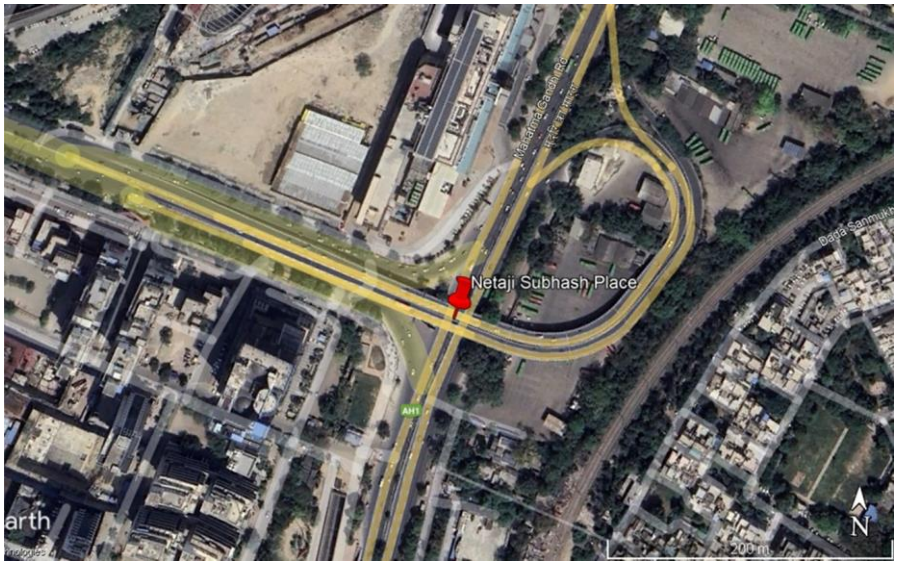
Passing through the North West district, the Outer Ring Road is a seven km stretch and the Mahatma Gandhi Marg is a 4.5 km stretch. There are a total of 41 motorcyclist deaths and 17 pedestrian deaths on the Outer Ring Road. Similarly, there are 15 motorcyclist deaths and 22 pedestrian deaths in Mahatma Gandhi Marg. The above graph shows the deaths per km among motorcyclists and pedestrians. We can see that the motorcyclists are more vulnerable at Outer Ring Road when compared to Mahatma Gandhi Marg and pedestrians are more vulnerable at Mahatma Gandhi Marg when compared to the Outer Ring Road.

B. DATA TO ACTION

B.1: NETAJI SUBHASH PLACE

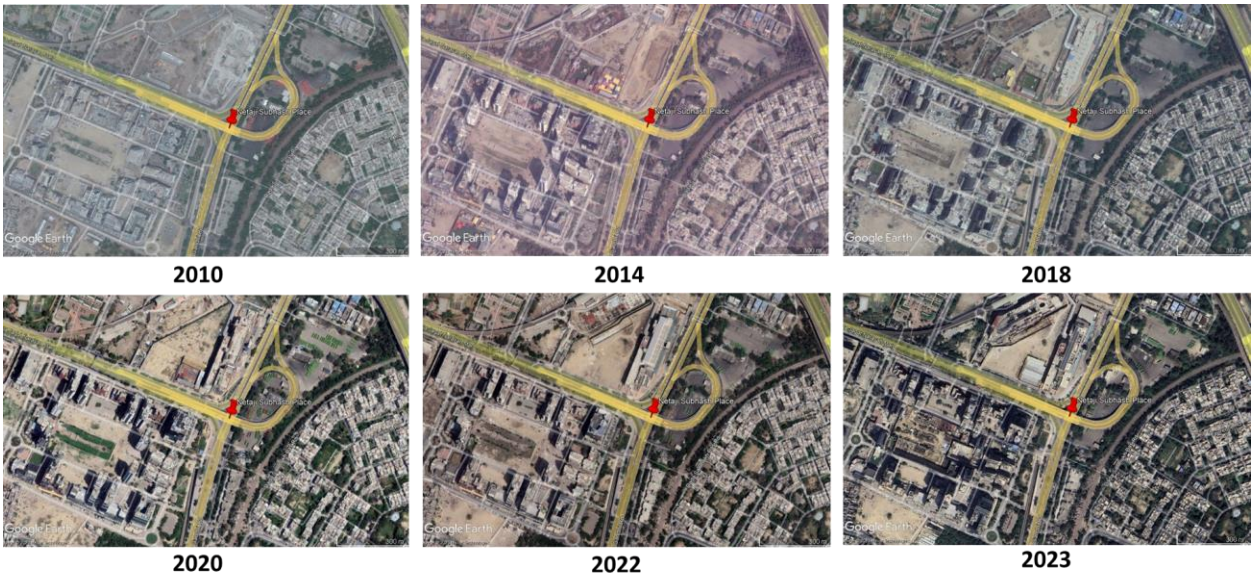
B.1.1 : GENERAL DESCRIPTION OF THE SITE

Netaji Subhash Place (Latitude: 28°41'34.72"N, Longitude: 77° 9'14.45"E) is an unsignalized three-arm intersection with an interchange across a DTC bus terminal where Mahatma Gandhi Road and Lala Jagat Narayan Marg intersect. It is a major point for passengers between Pitampura and Azadpur. This area is served by the red line, and the nearest metro station is the Netaji Subhash Place metro station. The pink line also intersects the Netaji Subhash Place intersection with Shakarpur and Shalimar Bagh nearby. The nearby land uses are commercial, industrial and transportation (the DTC bus terminal).

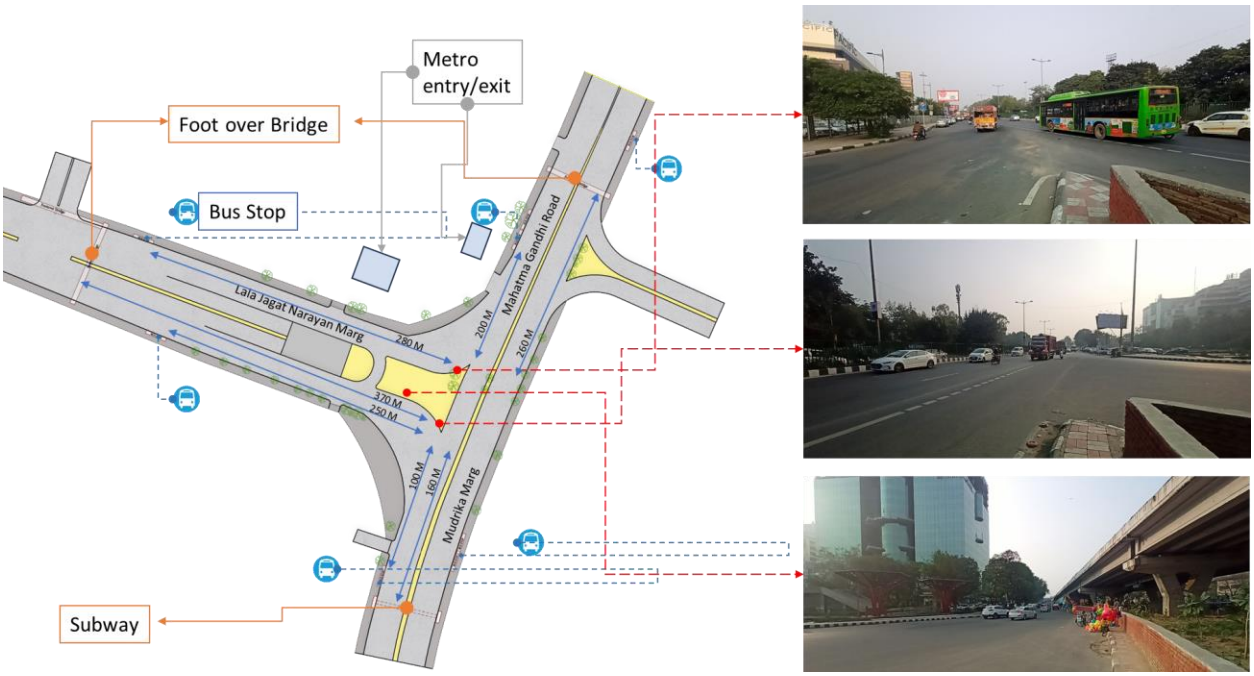


B.1.2 : EXISTING LAND USE

B.1.3 : LAND USE EVOLUTION

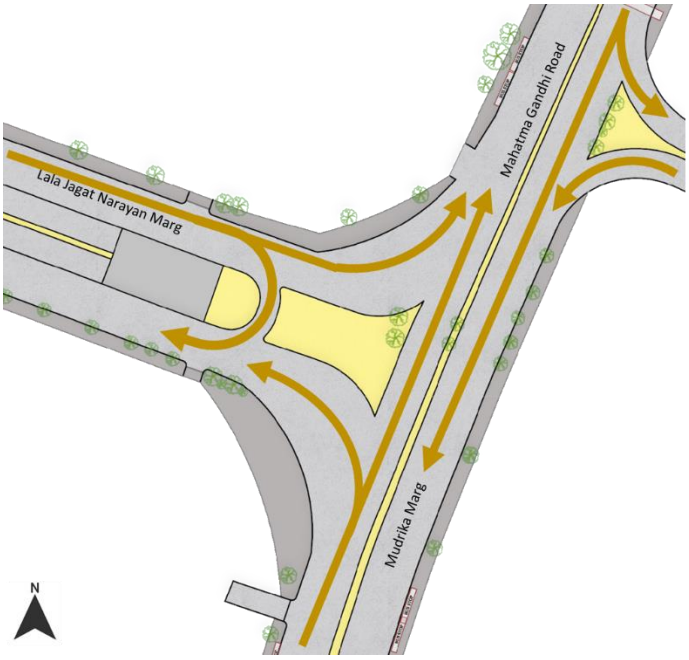


B.1.4 : EXISTING SCENARIO

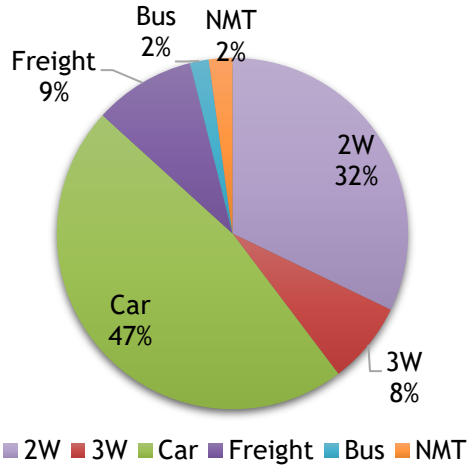


Note: The drawing presented above is a conceptual drawing and is not to scale.

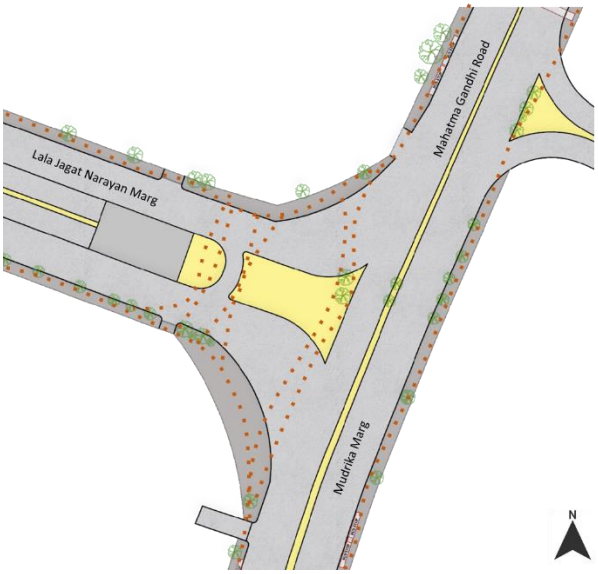
B.1.5 : EXISTING VEHICULAR CIRCULATION



- The junction is unsignalized
- There is no provision for non – motorized transport infrastructure.



B.1.6 : EXISTING PEDESTRIAN CIRCULATION



Absence of pedestrian crossing at the junction, making the pedestrians extremely vulnerable among the highspeed traffic movement.

Pedestrian Crossing conflict with free moving U-turn vehicles.

B.1.7 : TRAFFIC VOLUME COUNT

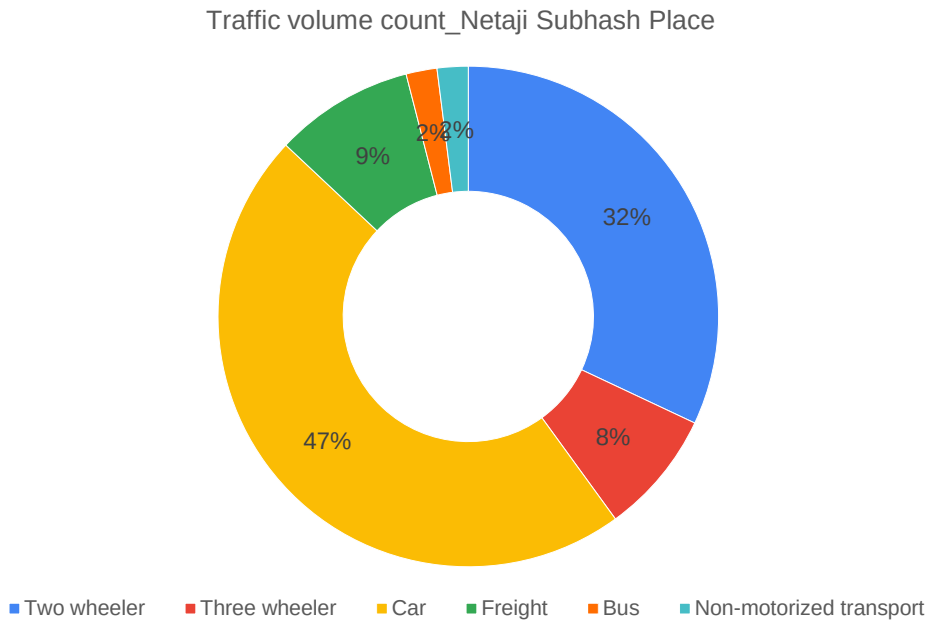


Figure 16: Traffic volume count: Netaji Subhash Place

Hourly Traffic Flow:

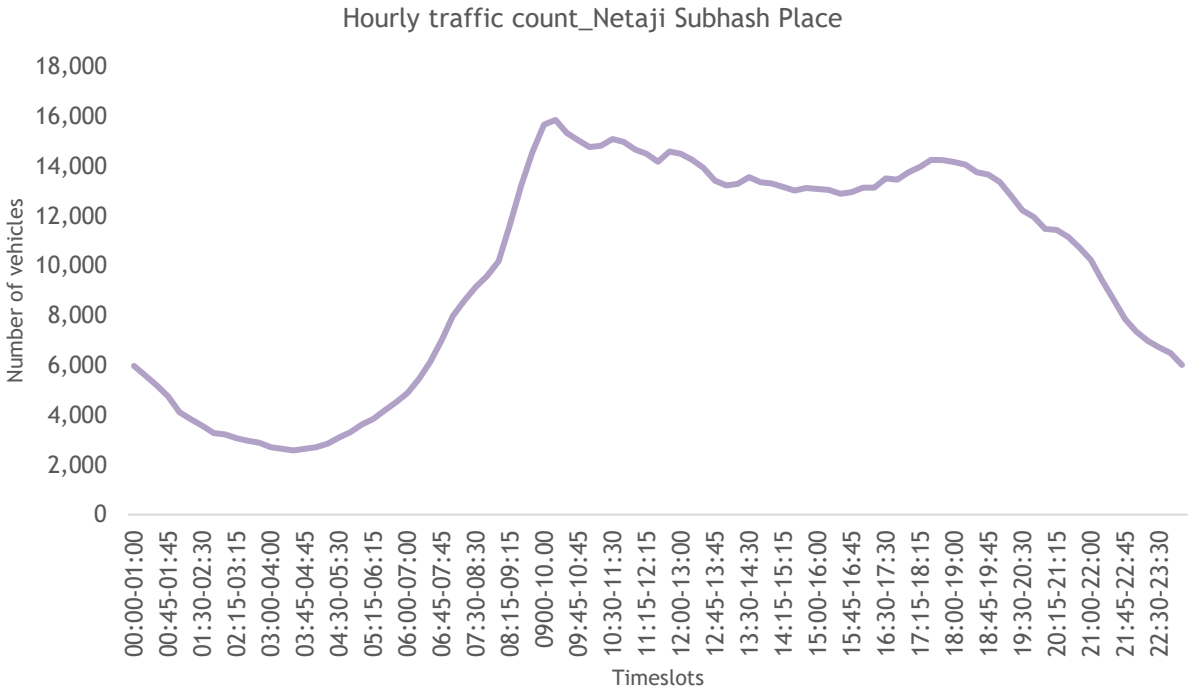


Figure 17: Hourly Traffic Flow: Netaji Subhash Place

Mode wise hourly traffic distribution:

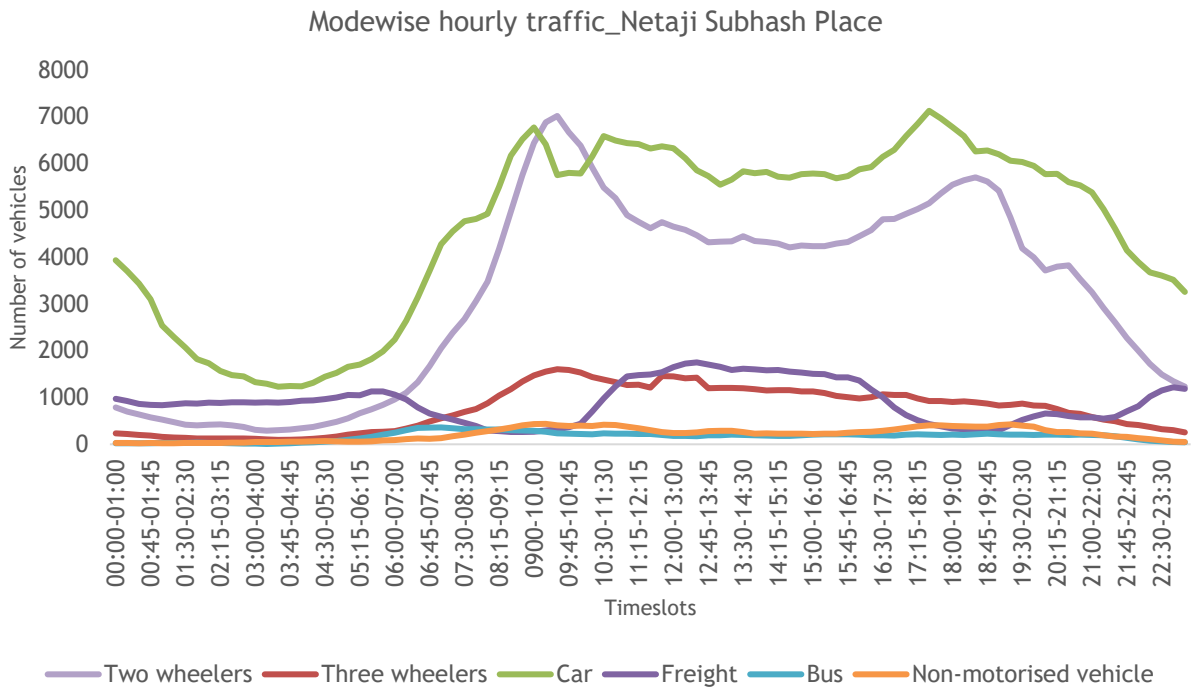
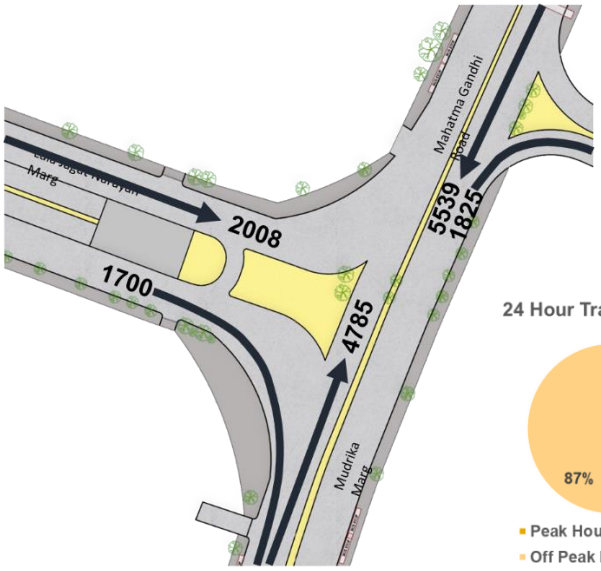
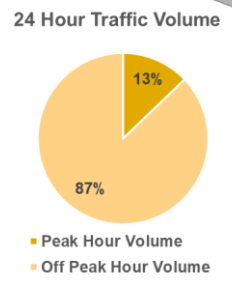


Figure 18: Mode wise hourly traffic distribution

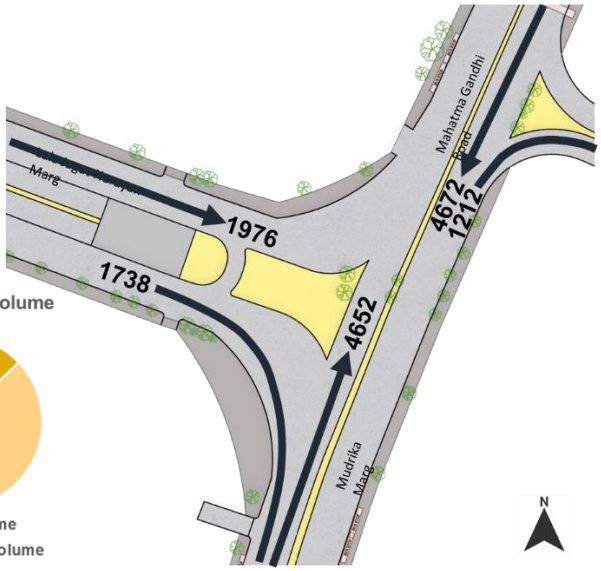
B.1.8 : PEAK HOUR TRAFFIC FLOW

Morning Peak: 09:15 - 10:15

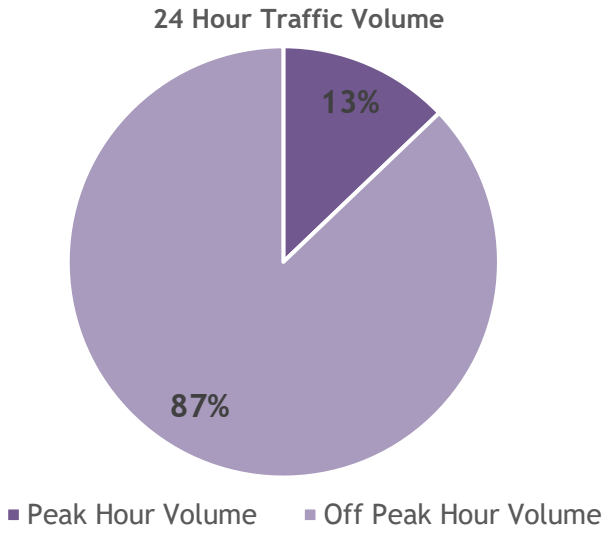




Evening peak: 17:30 - 18-30



*Note- The data presented above is number of vehicles and not PCU



B.1.9 : HELMET USAGE OBSERVATIONAL STUDY

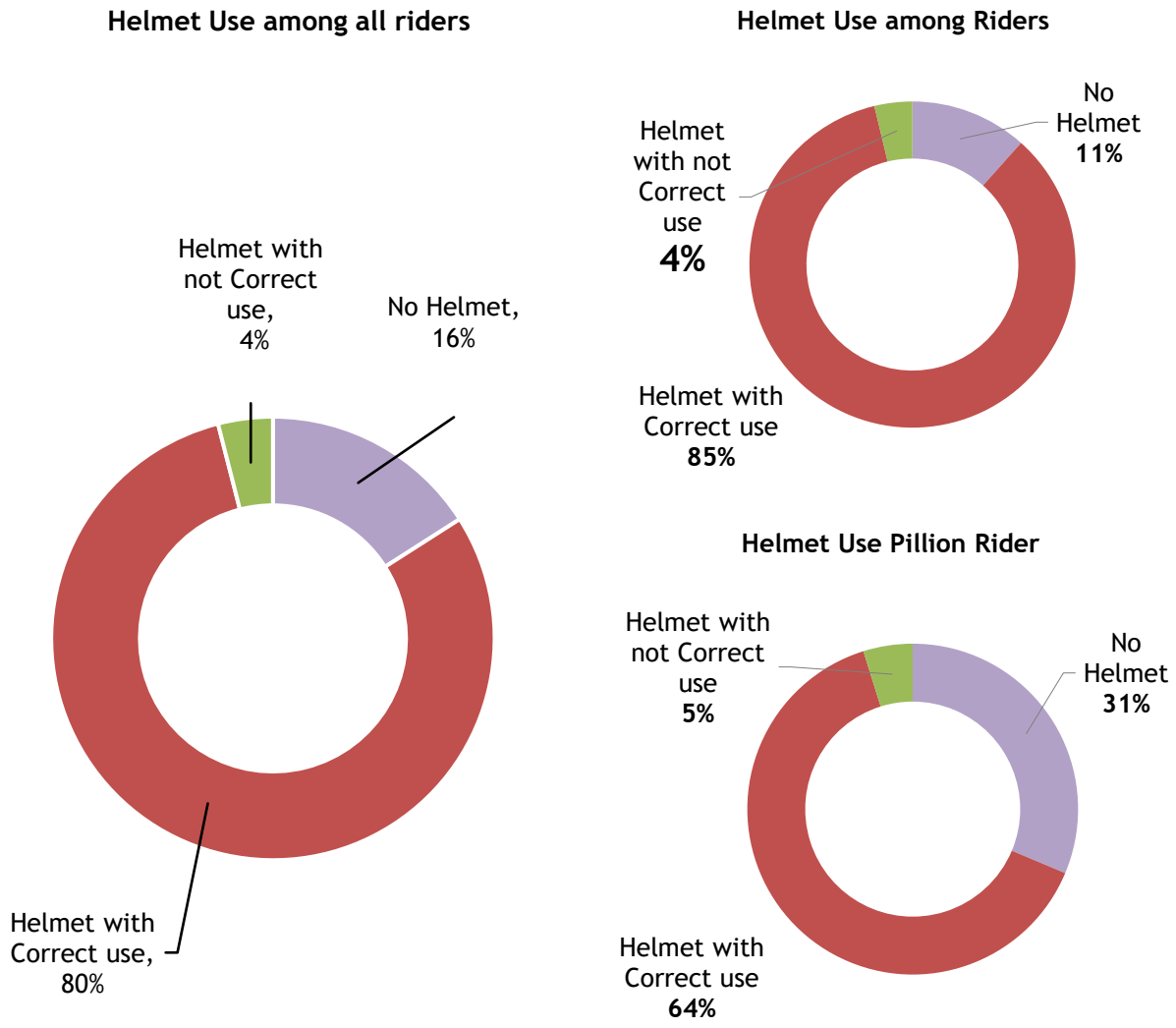
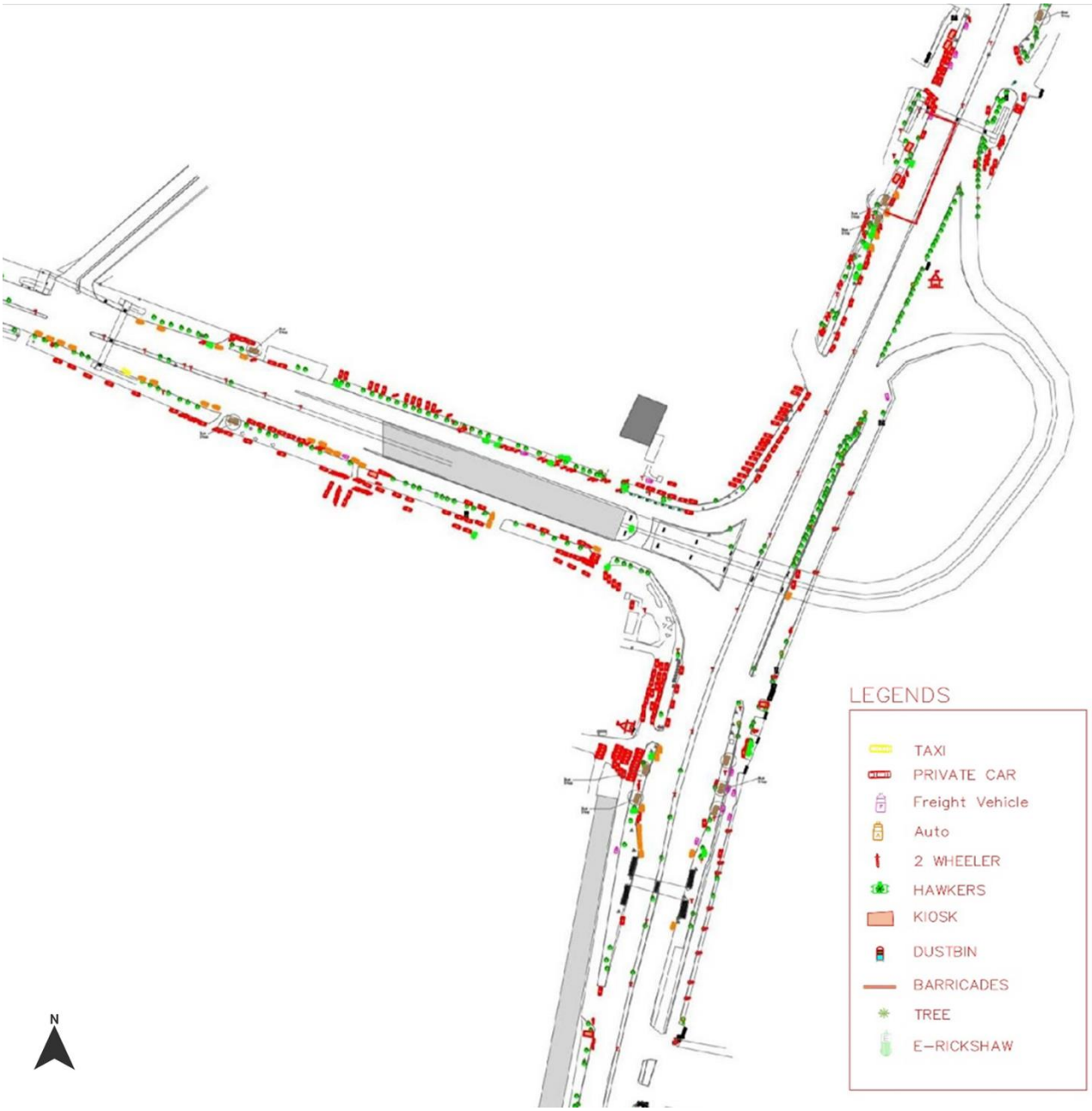


Figure 19: Helmet use among all riders

B.1.10 : ACTIVITY MAP

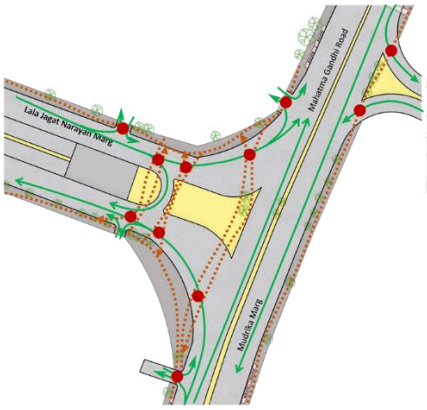


Junction has multiple activities:

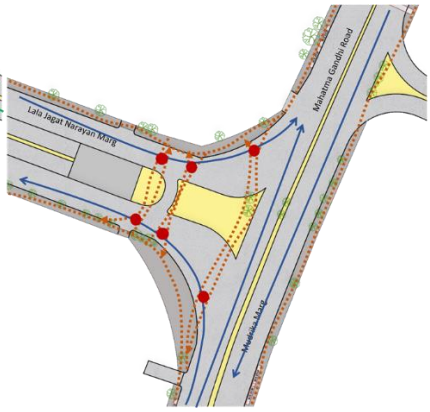
- Vendors standing near bus stop hindering pedestrian and vehicular circulation
- E-rickshaw and auto standing near bus stop and on junction hindering the vehicular circulation

B.1.11 : CONFLICT POINTS

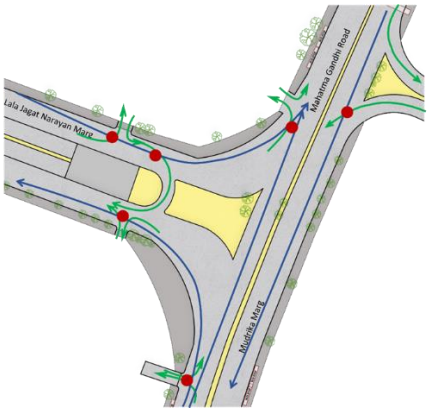
Cars/2W vs Pedestrians;

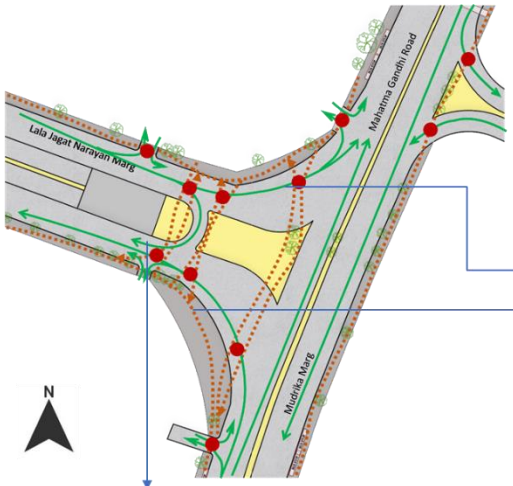


Buses vs Pedestrian;



Cars/2W vs Buses





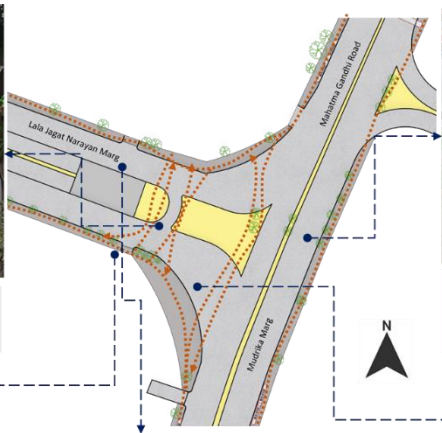
Conflict Points

Conflict Points

Conflict Points

B.1.12 : ISSUES IDENTIFIED

Absence of zebra crossing



Absence of tactile flooring for differently abled users on outer ring road.

Absence of kerb ramps in front of crossing

Inappropriate gap between bollards and absence of bollards at some places.

Absence of raised crossing for pedestrians at unsignalized junctions.

Obstructed pedestrian infrastructure

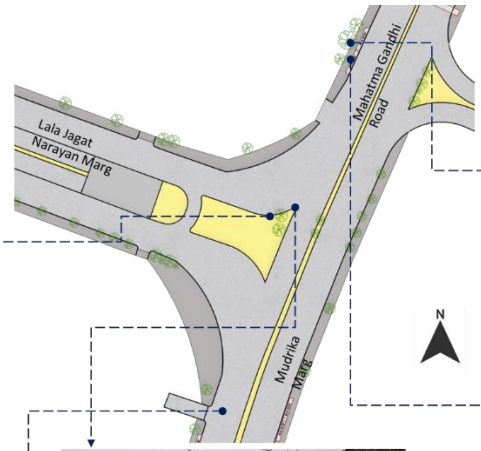
Absence of road markings, signages and speed control measures at the intersection.

Damaged and obstructed pedestrian infrastructure

Absence of traffic calming measures like rumble strips near junctions.

Absence of road markings, signages and speed control measures at the intersection.

Absence of delineators and reflectors on the median and carriageway edges.



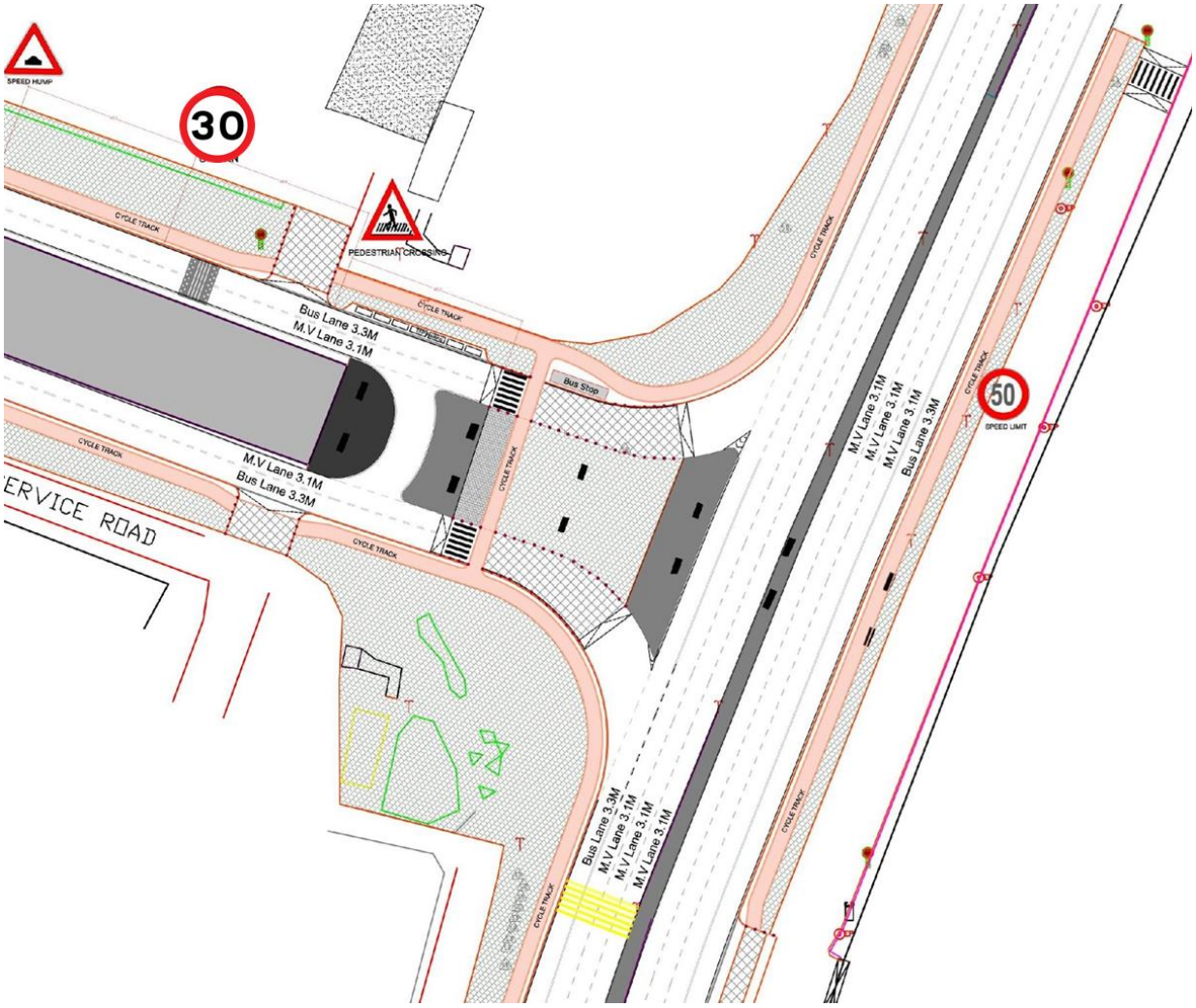
Visual hindrance by excessive growth of trees, hiding the signages and obstructing the driver's vision.

Absence of segregated cycle tracks on arterial roads.

Absence of chevron marking.

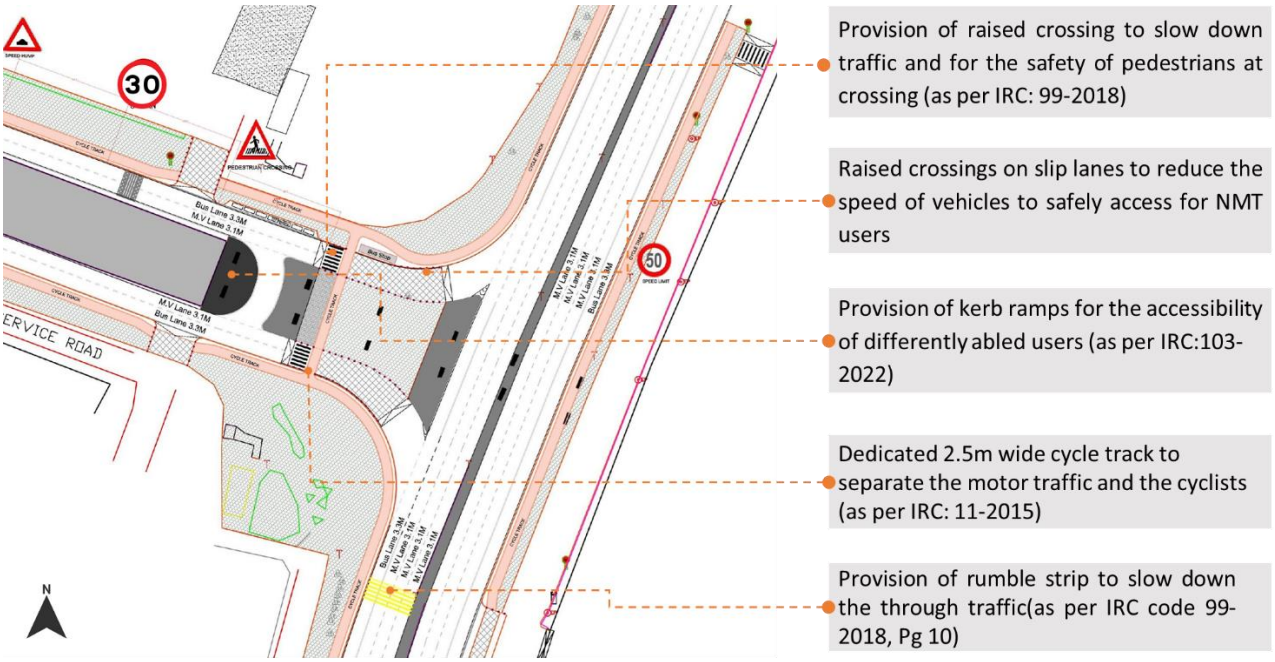
Absence of bus stop marking at bus stop.

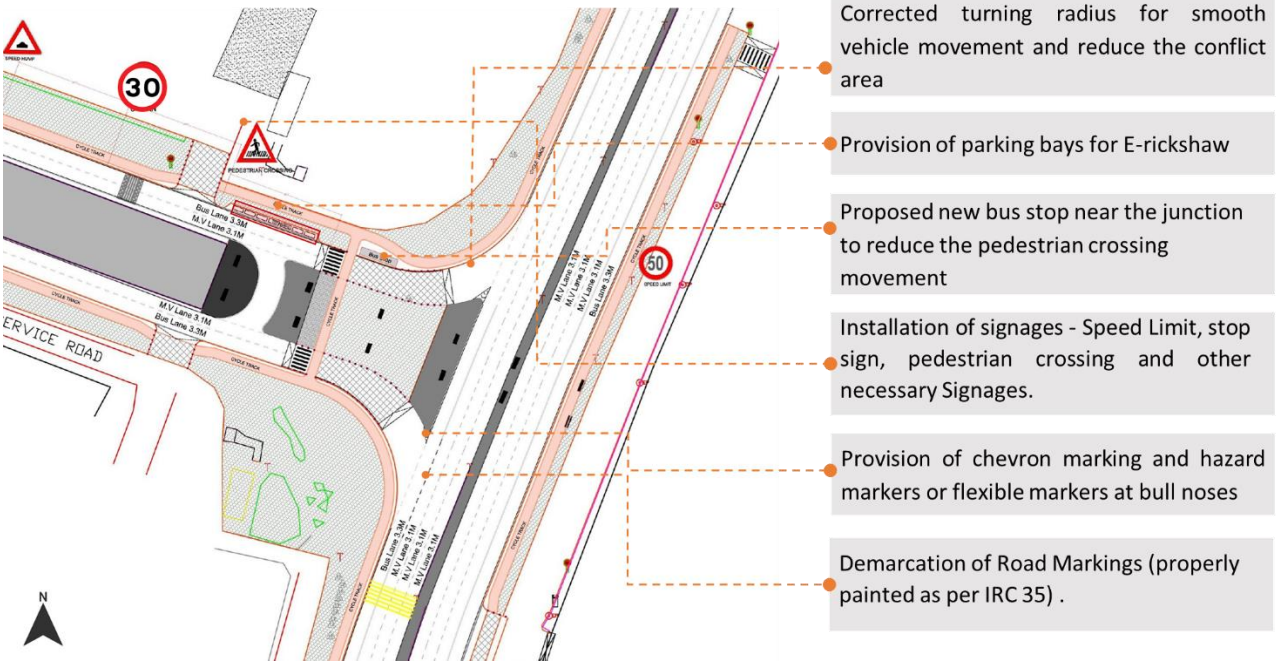
B.1.13 : PROPOSED DESIGN



1. Provision of kerb ramps for the accessibility of differently abled users (as per IRC:103-2022).
2. Bollards should be provided in front of at-grade zebra crossing (as per IRC code:103-2022).
3. Provision of zebra crossing (as per IRC:35-2015, Pg. 107).
4. Provision of tactile pavers for differently abled on footpath (as per IRC 103-2022, Pg. 18).
5. Provision of raised crossing to slow down traffic and for the safety of pedestrians at crossing. As per IRC: 99-2018, Pg. 25 raised crossing with a height of 150mm and slope of 1:10 is recommended.
6. User- friendly footpaths must be provided, at a height of 150mm from road and a minimum clear width of 1.8m - and/or in conformation with the guidelines given in IRC:103-2022, Pg. 8).
7. Typical road markings for road intersections should be provided (as per IRC:35-2015 Annexure: A, Pg. 101).
8. Signages (as per IRC: 67-2022).
9. Provision of rumble strip (as per IRC code 99-2018, Pg. 10).
10. Delineators and reflectors must be provided on the median and carriageway edges for avoiding accidents and for alerting users at night (as per IRC:79-2019, Pg. 03).

11. Provision of dedicated cycle track to separate the motor traffic and the cyclists (as per IRC: 11-2015 Table No.4, Pg.-7).
12. Any kind of vegetation must be removed at junctions for a length of 120 m on either side of the opening to afford complete visibility to drivers (as per IRC: SP: 88-2019, Pg. 44).
13. Provision of chevron marking at intersection (as per IRC: 35-2015 Pg. 30) and hazard markers or flexible object markers at bull noses (as per IRC: 79-2018 Pg. 11 & 12).
14. Provision of bus stop marking (as per page no. 79 IRC:35-2015).





B.1.14 : SUMMARY BUDGET ESTIMATES

S.No	Component	Details	Notes	Rate (per sq.m.)	Cost (INR)	Cost (INR, crores)
A	CIVIL WORK					
A.1	Footpath (Primary, Secondary including other Flooring area)	2m to 3m wide segregated footpath with tactile pavers	Providing and laying of footpath 2m to 3m wide, including earthwork and base layer - PCC, GSB and finishing material.	2594	1,40,44,129	1.404
A.2	Raised Crossing	Raised crossing with 80mm thick pavers and DQ stone surface	Providing and laying Raised crossing with 80 mm thk pavers blocks, and DQ stone including Earth work and Base layers- PCC (M15), RCC (M30 Design mix) & GSB etc.	4290	52,03,783	0.520
A.3	Cycle Infrastructure	2.5m wide segregated cycle track	Providing and laying cycle track (2.5mt wide segregated) including Earth work and Base layers- PCC (M15), RCC (M40 Design mix) & GSB etc. also thermoplastic paint for marking and cycle symbol and spring post etc	3551	91,25,057	0.913
A.4	CC Items (Kerbs, Pipe, etc)	Kerb stones, Bollards, Kerb Channels etc.	Providing and fixing Kerbs, Bollards, and Kerb Channel etc. in CC.		23,43,315	0.234
A.5	Signages	Mandatory, Cautionary and Informatorily Sign Boards of different sizes	Providing and fixing Signage Mandatory, Cautionary and informatorily sign board inculding all the fixing and labours etc.		59,485	0.006
A.6	Marking	Thermoplastic Paint Marking (Edge lines, Centre Line, Lane Marking, Hazard Marking,	Providing and applying road marking strips (retro- reflective) of specified shade/ colour using hot thermoplastic material for road marking .	748	5,39,912	0.054

S.No	Component	Details	Notes	Rate (per sq.m.)	Cost (INR)	Cost (INR, crores)
		Chevron, Zebra Crossing, Bar Marking, etc)				
A.7	Special Zones	Provision of Sitting Bollards, CC Benches, GRC Jali, Pergola, Dustbin etc.	Miscellaneous items- Provision of Sitting Bollards, CC Benches, GRC Jali, Pargola, Dustbin etc. complete items- including foundation and fixing etc.		1,22,175	0.012
A.8	Brick Work		Brick work with common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 in foundation and plinth in: Cement mortar 1:4 (1 cement: 4 coarse sand)	7370.65/CUM	2,94,826	0.029
A.9	Steel Reinforcement for RCC work		Steel reinforcement (in per kg) for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete up to plinth level. Thermo-Mechanically Treated bars of grade Fe-500D or more	107.85/kg	43,140	0.004
A.10	Pavement Surface Dressing	Pavement of Bitumen layer on existing road surface	Surface dressing on old surface with hot bitumen of grade VG - 10	175.10 / sq.m	4,00,104	0.040
A.11	Safety Management Equipment (as per design requirement)	Provision of Delineator Post, Spring Post, Cat eye/studs etc.	Miscellaneous items for Safety Management Equipment (as per design requirement) - Provision of Delineator Post, Spring Post, Cat eye/studs etc.- including foundation and fixing etc.		1,20,886	0.012

S.No	Component	Details	Notes	Rate (per sq.m.)	Cost (INR)	Cost (INR, crores)
A.12	Bus Shelter	10.5mX2.5m Bus Shelter (Stainless Steel Structure)			18,00,000	0.180
	SUB TOTAL CIVIL WORK (A)				3,40,96,810	3.410
B	Drainage, Irrigation & Plumbing	(Drainage items based on design proposal)	Drainage, Irrigation & Plumbing work @ 20% of the cost of Civil work	20%	68,19,362	0.682
C	Electrical Work	(Light poles, junction box, other electrical works proposed based on design proposal)	Electrical work @25% of the cost of Civil work	25%	85,24,202	0.852
D	Horticulture Work	(Landscape items based on design proposal)	Horticulture work @ 15% of the cost of Civil work	15%	51,14,521	0.511
E	Dismantling / Demolition	--	Dismantling work @ 15% of the cost of Civil work	15%	51,14,521	0.511
F	Work Zone Safety & Management	--	Work zone Management @ 5% of the cost of Civil work	5%	17,04,840	0.170
PART 1	SUB TOTAL PART 1 (A+B+C+D+E+F)				6,13,74,258	6.137

S.No	Component	Details	Notes	Rate (per sq.m.)	Cost (INR)	Cost (INR, crores)
G	Design Services & Support	--	Design Consultancy (Preparation of Drawings, BOQ support, Work Zone plan, Site Supervision, Community Engagement & Liaison, Change Management @ 2% - 8% of the cost of Civil work.	2%	12,27,485	0.123
H	Survey Cost	--	Survey Cost (Total Station Survey, underground services, tree demarcation, girths, level differences, steps etc @ (80,000 per junction - 250m on each arm)	80000	80,000	0.008
PART 2	SUB TOTAL PART 2 (PART 1 + G +H)				6,26,81,743	6.268
J	Contingencies '2.5%	--	Contingencies (@2.5%)		15,67,044	0.157
I	GST ('@18%)	--	GST @18%		1,15,64,782	1.156
FINAL	GRAND TOTAL (PART 2 + J + I)				7,58,13,568	7.581

Notes:

- This is a preliminary estimate. Final costing to be evaluated & approved by road owning agency
- DSR 2023 has been followed for all rates. Market Rate and Costing from part PWD projects has been included for certain items
- Cost of Drainage, Irrigation, Plumbing has been calculated at 20% of the civil work cost
- Cost of Electrical Work can be calculated at 20% - 25 % of the civil work cost
- Cost of Horticulture has been calculated at 15% of the civil work cost
- Cost of Dismantling has been calculated at 15% of the civil work cost

- Cost of Work Zone Management has been calculated at 5% of the civil work cost
- Cost for Design Support can range from 2% - 8%, can vary from site to site. This should include Technical Assistance on drawings, 3D supports, Site Supervision, Change management
- Bus Shelter has been calculated at 18 L per shelter; can be changed as per design specific cost
- In case of new items specific to design, please add relevant rows in detail budget estimation and include the same in the budget summary under relevant head.

B.1.15 : DETAILED BUDGET ESTIMATES

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
1	Footpath (Primary, Secondary including other Flooring area)								
1.1	Excavation	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in charge.	2.6.1	cum	0.85	5414	177.5	816837.25	
1.2	Construction of granular sub-base	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	16.78.2, pg no. 258	cum	0.15	5414	2924.85	2375270.685	
1.3	Providing and laying in position cement concrete (M15)	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level: 1:2:4 (1 Cement: 2 coarse sand (zone-III) derived from natural sources: 4 graded stone aggregate 40 mm nominal size derived from natural sources)	4.1.4, pg no. 103	cum	0.1	5414	7780.3	4212254.42	

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
1.4	Tactile - Warner (300 x 300 x 9.8 mm) (20% of total tactile quantity)	Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8 mm having with water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20 mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.	16.90, pg no. 261	sqm		0	2017.6	0	
1.5	Tactile - Guiding (300 x 300 x 9.8mm) (80% of total tactile quantity)	Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8 mm having with water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20 mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.	16.90, pg no. 261	sqm		650	2017.6	1311440	
1.6	Flamed Finish Granite (approved size & colour) (18mm thick)	Providing and laying flamed finish Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge :Flamed	11.55 pg no 198	sqm		162	3186.7	516245.4	

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
		finish granite stone slab Jet Black, Cherry Red, Elite Brown, Cat Eye or equivalent.							
1.7	Polished Granite	Providing and laying Polished Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge. Polished Granite stone slab colour of Black, Cherry/Ruby Red or equivalent.	11.56.1, Pg no 198	sqm			4481.3	0	
1.8	Interlocking Paver Blocks (approved size & colour) (60mm thick)	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50 mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge: 60 mm thick cement concrete paver block of M-35 grade with approved colour, design & pattern.	16.91.1, pg no. 261	sqm	0.6	4602	1045.65	4812081.3	

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
1.9	Glass Mosaic (20mm x 20mm x 4mm)	Providing and fixing Glass mosaic tiles on finished plain wall surface of size 20 mm x 20 mm x 4 mm in all colour, design, fixing in customize design as per direction of Engineer-in- Charge. The glass mosaic tiles to be fixed on the wall surface with the help of approved adhesive applied at the rate of 2.5 kg per sqm and grouting of the same. The rate is inclusive of all operation, material and required pattern approved by Engineer-in-Charge:	11.53 pg no 197	sqm			3891.15	0	
1.10	Crazy Marble Stone (18 mm thick)	Crazy marble stone flooring, including filling the gaps with light shade pigment with white cement marble powder mixture (3 parts of white cement: 1 part of marble powder) by weight in proportion of 4:7 (4 cement marble powder mix : 7 white, black or white and black marble chips of sizes from 1 mm to 4 mm nominal size by volume), with under layer 25 mm thick cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 12.5 mm nominal size), including rubbing, polishing and cement slurry etc. complete : 18 mm thick crazy marble stone white, black or as specified	As per NIT DAV Pedestrianization	sqm			948.85	0	
1.11	Crazy Vitrified Tiles (100x100x16mm)	Providing and laying matt finished vitrified tile of size 100x100x16mm having water absorption less than 0.5% and conforming to IS: 15622 of approved make in all colours and shades in outdoor floors such as footpath, court yard multi models etc., laid on 20mm thick base of cement mortar 1:4 (1cement: 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as direction of Engineer-in-Charge.	As per NIT DAV Pedestrianization	sqm			842.95	0	

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
1.12	Delhi Quartzite (MUZ) (10x10x7.50)	Providing and fixing 10x10x7.50 cm Granite stone block hand cut and chisel dressed on top, for paving in floors, drains etc. laid over 20 mm thick base mortar 1:4 (1 cement: 4 coarse sand) with joints 10 mm wide filled with same mortar including ruled pointing etc. complete as per direction of engineer-in-charge.	16.92 pg no 261	sqm		0	2189.15	0	
1.13	EPDM Flooring	Providing and fixing 36 MM thick Ethylene Propylene Diene Monomer (EPDM) [30 MM SBR (Styrene- Butadiene or Styrene-butadiene Rubber) & 6 MM EPDM] safety FLOORING with the help of BASF Glue 18 adhesive for children play area complete all as per manufacturer's specification and direction of Engineer- in-charge.	As per AR (Market Rate)	Sqm		0	3746.2	0	
	SUB TOTAL							14044129.06	2594.0

2	Raised Crossing	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
2.1	Excavation	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in charge.	2.6.1	cum	0.325	1213	177.5	69974.9375	
2.2	Construction of granular sub-base	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	16.78.2, pg no. 258	cum	0.1	1213	2924.85	354784.305	
2.3	Providing and laying in position cement concrete (M15)	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level: 1:2:4 (1 Cement: 2 coarse sand (zone-III) derived from natural sources: 4 graded stone aggregate 40 mm nominal size derived from natural sources)	4.1.4, pg no. 103	cum	0.1	1213	7780.3	943750.39	
2.4	Providing and laying in position cement concrete (M25, Design Mix)	Providing and laying in position ready mixed or site batched design mix cement concrete for plain cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana/Ordinary Portland /Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering and finishing as per direction of the engineer-in-charge; for the following grades of concrete.	4.20.1.4, page 108	cum	0.125	1213	9439.05	1431195.956	

2	Raised Crossing	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
		Note: Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the minimum specified cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement. Concrete of M25 grade with minimum cement content of 300 kg /cum							
2.4	Interlocking Paver Block (Red & White of approved size) 80mm thick	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50 mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge: 80 mm thick C.C. paver block of M-35 grade with approved colour design and pattern	16.91.2, pg no. 261	sqm		229	1091.5	249953.5	
2.5	Delhi Quartzite 10x10x7.50	Providing and fixing 10x10x7.50 cm Granite stone block hand cut and chisel dressed on top, for paving in floors, drains etc. laid over 20 mm thick base mortar 1:4 (1 cement: 4 coarse sand) with joints 10 mm wide filled with same mortar including ruled pointing etc. complete as per direction of engineer-in-charge.	16.92 pg no 261	sqm		984	2189.15	2154123.6	
	SUB TOTAL							5203782.689	4290.0

3	Cycle Infrastructure	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
3.1	Excavation	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in charge.	2.6.1	cum	0.4	2570	177.5	182470	
3.2	Construction of granular sub-base	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	16.78.2, pg no. 258	cum	0.15	2570	2924.85	1127529.675	
3.3	Providing and laying in position cement concrete (M15)	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level: 1:2:4 (1 Cement: 2 coarse sand (zone-III) derived from natural sources: 4 graded stone aggregate 40 mm nominal size derived from natural sources)	4.1.4, pg no. 103	cum	0.1	2570	7780.3	1999537.1	
3.4	Providing and laying in position cement concrete (M40, Design Mix)	Providing and laying in position ready mixed or site batched design mix cement concrete for reinforced cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana / Ordinary Portland /Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering, finishing and reinforcement as per direction of the engineer-in-charge; for the following grades of concrete. Note:	5.33.1.4, page 120	cum	0.15	2570	9957.65	3838674.075	

3	Cycle Infrastructure	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
		Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the specified minimum cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement: Concrete of M40 grade with minimum cement content of 390 kg/cum							
3.5	Thermoplastic Paint Marking (Cycle Track - Grey Colour; Cycle Box (Green); Cycle Lane, Edge Marking)	Providing and applying 2.5 mm thick road marking strips (retro- reflective) of specified shade/ colour using hot thermoplastic material by fully/ semi-automatic thermoplastic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator on road surface including cost of material, labour, T&P, cleaning the road surface of all dirt, seals, oil, grease and foreign material etc. complete as per direction of Engineer-in-charge and accordance with applicable specifications.	16.62, pg no. 257	sq.m		2570	747.8	1921846	
3.6	Cycle Symbol (On green box)	Providing and applying cycle symbol using thermoplastic paint as per IRC 35:2018 in cycle box at location specified	Market Rate	No.s		50	1100	55000	
3.7	Spring Post (80mm dia 750mm high Plastic)	Providing and applying Plastic spring post 80mm dia 750mm high at location specified	Market Rate	No.s		0	350	0	
	SUB TOTAL							9125056.85	3550.6

4	CC Items (Kerbs, Pipe, etc)	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
4.1	Excavation	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in charge.	2.6.1	cum	0.45	1468	177.5	117256.5	
4.2	Construction of granular sub-base	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	16.78.2, pg no. 258	cum	0.1	1468	2924.85	429367.98	
4.3	Dotted kerb stone of approved pattern of M-25 grade cement concrete (0.15x3xL)	Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5 mm), including making drainage opening wherever required complete etc. as per direction of Engineering-charge (length of finished kerb edging shall be measured to calculate volume for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge)	16.69, pg no. 313	cum	0.1	1468	10117.6	1485263.68	
4.4	Bollards (600mm 120mm dia) (Preferred size: 950mm high 150mm dia)	Pre-casting and placing in position 125 mm dia Bollards 600 mm high of required shape including providing M.S. Pipe Sleeve 50 mm dia 300 mm long in the Bollard and M.S. Pipes 40 mm dia and 450mm long with 150x150x6mm M.S. plate welded at bottom and embedded 150mm in cement concrete 1:3:6 (1 Cement : 3 coarse sand (zone-III) derived from natural	4.9, pg no. 106	No.s		150	929.8	139470	

4	CC Items (Kerbs, Pipe, etc)	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
		sources : 6 graded stone aggregate 20 mm nominal size derived from natural sources), including necessary excavation of size 250x250x450mm deep for the same in bitumen/concrete pavement at specified spacing							
4.5	Kerb Channel (L*0.3)	Providing, laying and making kerb channel 30 cm wide and 50 mm thick with cement concrete 1:3:6 (1 cement: 3 coarse sand:6 graded stone aggregate 20 mm nominal size) over 75 mm bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including finishing the top smooth etc. complete and as per direction of Engineer-in-charge.	16.63, pg no. 257	sqm		308	558.3	171956.4	
	SUB TOTAL							2343314.56	1596.3

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
5.1	Mandatory sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm on arterial - sub arterial roads	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.: Mandatory/ Regulatory sign boards of 900 mm diameter with support length of 3750 mm	16.59.1	No.s		2	7183.35	14366.7
5.2	Cautionary / warning sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm on arterial - sub arterial roads	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3	16.59.2	No.s		6	5559.75	33358.5

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
		mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.:: Cautionary /warning sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm						
5.3	Informatory sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm on arterial - sub arterial roads	Manufacturing, supplying and fixing retro reflective overhead signage boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity and encapsulated lens type heat activated retro reflective sheeting conforming to type - III of ASTM-D-4956-01 as approved by Engineer-in-charge, letters, borders etc. as per IRC : 67-2001 in silver white with blue colour back ground and with high intensity grade, pasted on substrate by pressure sensitive adhesive backing which shall be activated by applying pressure conforming to class II of ASTM-D-4956-01 and fixing the same to the plate of structural frame work by means of suitable sized aluminium alloys, rivets or bolts & nuts @ 300 mm centre to centre all along the periphery as well as in two vertical rows along with theft resistant measures, including the cost of painting with two or more coats of epoxy paint in grey colour on the back side of aluminium sheet including appropriate priming coat. The rate includes the cost of rounding off the corners, lowering down the structural frame work from the gantry, fixing and erecting the same in position all complete as per drawings, specification and direction of the engineer-in-charge. (Structural frame work including M.S. plate to be provided separately. Rectangular area of the sheet only shall	16.60.1	No.s		2	5879.9	11759.8

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
		be measured for payment). Overhead informatory road signage						
5.4	Mandatory sign boards of equilateral triangular shape having each side of 600 mm or lower with support length of 3650 mm on distributary roads (MARKET RATE)	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.: Mandatory/ Regulatory sign boards of 900 mm diameter with support length of 3750 mm	16.59.1 (Market Rate)	No.s			7183.35	0
5.5	Cautionary / Warning sign boards of equilateral triangular shape having each side	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and	16.59.2 (Market Rate)	No.s			5550.75	0

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
	of 600 mm or lower with support length of 3650 mm on distributary roads (MARKET RATE)	borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.:: Cautionary /warning sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm						
5.6	Informatorily sign boards of equilateral triangular shape having each side of 600 mm or lower with support length of 3650 mm on distributary roads (MARKET RATE)	Manufacturing, supplying and fixing retro reflective overhead signage boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity and encapsulated lens type heat activated retro reflective sheeting conforming to type - III of ASTM-D-4956-01 as approved by Engineer-in-charge, letters, borders etc. as per IRC : 67-2001 in silver white with blue colour back ground and with high intensity grade, pasted on substrate by pressure sensitive adhesive backing which shall be activated by applying pressure conforming to class II of ASTM-D-4956-01 and fixing the same to the plate of structural frame work by means of suitable sized aluminium alloys, rivets or bolts & nuts @ 300 mm centre to centre all along the periphery as well as in two vertical rows along with theft resistant measures, including the cost of painting with two or more coats of epoxy paint in grey colour on the back side of aluminium sheet including appropriate priming coat. The rate includes the cost of rounding off the corners, lowering down the structural frame work from the	16.60.1 (Market Rate)	No.s			5879.9	0

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
		gantry, fixing and erecting the same in position all complete as per drawings, specification and direction of the engineer-in-charge. (Structural frame work including M.S. plate to be provided separately. Rectangular area of the sheet only shall be measured for payment). Overhead informatory road signage.						
5.7	Informatorily sign - Road Signages, Road Names	Providing, installing and fixing with necessary clamps etc. retro-reflective Single Sided shoulder / gantry / cantilever mounted signboards comprising of customized modular PU Epoxy Coated. MS Tube frame work, aluminium composite panel (ACP) (both side of frame) mill finished or PVDF coated or as specified as base board, micro prismatic retro-reflective sheet and electro- cut coloured overlay film. The horizontal and vertical members of the MS frame module shall be made of MS tube 50x50x3.6mm thick as per approved drawing and each panel shall be braced diagonally (one way only) with same section. The aluminium composite panel (ACP) shall have a thickness of 4mm which including 0.5 mm thick skin of aluminium on both sides. The ACP shall be routed, folded and fixed on the MS frame with VHB tape 24mm wide and 2.3 mm thick provided throughout the length and breadth of the frame including riveting at the right-angle face of the frame with pop riveting or with self-taping SS screws 5mm dia spaced not more than 300mm centre to centre on both side of frame ensuring that no riveting is seen on either face of the frame. On the front face of the ACP, micro prismatic retro- reflective sheet conforming to Type-XI of ASTM: D 4956-09 shall be pressure fixed as background sheet (In white colour) which will be digitally printed matter, border & symbol etc with 15 years warranty and having clear film for UV protection (the reflective value should be as per IRC 67 when tested) of approved make and colour to create a desired road sign and information message. The rear side of the MS frame shall be covered with balancing ACP sheet of the same description as mentioned above and shall be fixed in similar manner as described above. The edges of the board shall be covered all-round with powder coated die cast extruded aluminium channel of required color and shade of size 68x12x2mm. The channel shall be fixed using two rows of double sided VHB	As per AR (Market Rate)	Sq.m			16686.2	0

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
		tape of above description. The channel shall further be secured by pop rivets having SS screws of 5mm dia at junctions and corners. The rate shall include all materials, labour, equipment, fabrication, transportation, erection, installation and incidental charges all complete as per direction of the Engineer-in- Charge. Only front area of the board shall be measured for payment. (All Structural steel work shall be paid separately under the relevant agreement item, except MS tube frame work and fixing arrangement with clamps for the sign boards with are included in this item).						
	SUB TOTAL							59485

6	Marking	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
6.1	Thermoplastic Paint Marking (Edge lines, Centre Line, Lane Marking, Hazard Marking, Chevron, Zebra Crossing, Bar Marking, etc)	Providing and applying 2.5 mm thick road marking strips (retro-reflective) of specified shade/ colour using hot thermoplastic material by fully/ semi-automatic thermoplastic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator on road surface including cost of material, labour, T&P, cleaning the road surface of all dirt, seals, oil, grease and foreign material etc. complete as per direction of Engineer-in-charge and accordance with applicable specifications.	16.62, pg no. 257	sq.m		722	747.8	539911.6	
6.2	Epoxy paint (concrete bollards, kerbs) (Reference: For Segment Length 250m - Qty =150sq.m)	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete: On concrete work	13.52, pg no. 221	sqm			235.15	0	
6.3	Synthetic Enamel Paint	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade: Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture	13.62.1, pg no. 222	sqm			226.25	0	
	SUB TOTAL							539911.6	747.8

7	Special Zones	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
7.1	Seating Bollards (450mm dia, 400mm high)	Providing & Fixing Position precast reinforced cement concrete cylindrical bollard cum stool of size 400mm top dia, 300mm bottom dia, 475mm overall height, 150mm stem height and concrete grade M-30 as per approved design/drawing. The bollard shall be fixed in C.C. block mix 1:2:4 (1 Cement: 2 coarse sands: 4 graded stone aggregate 20mm nominal size) 300 mm dia and 150 mm deep including earth work in excavation, painting etc. complete as per direction and instruction of Engineer-in-Charge.	As per AR (Market Rate)	No		15	4258.98	63884.7
7.2	Benches (CC benches)	Providing and placing of precast RCC benches (chair bench with back Rest) using m-30 grade of concrete consisting of 2 no. L-shaped base support of thickness 100 mm having Back height 1000mm, front height 450mm and Base width 620mm having 5 No. of RCC planks 1500x100x50 mm and one number plank of size 1500x200x50mm in the approved colour and shade. The minimum weight of MS reinforcement bar in the base support will be 3.40 kg having 4 nos. 8mm dia M.S. Bar distributed alone the section and periphery of the legs with sufficient No. of 4mm dia MS stirrups. Each base support will have 3 nos. 12mm dia (2 Nos. 40mm and one number 65 mm long) galvanized coupling nuts welded suitably to the main reinforcement at appropriate locations so as to receive bolts for fixing of seats of concrete planks on base support and 3 holes to received carriage bolts for fixing back rest planks. The minimum weight of MS reinforcement bar in the plank of 200mm wide will be 4.4kg and of 100mm wide 2.90kg. All the RCC planks will have 2 holes of 14mm dia at appropriate location, so as to receive 12mm dia galvanized bolts for fixing on the base support. One of the planks of size 1500x100x50mm shall be engraved in the centre at the back with letter PWD, 2 plank of size 1500x100x50mm will be bolted to coupling nuts provided in the base support on both sides with 2 numbers of 12mm dia and 65mm long galvanized steel CSR bolt and one Eva washer for each bolt to form a seat 3 planks of size 1500x100x50mm will be bolted to coupling nuts provided in both the base support to form back rest with 6nos. (Two nos. in each plank) half threaded carriage bolts and nuts of size 165mm long and 8mm dia with Eva and steel washers. The holes visible at the back side of the bench will be sealed with cement mortar after assembling sides edges of all the planks shall be painted with acrylic base paint of approved colour and shade and front portion of seating and back	As per AR (Market Rate)	No		10	5829	58290

7	Special Zones	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
		rest planks shall be polished to given glossy finish complete as per direction of Engineer-in-charge						
7.3	GRC Jali	Providing and fixing Uni-Stone make or equivalent Glass Reinforced Concrete (G.R.C.) Screens casted with Spray Mix concrete design in approved size, Patten, thickness of 50mm on the outer Boarder & 25-30mm for internal member and shade. The Screens should be made from 53 grade White Portland Cement manufactured by JK Cement or Birla White, White Quartz fine graded sieved silica Sand, Alkali Resistant Glass Fiber Manufactured by NEG Japan, Owen Corning Saint Gobain or equivalent, Super Plasticizers manufactured by Karochem or equivalent, polymers manufactured by Nova Polychem or equivalent and U.V. resistant Synthetic inorganic pigments should be used for pigmentation manufactured by Phenochem industries or equivalent. The Screens casting shall take place with layering methodology using Direct Power Spray machines. The GRC Screens flexural strength average L.O.P. should be above or equivalent to 6 N/mm2 & M.O.R. Should be above or equivalent to 15 N/mm2 for tests done on 28 days cured samples. The fixing of Screens should be done using Dry fixing method onto structural support members i.e. R.C.C., Brick work, MS Framework. SS/MS Galvanized Clamps & Pins fasteners to be used of Worth, Hilti & Fischer or equivalent. All cast in Socket to be Epoxy primer Coated. Electrodes to be used of Advani, Mangalam, Esab or Victor brand or equivalent, all as per manufacturer's specification and direction of Engineer- in-charge. Vendor shall submit shop drawings of same, the drawings to be duly approved from Engineer-in- charge at site.	As per AR (Market Rate)	Sqm		0	8190.85	0
7.4	EPDM Flooring	Providing and fixing 36 MM thick Ethylene Propylene Diene Monomer (EPDM) [30 MM SBR (Styrene- Butadiene or Styrene-butadiene Rubber) & 6 MM EPDM] safety FLOORING with the help of BASF Glue 18 adhesive for children play area complete all as per manufacturer's specification and direction of Engineer- in-charge.	As per AR (Market Rate)	Sqm		0	3746.2	0
7.5	Exposed Brick Masonry (Seater with exp including putty, plaster, earth work, including	Brick work with common burnt clay selected F.P.S. (non-modular) bricks of class designation 7.5 in exposed brick work including making horizontal and vertical grooves 10 mm wide 12 mm deep complete in cement mortar 1:6 (1 cement: 6 coarse sand): Above plinth level up to floor V level	6.26.2, pg no. 129	cum		0	9439.75	0

7	Special Zones	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
	foundation with steel for RCC etc)							
7.6	Street Art Wall (wall putty)	Providing and applying plaster of paris putty of 2 mm thickness over plastered surface to prepare the surface even and smooth complete.	13.26, pg no. 218	Sqm			262.7	0
7.7	Street Art Wall (exterior paint, etc)	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade: New work (Two or more coats applied @ 1.43 ltr/10 sqm over and including priming coat of exterior primer applied @ 0.90 litre/10 sqm)	13.47.1, pg. no. 220	Sq.m			171.1	0
7.8	Metal Pergola	Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete. Hot finished welded type tubes	As per AR (Market Rate)	kg			90.25	0
7.9	Polycarbonate sheet		As per AR (Market Rate)	Sq.m			1300	0
7.10	CNC metal cut column / marker		As per AR (Market Rate)	sq.m			3000	0
7.11	Play / Gym Equipment	Providing designing and fixing play equipment as per size, shape and material s per design. All complete as per direction and approval of engineer-in-charge regarding material, shape of equipment, colour on metal, fixing of equipment etc(the cement concrete and excavation work shall be paid separately)	As per AR (Market Rate)	lump sum			40000	0
7.12	Dustbin		As per AR (Market Rate)	No			10000	0
7.13	Sculpture		As per AR (Market Rate)	lump sum				0
	SUB TOTAL							122174.7

8	Brick Work	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
8.1	Brick Work (1 cum for 1m)	Brick work with common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in:	6.1.1 pg no. 127	cum	0.1	400	7370.65	294826
	SUB TOTAL							294826

9	Steel Reinforcement for RCC work	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
9.1	Thermo-Mechanically Treated bars of grade Fe-500D or more	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete up to plinth level.:	5.22.6, pg no.	kg		400	107.85	43140
	SUB TOTAL							43140

10	Pavement Surface Dressing	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
10.1	Bituminous- Top Layer	Surface dressing on old surface with hot bitumen of grade VG - 10 of approved quality using 1.95 kg of bitumen per sqm with 1.50 cum of stone chippings 11.2 mm nominal size per 100 sqm of road surface, including consolidation with road roller of 6 to 8 tonne capacity, etc. complete.	16.27 Page 249	sqm		2285	175.1	400103.5	
	SUB TOTAL							400103.5	175.1

11	Safety Management Equipment (as per design requirement)	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
11.1	Delineator	Providing and fixing post delineators made of ABS round body fitted with 2 nos 100 mm dia high reflective reflectors and mounted on MS pipe of 65 mm dia duly powder coated anti-rust and anti-theft steel to be installed as per direction of Engineer-in-charge	16.65, Page 257	No		30	904.2	27126
11.2	Spring Post (80mm dia 750mm high Plastic)	Providing and applying Plastic spring post 80mm dia 750mm high at location specified	As per AR (Market Rate)	No		150	350	52500
11.3	Road Studs/Cat eye	Providing and fixing Glow studs of size 100x20 mm made of heavy-duty body shall be moulded ASA (Acrylic styrene Acryloretrite) or HIP (High impact polystyrene) or ABS having electronically welded micro- prismatic lens with abrasion resistant coating as approved by Engineer in charge. The glow stud shall support a load of 13635 kg tested in accordance with ASTM D4280. The slope of retro- reflective surface shall be 35 (+/- 5) degrees to base. The reflective panels on both sides with at least 12 cm of reflective area up each side. The luminance intensity should be as per the specification and shall be tested as described in ASTM I: 809 as recommended in BS: 873 part 4: 1973. The studs shall be fixed to the Road surface using the adhesive conforming to IS, as per procedure recommended by the manufacturer complete and as per direction of Engineer-in-charge.	16.50, Pg no. 253	No		200	206.3	41260
	SUB TOTAL							120886

12	Bus Stops	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
12.1	Bus Shelter (10.5mX2.5m)	Stainless Steel Structure	As per AR (Market Rate)	No		1	1800000	1800000
	SUB TOTAL							1800000

13	New Item 01: Pedestrian Bridges (to be added in Summary Sheet)	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
13.1	Steel Structure footbridge for pedestrians over the VUP	Stainless Steel Structure	As per AR (Market Rate)	No		0	4000000	0
	SUB TOTAL							0

B.2: PUNJABI BAGH JUNCTION

B.2.1 : GENERAL DESCRIPTION OF THE SITE

Punjabi Bagh junction (Latitude: 28°40'25.67"N, Longitude: 77° 8'24.37"E) is a grade-separated, signalised 4 arm junction/roundabout where the Mahatma Gandhi Road and Rohtak Road intersect. It is a major interchange for the passengers coming to Delhi from Rohtak side. The nearest metro station is Punjabi Bagh West on the pink line. The green line crosses the intersection with Shivaji Park and Punjabi Bagh metro stations nearby.

B.2.2 : LAND USE EVOLUTION OVER THE YEARS:


2010


2014


2018


2020

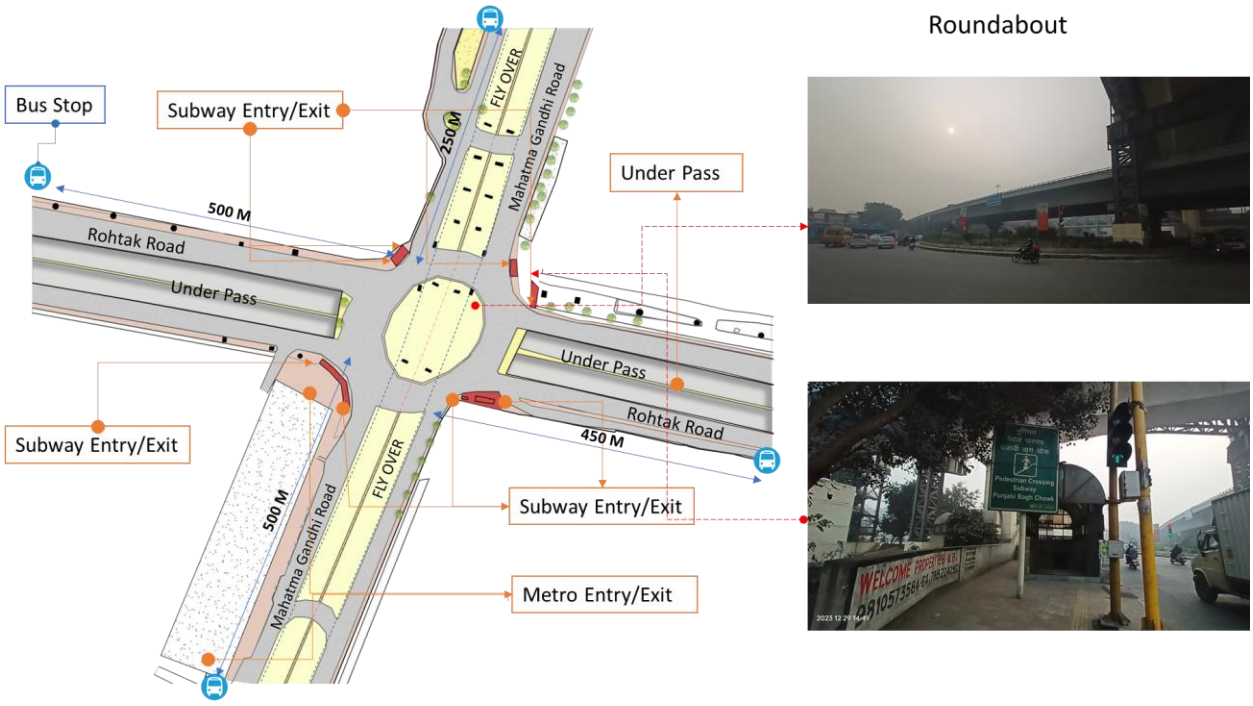

2022


2023

B.2.3 : EXISTING LAND USE

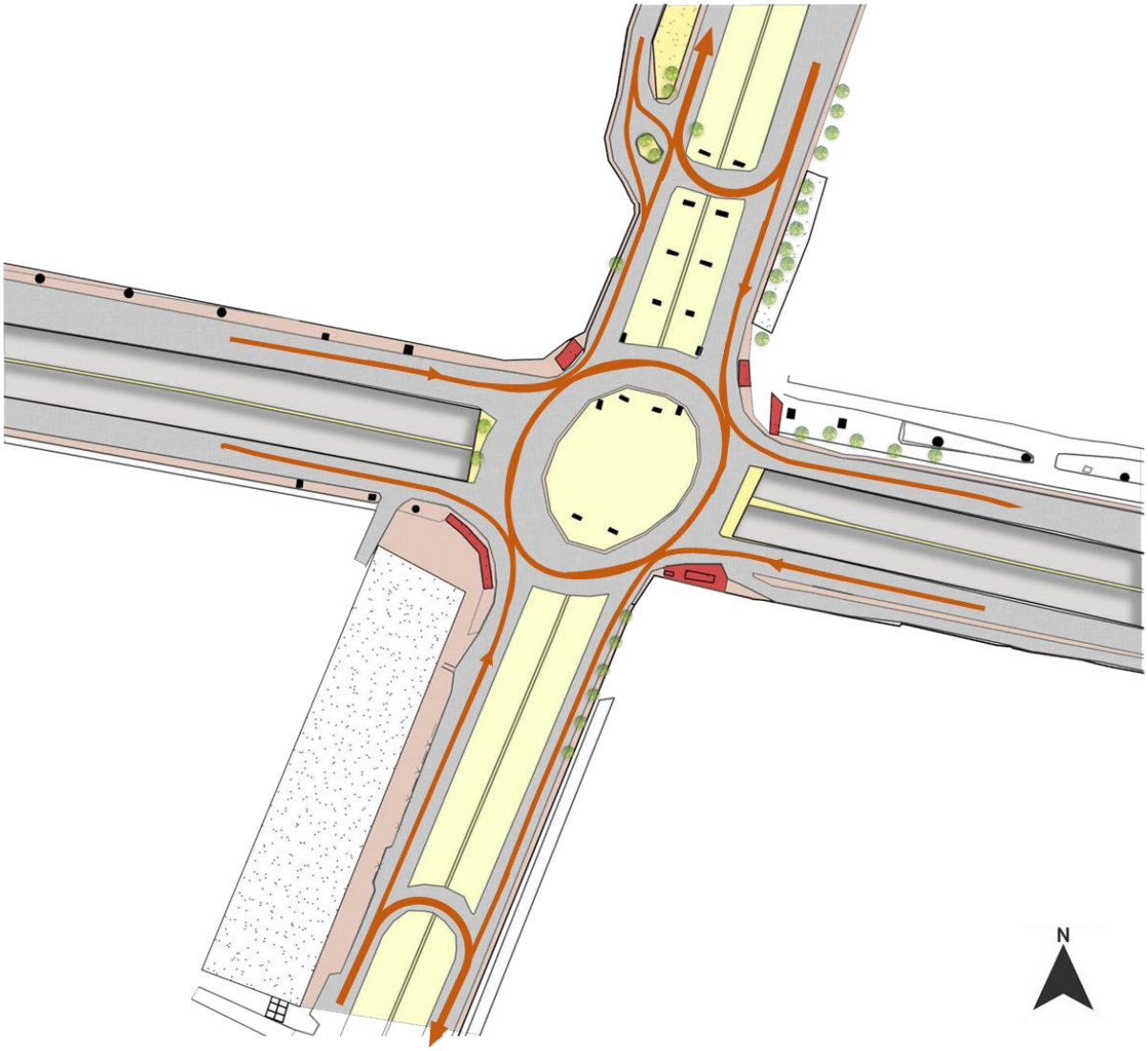
Commercial Transportation Residential

B.2.4 : EXISTING SCENARIO AROUND THE SITE



Note: The drawing presented above is a conceptual drawing and is not to scale.

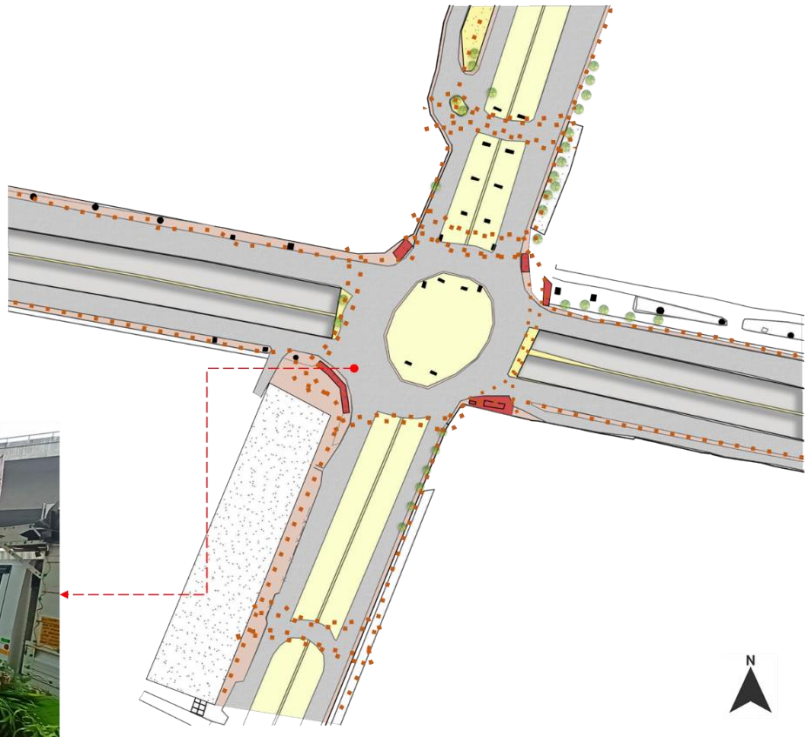
B.2.5 : EXISTING VEHICULAR CIRCULATION



- The junction is signalized with no pedestrian phasing.
- Junction doesn't have at grade crossing.
- For pedestrians crossing, there is a subway connected on each side.
- There is no provision for non – motorized transport infrastructure.

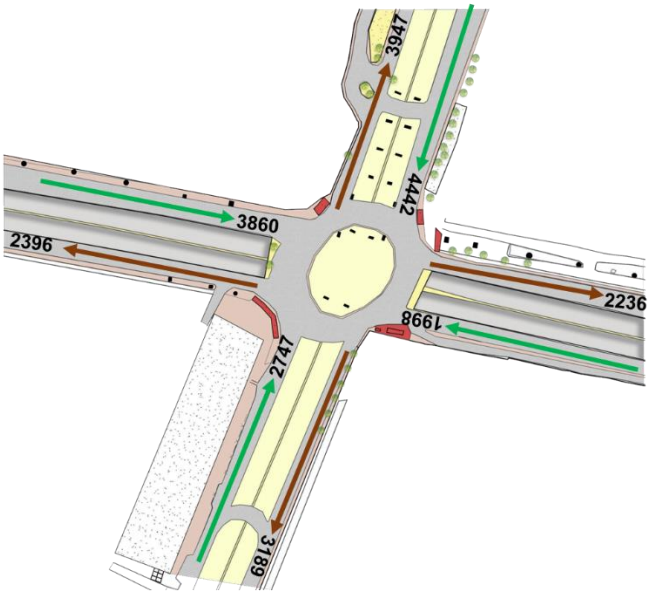
B.2.6 : EXISTING PEDESTRIAN CIRCULATION

- Absence of pedestrian crossing at the junction, making the pedestrians extremely vulnerable among the highspeed traffic movement.
- Pedestrian Crossing conflict with free moving U-turn vehicles.
- Obstructed pedestrian infrastructure making pedestrians to walk on road and exposed to high moving traffic.

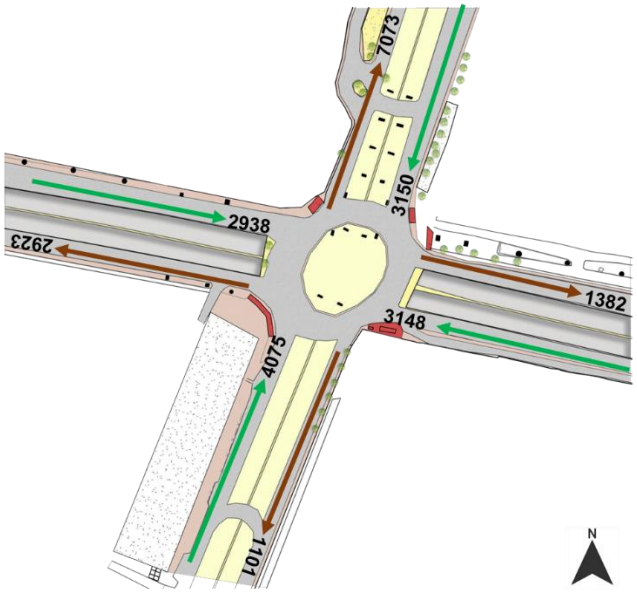


B.2.7 : DIRECTION WISE TRAFFIC VOLUME

Morning Peak 09:15 - 10:15



Evening Peak 17:30 -18:30



*Note- The data presented above is number of vehicles and not PCU

B.2.8 : TRAFFIC VOLUME COUNT

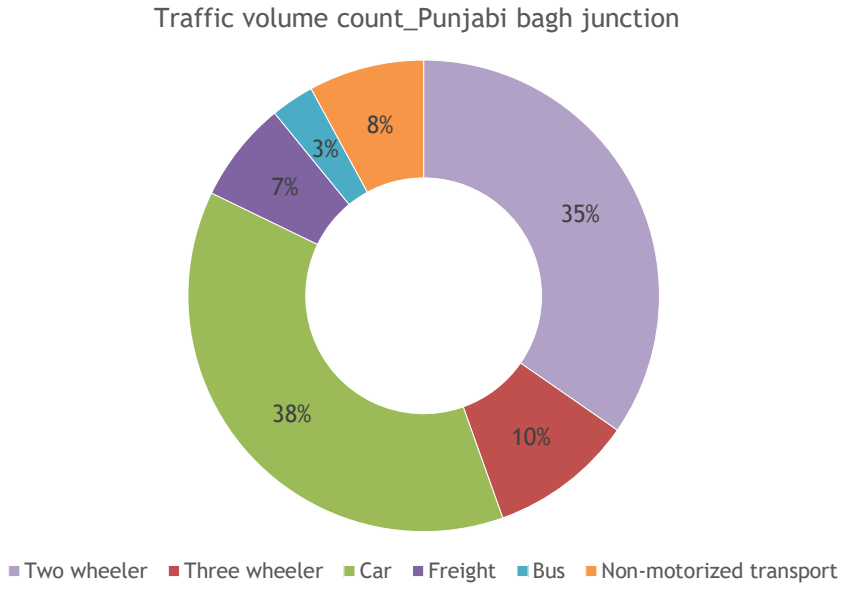


Figure 20: Traffic Volume Count: Punjabi Bagh Junction

Hourly Traffic flow

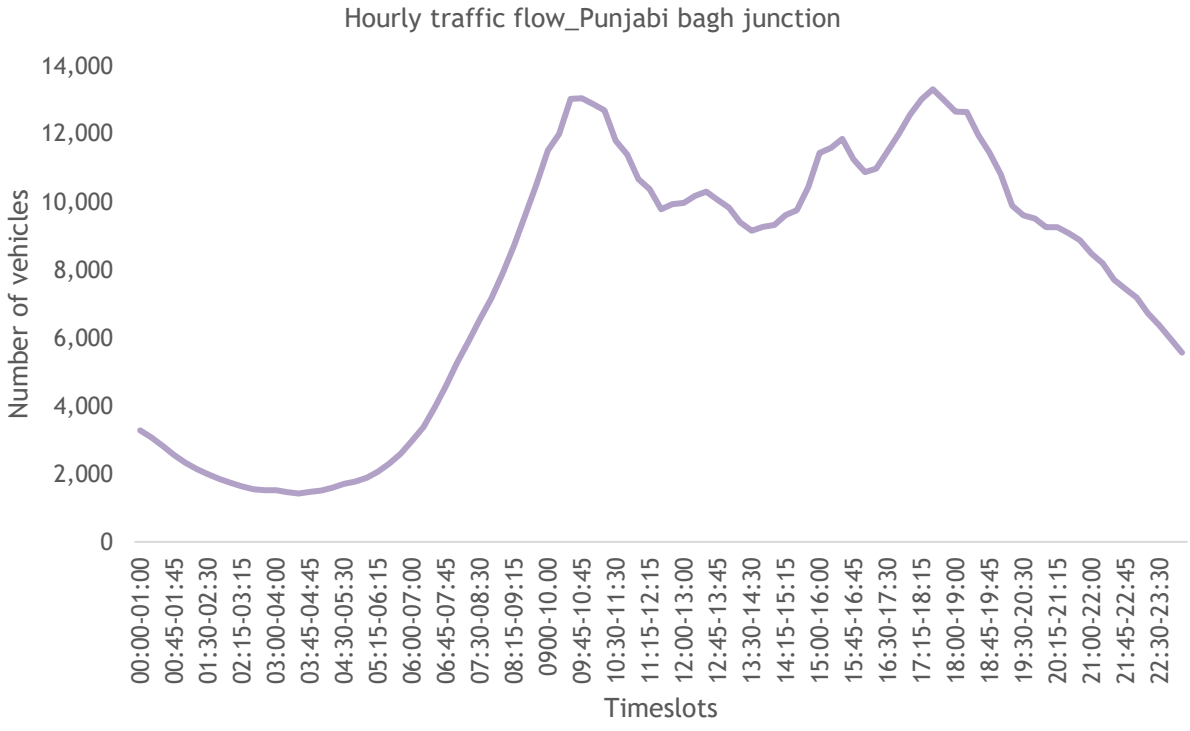


Figure 21: Hourly traffic flow: Punjabi Bagh Junction

Mode wise hourly traffic

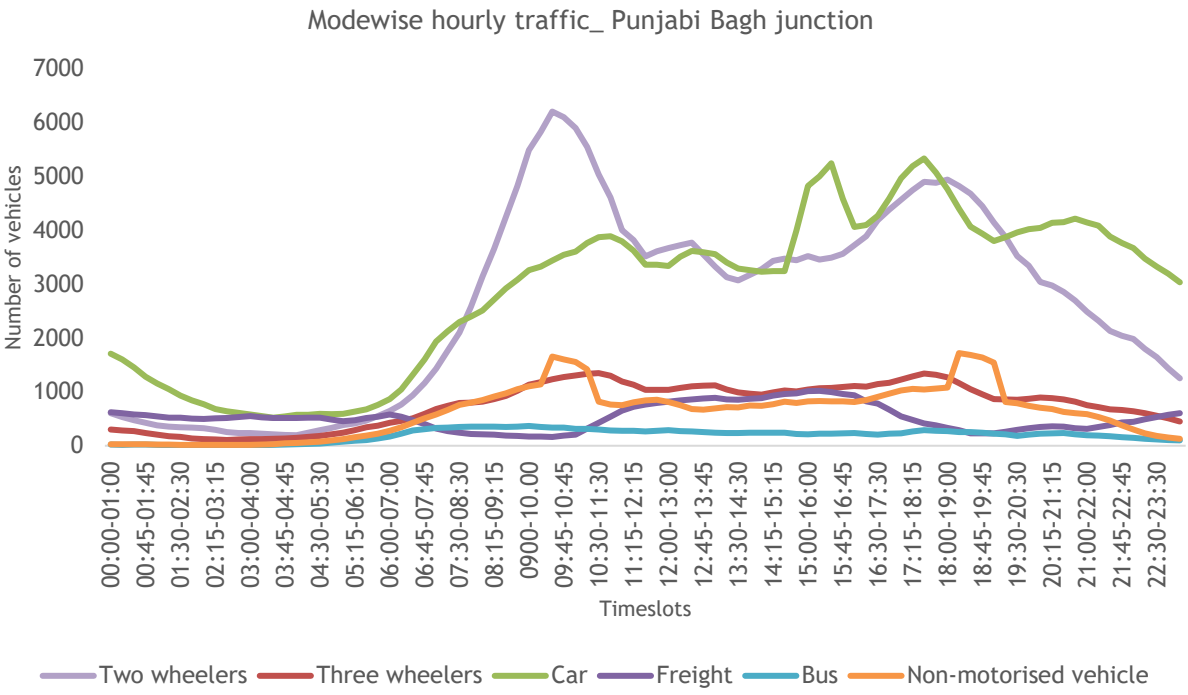
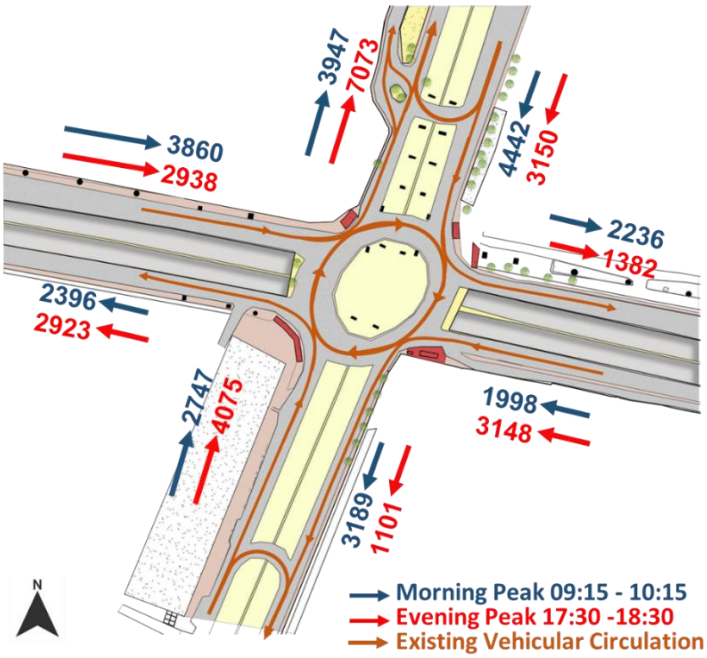


Figure 22: Mode wise hourly traffic flow: Punjabi Bagh Junction

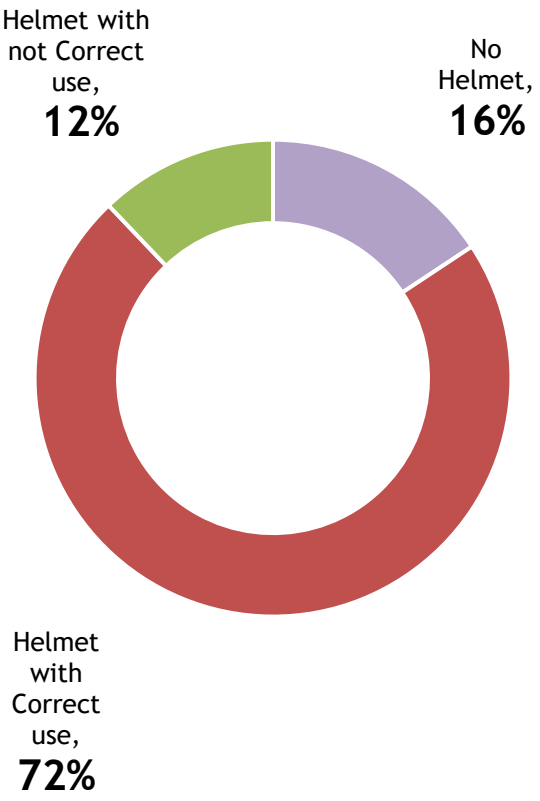
B.2.9 : PEAK HOUR TRAFFIC FLOW



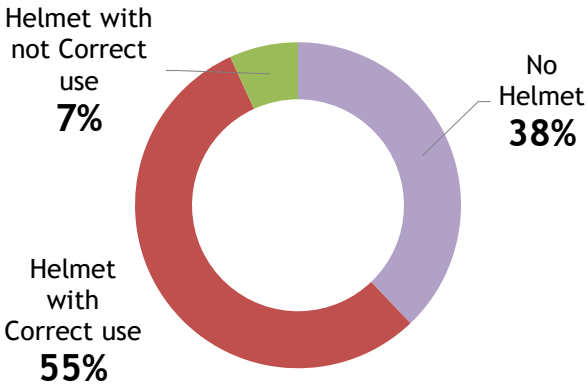
*Note- The data presented above is number of vehicles and not PCU.

B.2.10 : HELMET USAGE OBSERVATIONAL STUDY

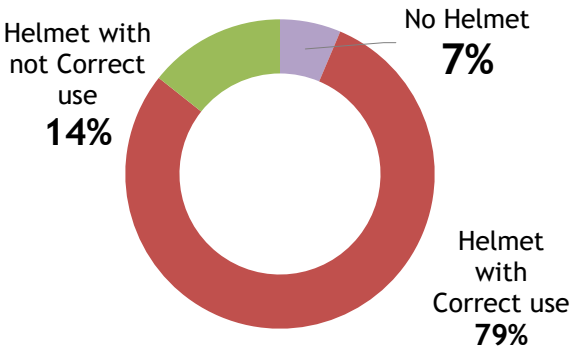
Helmet Use among all riders



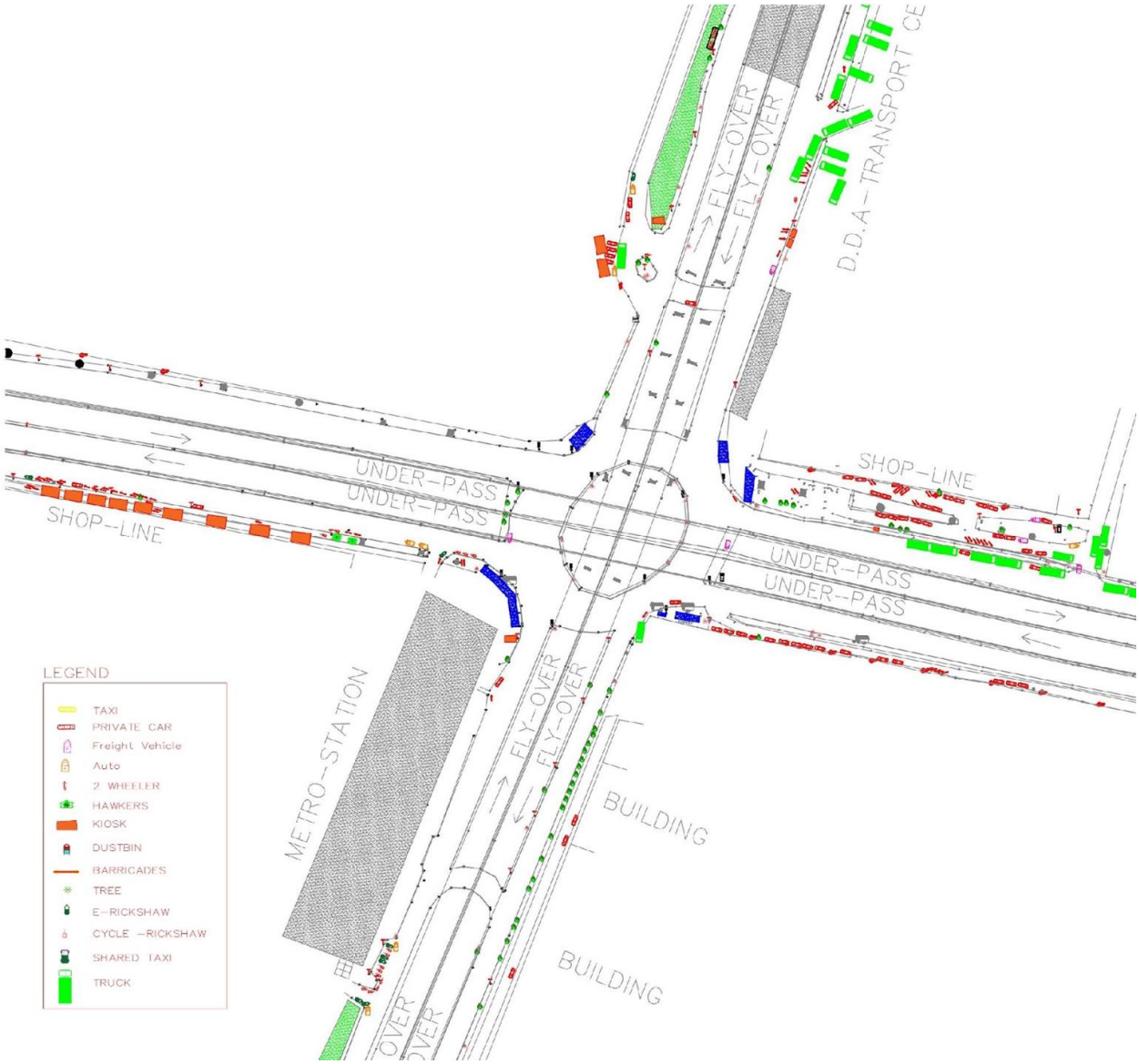
Helmet Use Pillion Rider



Helmet Use among Riders



B.2.11 : ACTIVITY MAP

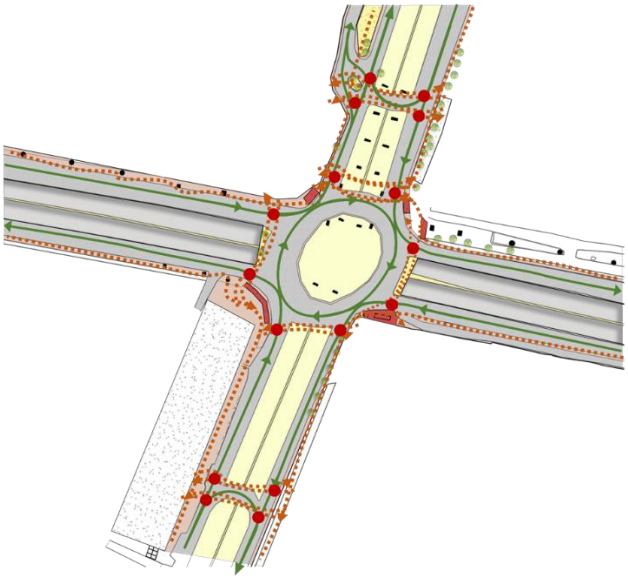


Junction has multiple activities:

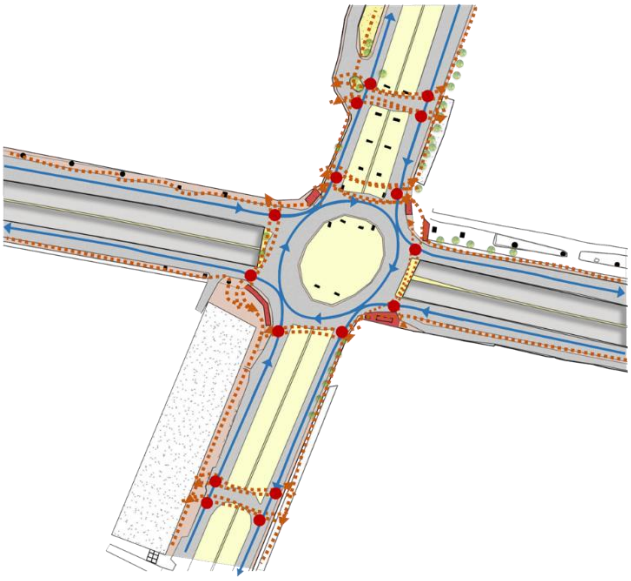
- Shopkeepers and vendors covered the footpath.
- There are lots of trucks standing on north & east road hindering the vehicular circulation and pedestrian movement.

B.2.12 : CONFLICT POINTS

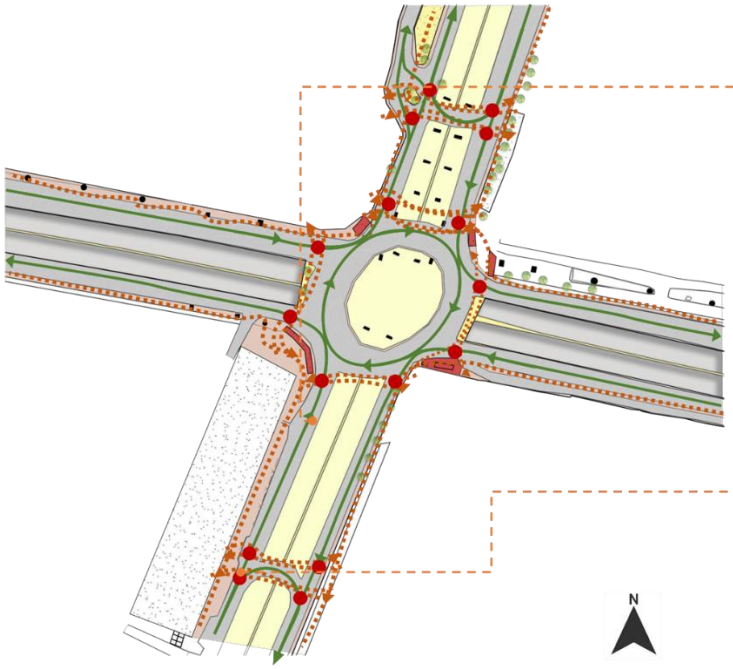
Car/ 2wheeler vs Pedestrian



Bus vs Pedestrian



- Conflict points emerging due to absence of pedestrian crossing and refuge island.
- The geometry of junction is also one of the main reasons for conflict points.

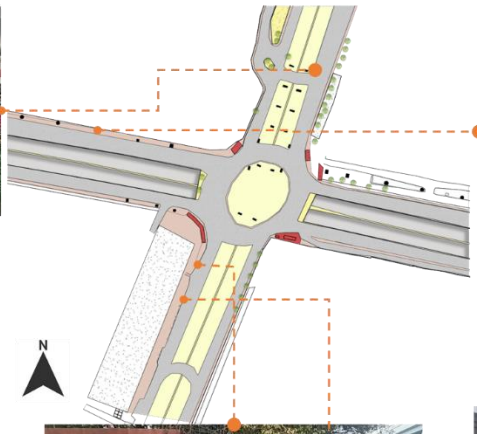


Conflict Points

Conflict Points

B.2.13 : ISSUES IDENTIFIED

Absence of zebra crossing



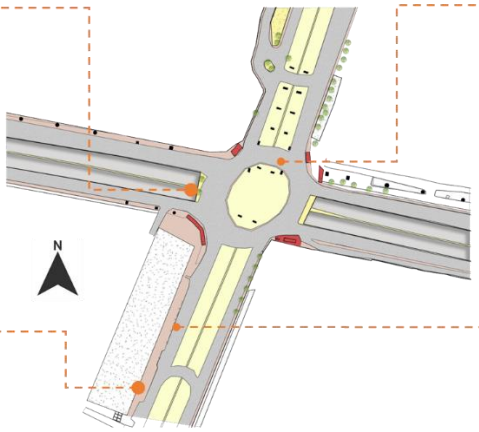
Absence of tactile flooring for differently abled users on outer ring road

Absence of kerb ramps in front of crossing

Inappropriate gap between bollards and absence of bollards at some places

Damaged footpath

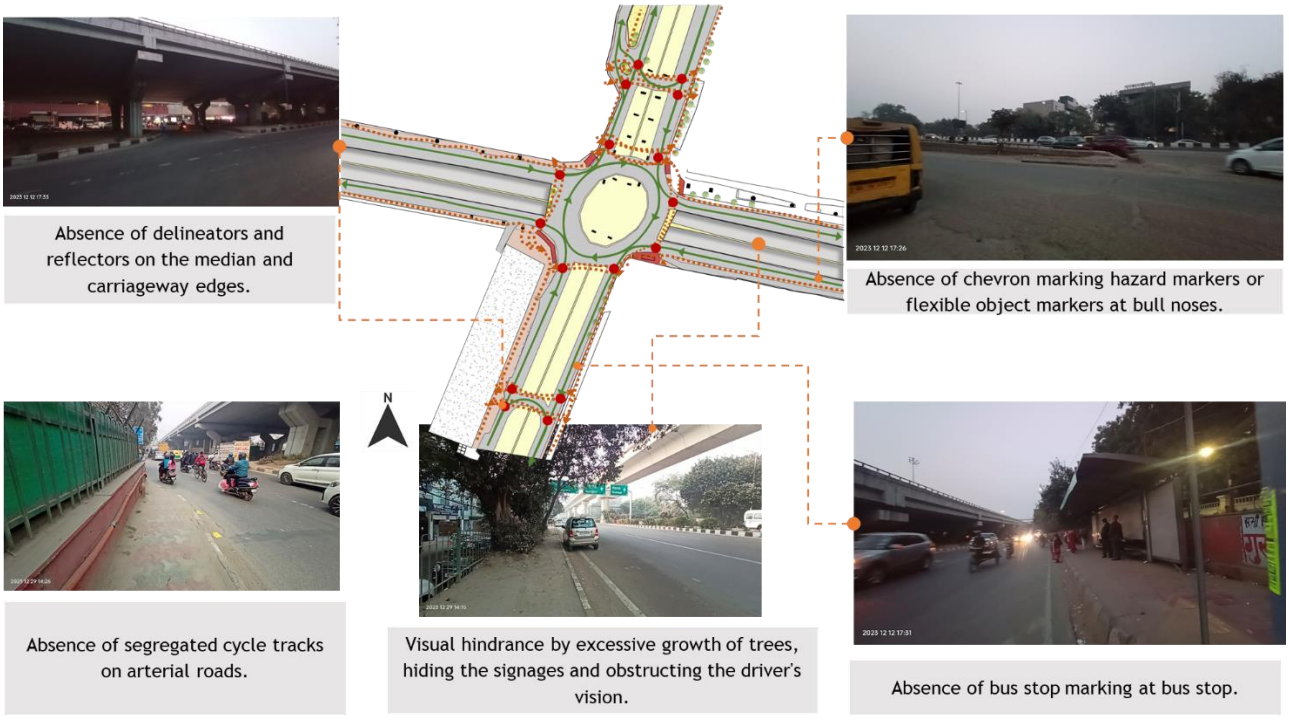
Damaged pedestrian infrastructure



Absence of road markings, signages and speed control measures at the intersection.

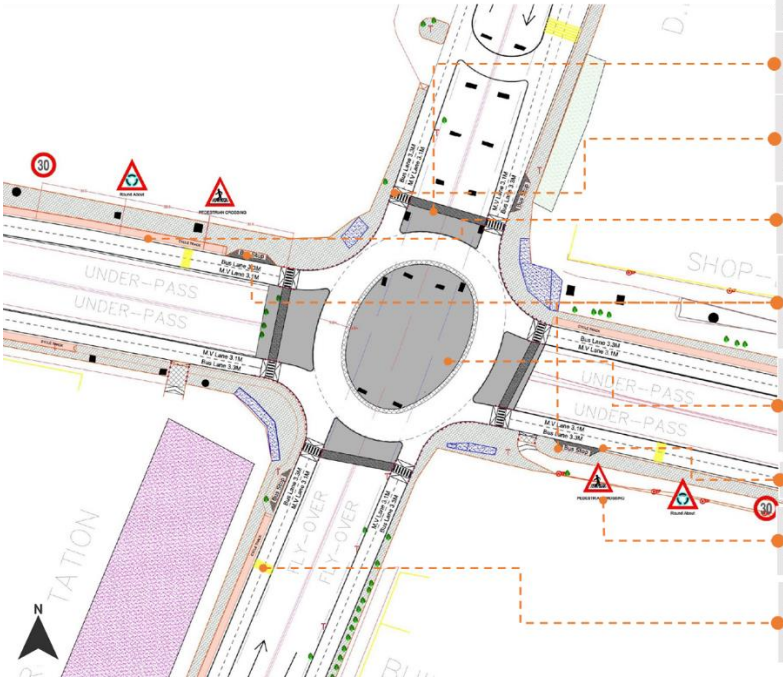
Obstructed pedestrian infrastructure

Absence of traffic calming measures like rumble strips near junctions (to control the speed of vehicles).

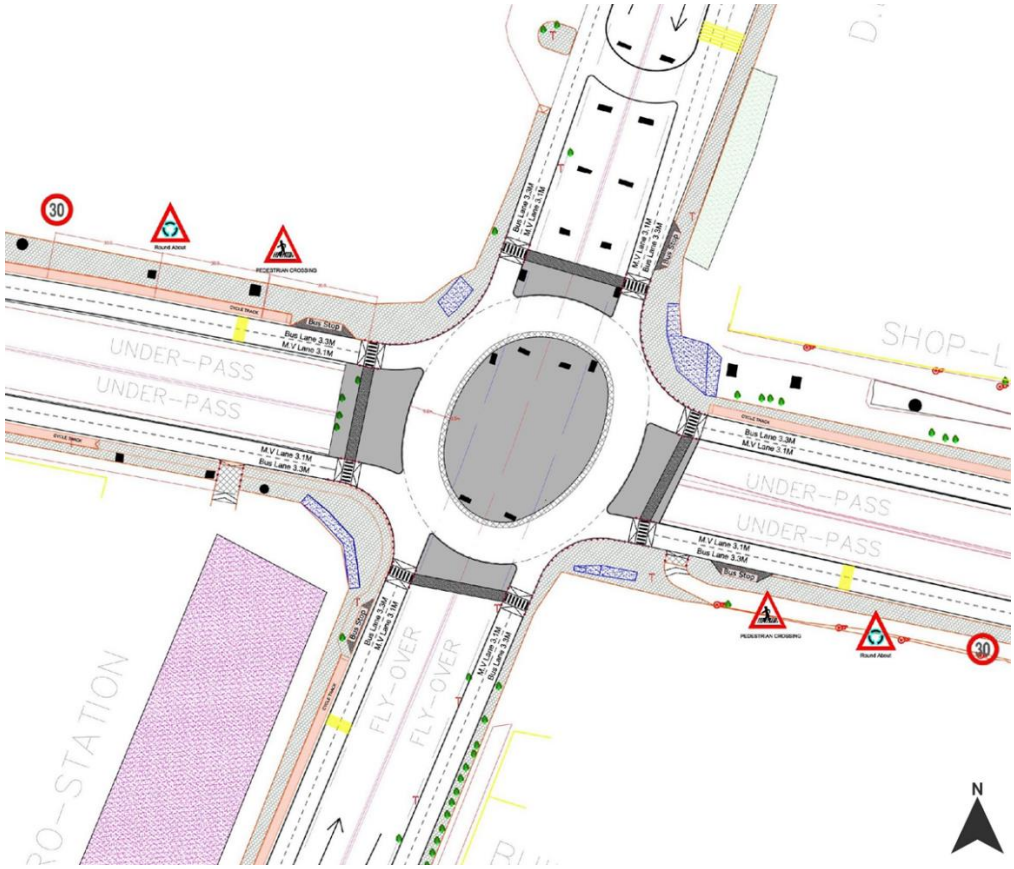


1. Absence of at-grade pedestrian infrastructure at the junction, making the pedestrians extremely vulnerable among the high-speed traffic movement.
2. There are no bus stops near the junction; they're about 400 to 500 meters away on each road leading from the junction.
3. Damaged and obstructed pedestrian infrastructure on each arm, most of the pedestrian is obstructed with columns.
4. Absence of tactile flooring for differently abled users.
5. Absence of traffic calming near junctions (to control the speed of vehicles).
6. Absence of road markings, signages and speed control measures at the intersection.
7. Absence of delineators and reflectors on the median and carriageway edges.
8. Absence of chevron marking and hazard markers or flexible markers at bull noses.
9. Absence of segregated cycle tracks on arterial roads.
10. Visual hindrance by excessive growth of trees, hiding the signages and obstructing the driver's vision.

B.2.14 : PROPOSED DESIGN



- The junction is redesigned for the speed of 30 km/hr to ensure the safety
- Proposed at-grade pedestrian infrastructure to increase the accessibility and safety for pedestrians
- Provision of raised crossing and extended Median Refuge islands on all four sides to slow down traffic for safety of pedestrians (as per IRC: 99-2018)
- Dedicated 2.5m wide cycle track to separate the motor traffic and the cyclists (as per IRC: 11-2015)
- Proposed new bus stops near the junction (30m to 40m) on each approaching road to reduce the pedestrian crossing movement
- Redesigned the geometry of roundabout and corrected the turning radius and road width to reduce the conflict area at intersection
- Road Markings (as per IRC 35) .
- Installation of signages - Speed Limit, stop sign, pedestrian crossing and other necessary Signages.
- Provision of rumble strip to slow down the through traffic(as per IRC code 99-2018, Pg 10)



1. The junction is redesigned for the speed of 30 km/hr to ensure the safety

2. Proposed at-grade pedestrian infrastructure to increase the accessibility and safety for pedestrians.

3. Provision of raised crossing and extended Median Refuge islands on all four sides to slow down traffic for safety of pedestrians (as per IRC: 99-2018)

4. Dedicated 2.5m wide cycle track to separate the motor traffic and the cyclists (as per IRC: 11-2015)

5. Proposed new bus stops near the junction (30m to 40m) on each approaching road to reduce the pedestrian crossing movement

6. Redesigned the geometry of roundabout and corrected the turning radius and road width to reduce the conflict area at intersection

7. Road Markings (as per IRC 35).

8. Installation of signages - Speed Limit, stop sign, pedestrian crossing and other necessary Signages.

9. Provision of rumble strip to slow down the through traffic (as per IRC code 99-2018, Pg. 10)

B.2.15 : SUMMARY DESIGN ESTIMATES

S.No	Component	Details	Notes	Rate (per sq.m)	Cost (INR)	Cost (INR, crores)
A	CIVIL WORK					
A.1	Footpath (Primary, Secondary including other Flooring area)	2m to 3m wide segregated footpath with tactile pavers	Providing and laying of footpath 2m to 3m wide, including earthwork and base layer - PCC, GSB and finishing material.	2559	1,75,50,428	1.755
A.2	Raised Crossing	Raised crossing with 80mm thick pavers and DQ stone surface	Providing and laying Raised crossing with 80 mm thk pavers blocks, and DQ stone including Earth work and Base layers- PCC (M15), RCC (M30 Design mix) & GSB etc.	3999	7,39,786	0.074
A.3	Cycle Infrastructure	2.5m wide segregated cycle track	Providing and laying cycle track (2.5mt wide segregated) including Earth work and Base layers- PCC (M15), RCC (M40 Design mix) & GSB etc. also thermoplastic paint for marking and cycle symbol and spring post etc	3621	45,54,781	0.455
A.4	CC Items (Kerbs, Pipe, etc)	Kerb stones, Bollards, Kerb Channels etc.	Providing and fixing Kerbs, Bollards, and Kerb Channel etc. in CC.		22,94,219	0.229
A.5	Signages	Mandatory, Cautionary and Informatory Sign Boards of different sizes	Providing and fixing Signage Mandatory, Cautionary and informatory sign board including all the fixing and labours etc.		96,731	0.010
A.6	Marking	Thermoplastic Paint Marking (Edge lines, Centre Line, Lane Marking, Hazard Marking, Chevron,	Providing and applying road marking strips (retro- reflective) of specified shade/ colour	748	5,83,284	0.058

S.No	Component	Details	Notes	Rate (per sq.m)	Cost (INR)	Cost (INR, crores)
		Zebra Crossing, Bar Marking, etc)	using hot thermoplastic material for road marking.			
A.7	Special Zones	Provision of Sitting Bollards, CC Benches, GRC Jali, Pergola, Dustbin etc.	Miscellaneous items- Provision of Sitting Bollards, CC Benches, GRC Jali, Pergola, Dustbin etc. complete items- including foundation and fixing etc.		1,43,470	0.014
A.8	Brick Work		Brick work with common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 in foundation and plinth in: Cement mortar 1:4 (1 cement : 4 coarse sand)	7370.65/CUM	5,89,652	0.059
A.9	Steel Reinforcement for RCC work		Steel reinforcement (in per kg) for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level.Thermo-Mechanically Treated bars of grade Fe-500D or more	107.85/kg	86,280	0.009
A.10	Pavement Surface Dressing	Pavement of Bitumen layer on existing road surface	Surface dressing on old surface with hot bitumen of grade VG - 10	175.10 / sq.m	19,56,567	0.196
A.11	Safety Management Equipment (as per design requirement)	Provision of Delineator Post, Spring Post, Cat eye/studs etc.	Miscellaneous items for Safety Management Equipment (as per design requirement) - Provision of Delineator Post, Spring Post, Cat eye/studs etc.- including foundation and fixing etc.		2,12,100	0.021

S.No	Component	Details	Notes	Rate (per sq.m)	Cost (INR)	Cost (INR, crores)
A.12	Bus Shelter	10.5mX2.5m Bus Shelter (Stainless Steel Structure)			72,00,000	0.720
	SUB TOTAL CIVIL WORK (A)				3,60,07,297	3.601
B	Drainage, Irrigation & Plumbing	(Drainage items based on design proposal)	Drainage, Irrigation & Plumbing work @ 20% of the cost of Civil work	20%	72,01,459	0.720
C	Electrical Work	(Light poles, junction box, other electrical works proposed based on design proposal)	Electrical work @25% of the cost of Civil work	25%	90,01,824	0.900
D	Horticulture Work	(Landscape items based on design proposal)	Horticulture work @ 15% of the cost of Civil work	15%	54,01,095	0.540
E	Dismantling / Demolition	--	Dismantling work @ 15% of the cost of Civil work	15%	54,01,095	0.540
F	Work Zone Safety & Management	--	Work zone Management @ 5% of the cost of Civil work	5%	18,00,365	0.180
PART 1	SUB TOTAL PART 1 (A+B+C+D+E+F)				6,48,13,135	6.481

S.No	Component	Details	Notes	Rate (per sq.m)	Cost (INR)	Cost (INR, crores)
G	Design Services & Support	--	Design Consultancy (Preparation of Drawings, BOQ support, Work Zone plan, Site Supervision, Community Engagement & Liaison, Change Management @ 2% - 8% of the cost of Civil work.	2%	12,96,263	0.130
H	Survey Cost	--	Survey Cost (Total Station Survey, underground services, tree demarcation, girths, level differences, steps etc @ (80,000 per junction - 250m on each arm)	80000	80,000	0.008
PART 2	SUB TOTAL PART 2 (PART 1 + G +H)				6,61,89,398	6.619
J	Contingencies '2.5%	--	Contingencies (@2.5%)		16,54,735	0.165
I	GST('@18%)	--	GST @18%		1,22,11,944	1.221
FINAL	GRAND TOTAL (PART 2 + J + I)				8,00,56,077	8.006

Notes:

- This is a preliminary estimate. Final costing to be evaluated & approved by road owning agency.
- DSR 2023 has been followed for all rates. Market Rate and Costing from part PWD projects has been included for certain items.
- Cost of Drainage, Irrigation, Plumbing has been calculated at 20% of the civil work cost.

- Cost of Electrical Work can be calculated at 20% - 25 % of the civil work cost.
- Cost of Horticulture has been calculated at 15% of the civil work cost.
- Cost of Dismantling has been calculated at 15% of the civil work cost.
- Cost of Work Zone Management has been calculated at 5% of the civil work cost.
- Cost for Design Support can range from 2% - 8%, can vary from site to site. This should include Technical Assistance on drawings, 3D supports, Site Supervision, Change management.
- Bus Shelter has been calculated at 18 L per shelter; can be changed as per design specific cost.
- In case of new items specific to design, please add relevant rows in detail budget estimation and include the same in the budget summary under relevant head.

B.2.16 : DETAILED BUDGET ESTIMATE

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
1	Footpath (Primary, Secondary including other Flooring area)								
1.1	Excavation	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in charge.	2.6.1	cum	0.85	6858	177.5	1034700.75	
1.2	Construction of granular sub-base	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	16.78.2, pg no. 258	cum	0.15	6858	2924.85	3008793.195	
1.3	Providing and laying in position cement concrete (M15)	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level: 1:2:4 (1 Cement: 2 coarse sand (zone-III) derived from natural sources : 4 graded stone aggregate 40 mm nominal size derived from natural sources)	4.1.4, pg no. 103	cum	0.1	6858	7780.3	5335729.74	

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
1.4	Tactile - Warner (300 x 300 x 9.8 mm) (20% of total tactile quantity)	Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8 mm having with water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20 mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.	16.90, pg no. 261	sqm		206	2017.6	415625.6	
1.5	Tactile - Guiding (300 x 300 x 9.8mm) (80% of total tactile quantity)	Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8 mm having with water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20 mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.	16.90, pg no. 261	sqm		823	2017.6	1660484.8	
1.6	Flamed Finish Granite (approved size & colour) (18mm thick)	Providing and laying flamed finish Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge :Flamed finish granite stone slab Jet Black, Cherry Red, Elite Brown, Cat Eye or equivalent.	11.55 pg no 198	sqm		0	3186.7	0	

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
1.7	Polished Granite	Providing and laying Polished Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge. Polished Granite stone slab colour of Black, Cherry/Ruby Red or equivalent	11.56.1, Pg no 198	sqm			4481.3	0	
1.8	Interlocking Paver Blocks (approved size & colour) (60mm thick)	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50 mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge: 60 mm thick cement concrete paver block of M-35 grade with approved colour, design & pattern.	16.91.1, pg no. 261	sqm	0.6	5829	1045.65	6095093.85	
1.9	Glass Mosaic (20mm x 20mm x 4mm)	Providing and fixing Glass mosaic tiles on finished plain wall surface of size 20 mm x 20 mm x 4 mm in all colour, design, fixing in customize design as per direction of Engineer-in-Charge. The glass mosaic tiles to be fixed on the wall surface with the help of approved adhesive applied at the rate of 2.5 kg per sqm and grouting of the same. The rate is inclusive of all operation, material and required pattern approved by Engineer-in-Charge:	11.53 pg no 197	sqm			3891.15	0	

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
1.10	Crazy Marble Stone (18 mm thick)	Crazy marble stone flooring, including filling the gaps with light shade pigment with white cement marble powder mixture (3 parts of white cement: 1 part of marble powder) by weight in proportion of 4:7 (4 cement marble powder mix : 7 white, black or white and black marble chips of sizes from 1 mm to 4 mm nominal size by volume), with under layer 25 mm thick cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 12.5 mm nominal size), including rubbing, polishing and cement slurry etc. complete : 18 mm thick crazy marble stone white, black or as specified	As per NIT DAV Pedestrianization	sqm			948.85	0	
1.11	Crazy Vitrified Tiles (100x100x16mm)	Providing and laying matt finished vitrified tile of size 100x100x16mm having water absorption less than 0.5% and conforming to IS: 15622 of approved make in all colours and shades in outdoor floors such as footpath, court yard multi models etc., laid on 20mm thick base of cement mortar 1:4 (1cement: 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as direction of Engineer-in-Charge.	As per NIT DAV Pedestrianization	sqm			842.95	0	
1.12	Delhi Quartzite (MUZ) (10x10x7.50)	Providing and fixing 10x10x7.50 cm Granite stone block hand cut and chisel dressed on top, for paving in floors, drains etc. laid over 20 mm thick base mortar 1:4 (1 cement: 4 coarse sand) with joints 10 mm wide filled with same mortar including ruled pointing etc. complete as per direction of engineer-in-charge.	16.92 pg no 261	sqm		0	2189.15	0	
1.13	EPDM Flooring	Providing and fixing 36 MM thick Ethylene Propylene Diene Monomer (EPDM) [30 MM SBR (Styrene- Butadiene or Styrene-butadiene Rubber) & 6 MM EPDM] safety FLOORING with the help of BASF Glue 18 adhesive for children play area complete all as per manufacturer's specification and direction of Engineer- in-charge.	As per AR (Market Rate)	Sqm		0	3746.2	0	
	SUB TOTAL							17550427.94	2559.1

2	Raised Crossing	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
2.1	Excavation	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in charge.	2.6.1	cum	0.325	185	177.5	10672.1875	
2.2	Construction of granular sub-base	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	16.78.2, pg no. 258	cum	0.1	185	2924.85	54109.725	
2.3	Providing and laying in position cement concrete (M15)	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level: 1:2:4 (1 Cement: 2 coarse sand (zone-III) derived from natural sources: 4 graded stone aggregate 40 mm nominal size derived from natural sources)	4.1.4, pg no. 103	cum	0.1	185	7780.3	143935.55	
2.4	Providing and laying in position cement concrete (M25, Design Mix)	Providing and laying in position ready mixed or site batched design mix cement concrete for plain cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana/Ordinary Portland /Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering and finishing as per direction of the engineer-in-charge; for the following grades of concrete. Note: Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the minimum specified cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.	4.20.1.4, page 108	cum	0.125	185	9439.05	218278.0313	

2	Raised Crossing	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
		Concrete of M25 grade with minimum cement content of 300 kg /cum							
2.4	Interlocking Paver Block (Red & White of approved size) 80mm thick	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50 mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge: 80 mm thick C.C. paver block of M-35 grade with approved colour design and pattern	16.91.2, pg no. 261	sqm		84	1091.5	91686	
2.5	Delhi Quartzite 10x10x7.50	Providing and fixing 10x10x7.50 cm Granite stone block hand cut and chisel dressed on top, for paving in floors, drains etc. laid over 20 mm thick base mortar 1:4 (1 cement: 4 coarse sand) with joints 10 mm wide filled with same mortar including ruled pointing etc. complete as per direction of engineer-in-charge.	16.92 pg no 261	sqm		101	2189.15	221104.15	
	SUB TOTAL							739785.6438	3998.8

3	Cycle Infrastructure	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
3.1	Excavation	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in charge.	2.6.1	cum	0.4	1258	177.5	89318	
3.2	Construction of granular sub-base	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	16.78.2, pg no. 258	cum	0.15	1258	2924.85	551919.195	
3.3	Providing and laying in position cement concrete (M15)	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level: 1:2:4 (1 Cement: 2 coarse sand (zone-III) derived from natural sources: 4 graded stone aggregate 40 mm nominal size derived from natural sources)	4.1.4, pg no. 103	cum	0.1	1258	7780.3	978761.74	
3.4	Providing and laying in position cement concrete (M40, Design Mix)	Providing and laying in position ready mixed or site batched design mix cement concrete for reinforced cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana / Ordinary Portland /Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering, finishing and reinforcement as per direction of the engineer-in-charge; for the following grades of concrete. Note: Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the specified minimum cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement:	5.33.1.4, page 120	cum	0.15	1258	9957.65	1879008.555	

3	Cycle Infrastructure	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
		Concrete of M40 grade with minimum cement content of 390 kg/cum							
3.5	Thermoplastic Paint Marking (Cycle Track - Grey Colour; Cycle Box (Green); Cycle Lane, Edge Marking)	Providing and applying 2.5 mm thick road marking strips (retro- reflective) of specified shade/ colour using hot thermoplastic material by fully/ semi-automatic thermoplastic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator on road surface including cost of material, labour, T&P, cleaning the road surface of all dirt, seals, oil, grease and foreign material etc. complete as per direction of Engineer-in-charge and accordance with applicable specifications.	16.62, pg no. 257	sq.m		1353	747.8	1011773.4	
3.6	Cycle Symbol (On green box)	Providing and applying cycle symbol using thermoplastic paint as per IRC 35:2018 in cycle box at location specified	Market Rate	No.s		40	1100	44000	
3.7	Spring Post (80mm dia 750mm high Plastic)	Providing and applying Plastic spring post 80mm dia 750mm high at location specified	Market Rate	No.s		250	350	87500	
	SUB TOTAL							4554780.89	3620.7

4	CC Items (Kerbs, Pipe, etc)	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
4.1	Excavation	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and lift up to 1.5 m, as directed by Engineer-in charge.	2.6.1	cum	0.45	1393	177.5	111265.875	
4.2	Construction of granular sub-base	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	16.78.2, pg no. 258	cum	0.1	1393	2924.85	407431.605	
4.3	Dotted kerb stone of approved pattern of M-25 grade cement concrete (0.15x3xL)	Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5 mm), including making drainage opening wherever required complete etc. as per direction of Engineering-charge (length of finished kerb edging shall be measured to calculate volume for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge)	16.69, pg no. 313	cum	0.1	1393	10117.6	1409381.68	
4.4	Bollards (600mm 120mm dia) (Preferred size: 950mm high 150mm dia)	Precasting and placing in position 125 mm dia Bollards 600 mm high of required shape including providing M.S. Pipe Sleeve 50 mm dia 300 mm long in the Bollard and M.S. Pipes 40 mm dia and 450mm long with 150x150x6mm M.S. plate welded at bottom and embedded 150mm in cement concrete 1:3:6 (1 Cement : 3 coarse sand (zone-III) derived from natural sources : 6 graded stone aggregate 20 mm nominal size derived from natural sources), including necessary excavation of size 250x250x450mm deep for the same in bitumen/concrete pavement at specified spacing	4.9, pg no. 106	No.s		150	929.8	139470	

4	CC Items (Kerbs, Pipe, etc)	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
4.5	Kerb Channel (L*0.3)	Providing, laying and making kerb channel 30 cm wide and 50 mm thick with cement concrete 1:3:6 (1 cement: 3 coarse sands:6 graded stone aggregate 20 mm nominal size) over 75 mm bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including finishing the top smooth etc. complete and as per direction of Engineer-in-charge.	16.63, pg no. 257	sqm		406	558.3	226669.8	
	SUB TOTAL							2294218.96	1647.0

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
5.1	Mandatory sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm on arterial - sub arterial roads	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.: Mandatory/ Regulatory sign boards of 900 mm diameter with support length of 3750 mm	16.59.1	No.s		4	7183.35	28733.4

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
5.2	Cautionary / warning sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm on arterial - sub arterial roads	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.:: Cautionary /warning sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm	16.59.2	No.s		8	5559.75	44478
5.3	Informatory sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm on arterial - sub arterial roads	Manufacturing, supplying and fixing retro reflective overhead signage boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity and encapsulated lens type heat activated retro reflective sheeting conforming to type - III of ASTM-D-4956-01 as approved by Engineer-in-charge, letters, borders etc. as per IRC : 67-2001 in silver white with blue colour back ground and with high intensity grade, pasted on substrate by pressure sensitive adhesive backing which shall be activated by applying pressure conforming to class II of ASTM-D-4956-01 and fixing the same to the plate of structural frame work by means of suitable sized aluminium alloys, rivets or bolts & nuts @ 300 mm centre to centre all along the periphery as well as in two vertical rows along with theft resistant measures, including the cost of painting with two or more coats of epoxy paint in grey colour on the back side of aluminium sheet including appropriate priming coat. The rate includes the cost of rounding off the corners, lowering down the structural frame work	16.60.1	No.s		4	5879.9	23519.6

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
		from the gantry, fixing and erecting the same in position all complete as per drawings, specification and direction of the engineer-in-charge. (Structural frame work including M.S. plate to be provided separately. Rectangular area of the sheet only shall be measured for payment). Overhead informatory road signage						
5.4	Mandatory sign boards of equilateral triangular shape having each side of 600 mm or lower with support length of 3650 mm on distributary roads (MARKET RATE)	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.: Mandatory/ Regulatory sign boards of 900 mm diameter with support length of 3750 mm	16.59.1 (Market Rate)	No.s			7183.35	0
5.5	Cautionary / Warning sign boards of equilateral triangular shape having each side of 600 mm or lower with support length of 3650 mm on	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of	16.59.2 (Market Rate)	No.s			5550.75	0

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
	distributary roads (MARKET RATE)	size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.:: Cautionary /warning sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm						
5.6	Informatory sign boards of equilateral triangular shape having each side of 600 mm or lower with support length of 3650 mm on distributary roads (MARKET RATE)	Manufacturing, supplying and fixing retro reflective overhead signage boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity and encapsulated lens type heat activated retro reflective sheeting conforming to type - III of ASTM-D-4956-01 as approved by Engineer-in-charge, letters, borders etc. as per IRC : 67-2001 in silver white with blue colour back ground and with high intensity grade, pasted on substrate by pressure sensitive adhesive backing which shall be activated by applying pressure conforming to class II of ASTM-D-4956-01 and fixing the same to the plate of structural frame work by means of suitable sized aluminium alloys, rivets or bolts & nuts @ 300 mm centre to centre all along the periphery as well as in two vertical rows along with theft resistant measures, including the cost of painting with two or more coats of epoxy paint in grey colour on the back side of aluminium sheet including appropriate priming coat. The rate includes the cost of rounding off the corners, lowering down the structural frame work from the gantry, fixing and erecting the same in position all complete as per drawings, specification and direction of the engineer-in-charge.(Structural frame work including M.S. plate to be provided separately. Rectangular area of the sheet only shall be measured for payment). Overhead informatory road signage	16.60.1 (Market Rate)	No.s			5879.9	0
5.7	Informatory sign - Road Signages, Road Names	Providing, installing and fixing with necessary clamps etc. retro-reflective Single Sided shoulder / gantry / cantilever mounted signboards comprising of customized modular PU Epoxy Coated. MS Tube frame work, aluminium composite panel (ACP) (both side of frame) mill finished or PVDF coated or as specified as base board,	As per AR (Market Rate)	Sq.m			16686.2	0

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
		micro prismatic retro-reflective sheet and electro- cut coloured overlay film. The horizontal and vertical members of the MS frame module shall be made of MS tube 50x50x3.6mm thick as per approved drawing and each panel shall be braced diagonally (one way only) with same section. The aluminium composite panel (ACP) shall have a thickness of 4mm which including 0.5 mm thick skin of aluminium on both sides. The ACP shall be routed, folded and fixed on the MS frame with VHB tape 24mm wide and 2.3 mm thick provided throughout the length and breadth of the frame including riveting at the right-angle face of the frame with pop riveting or with self-taping SS screws 5mm dia spaced not more than 300mm centre to centre on both side of frame ensuring that no riveting is seen on either face of the frame. On the front face of the ACP, micro prismatic retro- reflective sheet conforming to Type-XI of ASTM: D 4956-09 shall be pressure fixed as background sheet (In white colour) which will be digitally printed matter, border & symbol etc with 15 years warranty and having clear film for UV protection (the reflective value should be as per IRC 67 when tested) of approved make and colour to create a desired road sign and information message. The rear side of the MS frame shall be covered with balancing ACP sheet of the same description as mentioned above and shall be fixed in similar manner as described above. The edges of the board shall be covered all-round with powder coated die cast extruded aluminium channel of required color and shade of size 68x12x2mm. The channel shall be fixed using two rows of double sided VHB tape of above description. The channel shall further be secured by pop rivets having SS screws of 5mm dia at junctions and corners. The rate shall include all materials, labour, equipment, fabrication, transportation, erection, installation and incidental charges all complete as per direction of the Engineer-in- Charge. Only front area of the board shall be measured for payment. (All Structural steel work shall be paid separately under the relevant agreement item, except MS tube frame work and fixing arrangement with clamps for the sign boards with are included in this item).						
	SUB TOTAL							96731

6	Marking	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
6.1	Thermoplastic Paint Marking (Edge lines, Centre Line, Lane Marking, Hazard Marking, Chevron, Zebra Crossing, Bar Marking, etc)	Providing and applying 2.5 mm thick road marking strips (retro- reflective) of specified shade/ colour using hot thermoplastic material by fully/ semi-automatic thermoplastic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator on road surface including cost of material, labour, T&P, cleaning the road surface of all dirt, seals, oil, grease and foreign material etc. complete as per direction of Engineer-in-charge and accordance with applicable specifications.	16.62, pg no. 257	sq.m		780	747.8	583284	
6.2	Epoxy paint (concrete bollards, kerbs) (Reference: For Segment Length 250m - Qty =150sq.m)	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete: On concrete work	13.52, pg no. 221	sqm			235.15	0	
6.3	Synthetic Enamel Paint	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade : Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture	13.62.1, pg no. 222	sqm			226.25	0	
	SUB TOTAL							583284	747.8

7	Special Zones	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
7.1	Seating Bollards (450mm dia, 400mm high)	Providing & Fixing Position precast reinforced cement concrete cylindrical bollard cum stool of size 400mm top dia, 300mm bottom dia, 475mm overall height, 150mm stem height and concrete grade M-30 as per approved design/drawing. The bollard shall be fixed in C.C. block mix 1:2:4 (1 Cement: 2 coarse sands: 4 graded stone aggregate 20mm nominal size) 300 mm dia and 150 mm deep including earth work in excavation, painting etc. complete as per direction and instruction of Engineer-in-Charge.	As per AR (Market Rate)	No		20	4258.98	85179.6
7.2	Benches (CC benches)	Providing and placing of precast RCC benches (chair bench with back Rest) using m-30 grade of concrete consisting of 2 no. L-shaped base support of thickness 100 mm having Back height 1000mm, front height 450mm and Base width 620mm having 5 No. of RCC planks 1500x100x50 mm and one number plank of size 1500x200x50mm in the approved colour and shade. The minimum weight of MS reinforcement bar in the base support will be 3.40 kg having 4 nos. 8mm dia M.S. Bar distributed alone the section and periphery of the legs with sufficient No. of 4mm dia MS stirrups. Each base support will have 3 nos. 12mm dia (2 Nos. 40mm and one number 65 mm long) galvanized coupling nuts welded suitably to the main reinforcement at appropriate locations so as to receive bolts for fixing of seats of concrete planks on base support and 3 holes to received carriage bolts for fixing back rest planks. The minimum weight of MS reinforcement bar in the plank of 200mm wide will be 4.4kg and of 100mm wide 2.90kg. All the RCC planks will have 2 holes of 14mm dia at appropriate location, so as to receive 12mm dia galvanized bolts for fixing on the base support. One of the planks of size 1500x100x50mm shall be engraved in the centre at the back with letter PWD, 2 plank of size 1500x100x50mm will be bolted to coupling nuts provided in the base support on both sides with 2 numbers of 12mm dia and 65mm long galvanized steel CSR bolt and one Eva washer for each bolt to form a seat 3 planks of size 1500x100x50mm will be bolted to coupling nuts provided in both the base support to form back rest with 6nos. (Two nos. in each planks) half threaded carriage bolts and nuts of size 165mm long and 8mm dia with Eva and steel washers. The holes visible at the back side of the bench will be sealed with cement mortar after assembling sides edges of all the planks shall be painted with acrylic base paint of approved colour and shade and front portion of seating and back rest planks shall be polished to given glossy finish complete as per direction of Engineer-in-charge	As per AR (Market Rate)	No		10	5829	58290

7	Special Zones	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
7.3	GRC Jali	Providing and fixing Uni-Stone make or equivalent Glass Reinforced Concrete (G.R.C.) Screens casted with Spray Mix concrete design in approved size, Patten, thickness of 50mm on the outer Boarder & 25-30mm for internal member and shade. The Screens should be made from 53 grade White Portland Cement manufactured by JK Cement or Birla White, White Quartz fine graded sieved silica Sand, Alkali Resistant Glass Fiber Manufactured by NEG Japan, Owen Corning Saint Gobain or equivalent, Super Plasticizers manufactured by Karochem or equivalent, polymers manufactured by Nova Polychem or equivalent and U.V. resistant Synthetic inorganic pigments should be used for pigmentation manufactured by Phenochem industries or equivalent. The Screens casting shall take place with layering methodology using Direct Power Spray machines. The GRC Screens flexural strength average L.O.P. should be above or equivalent to 6 N/mm2 & M.O.R. Should be above or equivalent to 15 N/mm2 for tests done on 28 days cured samples. The fixing of Screens should be done using Dry fixing method onto structural support members i.e., R.C.C., Brick work, MS Framework. SS/MS Galvanized Clamps & Pins fasteners to be used of Worth, Hilti & Fischer or equivalent. All cast in Socket to be Epoxy primer Coated. Electrodes to be used of Advani, Mangalam, Esab or Victor brand or equivalent, all as per manufacturer's specification and direction of Engineer- in-charge. Vendor shall submit shop drawings of same, the drawings to be duly approved from Engineer-in- charge at site.	As per AR (Market Rate)	Sqm		0	8190.85	0
7.4	EPDM Flooring	Providing and fixing 36 MM thick Ethylene Propylene Diene Monomer (EPDM) [30 MM SBR (Styrene- Butadiene or Styrene-butadiene Rubber) & 6 MM EPDM] safety FLOORING with the help of BASF Glue 18 adhesive for children play area complete all as per manufacturer's specification and direction of Engineer- in-charge.	As per AR (Market Rate)	Sqm		0	3746.2	0
7.5	Exposed Brick Masonry (Seater with exp including putty, plaster, earth work, including foundation with steel for RCC etc)	Brick work with common burnt clay selected F.P.S. (non-modular) bricks of class designation 7.5 in exposed brick work including making horizontal and vertical grooves 10 mm wide 12 mm deep complete in cement mortar 1:6 (1 cement: 6 coarse sand): Above plinth level up to floor V level	6.26.2, pg no. 129	cum		0	9439.75	0

7	Special Zones	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
7.6	Street Art Wall (wall putty)	Providing and applying plaster of paris putty of 2 mm thickness over plastered surface to prepare the surface even and smooth complete.	13.26, pg no. 218	Sqm			262.7	0
7.7	Street Art Wall (exterior paint, etc)	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade: New work (Two or more coats applied @ 1.43 ltr/10 sqm over and including priming coat of exterior primer applied @ 0.90 litre/10 sqm)	13.47.1, pg. no. 220	Sq.m			171.1	0
7.8	Metal Pergola	Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete. Hot finished welded type tubes	As per AR (Market Rate)	kg			90.25	0
7.9	Polycarbonate sheet		As per AR (Market Rate)	Sq.m			1300	0
7.10	CNC metal cut column / marker		As per AR (Market Rate)	sq.m			3000	0
7.11	Play / Gym Equipment	Providing designing and fixing play equipment as per size, shape and material s per design. All complete as per direction and approval of engineer-in-charge regarding material, shape of equipment, colour on metal, fixing of equipment etc(the cement concrete and excavation work shall be paid separately)	As per AR (Market Rate)	lump sum			40000	0
7.12	Dustbin		As per AR (Market Rate)	No			10000	0
7.13	Sculpture		As per AR (Market Rate)	lump sum				0
	SUB TOTAL							143469.6

8	Brick Work	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
8.1	Brick Work (1 cum for 1m)	Brick work with common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in:	6.1.1 pg no. 127	cum	0.1	800	7370.65	589652
	SUB TOTAL							589652

9	Steel Reinforcement for RCC work	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
9.1	Thermo-Mechanically Treated bars of grade Fe-500D or more	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete up to plinth level.:	5.22.6, pg no.	kg		800	107.85	86280
	SUB TOTAL							86280

10	Pavement Surface Dressing	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount	Rate per Sq.m
10.1	Bituminous- Top Layer	Surface dressing on old surface with hot bitumen of grade VG - 10 of approved quality using 1.95 kg of bitumen per sqm with 1.50 cum of stone chippings 11.2 mm nominal size per 100 sqm of road surface, including consolidation with road roller of 6 to 8 tonne capacity, etc. complete.	16.27 Page 249	sqm		11174	175.1	1956567.4	
	SUB TOTAL							1956567.4	175.1

11	Safety Management Equipment (as per design requirement)	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
11.1	Delineator	Providing and fixing post delineators made of ABS round body fitted with 2 nos 100 mm dia high reflective reflectors and mounted on MS pipe of 65 mm dia duly powder coated anti-rust and anti-theft steel to be installed as per direction of Engineer-in-charge	16.65, Page 257	No		50	904.2	45210
11.2	Spring Post (80mm dia 750mm high Plastic)	Providing and applying Plastic spring post 80mm dia 750mm high at location specified	As per AR (Market Rate)	No		300	350	105000
11.3	Road Studs/Cat eye	Providing and fixing Glow studs of size 100x20 mm made of heavy-duty body shall be moulded ASA (Acrylic styrene Acryloretrite) or HIP (High impact polystyrene) or ABS having electronically welded micro-prismatic lens with abrasion resistant coating as approved by Engineer in charge. The glow stud shall support a load of 13635 kg tested in accordance with ASTM D4280. The slope of retro- reflective surface shall be 35 (+/- 5) degrees to base. The reflective panels on both sides with at least 12 cm of reflective area up each side. The luminance intensity should be as per the specification and shall be tested as described in ASTM I: 809 as recommended in BS: 873 part 4 : 1973. The studs shall be fixed to the Road surface using the adhesive conforming to IS, as per procedure recommended by the manufacturer complete and as per direction of Engineer-in-charge.	16.50, Pg no. 253	No		300	206.3	61890
	SUB TOTAL							212100

12	Bus Stops	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
12.1	Bus Shelter (10.5mX2.5m)	Stainless Steel Structure	As per AR (Market Rate)	No		4	1800000	7200000
	SUB TOTAL							7200000

13	New Item 01: Pedestrian Bridges (to be added in Summary Sheet)	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
13.1	Steel Structure footbridge for pedestrians over the VUP	Stainless Steel Structure	As per AR (Market Rate)	No		0	4000000	0
	SUB TOTAL							0

B.3: MADHUBAN CHOWK

B.3.1 : GENERAL DESCRIPTION OF THE SITE

A major interchange point, Madhuban Chowk is where the Outer Ring Road, Bhagwan Mahaveer Marg and Lala Jagat Narayan Marg intersect. It is a major interchange point for passengers between the Delhi Metro and other modes of public transportation on the Outer Ring Road.

Madhuban Chowk: The area is served by the Red Metro line, and the nearest metro station is Pitampura, and nearby land uses include residential, commercial, and institutional. With Pitampura as the nearest metro station, it attracts high pedestrian footfall. The wide junction also encourages speed making it a risky spot. The road at the junction is wide enough to encourage increase in Vehicular speeds, resulting in unsafe movement for all road users. As per Delhi Traffic Police Accident Report, it was named as one of the blackspots in 2019.

3400 sqm four – armed intersection witnesses' traffic throughout the day.

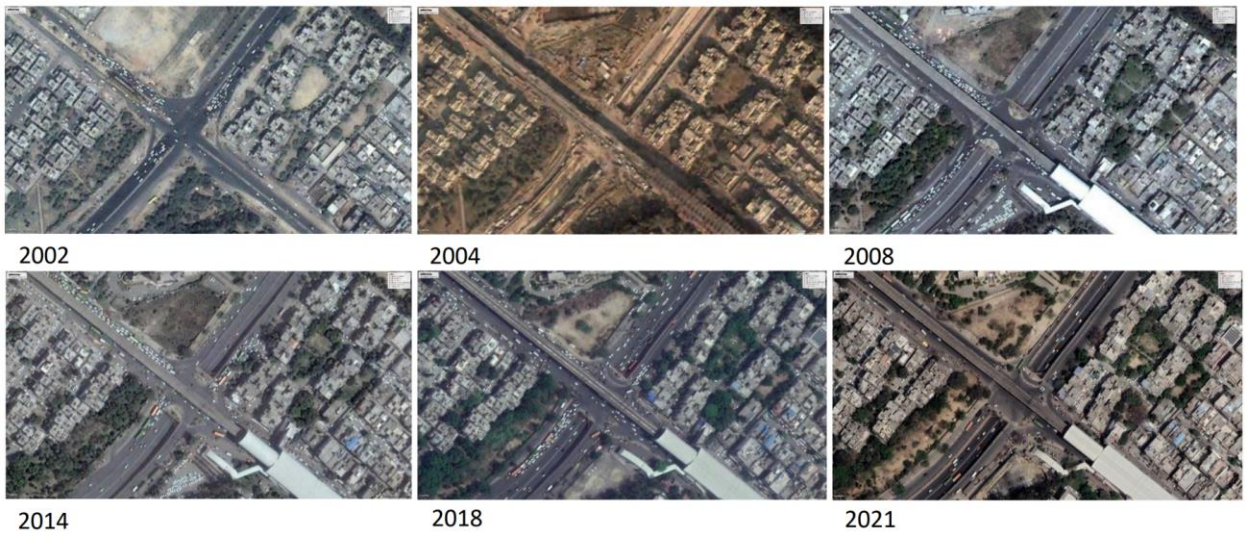
• There are no restricted right turns or U-turns here.

• All the arms have two and three defined lanes while the traffic forms multiple ques during the signal.

• There is no provision for non – motorized transport infrastructure.

• There are numerous non permitted vehicular movements around the refuge islands, as well as conflicting signal phasing which leads to an unsafe environment for vulnerable road users.

B.3.2 : LAND USE EVOLUTION OVER THE YEARS



B.3.3 : EXISTING TRAFFIC CIRCULATION

Modal share:

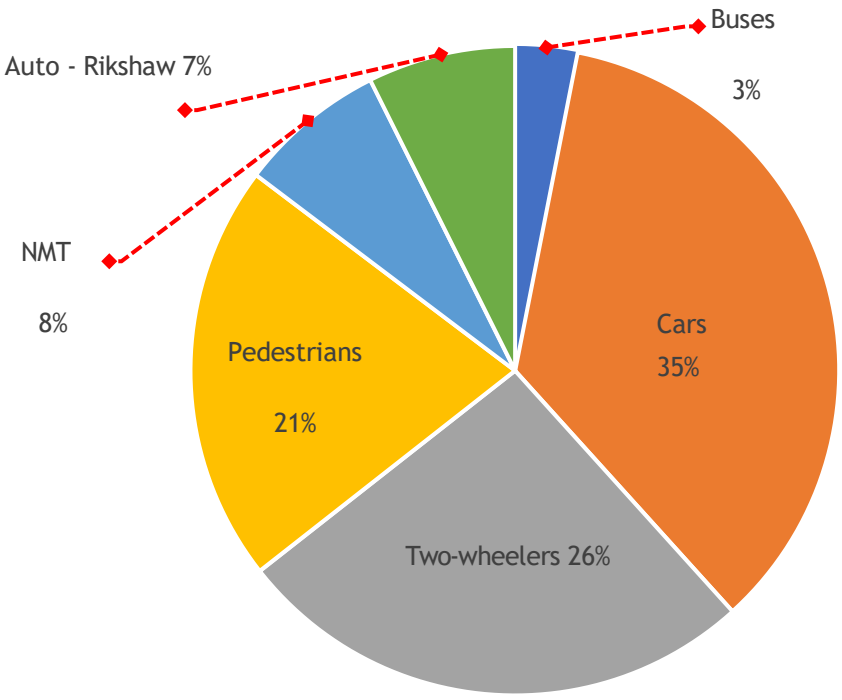
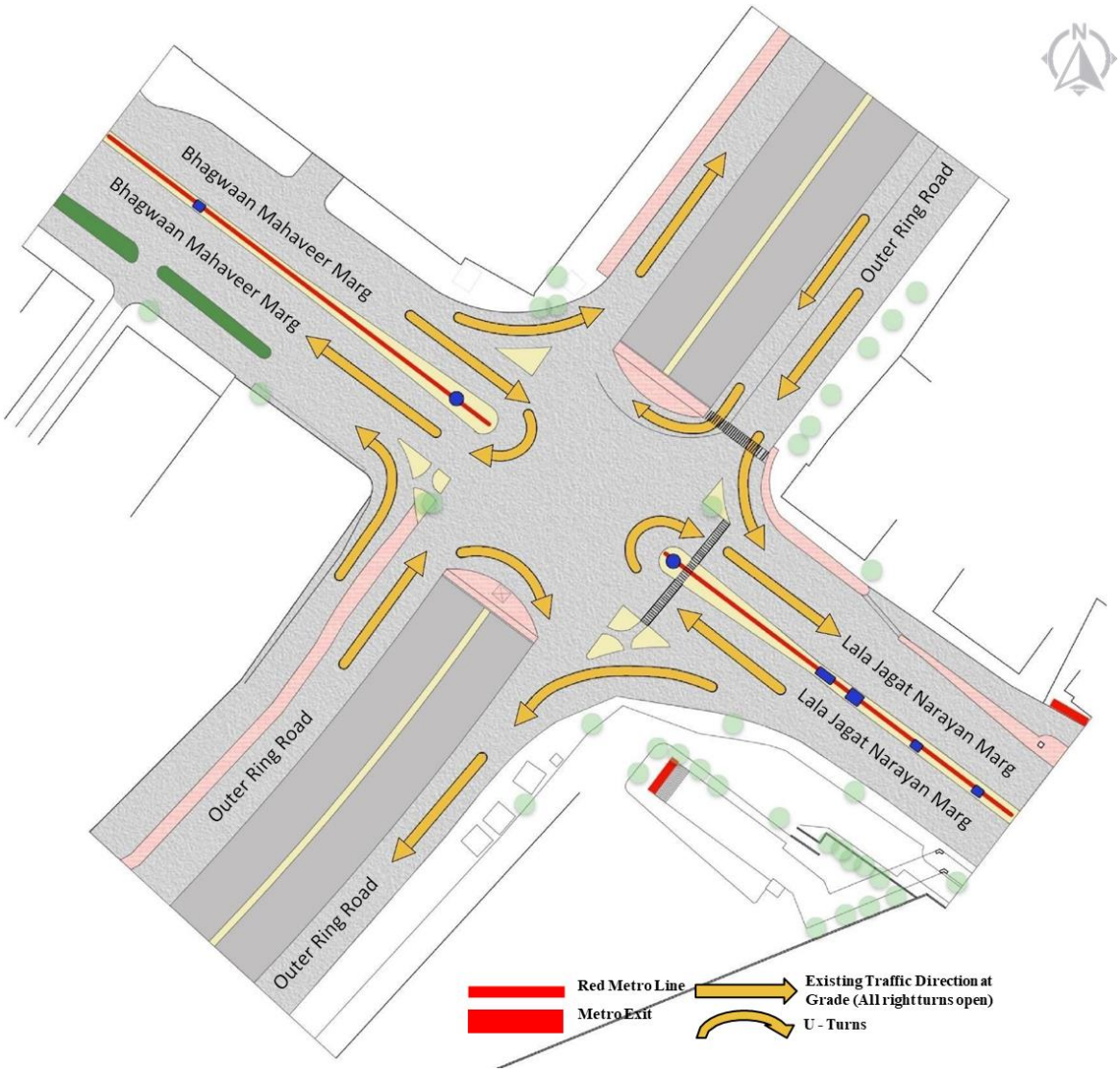


Figure 23: Modal share: Madhuban Chowk

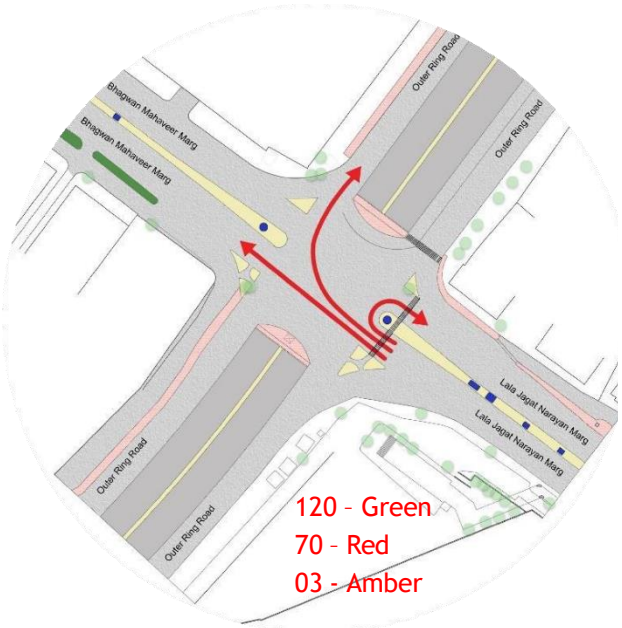
1. Majority of percentage **(almost 47%)** in the modal share is of the **vulnerable road users** which includes **pedestrians and two wheelers.**

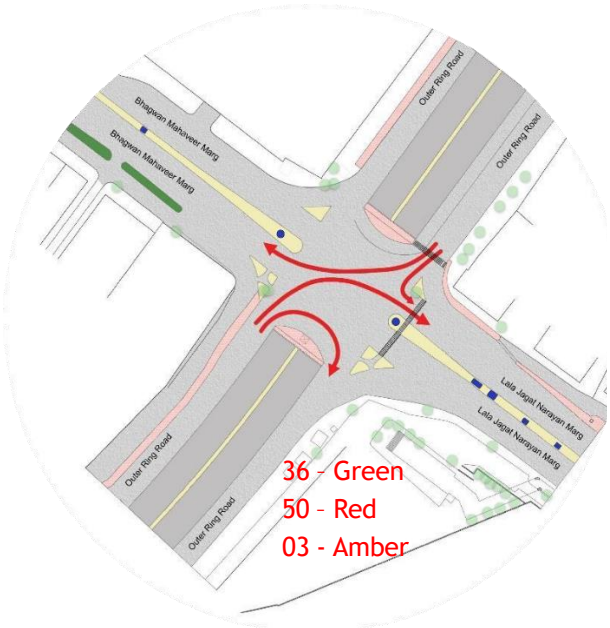
2. High number of **pedestrians footfall** on the intersection because of its **proximity to the metro station.**


Bhagwaan Mahaveer Marg
Bhagwaan Mahaveer Marg
Outer Ring Road
Lala Jagat Narayan Marg
Lala Jagat Narayan Marg
Outer Ring Road
Outer Ring Road
Red Metro Line
Metro Exit
Existing Traffic Direction at Grade (All right turns open)
U - Turns

B.3.4 : EXISTING SIGNAL PHASING

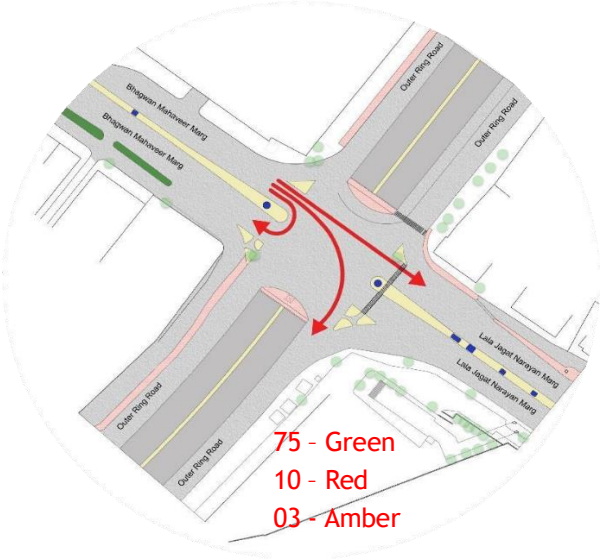
- The intersection has traffic lights managed by the traffic police and at times in peak hours, ground officers operate manually.
- Signal phasing vary depending on the peak hours, but they usually range between 35 and 120 seconds on each side.
- Multiple conflicts are observed during the second phase where vehicles coming from northeast and southwest on ring road turn right on the intersection at the same time.
- There is no separate signal phase for pedestrians. Although pedestrian symbols are recently added to the signal, allowing them to cross during the red lights.





1. Traffic movement towards Bhagwan Mahaveer Marg and Outer Ring Road

2. Traffic movement towards Lala Jagat Narayan Marg, Mahaveer Marg and Outer Ring Road.



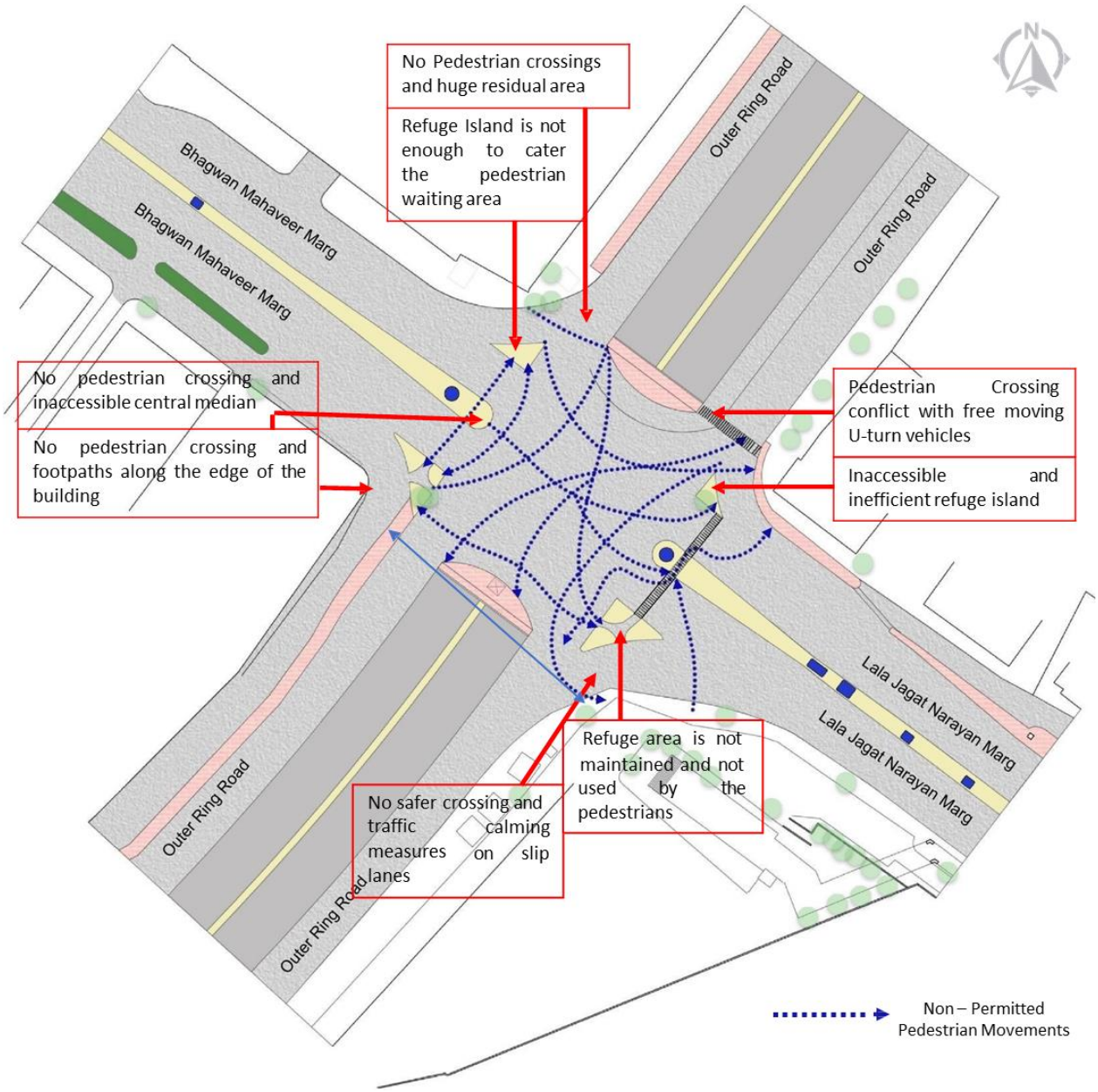
3. Traffic movement towards Lala Jagat Narayan Marg and Outer Ring Road

Absence of STOP line due to which vehicular traffic is coming over the junction

People were navigating the junction randomly due to the absence of pedestrian crossings

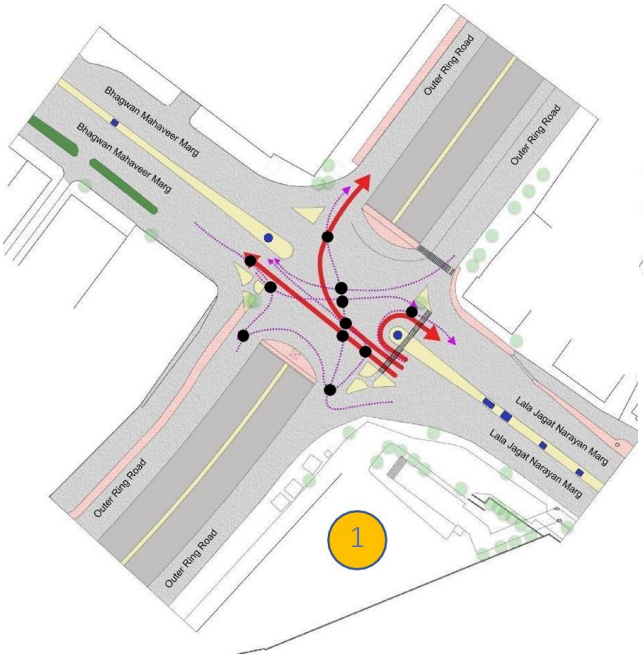
No provision for pedestrians to cross leads to vehicular-pedestrian clashes

B.3.5 : EXISTING PEDESTRIAN CIRCULATION

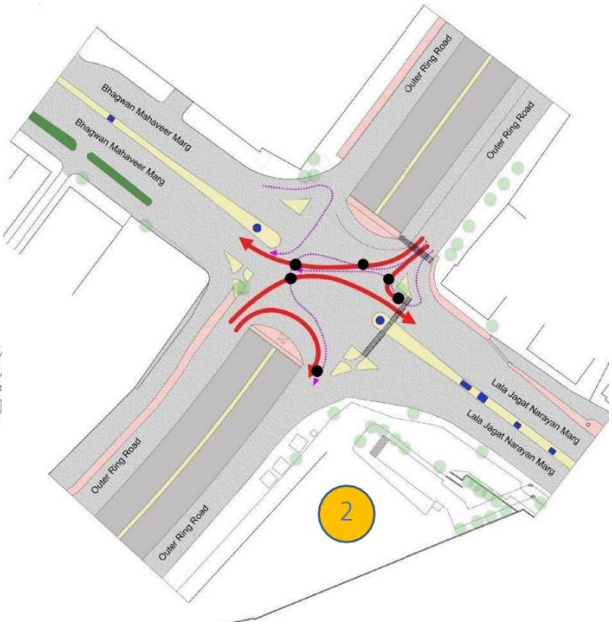


- The junction lacks refuge islands and pedestrian crossings, putting lives at risk. People also tend to cross haphazardly owing to lack of pedestrian infrastructure.
- The wide slip lanes for free left turns lack traffic calming measures.
- Long distance to cross due to underpass without any refuge islands makes pedestrian extremely vulnerable among the high- speed traffic movements.

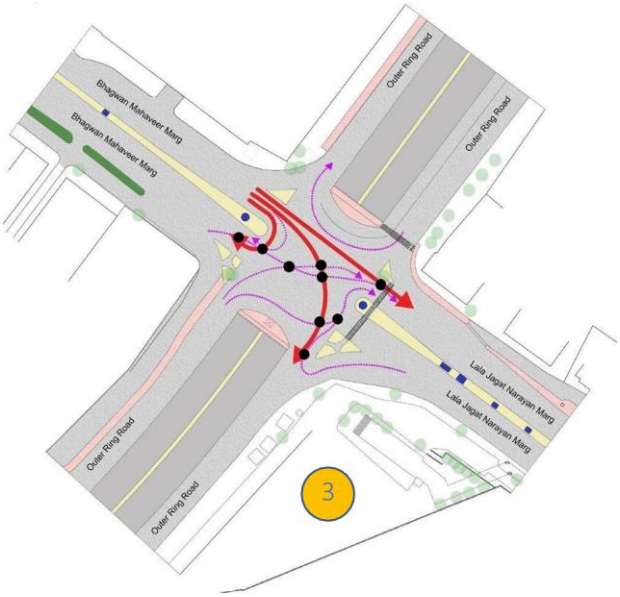
B.3.6 : CONFLICT POINTS



1.Traffic from Southwest is taking non permitted movement leads to availability of space near the refuge islands. Also, multiple two wheelers take U- turn on the North – East edge from an unseparated space increases the risk of near miss.



2.During the second phase of the signal, right turn movements are allowed from two directions increasing the risk of collisions. This increases the risk of crashes.



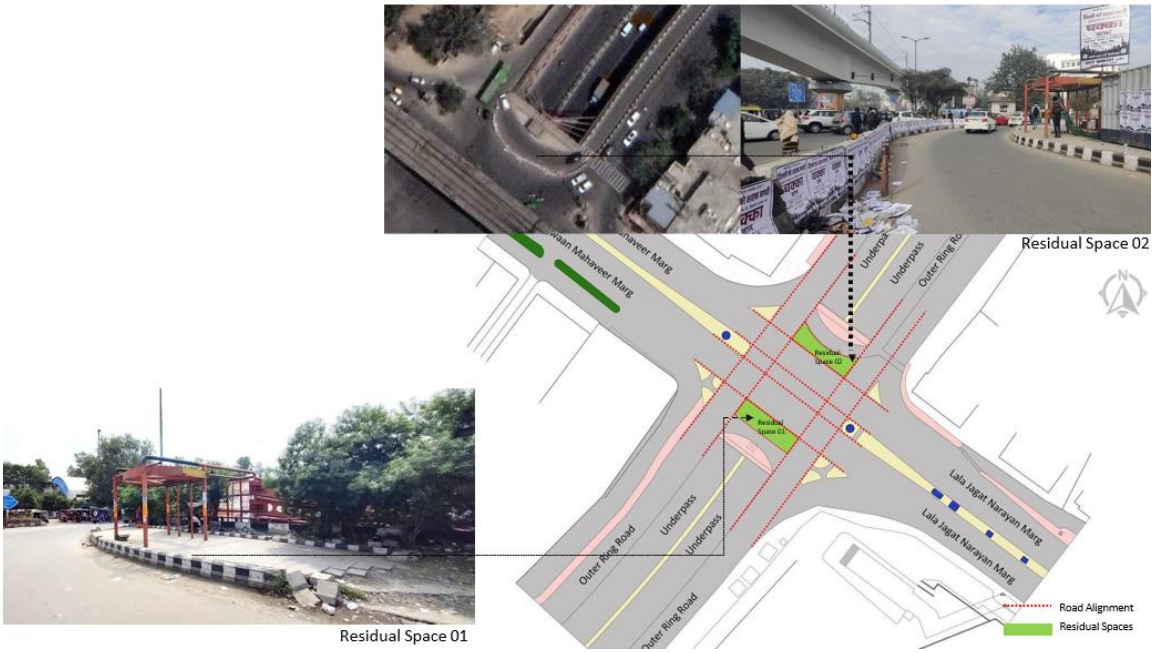
3. Movement from South – East edge of the intersection but there are multiple non permitted movements overriding the refuge islands from South – West corner.

Signalized Traffic Movements

Non – Permitted Movements

Conflict Points

B.3.7 : ISSUES IDENTIFIED



- Due to existing road alignment and underpass infrastructure, two residual spaces are created on North- East and South-West edge of the intersection. As a result, these residual spaces are misused by vehicles to take U- turns.
- Due to unavailability of the pedestrian crossings, pedestrians also prefer to use these spaces as waiting areas, exposing them to high-speed turning vehicles.
- These residual spaces also encourage non permitted movements further adding to the risk factors.


Vehicles tends to encroach pedestrian crossing during traffic signal.


Conflict Points on the slip lanes between pedestrians and diverging traffic from the main lane.


Corner island is not maintained.


Pedestrians walk along the carriageway owing to lack of pedestrian infrastructure.

B.3.8 : PROPOSED DESIGN

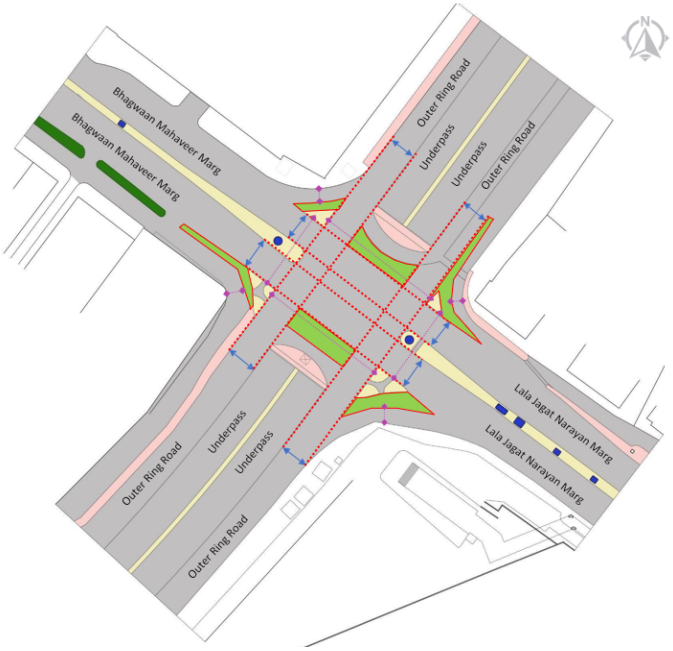
CONCEPTUAL DESIGN

1. Balancing downstream and upstream on all four arms by defining minimum available space on roads for the carriageway.

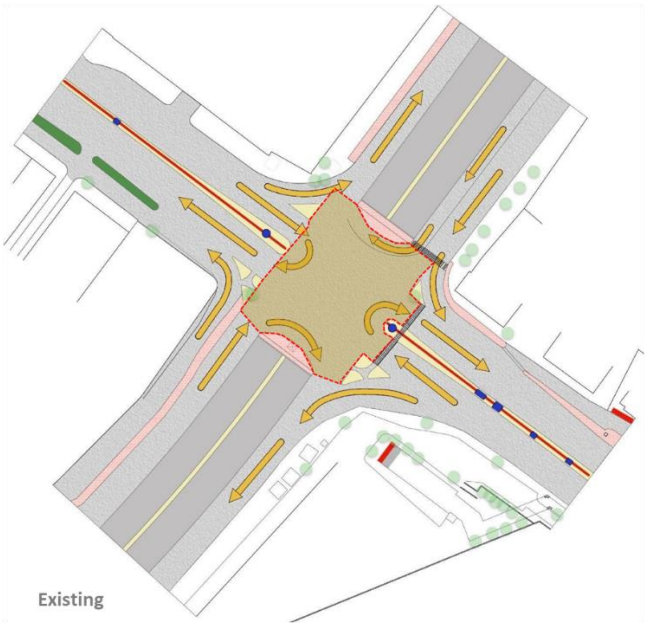
2. Aligning all the roads and orient them to the opposite side for a smooth and efficient traffic flow.

3. Absorb the residual spaces to expand the existing refuge islands and create new ones for pedestrians to safely wait before crossing.

4. Identifying the shortest, continuous and safest pedestrian paths by compacting the conflicting area of the intersection. Providing tabletops on all four corners for safer access.



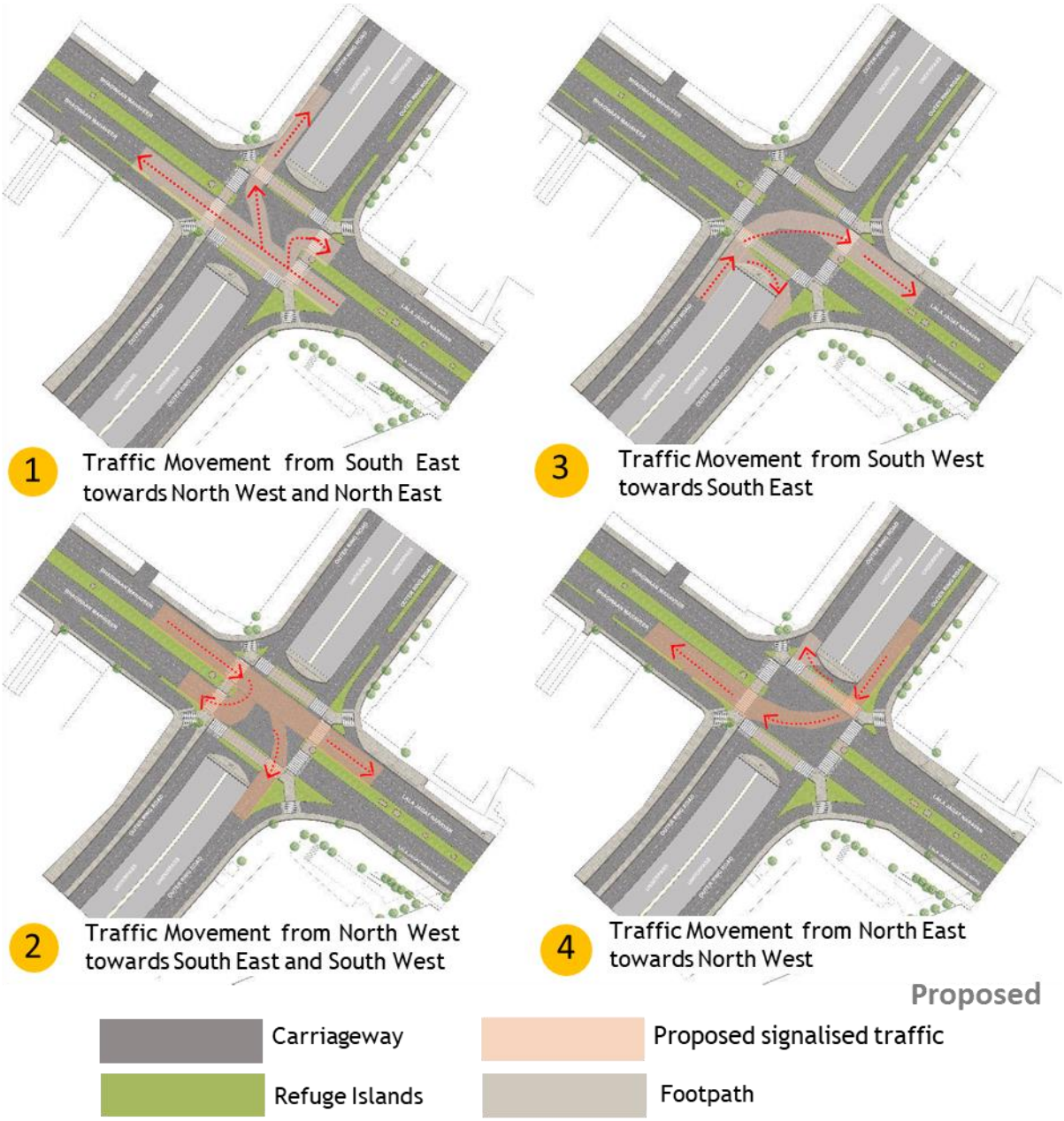
COMPACT INTERSECTION: 50% REDUCTION IN CONFLICT AREA



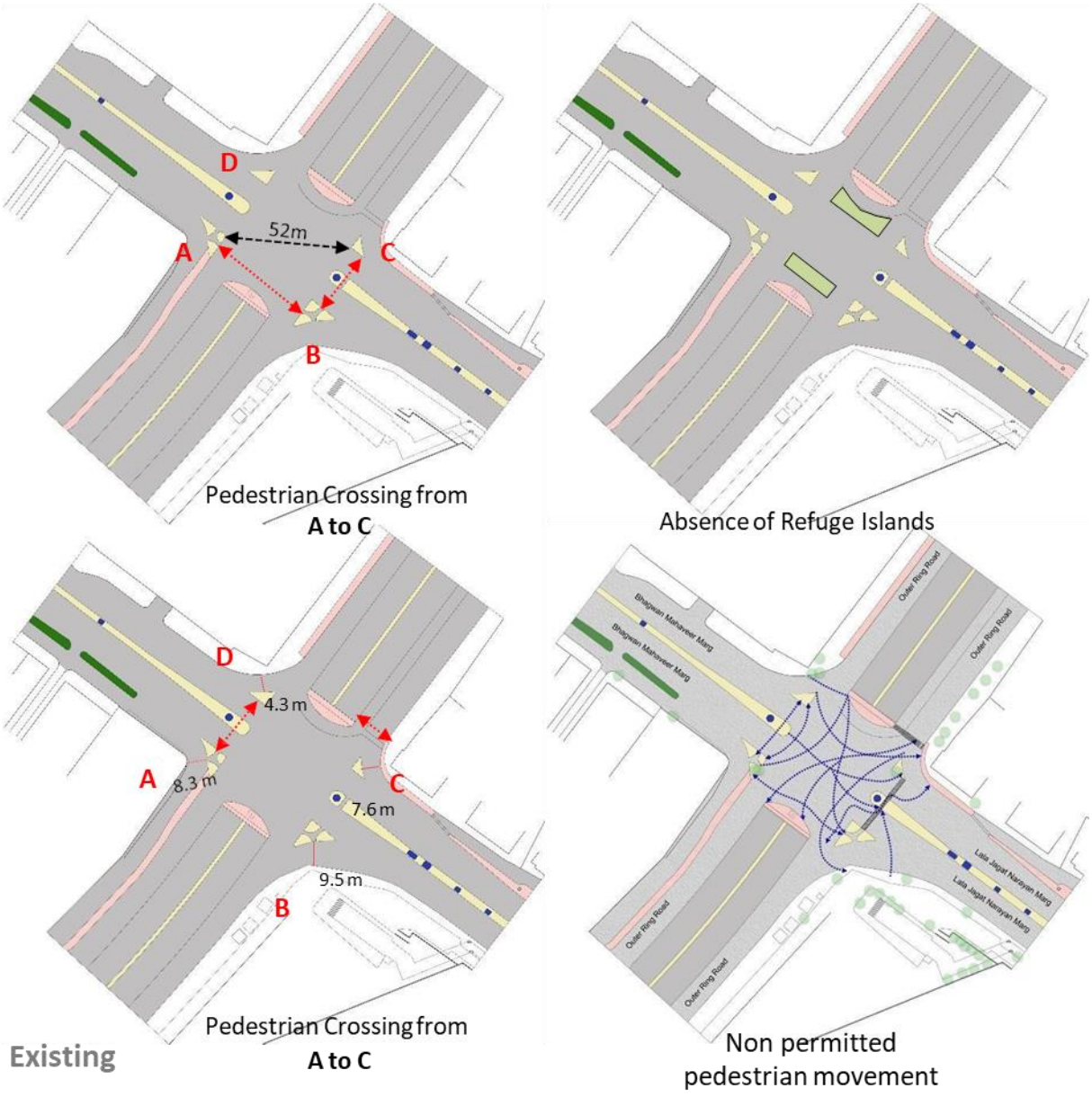
Conflict Area – 2003 sq. m. after

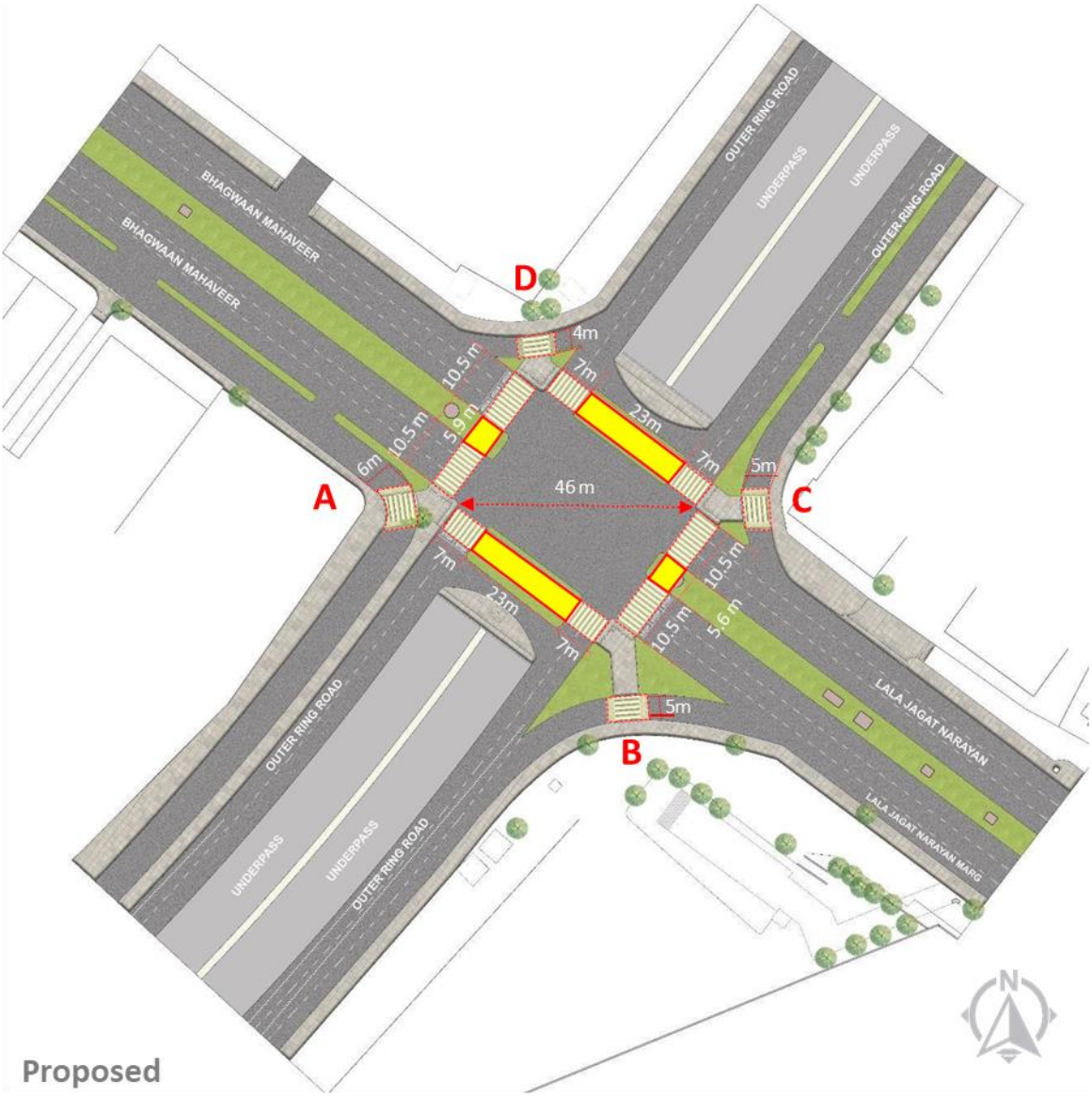
Conflict Area – 1140 sq. m. after

SAFE AND EFFICIENT TRAFFIC MOVEMENT: INTRODUCING FOURTH SIGNAL PHASE – 50 % REDUCTION IN CROSSING DISTANCE



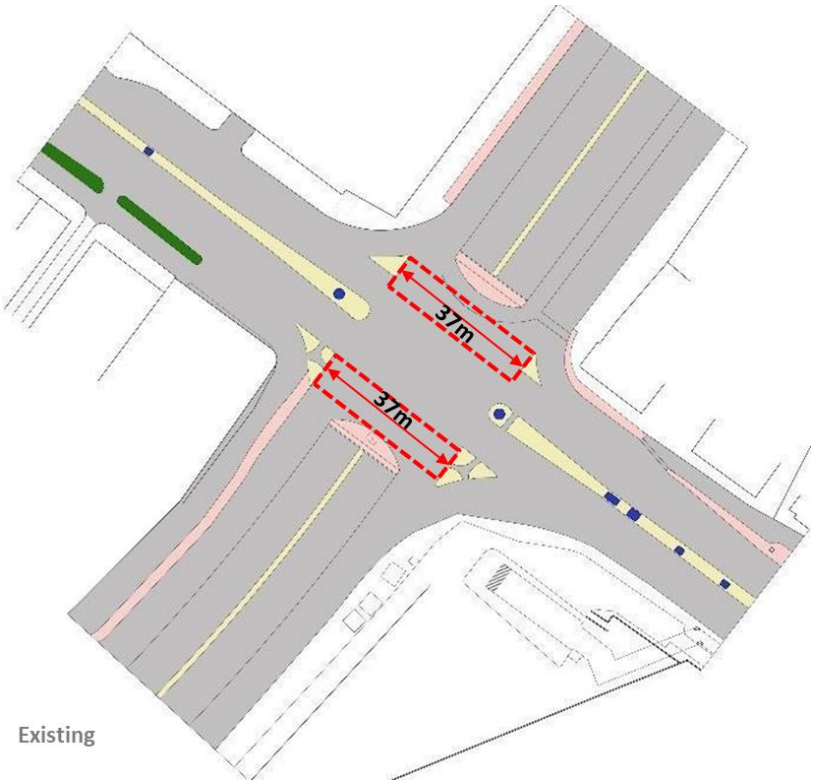
SAFE AND ACCESSIBLE PEDESTRIAN MOVEMENT: CONTINUOUS AND ACCESSIBLE PEDESTRIAN CROSSINGS WITH REFUGE ISLANDS AFTER EVERY TWO - THREE LANES



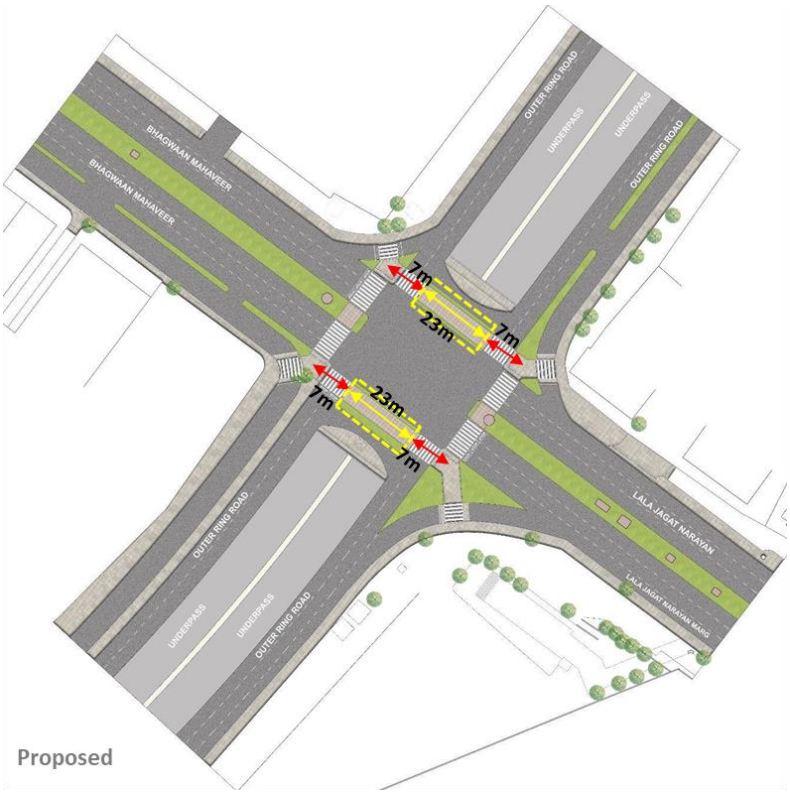


Proposed Safe Pedestrian Crossing Proposed Refuge Islands Proposed Refuge Islands

SAFE AND ACCESSIBLE PEDESTRIAN MOVEMENT: CONTINUOUS AND ACCESSIBLE PEDESTRIAN CROSSINGS WITH REFUGE ISLANDS AFTER EVERY TWO - THREE LANES

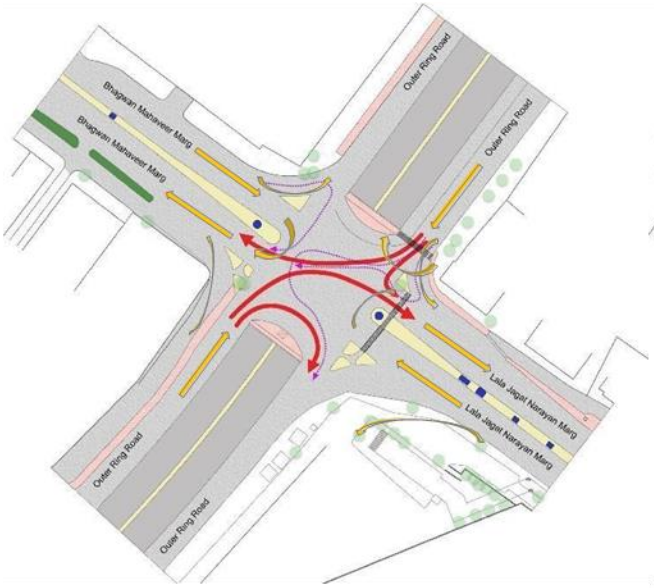


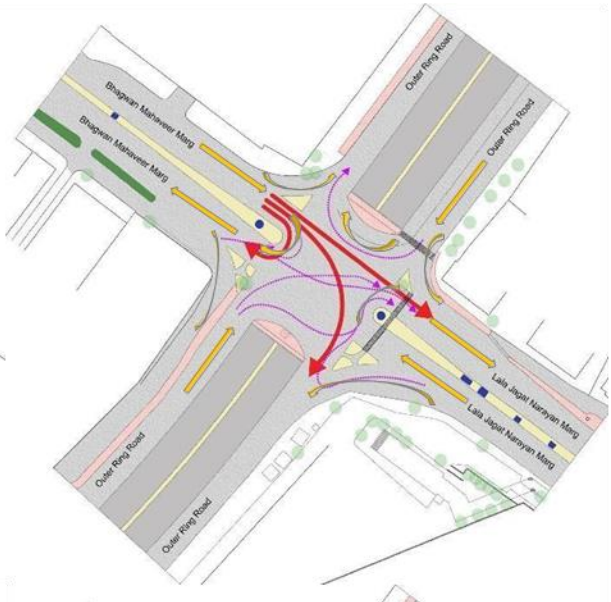
- 37m Unsafe pedestrian crossing mixed with vehicular traffic flow, creates a risk of pedestrian vehicular conflict.



- 23m Refuge Pedestrian Island has been created, which will be buffered with hedges/railings or bollards.
- 62% reduction in conflict area per crossing.

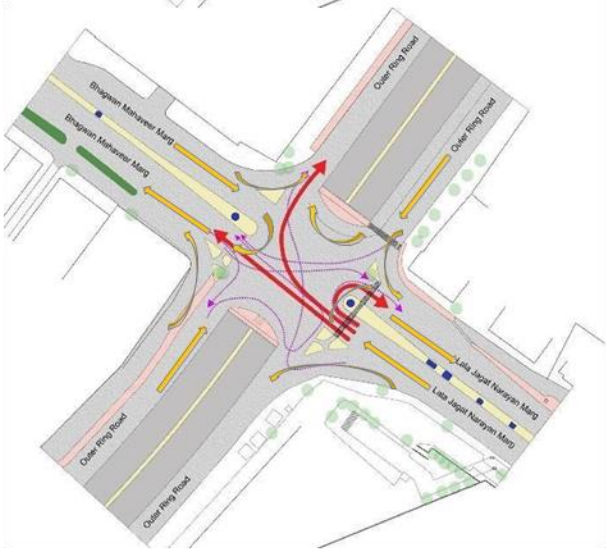
DISCOURAGING NON-PERMITTED MOVEMENTS:





Reclaimed refuge islands:

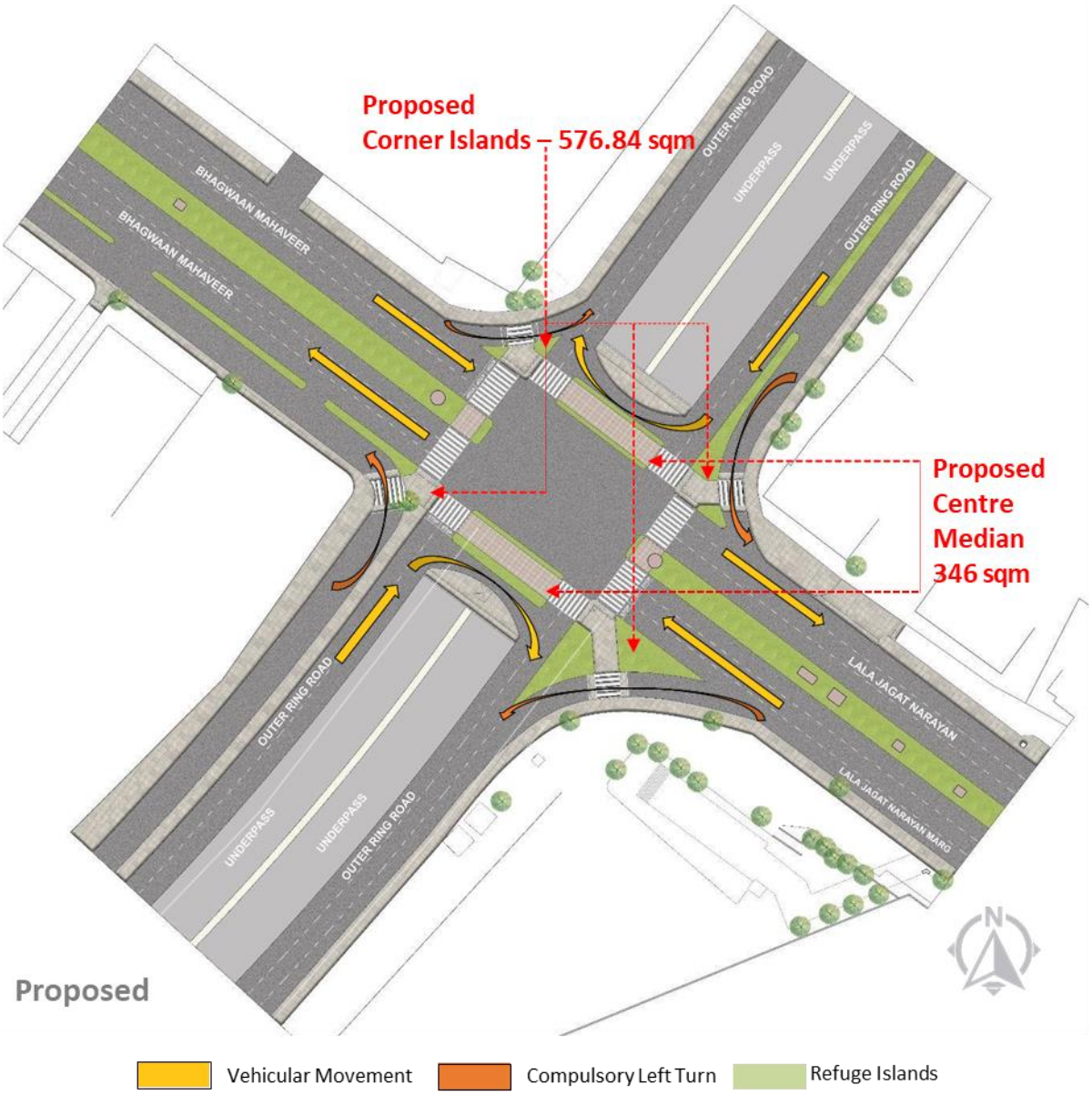
- Reclaimed 410 sqm area as corner islands.
- Reclaimed 346 sqm area as centre median.



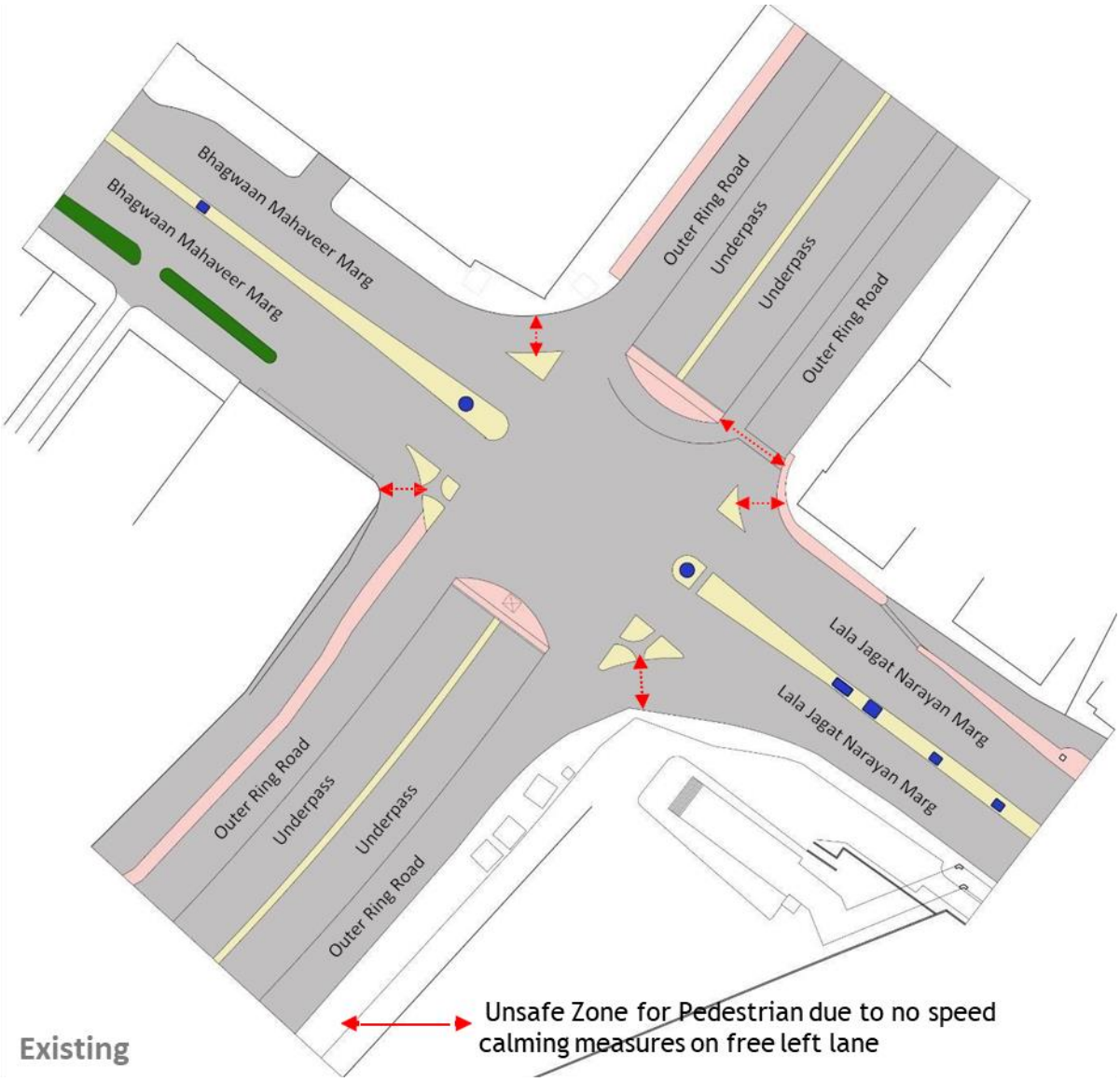
Existing

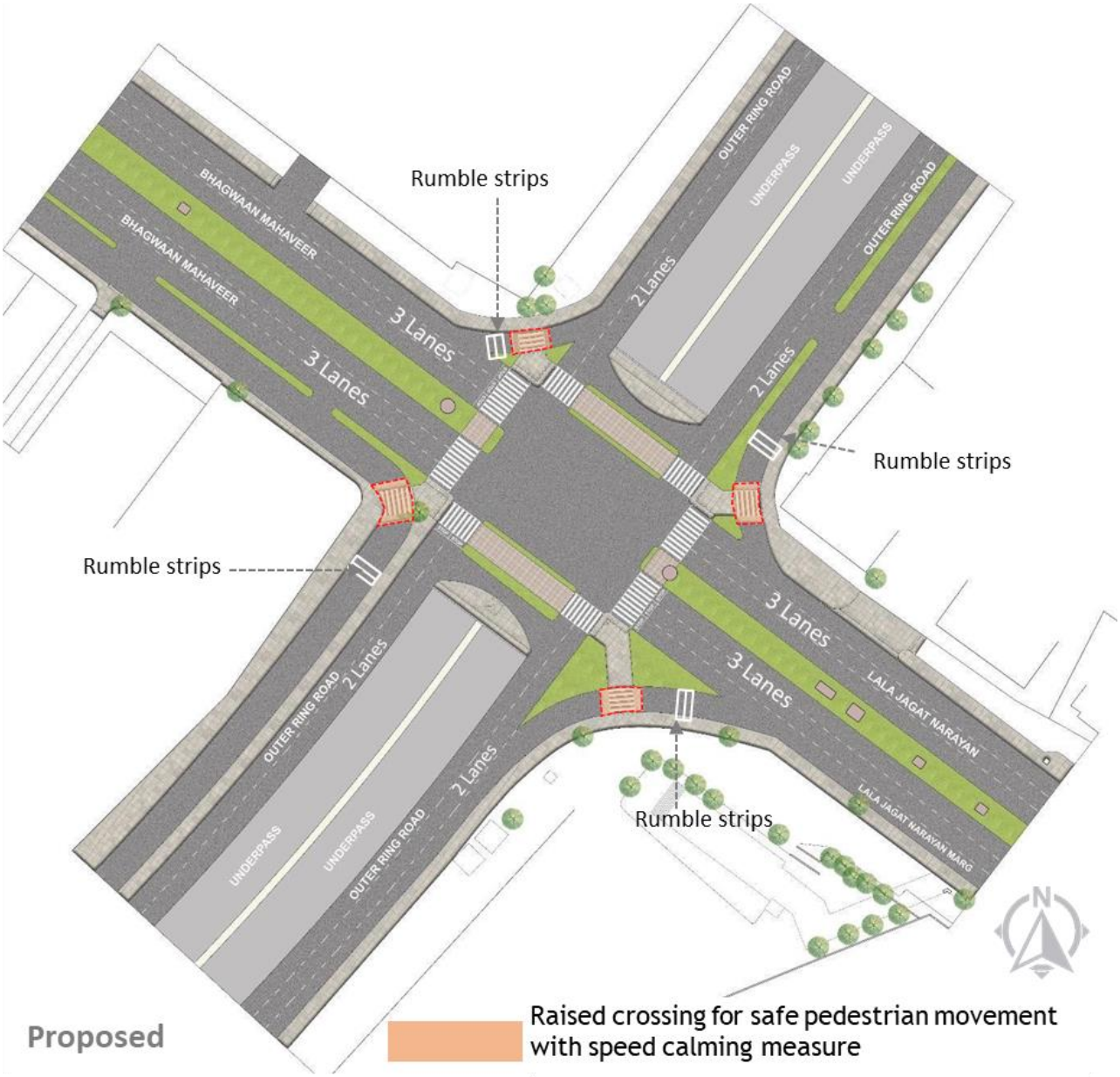
Non Permitted Movements

Vehicular Movement


Proposed
Corner Islands – 576.84 sqm
Proposed
Centre
Median
346 sqm
BHAGWAAN MAHAVEER
BHAGWAAN MAHAVEER
OUTER RING ROAD
UNDERPASS
UNDERPASS
OUTER RING ROAD
OUTER RING ROAD
UNDERPASS
UNDERPASS
OUTER RING ROAD
LALA JAGAT NARAYAN
LALA JAGAT NARAYAN MARG
N
Proposed
Vehicular Movement
Compulsory Left Turn
Refuge Islands

TRAFFIC CALMING MEASURES: RAISED CROSSING FOR SAFE PEDESTRIAN MOVEMENT WITH TRAFFIC CALMING MEASURE




Rumble strips
BHAGWAAN MAHAVEER
BHAGWAAN MAHAVEER
3 Lanes
3 Lanes
OUTER RING ROAD
UNDERPASS
UNDERPASS
OUTER RING ROAD
2 Lanes
2 Lanes
Rumble strips
Rumble strips
3 Lanes
3 Lanes
LALA JAGAT NARAYAN
LALA JAGAT NARAYAN MARG
OUTER RING ROAD
2 Lanes
UNDERPASS
UNDERPASS
OUTER RING ROAD
2 Lanes
Rumble strips
N
Proposed
Raised crossing for safe pedestrian movement with speed calming measure

TRIAL FINDINGS

1.Absence of pedestrian crossings increases the risk of conflicts.

2. Additionally, E-rickshaws were taking U turns which created problem for the traffic flow.

1.Safer dedicated Pedestrian crossings along with refuge islands throughout the junction for people to halt safely while crossing.

2. The wrong-side movement of E-rickshaws is also managed by the traffic police.

1.The absence of a stop line allows vehicular movement to come over the junction.

2. The metro pillar also created a visibility barrier for pedestrians as well as the vehicular movement taking a U-turn

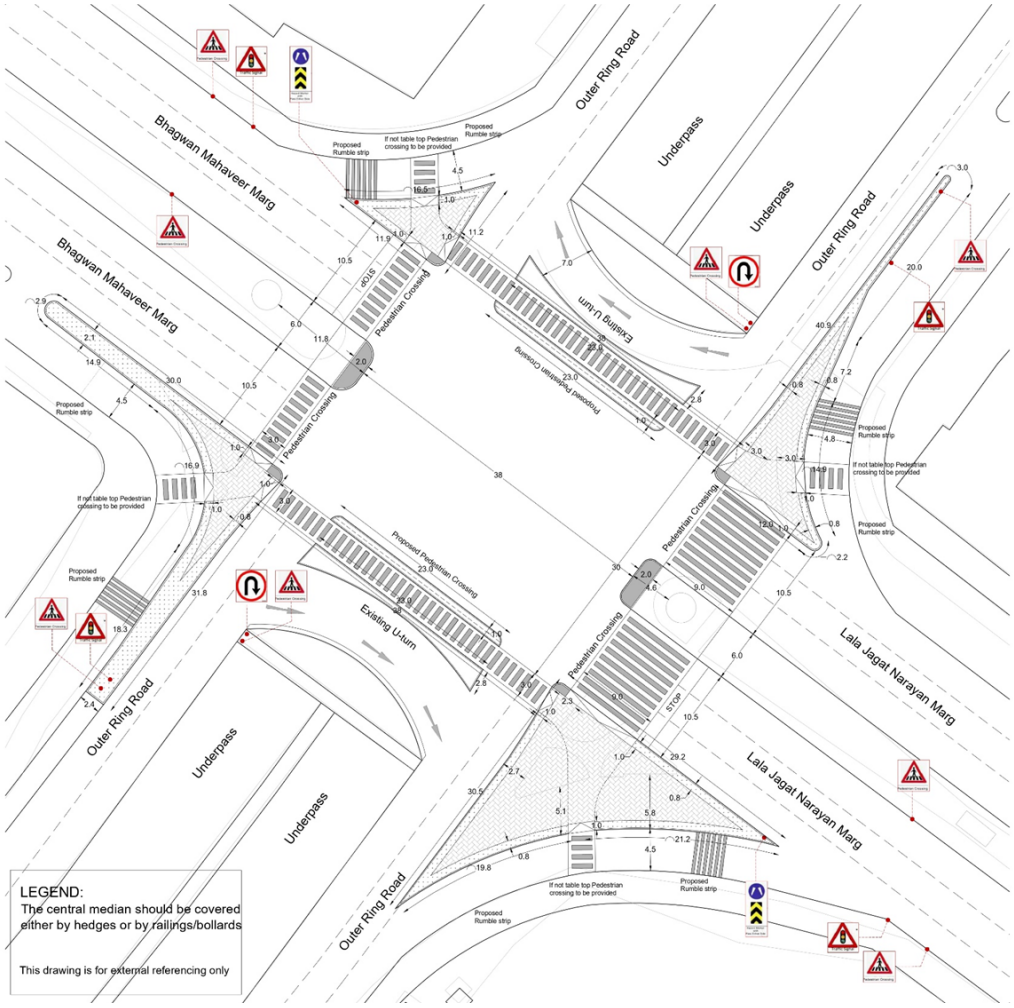
1.post-intervention a pedestrian crossing along with a refuge island allows safer pedestrian flow as well as provides space for the U-turns.

1.Large unsafe zones in the centre created conflicts between the pedestrian and vehicular movement.

1.Refuge islands for pedestrians to safely wait before crossing.

2.This immediately reduced the conflicting distance to be crossed by pedestrians and provided them with a safe space to wait.

FINAL DESIGN



In summary,

- Intersection space needs to be compacted by balancing downstream and upstream on all four arms and aligning all the roads for a smooth and efficient traffic flow, well integrated with the U-turns present on the Ring Road.

- There is a need to create permanent corner refuge islands and central medians as demonstrated during the temporary installation to create safe and secure waiting spaces for crossing the intersection.

- Permanent pedestrian crossing & road markings need to be aligned with the post geometrical correction to provide a shortest, continuous pedestrian infrastructure.

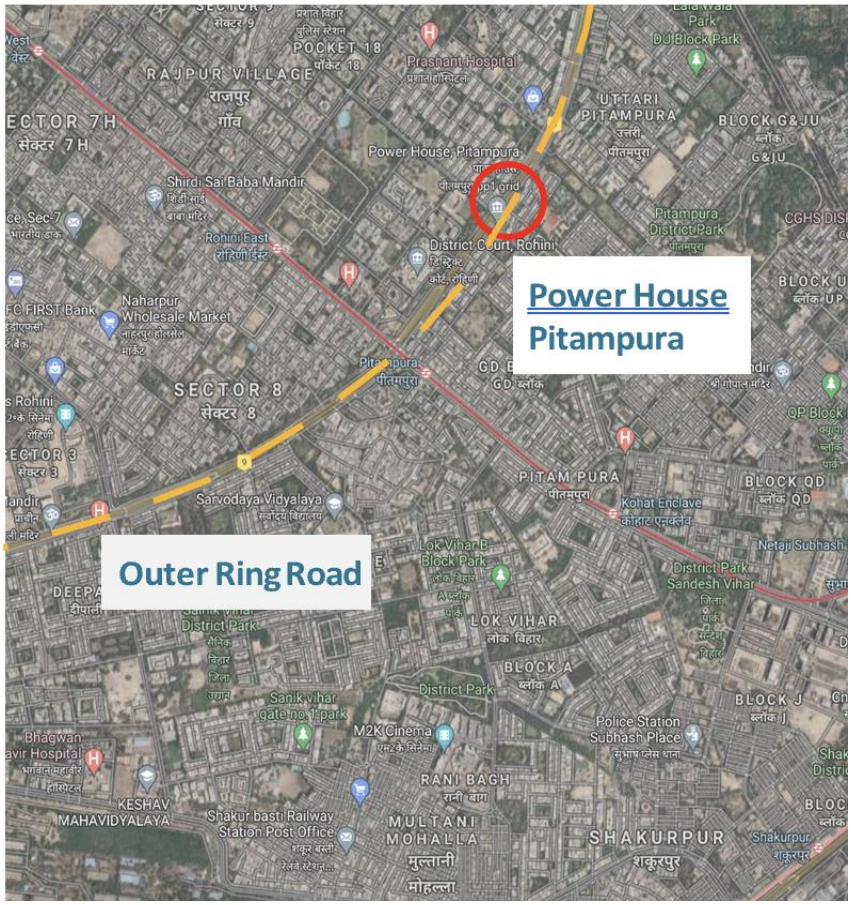
- Additionally, to support the execution of the proposed design traffic signals should be placed at appropriate locations as per the suggested geometrical correction, to improve the efficiency of the traffic movement.

- To make it inclusive and safer for all road users some key elements such as lighting, Signages, table tops at the slip lanes, rumble strips, and horticulture need to be incorporated at the time of implementation.

B.4: POWERHOUSE PITAMPURA

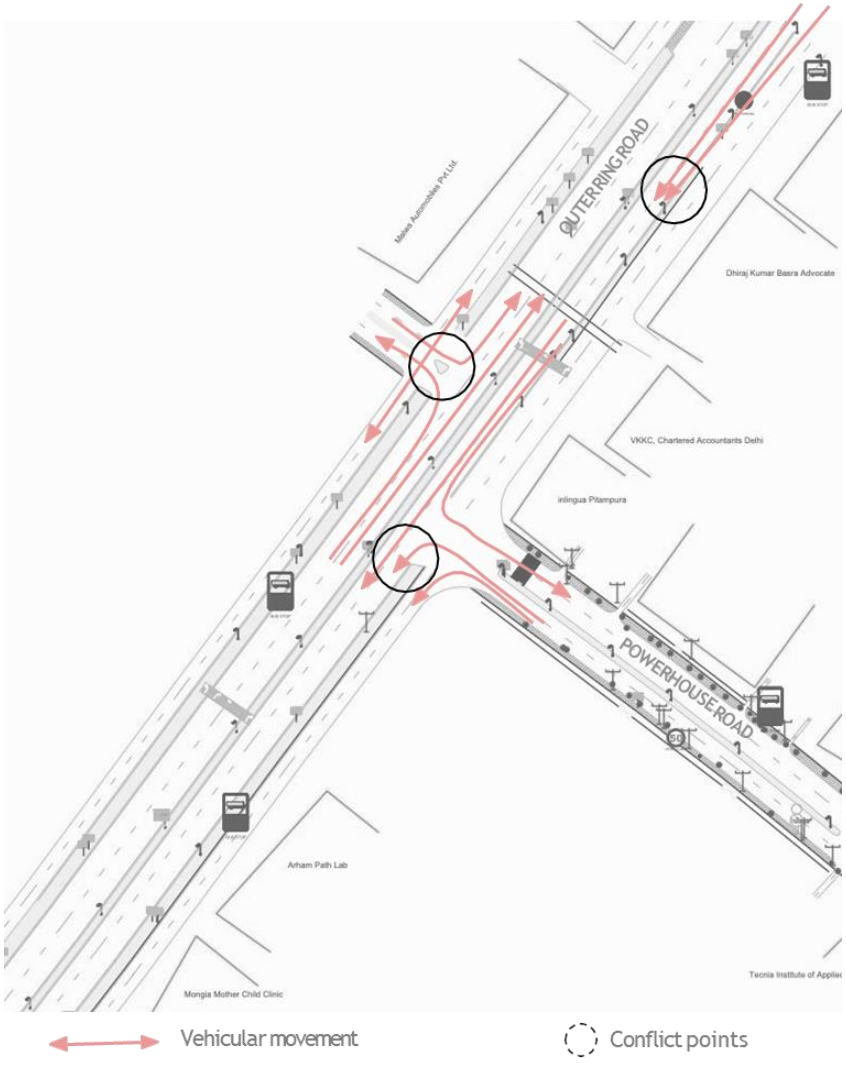
B.4.1 : GENERAL DESCRIPTION OF THE SITE

Power House Pitampura is located in North West Delhi, on the Outer Ring Road which is a continuous high-speed road that encircles Delhi. The area has dense commercial and residential use, so high volumes of pedestrians and vulnerable road users frequent this location. Vehicular traffic has been given top priority in the way the Outer Ring Road has been designed making it less safe for pedestrians and cyclists. Currently, the corridor also has Delhi Metro construction work underway.

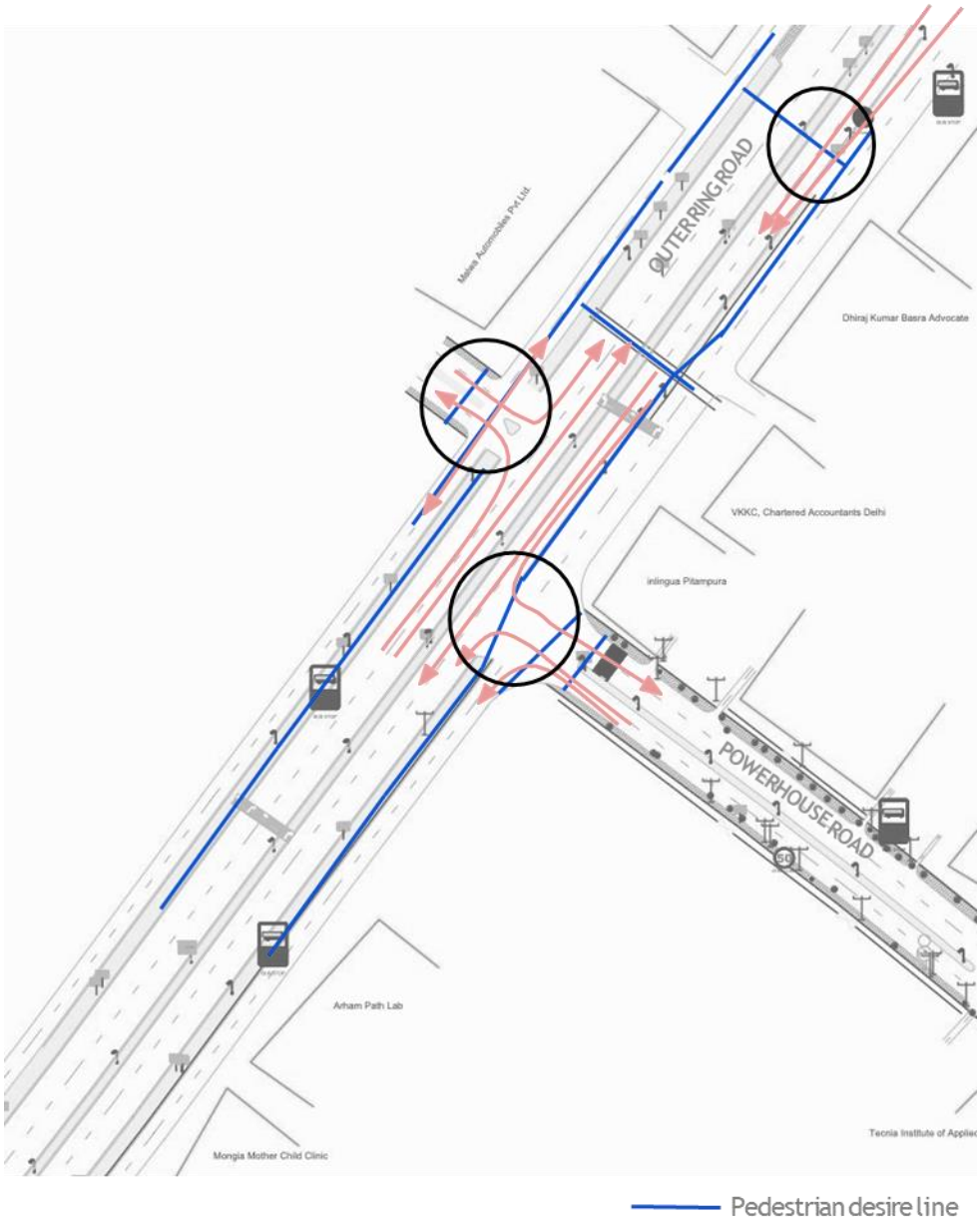


B.4.2 : EXISTING SCENARIO ON SITE

- Wide, 6 lane corridors with high-speed traffic and no signals.
- Large corner radii and unregulated turns leading to vehicles turning at high speeds.
- Service lanes used for vehicle parking.
- Blind turn due to metro barricade.
- Conflicting traffic where the flyover and the underpass meet the road.



- Lack of pedestrian infrastructure such as signals and continuous footpaths.
- No at-grade pedestrian crossing for over a km, resulting in unsafe pedestrian movement across the unsafe corridor.
- Encroachment of service lanes and footpaths with parking.
- No designated bus, taxi, and auto loading zones causing boarding/deboarding in the middle of the street.
- School kids and commercial activity causing pedestrian desire lines.

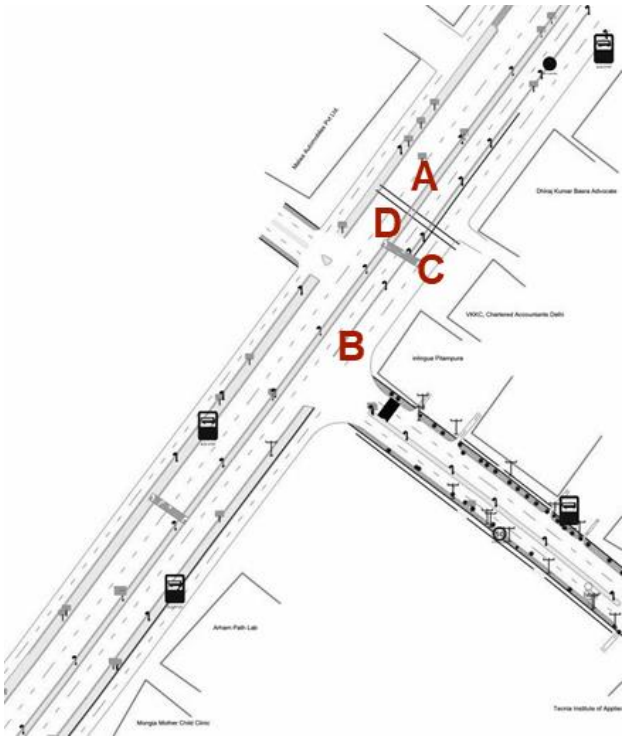



पीतमपुरा
Pitampura
मुकरबा चौक
Mukarba Chowk
अ.रा.ब.अ. कश्मीरी गेट
I. S. B.T. Kashmeri Gate
A


C


B


D


A
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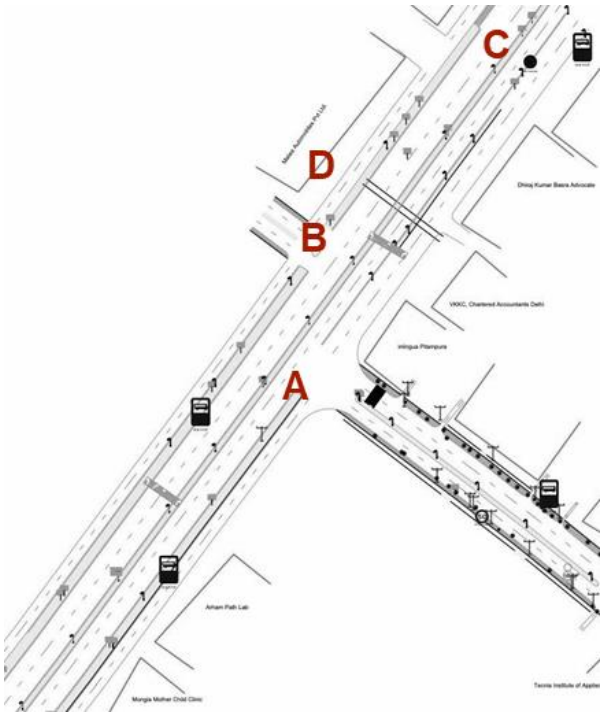
A


C


B


D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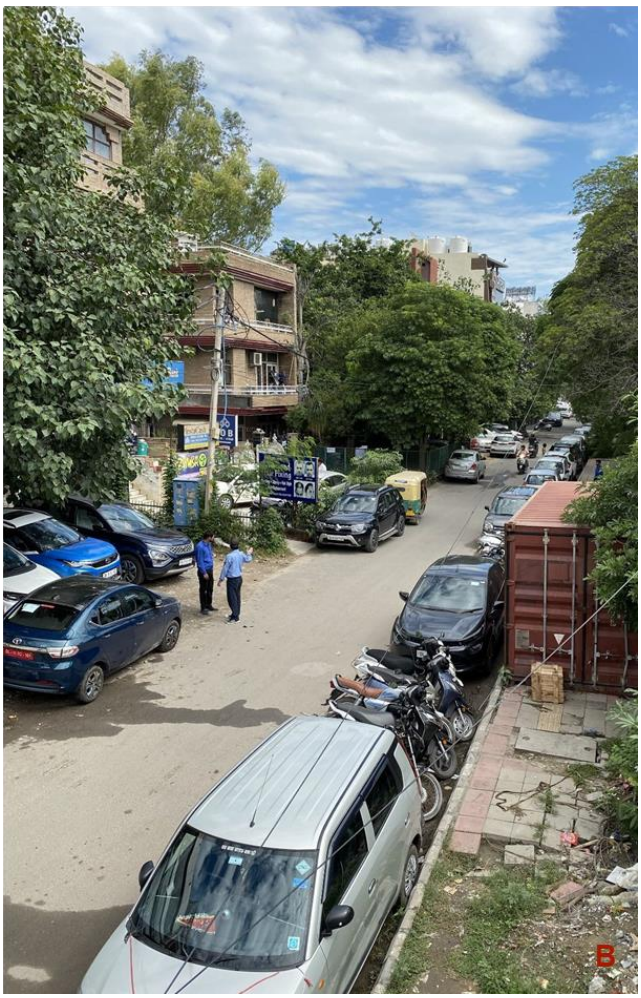
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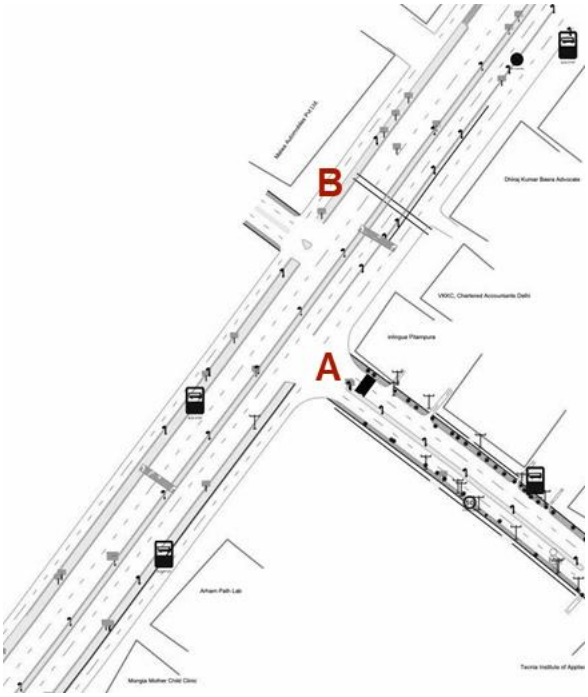
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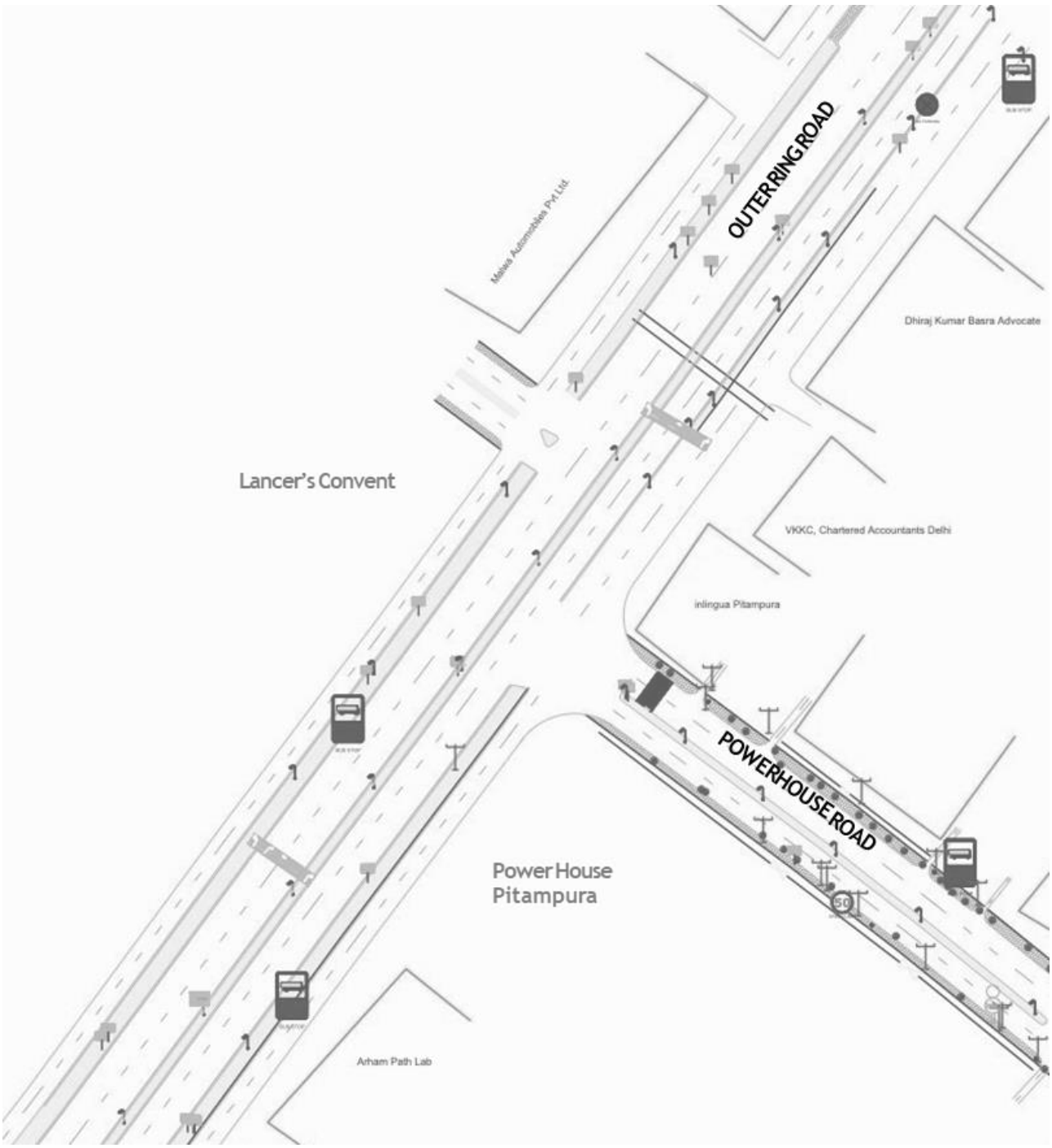
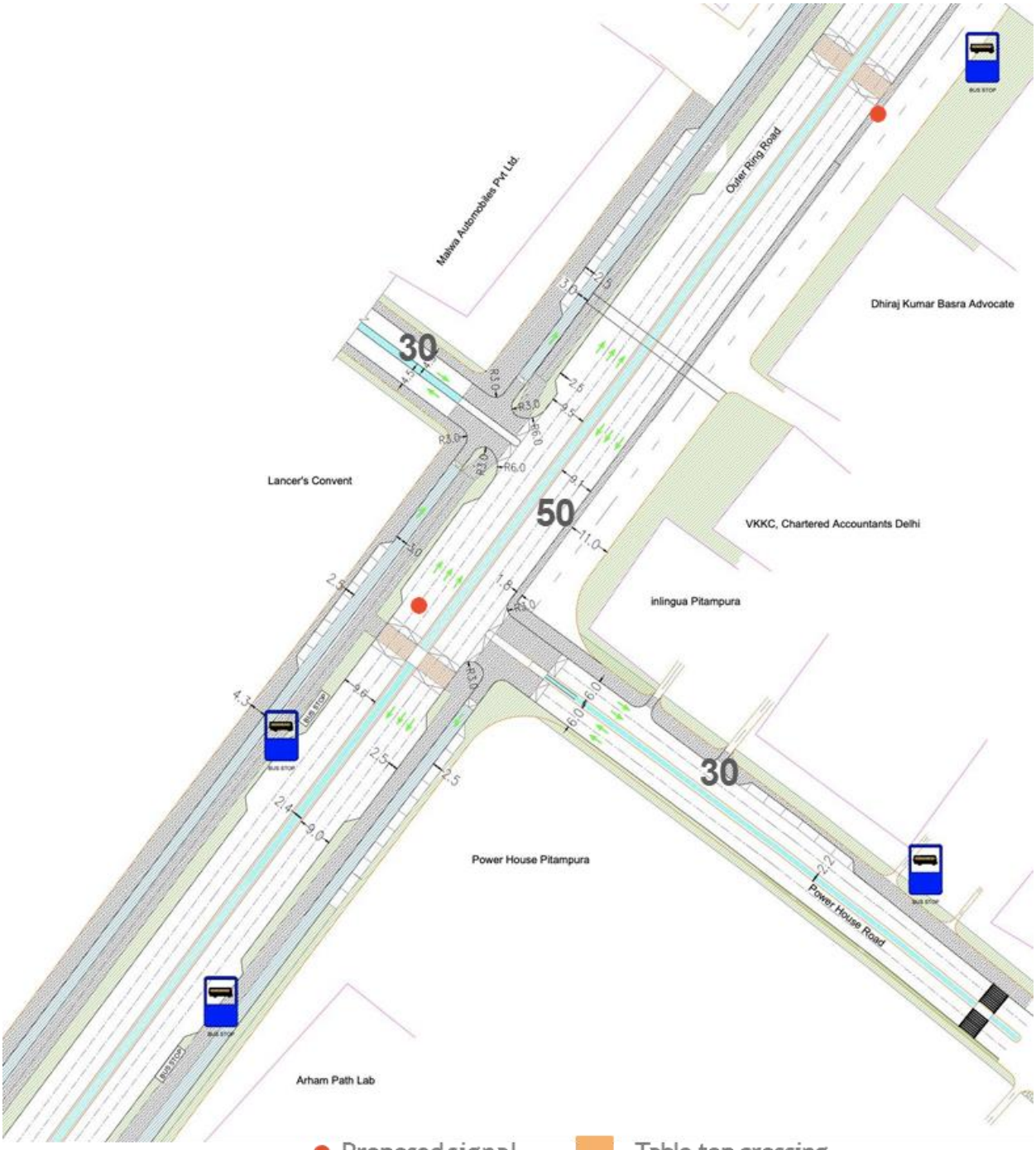
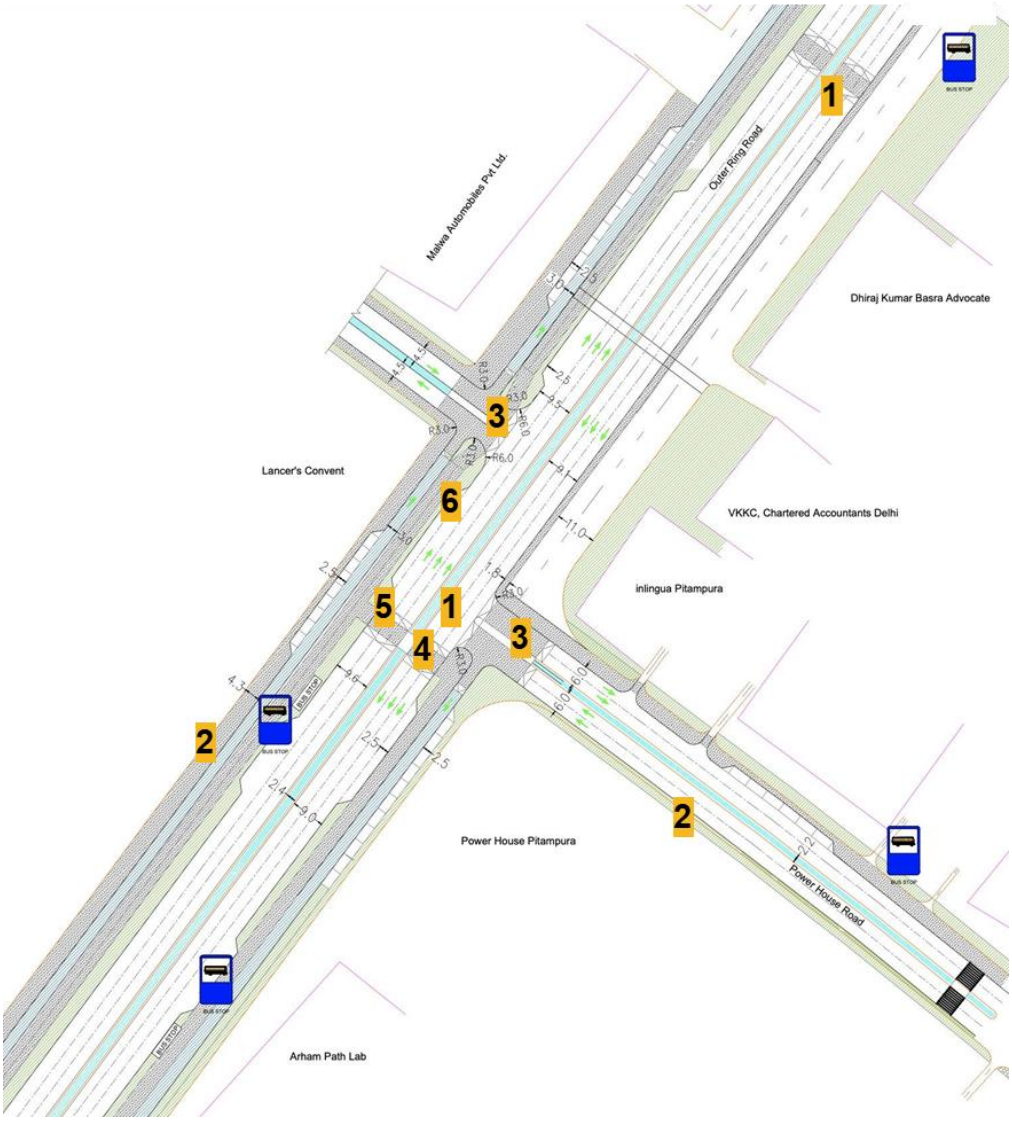
B.4.3 : EXISTING DESIGN



B.4.4 : PROPOSED DESIGN





1. At grade pedestrian crossings at maximum 200 metres intervals with table top facilities.

2. Continuous clear path for walking with minimum width of 1.80 - 2.40 metres.

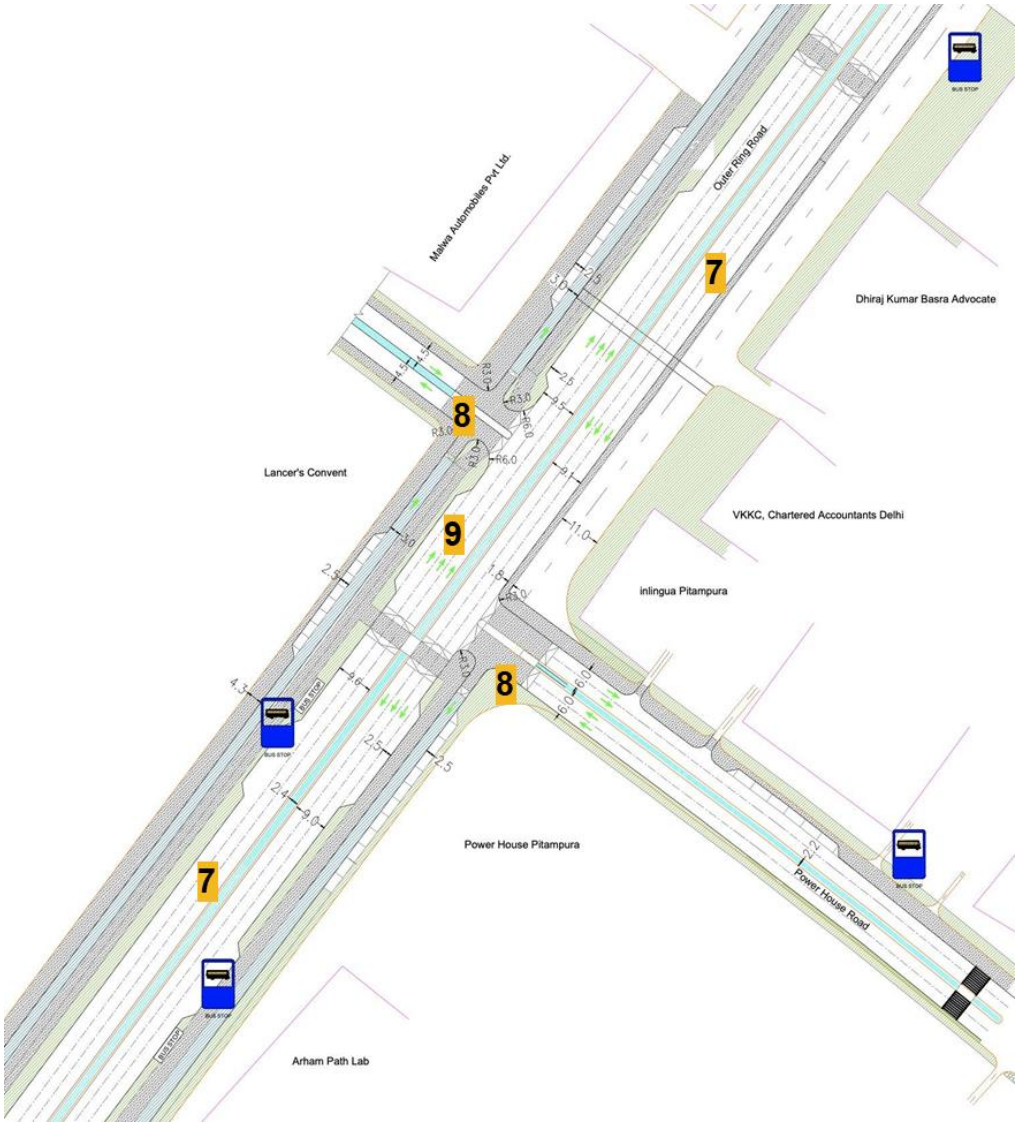
3. Table top crossing at T-junctions.

4. Introduction of safe and accessible refuge islands along all corridors to reduce speeds and provide pedestrians with a safe space.

5. Introduction of bulb outs to reduce crossing distances.

6. Dedicated bike lanes along all main corridors.

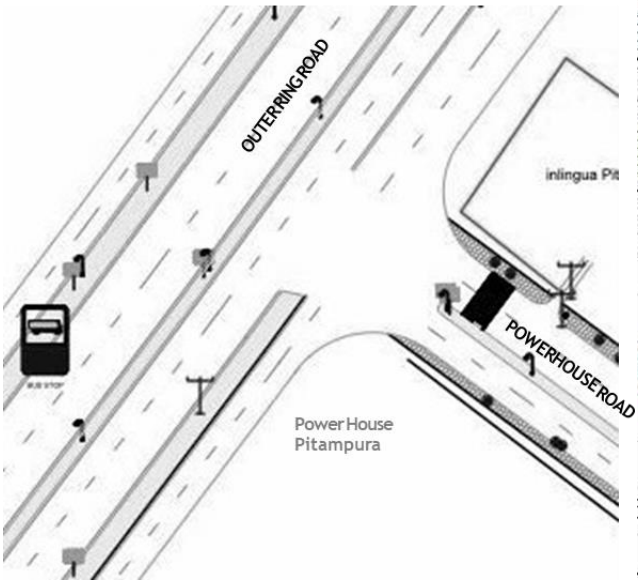
Note: Proposed interventions and dimensions are in line with the UTTIPEC guidelines and IRC Codes.



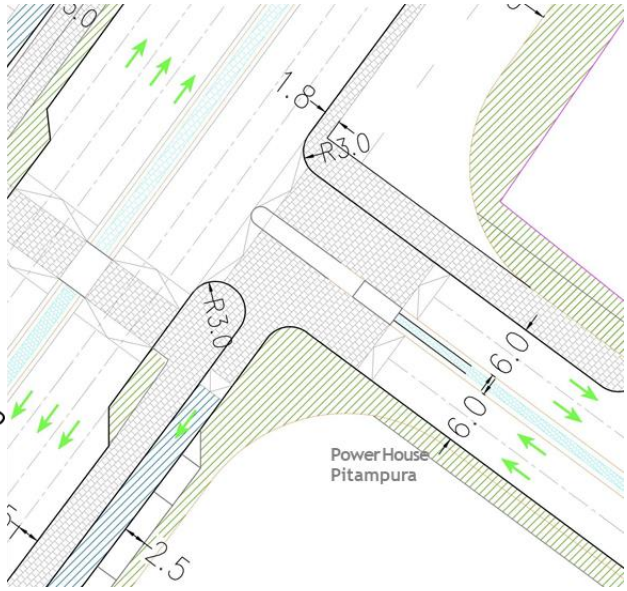
7. Even and equal travel lane widths with lane narrowing.

8. Tightening turning radii at all locations to reduce tuning speeds.

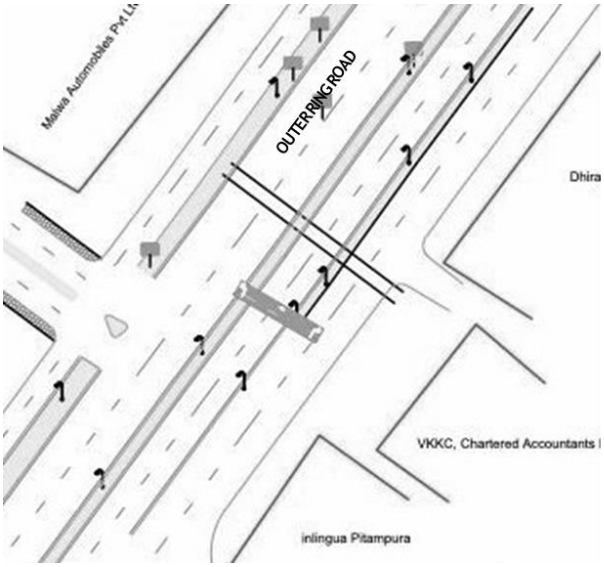
9. Dedicated and accessible parking spaces for vehicles, autos, two wheelers, buses.



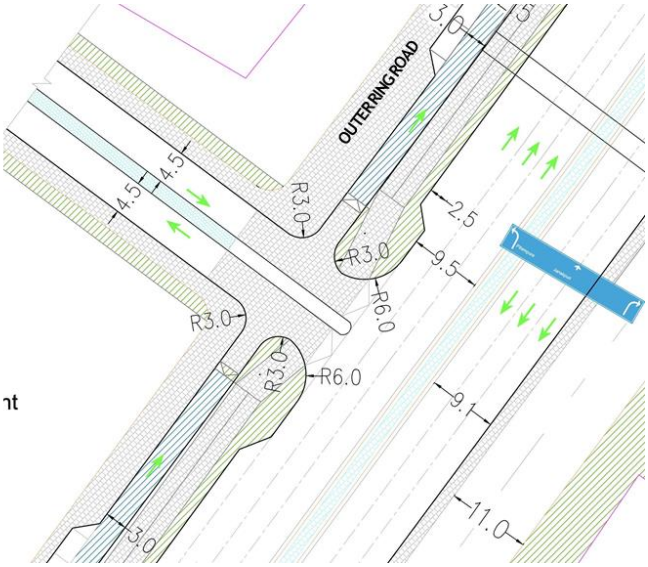
Existing



Proposed



Existing



Proposed

B.5: JASPAL KAUR PUBLIC SCHOOL, SHALIMAR BAGH

SAFER SCHOOL ZONE PROJECT

The Transport Department is the Lead Agency for Road Safety in Delhi. Safer School Zones was launched as part of High Impact Project in 2022 initiating a focus on school and school travel safety in partnership with HumanQind as the lead partner of the Transportation Research and Injury Prevention Centre (TRIP C) at Indian Institute of Technology, Delhi. Road Safety Clubs were established in all schools by the Directorate of Education in November 2022. As part of the High Impact Project, 11 model school zones, one every district of Delhi. The project has brought all school members including students to discuss and plan long term traffic safety and school accessibility blueprint based on data and collaborative action with District Road Safety Committees.

The road safety club are core teams constituting a representative group of the school community including students and alumni, school staff, parents, and head of school. The primary objective of this club is to promote traffic safety, especially in how users get to and from school.

B.5.1 : ENGAGEMENT TIMELINE

STAGE 1 Orientation	STAGE 2 Data Collection	STAGE 3 Design Collaboration	STAGE 4 Exhibition	STAGE 5 Implementation	STAGE 6 Management
Focus the school towards safer commuting to school for all- parents, staff, students, SMC/PTA.	Conduct school accessibility audits and traffic safety assessment for evidence-based planning and understanding the school community.	Conduct co-design workshops with students, staff and parents to prepare safe school zone plan, design and management- including circulation and parking.	Organise periodic exhibitions on school zone and road safety with decision makers and the school community.	Involve the government to implement the safe school zone plan.	Enable the Road safety club to manage the school zone and organise talks and interviews with experts.
Sep 22	Dec 22 - Jan 23	Nov -Dec 22	July 23	Current Stage	

B.5.2 : GENERAL DESCRIPTION OF THE SITE

District	Co-ed	School Shift	Shared Campus	Cluster of Schools	Total No. of Students:	ROW
North West	Yes	Morning	No	Yes	2404	14m - 24m

Length of Intervention (all arms, in meters) : 625

Land Use Map around Jaspal Kaur Public School and School Zone Data (AY 22-23)

Situated at the Gyan Shakti Mandir Marg and Som Bazar Road, the Jaspal Kaur Public School (JKPS) is the pilot safe school site in the North West district. With a cluster of 4 schools, the site was identified as a potential crash location as per the Action to Data report 2022-23. The school is surrounded in the vicinity of Shalimar Bagh and Godaipur, making the land use predominantly residential in nature with small shops and other schools. The school has a total of four gates. Gate no. 1, 2, and 3 opens at the Som bazar road and gate no. 4 opens at the Gyan shakti mandir marg. Currently, only gate no.1 and gate no.4 are used during the entry and exit hours. JKPS is a co-ed school with a total enrolment of 2404 students from class Nursery to XII (age 5 to age 17). With a wing distribution of 48.8% in junior, 22.3% in secondary and 29% in senior secondary, the school thus has children from age 5 to 17 travelling to and from school. The larger modes of transport observed in the school surroundings are walk, iPT, buses, cars, and vans.

B.5.3 : EXISTING SCENARIO

As per a travel survey conducted in Dec 22, response from 196 students (8% of total school population) was mapped to understand travel patterns and socio-emotional data relevant to school journeys.

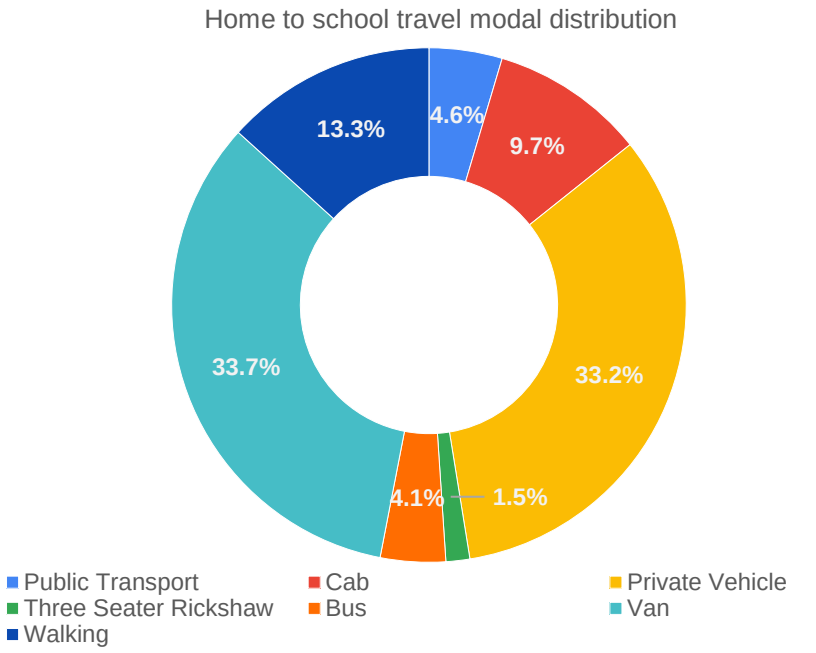


Figure 24: Home to school travel modal distribution: Jaspal Kaur Public School

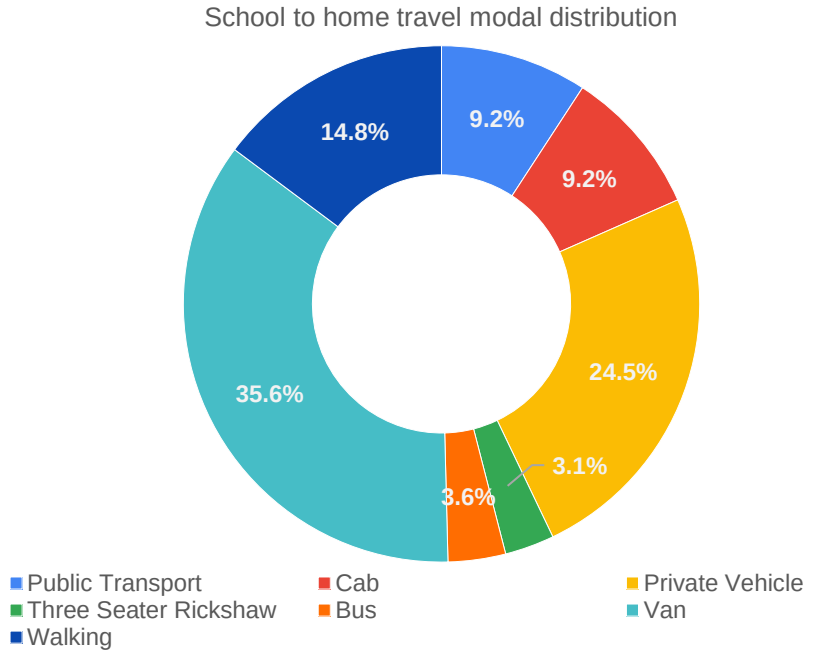


Figure 25: School to home travel modal distribution: Jaspal Kaur Public School

Source: HumanQind School Travel Survey 2022-2023

- Private vehicles and school van are the most common modes of travel both in the morning and the afternoon.
- Although the number of private vehicles decreased slightly in the afternoon.
- Around 14% of the students walked to and back from school.
- And 9.5% of them used cabs. Public transport use is very low in the morning < 5% although it increases to 9% in the afternoon. Very few of the students who responded travel by school buses

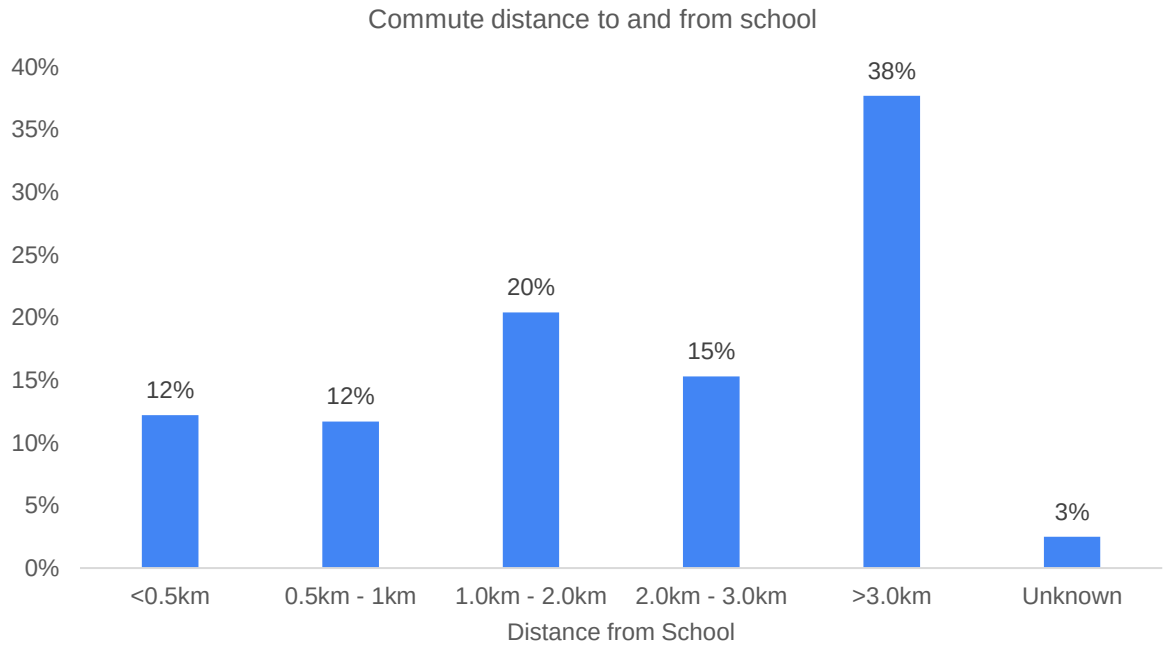


Figure 26: Commute distance to and from school

Figure 3 - Distance from School (Source: HumanQind School Travel Survey 22-23)

- 24% of the students live within 1 km of the school.
- More than half the students live more than 2km away from the school.
- 90% of the students stay within 8km of the school.
- As noted above very few students walk to school and none of them cycle. There might be a scope to improve an active mode of travel.
- Since students come from larger distances, we need to ensure a safe travel to and from the school by making all routes and roads they access as safer. Safe street designs must be implemented on the major routes which they take.

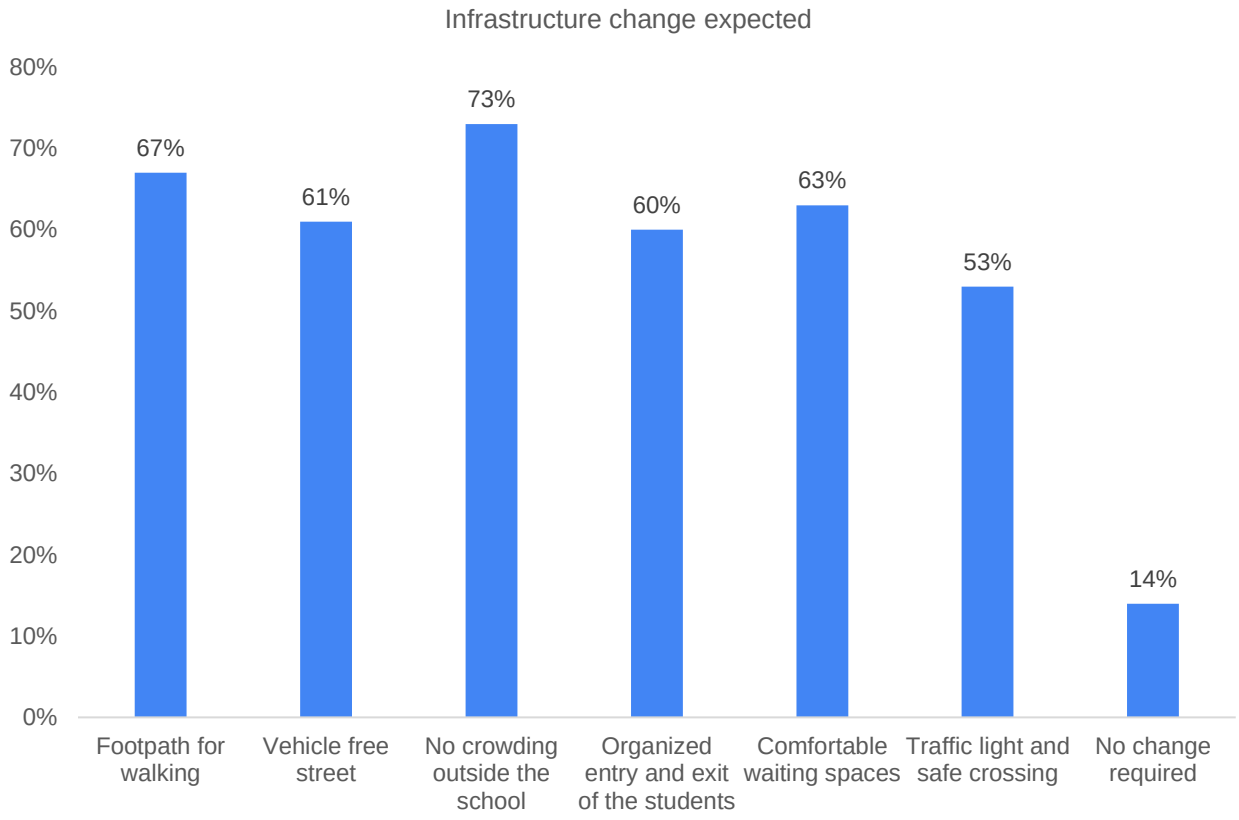


Figure 27: Experience of fear during school travel and Infrastructure change expected

Source: **HumanQind School Travel Survey 2022-2023**

- Half of the students feel unsafe during their trip to school.
- Gender wise distribution of this is also very similar with the male students reporting marginally less fear compared to girls.
- Students felt the safest in private vehicles.
- Students travelling in vans and autorickshaws felt the most unsafe in the morning.
- In the afternoon no student responded to the fear while using vans and only half of them responded as feeling unsafe for autorickshaws.
- Many students felt unsafe while walking 50% in the morning and 38% in the afternoon.
- Students travelling in public transport also reported some fear although much less in the afternoon trip.

- Many of these numbers maybe misleading due to low data collection and might change with an extensive data collection.

Infrastructure Interventions and its Impact on Social and Emotional Learning

When asked what infrastructural changes both in the school surroundings and their travel routes will have a positive impact on them. 73% of students preferred no crowding outside the school 67% suggested a footpath for walking will be beneficial to them. There are also a significant number of students who opted for comfortable waiting spaces, vehicle-free streets and organised entry and exit outside the schools (63%, 61% and 60% respectively). Infrastructure not only provides a change in the environment but also serves a psychological purpose of providing safety and comfort which affects the sense of belonging and emotions around a public space. (Source: HumanQind School Travel Survey 22-23)

Infrastructure Interventions and Academic Performance

The students were also surveyed about what are the factors they believe with enhance their learning and academic performance. 75% of students reported lesser noise outside the classroom and school. Noise is a major factor in learning and concentration and can have an impact on the attention process. 56% of students also reported the availability of school transport, public transport near the school (51%) and lesser travel time (52%). Long and cumbersome commutes to school can hamper the readiness for learning and the exhaustion of learning. (Source: HumanQind School Travel Survey 22-23)

B.5.4 : ISSUES IDENTIFIED

Observations on Road Infrastructure: Due to the traditional vehicle centric planning approach, the road infrastructure does not adhere to safety principles as per IRCs. This leads to an unsafe environment for the vulnerable road users. There have been observations about high speeding and wrong side driving because of the lack of any traffic calming devices, signages and marking conducive to school zones. With that, there is lack of provision in the pedestrian and cyclist infrastructure though a good number of students commute to school and back home by walk and cycle. Some additional infrastructure issues with high demand value includes, lack of dedicated parking zones, waiting areas, dedicated drop off and pick off areas and vendor/hawkers' zone within the school zone and better planning of utilities.

Site Photographs: Jaspal Kaur Public School

Type and Quality of Enforcement

Lack of traffic personnel in the school vicinity leads to an uncontrolled environment and circumstances. Over speeding and wrong side driving is observed to be a common phenomenon. Especially during the active school hours, this results in conflict with vulnerable road users.

Road Users Behaviour and mobility patterns

To understand the regular patterns of movements and conflicts in the school vicinity, HumanQind conducted activity mapping during the active school hours for Jaspal Kaur Public school. Observations were made twice in a day. First, for the morning hours i.e. to derive Home to school patterns of students. Second, in the afternoon hours i.e. to derive school to home patterns of students

B.5.5 : ACTIVITY MAP

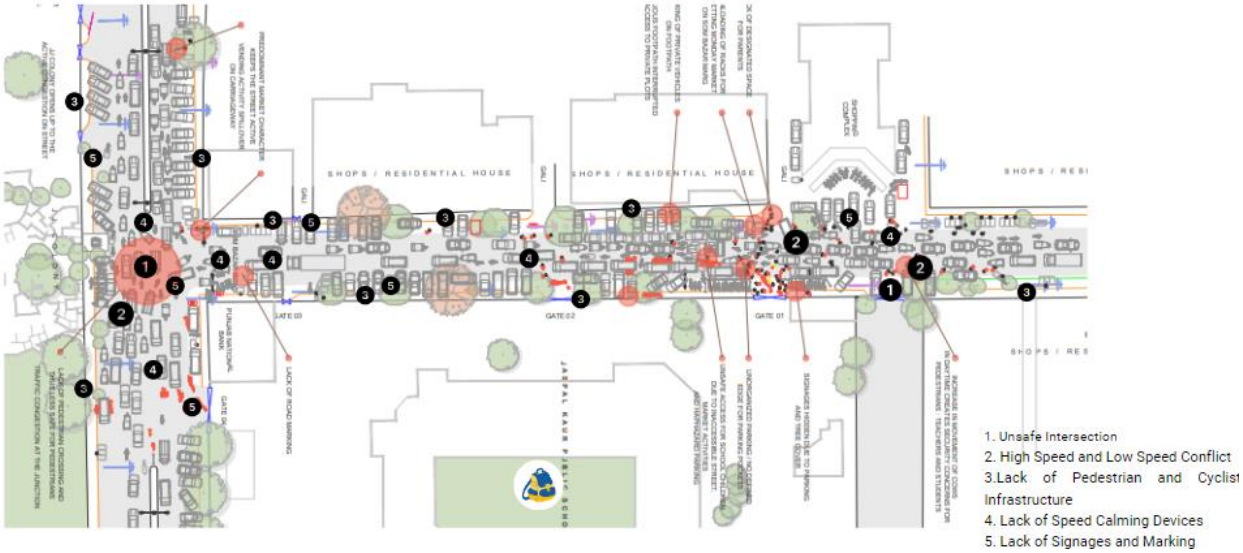


Figure 5 - Activity Mapping

Key Findings:

Morning: Home to School	**Afternoon: School to Home**
• There is overcrowding of vans and e-rickshaws near main gate 01. Students find it difficult to navigate their way to the school gate. • Private vehicles are parked on footpaths making it inaccessible to the students and parents who walk to school. Pedestrians and children as young as 5 walk on the carriageway with high-speed traffic. • Parents and caregivers are observed standing due to lack of waiting spaces near the school gate. Parents with two wheelers also park their bikes very close to the school gate for the same reason. • There is a clear conflict between the high and low speed vulnerable users on the street near the school.	• In the afternoon hours of school, the conflict points relatively increase with the increase in general traffic on the road. • The vans and e-rickshaw due to no pick-up points are scattered on the carriageway. Students find it difficult to navigate through them and some students have also mentioned that they tend to get late and miss their vans because of overcrowding and congestion at the school gate. • Due to encroachment and parking on footpaths, the students walking often spill over at the carriage way, and thus it becomes difficult for them to navigate through high speed and wrong side driving traffic.

B.5.6 : PROPOSED DESIGN

The School Zone plan addressed by school road safety clubs is titled 'Happy School Zone' strictly adheres to IRC guidelines and principles of traffic safety and management around schools. The design takes into consideration some of the specific problems and challenges identified together. Students embrace a slow zone, promote walkability, extend limits to the intersection, propose an integrated plan with public transport and incorporate their visible needs. The proposed design covers 625 m length of streets and adheres to 20km/h or lower in the school zone promoting walkability and designated spaces for parking to avoid conflicts. The area in front of gates including the intersection of Gyan Bharti Marg and Som Bazar Road have been made safer with surface texture change and wide prominent crossings for all road users.

Figure 6 - School Road Safety Club design safety interventions for school zone

Advantages of the new design

Designed with students, the proposed design prioritises the needs of the students and vulnerable users and incorporates efficient sharing of streets for all. It includes the following:

- Provision of pedestrian infrastructure as per IRC 103
- Provision of cyclist infrastructure as per IRC 11
- Provision of traffic calming devices
- Provision of Signages and Markings conducive to school zone requirements.
- Provision of waiting areas and dedicated vendor zones
- Better planning of utilities, and street furniture
- Student friendly street elements and details
- Reduction of Conflict Area: Segregated and continuous footpaths have been provided along with texture change and raised crossings at intersections. Cycle lanes have been segregated using safety spring posts.
- Safer Junctions - Both the intersections are textured with provision of pedestrian crossing, signages and markings as per the school zone requirements
- Safe and efficient traffic movement - Provision of dedicated Motorised Vehicle lanes are incorporated with markings and signages to ensure safe and efficient traffic movement.
- Safe and accessible pedestrian movement- Dedicated pedestrian infrastructure all along the school stretch provided with required markings, signages and universal accessibility features.
- Discouraging non permitted movements: Som Bazar Set up conflicts with school disbursal timings. Staggering the two activities can help resolve conflicts and streamline. Active measures need to be taken up to curb wrong side driving.

- Safer speeds - In accordance to Design speed of 20kmph as per IRC 86:2018 and IRC SP 32

Figure 7 - Happy School Zone - Proposed Render of Som Bazar Road in front of Gate 1 of Jaspal Kaur Public School

Design Interventions

The proposal prepared by road safety clubs (Refer Safer Delhi through Road Safety Clubs) is called 'Happy School Zone' aligning to pedestrian first approach, traffic safety principles, UN Sustainable Development Goals and Ladder of Children Participation. Happy School Zone is an area plan connecting 3 schools and the neighbourhood to 625m of school zone development. The entire plan is in adherence to Indian Road Congress Guidelines. To reduce speeds and conflicts, the school zone has been designed as per 20km/h or lower speed, promoting walkability, safe mobility. Continuous footpaths with designated boarding areas and drop off zones have been proposed. All streets are collector streets and cycle lanes with bollards have been planned. The area in front of gates, including the intersection of Gyan Bharti Marg and Som Bazar Road have been made safer with Table top crossings, change of surface texture and prominent markings to highlight school zones for all road users.

- 2.5m segregated footpaths on both sides
- 0.75m of Multi-Utility Zone for Services such as lighting and drainage.
- Designated boarding areas and drop off zones near school gates
- Waiting spaces and Street furniture integrated
- 1.5m painted cycle lanes on both sides (segregated by spring post)
- School specific signage and marking
- Minor intersections converted to table top crossings with change of surface texture.
- Wide Pedestrian Crossings to accommodate three school traffic.
- Continuous carriageway (2 lanes each direction on Gyan Shakti Marg) and (one lane each direction on Som Bazar Road)

The plan proposes certain restrictions such as the Monday market on Som Bazar Road to initiate installation post school exit hours to avoid conflict. Staggering the two activities can help resolve conflicts and streamline movement. Active measures need to be taken up to curb wrong side driving.

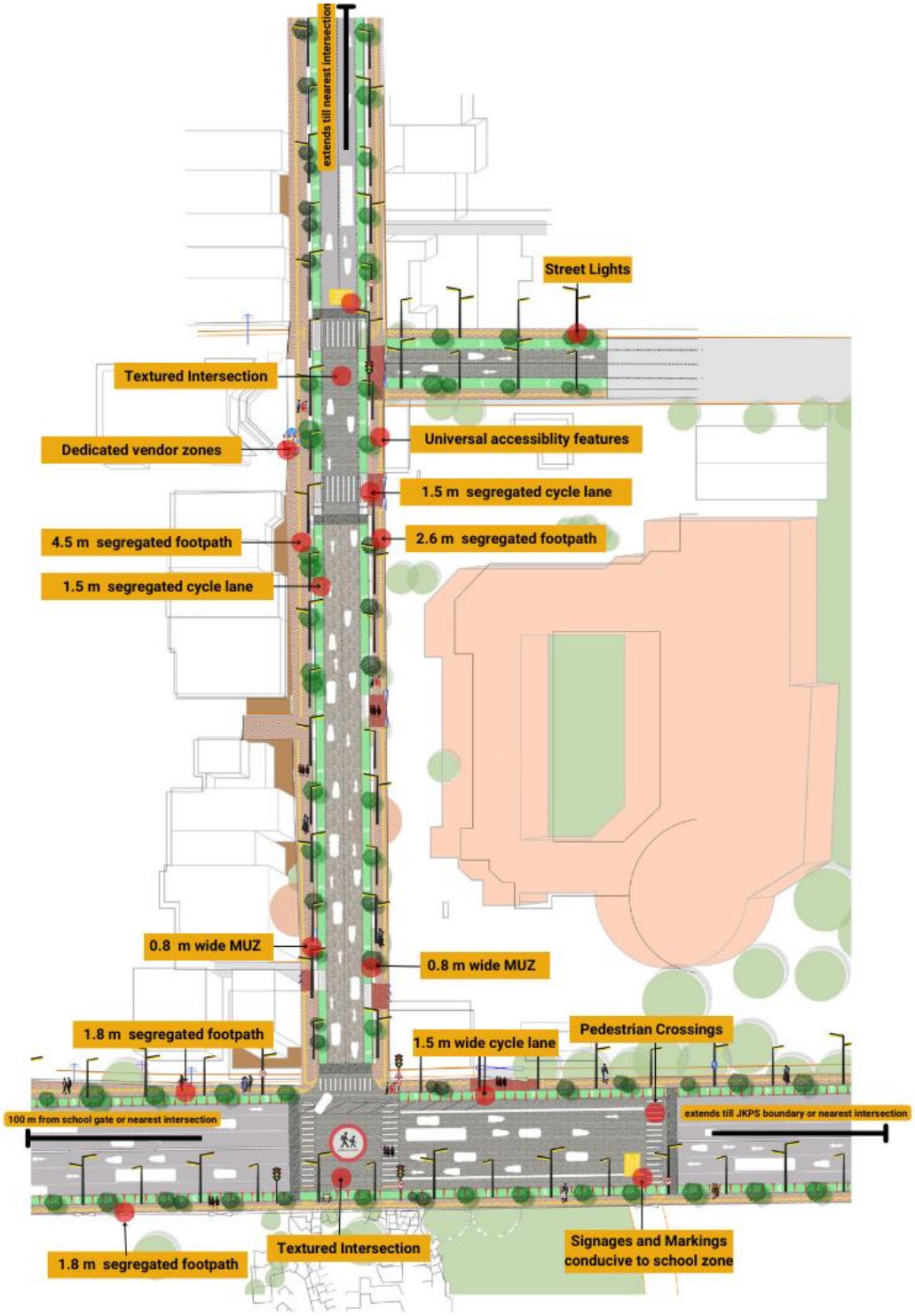


Figure 9- Proposed Design for School Zone Jaspal Kaur Public School, Shalimar Bagh

B.5.7 : SUMMARY BUDGET ESTIMATES

Total Length: 625m

Estimated Total Cost: **INR 4.752 Crores**

S.No	Component	Details	Notes	Rate (per sq.m)	Cost (INR)	Cost (INR, crores)
A	**CIVIL WORK**					
A.1	Footpath (Primary, Secondary including other Flooring area)	2.5m segregated footpath with tactile pavers in both directions	Providing and laying of footpath 2m to 3m wide, including earthwork and base layer - PCC, GSB and finishing material.	2929	9322396	0.932
A.2	Raised Crossing	Traffic calming in front of school gate 1, intersection of som bazar road and	Providing and laying Raised crossing with 80 mm thick pavers blocks, and DQ stone including Earth work and Base layers- PCC (M15), RCC (M30 Design mix) & GSB etc.	3635	7400277	0.740
A.3	Cycle Infrastructure	1.5m cycle lane both sides	Providing and laying cycle track (2.5mt wide segregated) including Earth work and Base layers- PCC (M15), RCC (M40 Design mix) & GSB etc. also thermoplastic paint for marking and cycle symbol and spring post etc	0	1676556	0.168
A.4	CC Items (Kerbs, Pipe, etc)	Provision of bollards, kerbs - mountable, kerb channels, etc	Providing and fixing Kerbs, Bollards, and Kerb Channel etc. in CC.		511773	0.051
A.5	Signages	Provision of signages as per IRC 67 for school zone & 20km/h	Providing and fixing Signage Mandatory, Cautionary and informatorily sign board		697166	0.070

S.No	Component	Details	Notes	Rate (per sq.m)	Cost (INR)	Cost (INR, crores)
			including all the fixing and labours etc.			
A.6	Marking	Provision of signages as per IRC 35 for school zone & 20km/h	Providing and applying road marking strips (retro- reflective) of specified shade/ colour using hot thermoplastic material for road marking.	1368	466635	0.047
A.7	Special Zones	Provision of seating areas, vendor spaces and play integrated with design proposal	Miscellaneous items- Provision of Sitting Bollards, CC Benches, GRC Jali, Pergola, Dustbin etc. complete items- including foundation and fixing etc.		112865	0.011
A.8	Brick Work	--	Brick work with common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 in foundation and plinth in: Cement mortar 1:4 (1 cement: 4 coarse sand)	7370.65/ CUM	191489	0.019
A.9	Steel Reinforncement for RCC work	--	Steel reinforcement (in per kg) for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete up to plinth level. Thermo-Mechanically Treated bars of grade Fe-500D or more	107.85/kg	407673	0.041
A.10	Pavement Surface Dressing	Pavement of Bitumen layer on existing road surface	Surface dressing on old surface with hot bitumen of grade VG - 10	175.10 / sq.m	0	0.000
A.11	Safety Management Equipment (as per design requirement)	Provision of Delineator Post, Spring Post, Cat eye/studs etc.	Miscellaneous items for Safety Management Equipment (as per design requirement) -Provision of Delineator Post, Spring Post, Cat eye/studs etc.-		0	0.000

S.No	Component	Details	Notes	Rate (per sq.m)	Cost (INR)	Cost (INR, crores)
			including foundation and fixing etc.			
A.12	Bus Shelter	--	Provision of new bus shelter.		0	
	SUB TOTAL CIVIL WORK (A)				**20786830**	2.079
B	Drainage, Irrigation & Plumbing	Details promote catch pit along the footpath linked to existing manholes. Bell mouths are not recommended. Details to be finalised with PWD	Drainage, Irrigation & Plumbing work @ 20% of the cost of Civil work	20%	**4157366**	0.416
C	Electrical Work	5m and 10m light poles have been located alongside footpath / MUZ. Details to be finalised with PWD.	Electrical work @25% of the cost of Civil work	25%	**5196707**	0.520
D	Horticulture Work	To increase green cover and shade, landscape plan to promote ground cover and trees for seasonal variation and colour. Irrigation plan to be finalised with PWD.	Horticulture work @ 15% of the cost of Civil work	15%	**3118024**	0.312
E	Dismantling / Demolition	--	Dismantling work @ 15% of the cost of Civil work	15%	**3118024**	0.312
F	Work Zone Safety & Management	--	Work zone Management @ 5% of the cost of Civil work	5%	**1039341**	0.104
PART 1	**SUB TOTAL PART 1 (A+B+C+D+E+F)**				**37416294**	3.742

S.No	Component	Details	Notes	Rate (per sq.m)	Cost (INR)	Cost (INR, crores)
G	Design Services & Support	--	Design Consultancy (Preparation of Drawings, BOQ support, Work Zone plan, Site Supervision, Community Engagement & Liason, Change Management @ 2% - 8% of the cost of Civil work.	**5%**	**1870815**	0.187
H	Survey Cost	--	Survey Cost (Total Station Survey, underground services, tree demarcation, girths, level differences, steps etc @ (80,000 per junction - 250m on each arm)	0	**0**	0.000
PART 2	**SUB TOTAL PART 2 (PART 1 + G +H)**				**39287108**	3.929
J	Contingencies '2.5%	--	Contingencies (@2.5%)		**982178**	0.098
I	GST('@18%)	--	GST @18%		**7248471**	0.725
FINAL	**GRAND TOTAL (PART 2 + J + I)**				**47517757**	**4.752**

Notes:

1. DSR 2023 has been followed for all rates. Market Rate and Costing from part PWD projects has been included for certain items. This is a preliminary estimate. Final costing to be evaluated & approved by road owning agency.
2. Cost of Drainage, Irrigation, Plumbing has been calculated at 20% of the civil work cost
3. Cost of Electrical Work can be calculated at 20% - 25 % of the civil work cost

4. Cost of Horticulture has been calculated at 15% of the civil work cost
5. Cost of Dismantling has been calculated at 15% of the civil work cost
6. Cost of Work Zone Management has been calculated at 5% of the civil work cost
7. Cost for Design Support can range from 2% - 8%, can vary from site to site. This should include Technical Assistance on drawings, 3D supports, Site Supervision, Change management
8. Bus Shelter has been calculated at 18 L per shelter; can be changed as per design specific cost
9. In case of new items specific to design, please add relevant rows in detail budget estimation and include the same in the budget summary under relevant head.

B.5.8 : DETAILED BUDGET ESTIMATE

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
1	Footpath (Primary, Secondary including other Flooring area)							
1.1	Excavation	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in charge.	2.6.1	cum	0.85	3182.8	177.5	480204.95
1.2	Construction of granular sub-base	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	16.78.2, pg no. 258	cum	0.15	3182.8	2924.85	1396381.887
1.3	Providing and laying in position cement concrete (M15)	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level :1:2:4 (1 Cement : 2 coarse sand (zone-III) derived from natural sources : 4 graded stone aggregate 40 mm nominal size derived from natural sources)	4.1.4, pg no. 103	cum	0.1	3182.8	7780.3	2476313.884

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
1.4	Tactile - Warner (300 x 300 x 9.8 mm) (20% of total tactile quantity)	Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8 mm having with water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20 mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.	16.90, pg no. 261	sqm		73.56	2017.6	148414.656
1.5	Tactile - Guiding (300 x 300 x 9.8mm) (80% of total tactile quantity)	Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8 mm having with water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20 mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.	16.90, pg no. 261	sqm		367.8	2017.6	742073.28
1.6	Flamed Finish Granite (approved size & color) (18mm thick)	Providing and laying flamed finish Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and	11.55 pg no 198	sqm		30	3186.7	95601

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
		as directed by the Engineer-in-Charge :Flamed finish granite stone slab Jet Black, Cherry Red, Elite Brown, Cat Eye or equivalent.						
1.7	Polished Granite	Providing and laying Polished Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge. Polished Granite stone slab colour of Black, Cherry/Ruby Red or equivalent	11.56.1, Pg no 198	sqm		20	4481.3	89626

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
1.8	Interlocking Paver Blocks (approved size & color) (60mm thick)	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50 mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge: 60 mm thick cement concrete paver block of M-35 grade with approved colour, design & pattern.	16.91.1, pg no. 261	sqm	0.6	2890.2	1045.65	3022137.63
1.9	Glass Mosaic (20mm x 20mm x 4mm)	Providing and fixing Glass mosaic tiles on finished plain wall surface of size 20 mm x 20 mm x 4 mm in all colour, design, fixing in customize design as per direction of Engineer-in- Charge. The glass mosaic tiles to be fixed on the wall surface with the help of approved adhesive applied at the rate of 2.5 kg per sqm and grouting of the same. The rate is inclusive of all operation, material and required pattern approved by Engineer-in-Charge:	11.53 pg no 197	sqm		10	3891.15	38911.5

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
1.10	Crazy Marble Stone (18 mm thick)	Crazy marble stone flooring, including filling the gaps with light shade pigment with white cement marble powder mixture (3 parts of white cement: 1 part of marble powder) by weight in proportion of 4:7 (4 cement marble powder mix : 7 white, black or white and black marble chips of sizes from 1 mm to 4 mm nominal size by volume), with under layer 25 mm thick cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 12.5 mm nominal size), including rubbing, polishing and cement slurry etc. complete : 18 mm thick crazy marble stone white, black or as specified	As per NIT DAV Pedestrianization	sqm		0	948.85	0
1.11	Crazy Vitrified Tiles (100x100x16mm)	Providing and laying matt finished vitrified tile of size 100x100x16mm having water absorption less than 0.5% and conforming to IS: 15622 of approved make in all colours and shades in outdoor floors such as footpath, court yard multi models etc., laid on 20mm thick base of cement mortar 1:4 (1cement: 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as direction of Engineer-in-Charge.	As per NIT DAV Pedestrianization	sqm		0	842.95	0
1.12	Delhi Quartzite (MUZ) (10x10x7.50)	Providing and fixing 10x10x7.50 cm Granite stone block hand cut and chisel dressed on top, for paving in floors, drains etc. laid over 20 mm thick base mortar 1:4 (1 cement: 4 coarse sand) with joints 10 mm wide filled with same mortar including ruled pointing etc. complete as per direction of engineer-in-charge.	16.92 pg no 261	sqm		366.7	2189.15	802761.305

S. No	Component	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
1.13	EPDM Flooring	Providing and fixing 36 MM thick Ethylene Propylene Diene Monomer (EPDM) [30 MM SBR (Styrene- Butadiene or Styrene-butadiene Rubber) & 6 MM EPDM] safety FLOORING with the help of BASF Glue 18 adhesive for children play area complete all as per manufacturer's specification and direction of Engineer- in-charge.	As per AR (Market Rate)	Sqm		8	3746.2	29969.6
	SUB TOTAL							9322395.692

2	Raised Crossing	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
2.1	Excavation	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in charge.	2.6.1	cum	0.325	2035.6	177.5	117428.675

2	Raised Crossing	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
2.2	Construction of granular sub-base	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	16.78.2, pg no. 258	cum	0.1	2035.6	2924.85	595382.466
2.3	Providing and laying in position cement concrete (M15)	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level: 1:2:4 (1 Cement: 2 coarse sand (zone-III) derived from natural sources: 4 graded stone aggregate 40 mm nominal size derived from natural sources)	4.1.4, pg no. 103	cum	0.1	2035.6	7780.3	1583757.868
2.4	Providing and laying in position cement concrete (M25, Design Mix)	Providing and laying in position ready mixed or site batched design mix cement concrete for plain cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana/Ordinary Portland /Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering and finishing as per direction of the engineer-in-charge; for the following grades of concrete. Note: Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the minimum	4.20.1.4, page 108	cum	0.125	2035.6	9439.05	2401766.273

2	Raised Crossing	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
		specified cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement. Concrete of M25 grade with minimum cement content of 300 kg /cum						
2.4	Interlocking Paver Block (Red & White of approved size) 80mm thick	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50 mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge: 80 mm thick C.C. paver block of M-35 grade with approved colour design and pattern.	16.91.2, pg no. 261	sqm		1557.34	1091.5	1699836.61

2	Raised Crossing	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
2.5	Delhi Quartzite 10x10x7.50	Providing and fixing 10x10x7.50 cm Granite stone block hand cut and chisel dressed on top, for paving in floors, drains etc. laid over 20 mm thick base mortar 1:4 (1 cement: 4 coarse sand) with joints 10 mm wide filled with same mortar including ruled pointing etc. complete as per direction of engineer-in-charge.	16.92 pg no 261	sqm		457.76	2189.15	1002105.304
	SUB TOTAL							7400277.196

3	Cycle Infrastructure	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
3.1	Excavation	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in charge.	2.6.1	cum	0.4	0	177.5	0
3.2	Construction of granular sub-base	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	16.78.2, pg no. 258	cum	0.15	0	2924.85	0

3	Cycle Infrastructure	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
3.3	Providing and laying in position cement concrete (M15)	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:2:4 (1 Cement : 2 coarse sand (zone-III) derived from natural sources : 4 graded stone aggregate 40 mm nominal size derived from natural sources)	4.1.4, pg no. 103	cum	0.1	0	7780.3	0
3.4	Providing and laying in position cement concrete (M40, Design Mix)	Providing and laying in position ready mixed or site batched design mix cement concrete for reinforced cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana / Ordinary Portland /Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering, finishing and reinforcement as per direction of the engineer-in-charge; for the following grades of concrete. Note: Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the specified minimum cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement: Concrete of M40 grade with minimum cement content of 390 kg/cum	5.33.1.4, page 120	cum	0.15	0	9957.65	0

3	Cycle Infrastructure	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
3.5	Thermoplastic Paint Marking (Cycle Track - Grey Colour; Cycle Box (Green); Cycle Lane, Edge Marking)	Providing and applying 2.5 mm thick road marking strips (retro-reflective) of specified shade/ colour using hot thermoplastic material by fully/ semi-automatic thermoplastic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator on road surface including cost of material, labour, T&P, cleaning the road surface of all dirt, seals, oil, grease and foreign material etc. complete as per direction of Engineer-in-charge and accordance with applicable specifications.	16.62, pg no. 257	sq.m		2115.48	747.8	1581955.944
3.6	Cycle Symbol (On green box)	Providing and applying cycle symbol using thermoplastic paint as per IRC 35:2018 in cycle box at location specified	Market Rate	No.s		86	1100	94600
3.7	Spring Post (80mm dia 750mm high Plastic)	Providing and applying Plastic spring post 80mm dia 750mm high at location specified	Market Rate	No.s		400	350	140000
	SUB TOTAL							1676555.944

4	CC Items (Kerbs, Pipe, etc)	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
4.1	Excavation	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead up to 50 m and lift up to 1.5 m, as directed by Engineer-in charge.	2.6.1	cum	0.45	244.8	177.5	19553.4
4.2	Construction of granular sub-base	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge. With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	16.78.2, pg no. 258	cum	0.1	244.8	2924.85	71600.328
4.3	Dotted kerb stone of approved pattern of M-25 grade cement concrete (0.15x3xL)	Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5 mm), including making drainage opening wherever required complete etc. as per direction of Engineering-charge (length of finished kerb edging shall be measured to calculate volume for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge)	16.69, pg no. 313	cum	0.1	244.8	10117.6	247678.848

4	CC Items (Kerbs, Pipe, etc)	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
4.4	Bollards (600mm 120mm dia) (Preferred size: 950mm high 150mm dia)	Precasting and placing in position 125 mm dia Bollards 600 mm high of required shape including providing M.S. Pipe Sleeve 50 mm dia 300 mm long in the Bollard and M.S. Pipes 40 mm dia and 450mm long with 150x150x6mm M.S. plate welded at bottom and embedded 150mm in cement concrete 1:3:6 (1 Cement : 3 coarse sand (zone-III) derived from natural sources : 6 graded stone aggregate 20 mm nominal size derived from natural sources), including necessary excavation of size 250x250x450mm deep for the same in bitumen/concrete pavement at specified spacing	4.9, pg no. 106	No.s		30	929.8	27894
4.5	Kerb Channel (L*0.3)	Providing, laying and making kerb channel 30 cm wide and 50 mm thick with cement concrete 1:3:6 (1 cement: 3 coarse sands:6 graded stone aggregate 20 mm nominal size) over 75 mm bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including finishing the top smooth etc. complete and as per direction of Engineer-in-charge.	16.63, pg no. 257	sqm		259.8	558.3	145046.34
	SUB TOTAL							511772.916

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
5.1	Mandatory sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm on arterial - sub arterial roads	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.: Mandatory/ Regulatory sign boards of 900 mm diameter with support length of 3750 mm	16.59.1	No.s		7	7183.35	50283.45

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
5.2	Cautionary / warning sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm on arterial - sub arterial roads	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.:: Cautionary /warning sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm	16.59.2	No.s		14	5559.75	77836.5

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
5.3	Informatory sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm on arterial - sub arterial roads	Manufacturing, supplying and fixing retro reflective overhead signage boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity and encapsulated lens type heat activated retro reflective sheeting conforming to type - III of ASTM-D-4956-01 as approved by Engineer-in-charge, letters, borders etc. as per IRC : 67-2001 in silver white with blue colour back ground and with high intensity grade, pasted on substrate by pressure sensitive adhesive backing which shall be activated by applying pressure conforming to class II of ASTM-D-4956-01 and fixing the same to the plate of structural frame work by means of suitable sized aluminium alloys, rivets or bolts & nuts @ 300 mm centre to centre all along the periphery as well as in two vertical rows along with theft resistant measures, including the cost of painting with two or more coats of epoxy paint in grey colour on the back side of aluminium sheet including appropriate priming coat. The rate includes the cost of rounding off the corners, lowering down the structural frame work from the gantry, fixing and erecting the same in position all complete as per drawings, specification and direction of the engineer-in-charge.(Structural frame work including M.S. plate to be provided separately. Rectangular area of the sheet only shall be measured for payment). Overhead informatory road signage	16.60.1	No.s		7	5879.9	41159.3

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
5.4	Mandatory sign boards of equilateral triangular shape having each side of 600 mm or lower with support length of 3650 mm on distributory roads (MARKET RATE)	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.: Mandatory/ Regulatory sign boards of 900 mm diameter with support length of 3750 mm	16.59.1 (Market Rate)	No.s		35	7183.35	251417.25

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
5.5	Cautionary / Warning sign boards of equilateral triangular shape having each side of 600 mm or lower with support length of 3650 mm on distributary roads (MARKET RATE)	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand & manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.:: Cautionary /warning sign boards of equilateral triangular shape having each side of 900 mm with support length of 3650 mm	16.59.2 (Market Rate)	No.s		18	5550.75	99913.5

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
5.6	Informatory sign boards of equilateral triangular shape having each side of 600 mm or lower with support length of 3650 mm on distributary roads (MARKET RATE)	Manufacturing, supplying and fixing retro reflective overhead signage boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity and encapsulated lens type heat activated retro reflective sheeting conforming to type - III of ASTM-D-4956-01 as approved by Engineer-in-charge, letters, borders etc. as per IRC : 67-2001 in silver white with blue colour back ground and with high intensity grade, pasted on substrate by pressure sensitive adhesive backing which shall be activated by applying pressure conforming to class II of ASTM-D-4956-01 and fixing the same to the plate of structural frame work by means of suitable sized aluminium alloys, rivets or bolts & nuts @ 300 mm centre to centre all along the periphery as well as in two vertical rows along with theft resistant measures, including the cost of painting with two or more coats of epoxy paint in grey colour on the back side of aluminium sheet including appropriate priming coat. The rate includes the cost of rounding off the corners, lowering down the structural frame work from the gantry, fixing and erecting the same in position all complete as per drawings, specification and direction of the engineer-in-charge. (Structural frame work including M.S. plate to be provided separately. Rectangular area of the sheet only shall be measured for payment). Overhead informatory road signage	16.60.1 (Market Rate)	No.s		13	5879.9	76438.7

5.7	Informatory sign - Road Signages, Road Names	Providing, installing and fixing with necessary clamps etc. retro-reflective Single Sided shoulder / gantry / cantilever mounted signboards comprising of customized modular PU Epoxy Coated. MS Tube frame work, aluminium composite panel (ACP) (both side of frame) mill finished or PVDF coated or as specified as base board, micro prismatic retro-reflective sheet and electro- cut coloured overlay film. The horizontal and vertical members of the MS frame module shall be made of MS tube 50x50x3.6mm thick as per approved drawing and each panel shall be braced diagonally (one way only) with same section. The aluminium composite panel (ACP) shall have a thickness of 4mm which including 0.5 mm thick skin of aluminium on both sides. The ACP shall be routed, folded and fixed on the MS frame with VHB tape 24mm wide and 2.3 mm thick provided throughout the length and breadth of the frame including riveting at the right-angle face of the frame with pop riveting or with self-taping SS screws 5mm dia spaced not more than 300mm centre to centre on both side of frame ensuring that no riveting is seen on either face of the frame. On the front face of the ACP, micro prismatic retro- reflective sheet conforming to Type-XI of ASTM: D 4956-09 shall be pressure fixed as background sheet (In white colour) which will be digitally printed matter, border & symbol etc with 15 years warranty and having clear film for UV protection (the reflective value should be as per IRC 67 when tested) of approved make and colour to create a desired road sign and information message. The rear side of the MS frame shall be covered with balancing ACP sheet of the same description as mentioned above and shall be fixed in similar manner as described above. The edges of the board shall be covered all-round with powder coated die cast extruded aluminium channel of required colour and shade of size 68x12x2mm. The channel shall be fixed using two rows of double sided VHB tape of above description. The channel shall further be secured by pop rivets having SS screws of 5mm dia at junctions and corners. The rate shall include all materials, labour, equipment, fabrication, transportation, erection, installation and incidental charges all complete as per direction of the Engineer-in- Charge. Only front area of the board shall be measured for payment. (All Structural steel work shall be paid separately under the relevant agreement item, except MS tube	As per AR (Market Rate)	Sq.m		6	16686.2	100117.2

		frame work and fixing arrangement with clamps for the sign boards with are included in this item).						

5	Signages	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
	SUB TOTAL							697165.9

6	Marking	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
6.1	Thermoplastic Paint Marking (Edge lines, Centre Line, Lane Marking, Hazard Marking, Chevron, Zebra Crossing, Bar Marking, etc)	Providing and applying 2.5 mm thick road marking strips (retro-reflective) of specified shade/ colour using hot thermoplastic material by fully/ semi-automatic thermoplastic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator on road surface including cost of material, labour, T&P, cleaning the road surface of all dirt, seals, oil, grease and foreign material etc. complete as per direction of Engineer-in-charge and accordance with applicable specifications.	16.62, pg no. 257	sq.m		341	747.8	254999.8
6.2	Epoxy paint (concrete bollards, kerbs) (Reference: For Segment Length 250m - Qty =150sq.m)	Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete: On concrete work	13.52, pg no. 221	sqm		900	235.15	211635
6.3	Synthetic Enamel Paint	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade : Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture	13.62.1, pg no. 222	sqm		0	226.25	0

6	Marking	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
	SUB TOTAL							466634.8

7	Special Zones	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
7.1	Seating Bollards (450mm dia, 400mm high)	Providing & Fixing Position precast reinforced cement concrete cylindrical bollard cum stool of size 400mm top dia, 300mm bottom dia, 475mm overall height, 150mm stem height and concrete grade M-30 as per approved design/drawing. The bollard shall be fixed in C.C. block mix 1:2:4 (1 Cement: 2 coarse sands: 4 graded stone aggregate 20mm nominal size) 300 mm dia and 150 mm deep including earth work in excavation, painting etc. complete as per direction and instruction of Engineer-in-Charge.	As per AR (Market Rate)	No		10	4258.98	42589.8

7	Special Zones	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
7.2	Benches (CC benches)	Providing and placing of precast RCC benches (chair bench with back Rest) using m-30 grade of concrete consisting of 2 no. L-shaped base support of thickness 100 mm having Back height 1000mm, front height 450mm and Base width 620mm having 5 No. of RCC planks 1500x100x50 mm and one number plank of size 1500x200x50mm in the approved colour and shade. The minimum weight of MS reinforcement bar in the base support will be 3.40 kg having 4 nos. 8mm dia M.S. Bar distributed alone the section and periphery of the legs with sufficient No. of 4mm dia MS stirrups. Each base support will have 3 nos. 12mm dia (2 Nos. 40mm and one number 65 mm long) galvanized coupling nuts welded suitably to the main reinforcement at appropriate locations so as to receive bolts for fixing of seats of concrete planks on base support and 3 holes to received carriage bolts for fixing back rest planks. The minimum weight of MS reinforcement bar in the plank of 200mm wide will be 4.4kg and of 100mm wide 2.90kg. All the RCC planks will have 2 holes of 14mm dia at appropriate location, so as to receive 12mm dia galvanized bolts for fixing on the base support. One of the planks of size 1500x100x50mm shall be engraved in the centre at the back with letter PWD, 2 plank of size 1500x100x50mm will be bolted to coupling nuts provided in the base support on both sides with 2 numbers of 12mm dia and 65mm long galvanized steel CSR bolt and one Eva washer for each bolt to form a seat 3 planks of size 1500x100x50mm will be bolted to coupling nuts provided in both the base support to form back rest with 6nos. (Two nos. in each plank) half threaded carriage bolts and nuts of size 165mm long and 8mm dia with Eva and steel washers. The holes visible at the back side of the bench will be sealed with cement mortar after assembling sides edges of all the planks shall be painted with acrylic base paint of approved colour and shade and front portion of seating and back rest planks shall be	As per AR (Market Rate)	No		8	5829	46632

7	Special Zones	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
		polished to given glossy finish complete as per direction of Engineer-in-charge						

7	Special Zones	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
7.3	GRC Jali	Providing and fixing Uni-Stone make or equivalent Glass Reinforced Concrete (G.R.C.) Screens casted with Spray Mix concrete design in approved size, Patten, thickness of 50mm on the outer Boarder & 25-30mm for internal member and shade. The Screens should be made from 53 grade White Portland Cement manufactured by JK Cement or Birla White, White Quartz fine graded sieved silica Sand, Alkali Resistant Glass Fibre Manufactured by NEG Japan, Owen Corning Saint Gobain or equivalent, Super Plasticizers manufactured by Karochem or equivalent, polymers manufactured by Nova Polychem or equivalent and U.V. resistant Synthetic inorganic pigments should be used for pigmentation manufactured by Phenochem industries or equivalent. The Screens casting shall take place with layering methodology using Direct Power Spray machines. The GRC Screens flexural strength average L.O.P. should be above or equivalent to 6 N/mm2 & M.O.R. Should be above or equivalent to 15 N/mm2 for tests done on 28 days cured samples. The fixing of Screens should be done using Dry fixing method onto structural support members i.e., R.C.C., Brick work, MS Framework. SS/MS Galvanized Clamps & Pins fasteners to be used of Worth, Hilti & Fischer or equivalent. All cast in Socket to be Epoxy primer Coated. Electrodes to be used of Advani, Mangalam, Esab or Victor brand or equivalent, all as per manufacturer's specification and direction of Engineer- in-charge. Vendor shall submit shop drawings of same, the drawings to be duly approved from Engineer-in- charge at site.	As per AR (Market Rate)	Sqm		0	8190.85	0
7.4	EPDM Flooring	Providing and fixing 36 MM thick Ethylene Propylene Diene Monomer (EPDM) [30 MM SBR (Styrene- Butadiene or Styrene-butadiene Rubber) & 6 MM EPDM] safety FLOORING with the help of BASF Glue 18 adhesive for children play area complete all as per manufacturer's specification and direction of Engineer- in-charge.	As per AR (Market Rate)	Sqm		0	3746.2	0

7	Special Zones	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
7.5	Exposed Brick Masonry (Seater with exp including putty, plaster, earth work, including foundation with steel for RCC etc)	Brick work with common burnt clay selected F.P.S. (non-modular) bricks of class designation 7.5 in exposed brick work including making horizontal and vertical grooves 10 mm wide 12 mm deep complete in cement mortar 1:6 (1 cement: 6 coarse sand): Above plinth level up to floor V level	6.26.2, pg no. 129	cum		0	9439.75	0
7.6	Street Art Wall (wall putty)	Providing and applying plaster of paris putty of 2 mm thickness over plastered surface to prepare the surface even and smooth complete.	13.26, pg no. 218	Sqm		90	262.7	23643
7.7	Street Art Wall (exterior paint, etc)	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade: New work (Two or more coats applied @ 1.43 ltr/10 sqm over and including priming coat of exterior primer applied @ 0.90 litre/10 sqm)	13.47.1, pg. no. 220	Sq.m		90	171.1	15399
7.8	Metal Pergola	Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete. Hot finished welded type tubes.	As per AR (Market Rate)	kg		300	90.25	27075
7.9	Polycarbonate sheet		As per AR (Market Rate)	Sq.m		8	1300	10400
7.10	CNC metal cut column / marker		As per AR (Market Rate)	sq.m		0	3000	0

7	Special Zones	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
7.11	Play / Gym Equipment	Providing designing and fixing play equipment as per size, shape and material s per design. All complete as per direction and approval of engineer-in-charge regarding material, shape of equipment, colour on metal, fixing of equipment etc (the cement concrete and excavation work shall be paid separately)	As per AR (Market Rate)	lump sum		1	40000	40000
7.12	Dustbin		As per AR (Market Rate)	No		35	10000	350000
7.13	Sculpture		As per AR (Market Rate)	lump sum		0		0
	SUB TOTAL							112864.8

8	Brick Work	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
8.1	Brick Work (1 cum for 1m)	Brick work with common burnt clay F.P.S. (non-modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in:	6.1.1 pg no. 127	cum	0.1	259.8	7370.65	191489.487
	SUB TOTAL							191489.487

9	Steel Reinforcement for RCC work	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
9.1	Thermo-Mechanically Treated bars of grade Fe-500D or more	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete up to plinth level.:	5.22.6, pg no.	kg		3780	107.85	407673
	SUB TOTAL							407673

10	Pavement Surface Dressing	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
10.1	Bituminous- Top Layer	Surface dressing on old surface with hot bitumen of grade VG - 10 of approved quality using 1.95 kg of bitumen per sqm with 1.50 cum of stone chippings 11.2 mm nominal size per 100 sqm of road surface, including consolidation with road roller of 6 to 8 tonne capacity, etc. complete.	16.27 Page 249	sqm		0	175.1	0
	SUB TOTAL							0

11	Safety Management Equipment (as per design requirement)	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
11.1	Delineator	Providing and fixing post delineators made of ABS round body fitted with 2 nos 100 mm dia high reflective reflectors and mounted on MS pipe of 65 mm dia duly powder coated anti-rust and anti-theft steel to be installed as per direction of Engineer-in-charge	16.65, Page 257	No		0	904.2	0
11.2	Spring Post (80mm dia 750mm high Plastic)	Providing and applying Plastic spring post 80mm dia 750mm high at location specified	As per AR (Market Rate)	No			350	0
11.3	Road Studs/Cat eye	Providing and fixing Glow studs of size 100x20 mm made of heavy-duty body shall be moulded ASA (Acrylic styrene Acryloretrite) or HIP (High impact polystyrene) or ABS having electronically welded micro- prismatic lens with abrasion resistant coating as approved by Engineer in charge. The glow stud shall support a load of 13635 kg tested in accordance with ASTM D4280. The slope of retro- reflective surface shall be 35 (+/- 5) degrees to base. The reflective panels on both sides with at least 12 cm of reflective area up each side. The luminance intensity should be as per the specification and shall be tested as described in ASTM I: 809 as recommended in BS: 873 part 4: 1973. The studs shall be fixed to the Road surface using the adhesive conforming to IS, as per procedure recommended by the manufacturer complete and as per direction of Engineer-in-charge.	16.50, Pg no. 253	No		0	206.3	0
	SUB TOTAL							0

12	Bus Stops	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
12.1	Bus Shelter (10.5mX2.5m)	Stainless Steel Structure	As per AR (Market Rate)	No		0	1800000	0
	SUB TOTAL							0

13	New Item 01: Pedestrian Bridges (to be added in Summary Sheet)	Material Description	Item No. (DSR 2023 / Market Rate)	Unit	Depth (m)	Qty	Unit Rate	Amount
13.1	Steel Structure footbridge for pedestrians over the VUP	Stainless Steel Structure	As per AR (Market Rate)	No		0	4000000	0
	SUB TOTAL							0