



DELHI NORTH EAST DISTRICT ROAD SAFETY REPORT (DRAFT)

SUBMITTED TO:



TRANSPORT DEPARTMENT

Government of NCT of Delhi



TRANSPORT DEPARTMENT

Government of NCT of Delhi

Report by:



TRANSPORT DEPARTMENT

Government of NCT of Delhi

Data support by:



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LIST OF ABBREVIATIONS

- **GNCTD** Government of National Capital Territory of Delhi
- **DM** District Magistrate
- **DMRC** Delhi Metro Rail Corporation
- **DRSC** District Road Safety Committee
- **DTC** Delhi Transport Corporation
- **DTP** Delhi Traffic Police
- **FIR** First Information Report
- **FOB** Foot Over Bridge
- **GIS** Geographic Information System
- **GT** Grand Trunk
- **HV** Heavy Vehicle
- **IACP** International Association of Chiefs of Police
- **IIT** Indian Institute of Technology
- **IPC** Indian Penal Code
- **IRC** Indian Road Congress
- **iRAD** Integrated Road Accident Database
- **ISBT** Inter State Bus Terminal
- **KM** Kilometre
- **LMV** Light Motor Vehicle
- **MACT** Motor Accident Claims Tribunal
- **MCD** Municipal Corporation of Delhi
- **MoRTH** Ministry of Road Transport and Highways
- **MPD** Master Plan for Delhi
- **MTW** Motorised Two-Wheeler
- **NCR** National Capital Region
- **NCT** National Capital Territory

- **NGO** Non-Governmental Organisation
- **NH** National Highway
- **NHAI** National Highways Authority of India
- **NIC** National Informatics Centre
- **NSP** Netaji Subhash Place
- **PCR** Police Control Room
- **QGIS** Quantum Geographic Information System
- **RSLA** Road Safety Lead Agency
- **SKV** Sarvodaya Kanya Vidyalaya
- **SOP** Standard Operating Procedure
- **TRIPC** Transportation Research and Injury Prevention Centre
- **UT** Union Territory
- **WHO** World Health Organisation

KEY HIGHLIGHTS

- Fatal road crashes increased from 35 to 39 from 2021 to 2022.
- Pedestrians comprised 61% of the fatalities and motorcyclists comprised 32% of the fatalities in 2022.
- A large number of fatal crashes occurred between 2200 to 0600 hours.
- Two out of three fatal crashes(62 %) are hit-and-run cases.
- A large number of fatal crashes involving pedestrians and motorcyclists were hit and run cases.
- The high-risk locations of the North East District are Shastri Park Chowk, Khajoori Chowk and GBSSS Gokalpuri.

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 to 2021 data and identified high-risk locations for each of the eleven districts in Delhi. The report provided detailed maps, overall analysis for the National Capital Territory (NCT) of Delhi, and general recommendations for each district. The report was 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. They are instrumental in planning road safety interventions for high-risk locations in the district, implement interventions on the ground, and disburse road safety funds.

As a next logical step, to take evidence-based action in order to reduce crashes, the Transport Department are producing highly customised district specific road safety reports (DRSR) for the DRSCs. These reports include detailed findings on road crashes in the given district including a list of high-risk locations and provide specific recommendations to reduce crashes. The purpose of these DRSR is to guide DRSCs in implementing evidence-based interventions to reduce crash fatalities in high-risk locations and provide detailed infrastructure designs for specific locations which can be readily implemented on ground. The ultimate goal of this process is to inform and train the DRSC members in replicating the evidence-based action 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 the years 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 were 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 was based on the following parameters:

- Inspection of the road infrastructure and land use at the site.
- Identification of hazards and conflict points, especially pedestrians' movement, bus stop locations.
- Assessment of the type and quality of enforcement
- Observations on road user behaviour, parked vehicles, street vendors and accessibility of vulnerable road users
- Identification of types of road users and traffic mix and speed.

These data points were collated and presented for the selected high-risk sites, and were used to inform the design of the proposed interventions.

REPORT STRUCTURE

Each district has a dedicated report. There will be a total of 11 reports - one for each district in NCT Delhi. The report is divided into three parts. The first part includes the introduction of road safety in the context of the district, and methodology that was 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

The District of North East Delhi borders river Yamuna on the west, Ghaziabad district to the north and east, East Delhi to the south, and North Delhi to the west across the Yamuna.

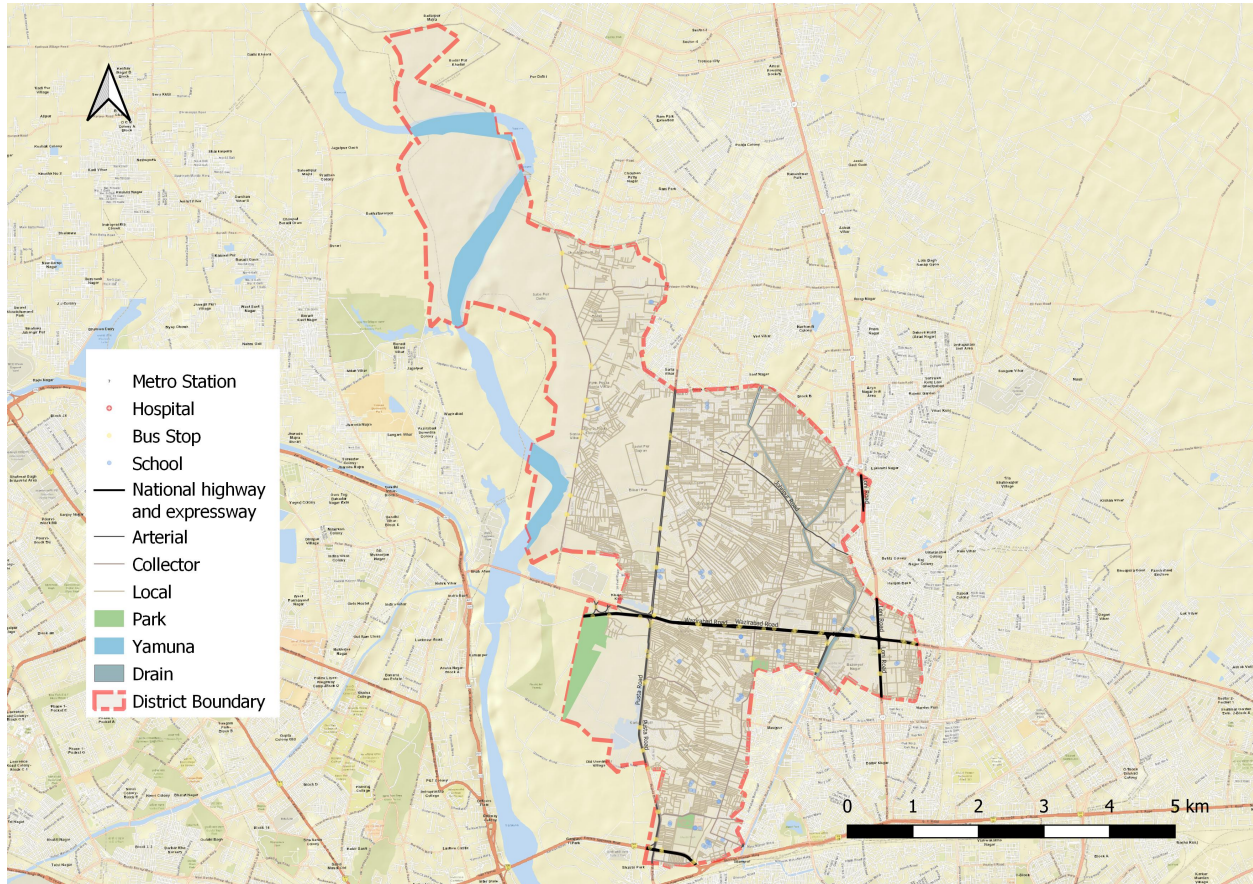


Figure 1: North East district map

A : ROAD SAFETY SITUATION AND TRENDS IN NORTH EAST DISTRICT

A.1 : ROAD CRASH DEATH TRENDS

A.1.1 : FATAL ROAD CRASHES AND FATALITIES TREND.

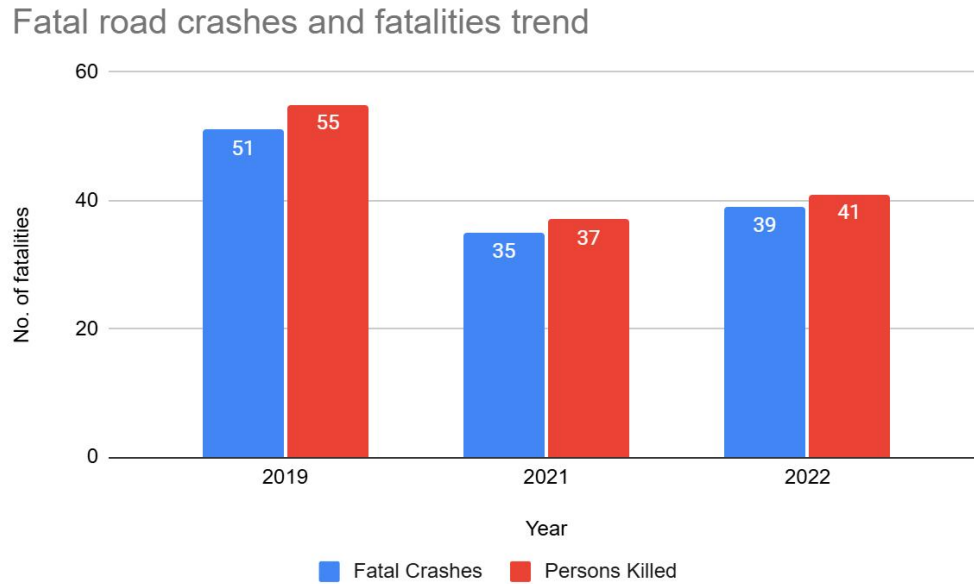


Figure 2: Fatal Road crashes and fatalities trend

There were 39 fatal road crashes in the North East District of Delhi in 2022 with 41 persons killed in these crashes. There is a 12% increase in road crashes compared to the previous year 2021 which is 35. One person is killed in road crashes in the North East District every nine to ten days.

A.1.2 : ROAD CRASH FATALITIES BY ROAD USER TYPES

Road crash fatalities by road user types

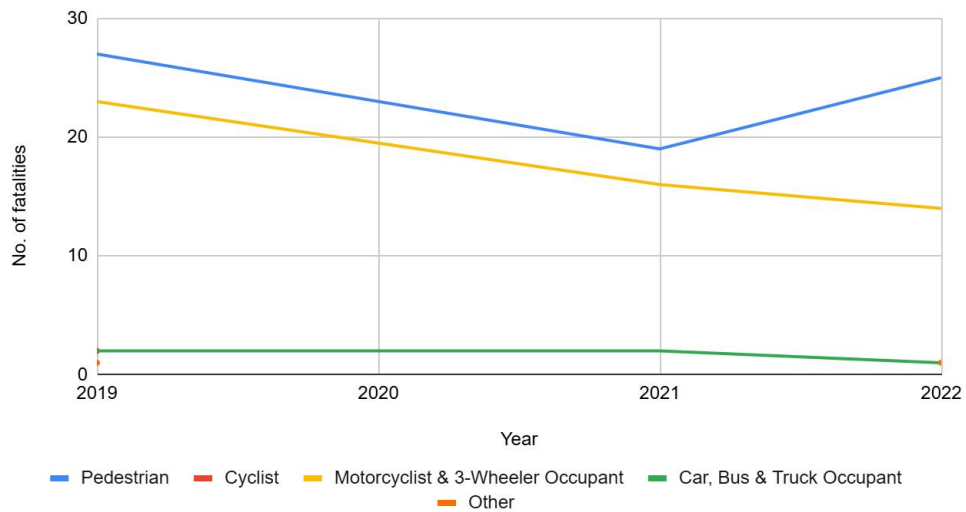


Figure 3: Road crash fatalities by road user types

Pedestrians formed the majority of persons killed in road crashes in the North East District followed by motorcyclists, auto rickshaw occupants and pedestrians across all three years. Between the highlighted categories, the pedestrians' fatalities surpassed the motorcyclist and autorickshaw occupants' fatalities in all years.

A.1.3 : ROAD CRASH DEATHS BY MONTH

Road crash deaths (month-wise trends)

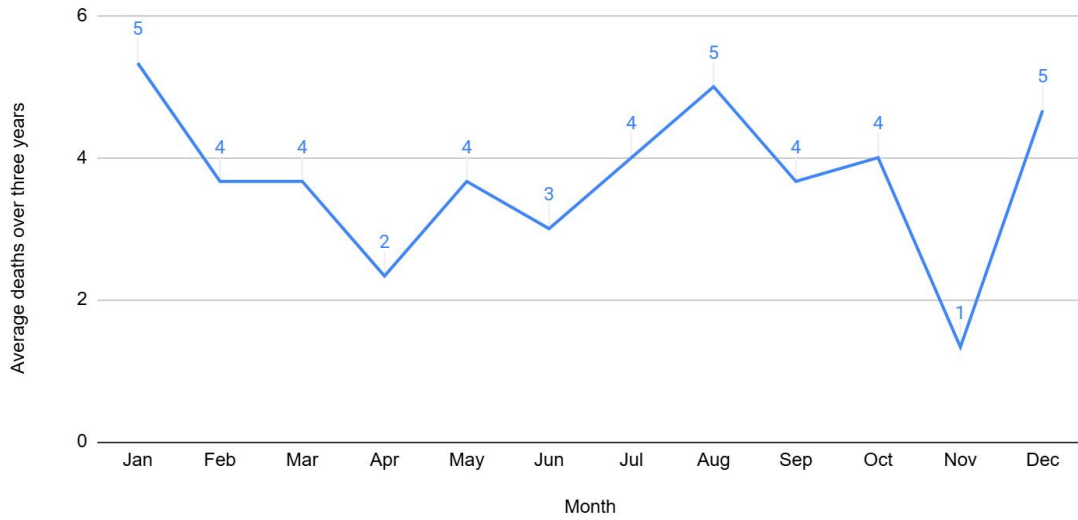


Figure 4: Average Road crash deaths by months

January, July and December witnessed the highest number of persons killed. There is no discernible pattern of fatalities by month.

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

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
02:00-06:00	2	3	0	2	1	2	4	14
06:00-10:00	1	3	1	2	6	5	0	18
10:00-14:00	4	3	1	7	3	4	1	23
14:00-18:00	1	4	0	2	5	3	3	18
18:00-22:00	8	1	5	4	5	1	2	26
22:00-02:00	3	7	3	2	6	3	2	26
Total	19	21	10	19	26	18	12	125

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

Forty-one percent of the total road crash deaths occurred at night between 18:00 pm to 2:00 am. Forty five percent of the total deaths occurred either on Friday, Saturday or on Sunday.

A.2 : ROAD CRASH DEATHS BY AGE AND GENDER

A.2.1 : ROAD CRASH DEATHS BY GENDER

Road crash deaths by gender

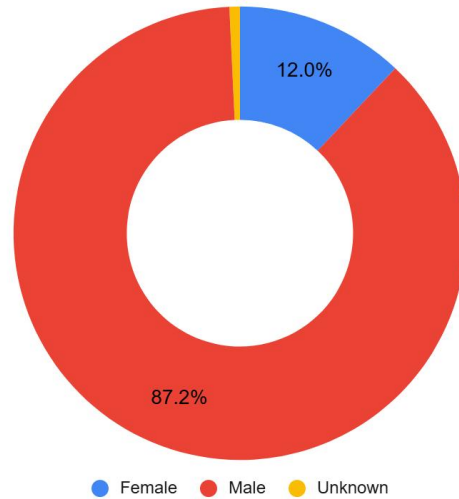


Figure 5: Road cash deaths by gender

A.2.2 : ROAD CRASH DEATHS BY AGE-GROUPS AND GENDER

Road crash deaths by age and gender

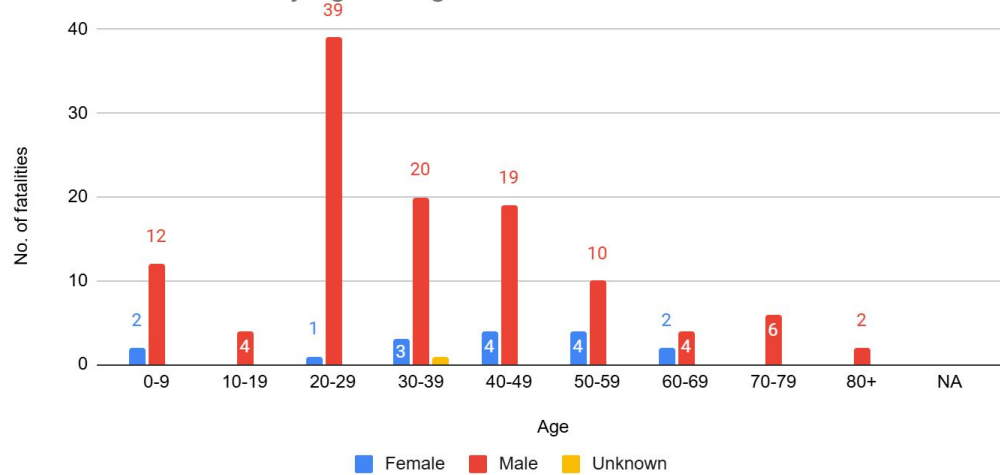


Figure 6: Road crash deaths by age groups and gender

Looking at the absolute numbers, the males had a higher number of fatalities 87% compared to females. Among the males, the fatalities were observed to be highest in the age group of 20-29 years, followed by 30-39 years.

A.3: ROAD CRASH DEATHS BY ROAD USER TYPE

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

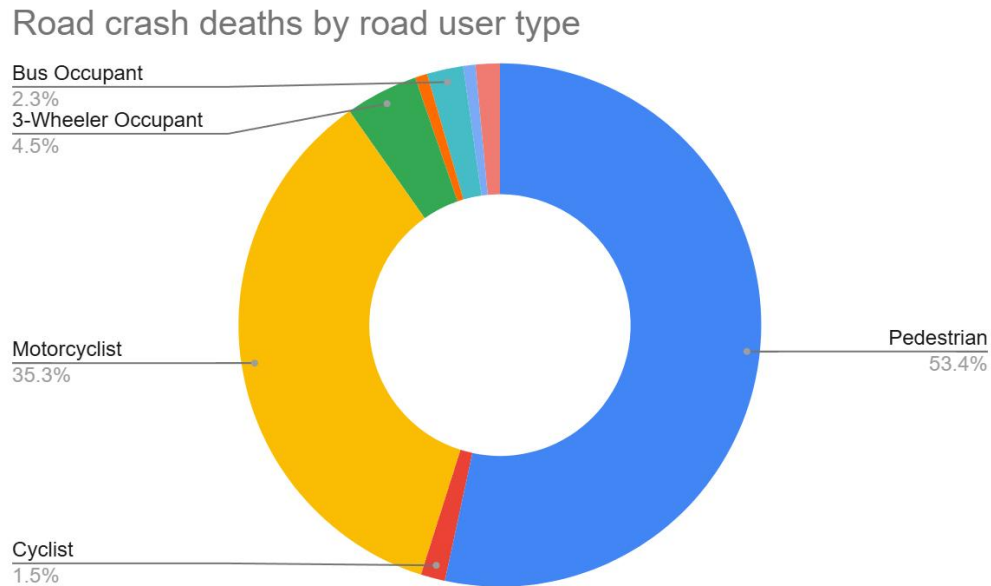


Figure 7: Road crash deaths by road user type (2019, 2021, 2022)

*Other includes cycle rickshaws, converted rickshaws and hand carts

Ninety-five percent of fatalities were among vulnerable road users (i.e., pedestrians, motorcyclists, cyclists, and auto rickshaw occupants). Among this, fifty-three percent of road crash deaths in the North East district were among pedestrians, followed by motorcyclists(35%).

A.3.2 : TIMEWISE ROAD CRASH DEATHS BY ROAD USER TYPE

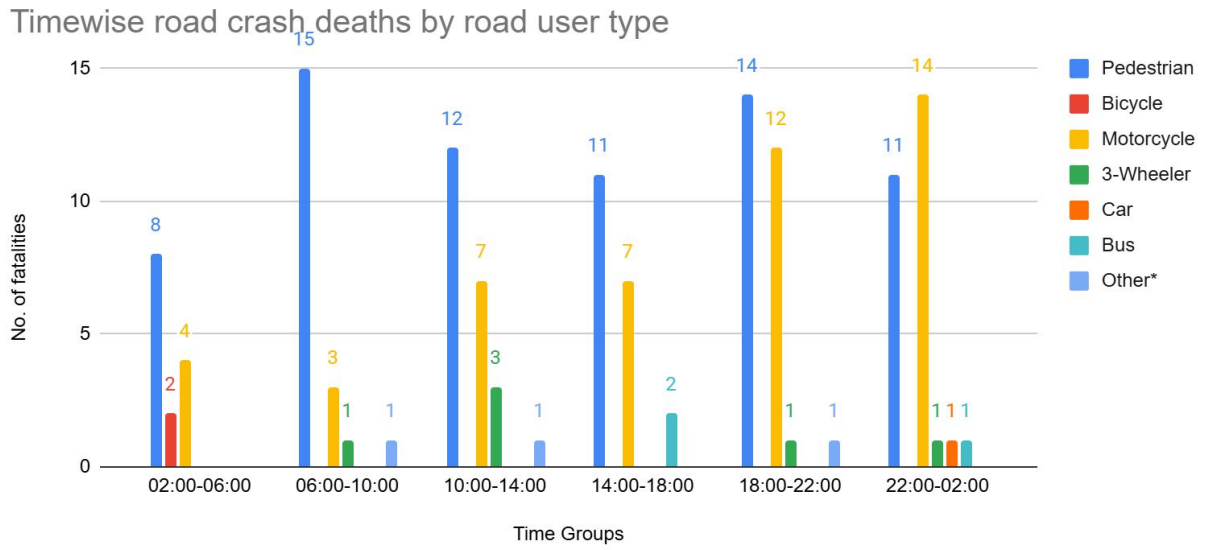


Figure 8: Timewise Road crash deaths by road user types

*Other includes cycle rickshaws, converted rickshaws and hand carts

A.3.3 : WHO-HIT-WHOM MATRIX

Victim Road User	Impacting Vehicle								
	Motorcycle	3-Wheeler	Car	Bus	Truck/Tractor	Single Vehicle Crash	Other	Unknown	Total
Pedestrian	6	1	10	2	7	0	1	44	71
Cyclist	0	1	0	0	1	0	0	0	2
Motorcyclist	2	0	0	9	11	5	2	18	47
3-Wheeler Occupant	0	1	0	2	0	0	0	3	6
Car Occupant	0	0	0	0	1	0	0	0	1
Truck Occupant	0	0	0	0	1	0	0	0	1
Other	2	0	0	1	0	1	0	1	5
Total	10	3	10	14	21	6	3	66	133

Table 2: Who-hit-whom matrix

Note: Other includes cycle rickshaws, converted rickshaws and hand carts

Among all fatal road crashes where the impacting vehicle was known, pedestrians and motorcyclists were found to be the most vulnerable category of road users. They were often hit by cars, trucks and tractors. Hit-and-run crashes dominate both the categories of cases where the impacting vehicle was not known for 44 cases in case of pedestrians and 18 in case of motorcyclists.

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

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

HR and NHR

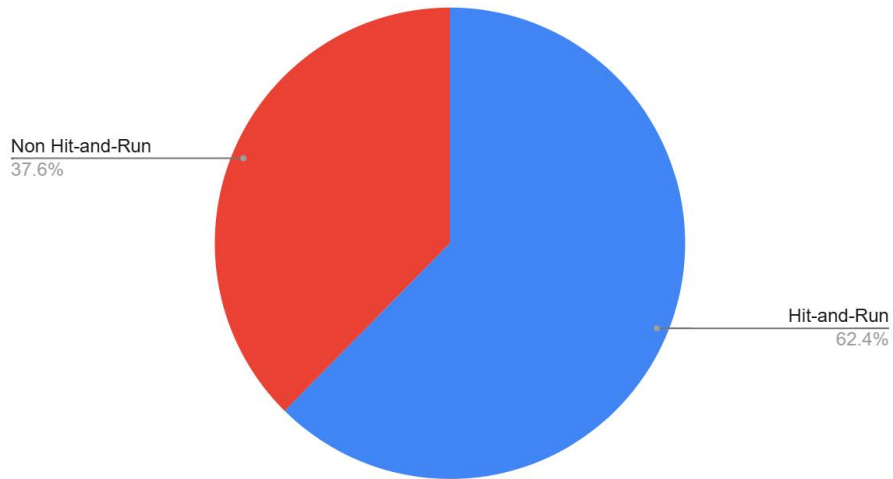


Figure 9: Percentage of hit-and-run and non-hit-and-run cases

Overall, two out of three 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

Hit-and-Run fatalities by road user type

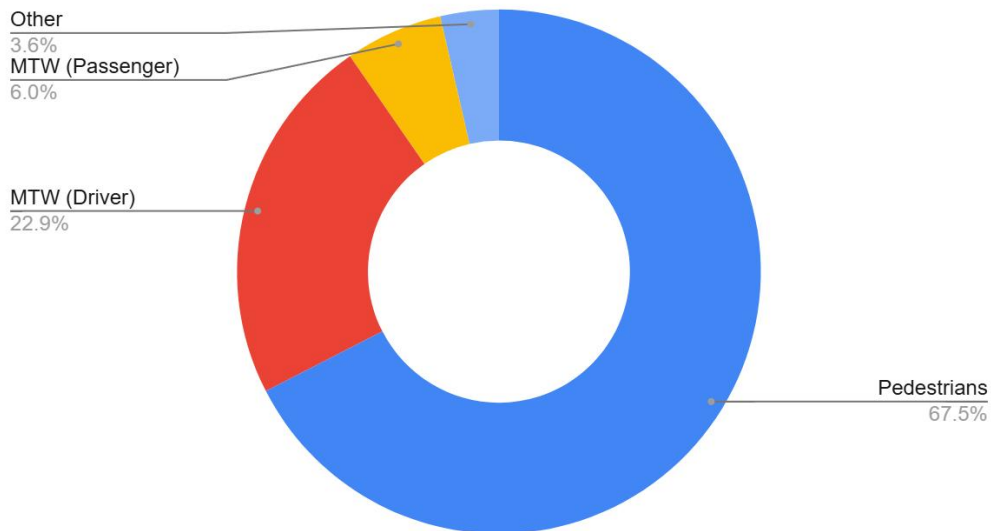


Figure 10: Hit-and-run Road user types

A.5: ROAD CRASH HEATMAPS

A.5.1 : HEATMAP OF ALL ROAD CRASH DEATHS

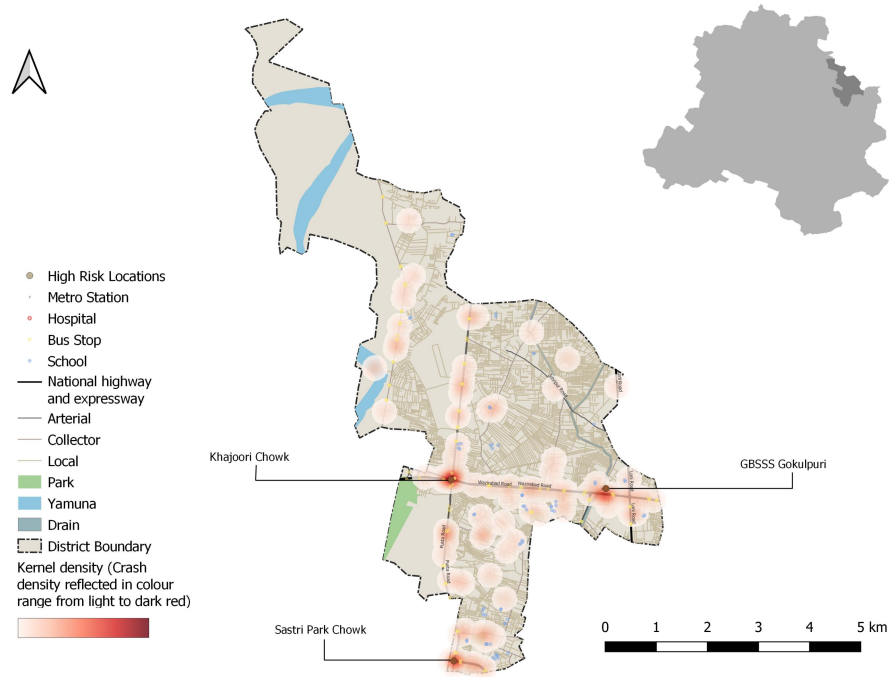


Figure 11: Heatmap of all road crash deaths in North East district

A.5.2 : HEATMAP OF ALL PEDESTRIAN DEATHS

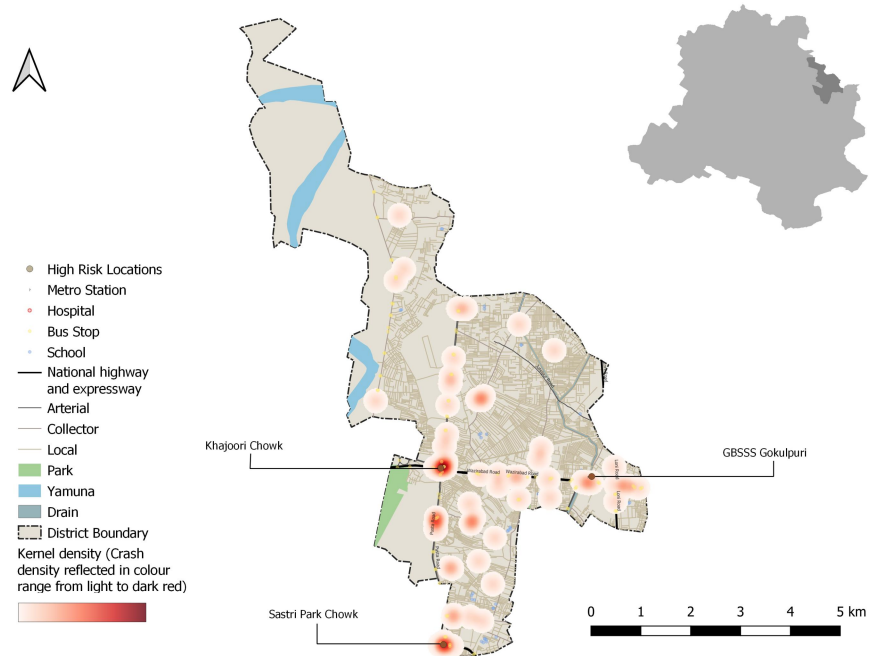


Figure 12: Heatmap of all pedestrian deaths due to road crashes in North East District

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

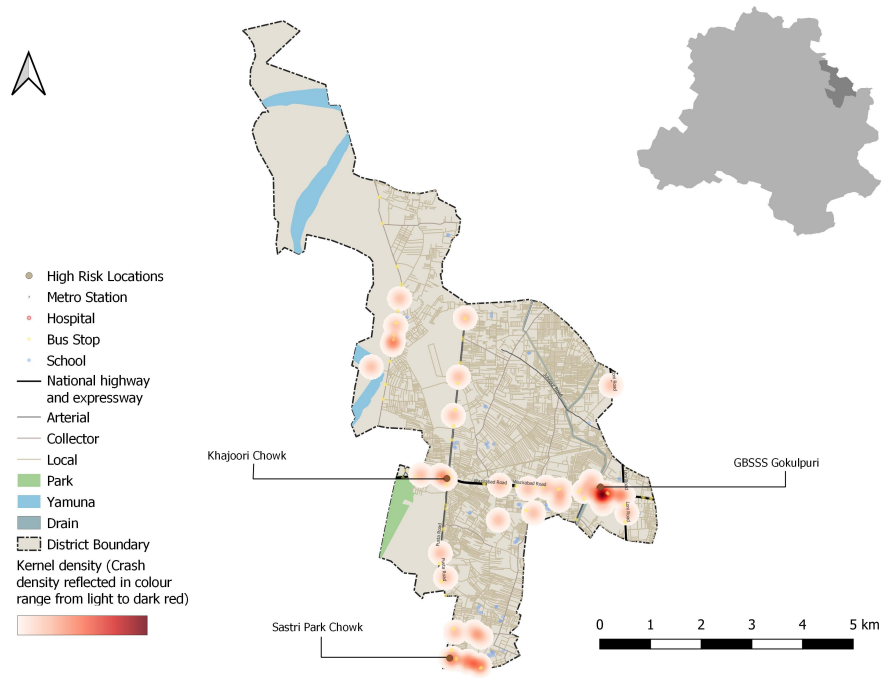


Figure 13: Heatmap of all motorcycle related deaths due to road crashes in North East District

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 East district which includes the number of fatal crashes, hit-and-run crashes, and deaths occurred during these crashes in years 2019, 2021 and 2022.

High Risk Location	Total fatal crashes	Total hit and run fatal crashes	Total persons killed
Khajoori Chowk	13	10	15
GBSSS Gokulpuri	1	0	1
Sastri Park	7	2	8

Table 3: List of high-risk locations

A.6.2 : MAP OF ALL HIGH-RISK LOCATIONS

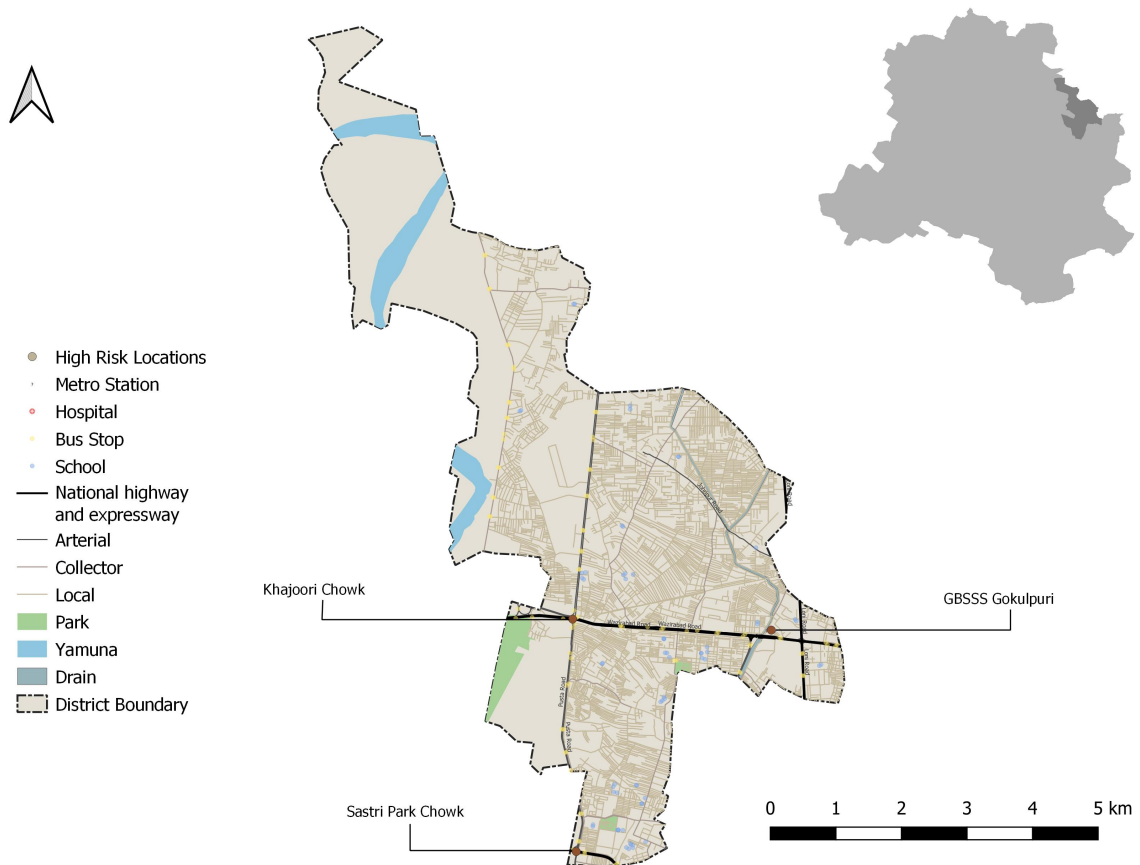


Figure 14: Map of all high-risk locations intervened in North East District

A.6.3 : HIGH RISK CORRIDORS

Pedestrian and motorcyclist fatalities in High Risk Corridors

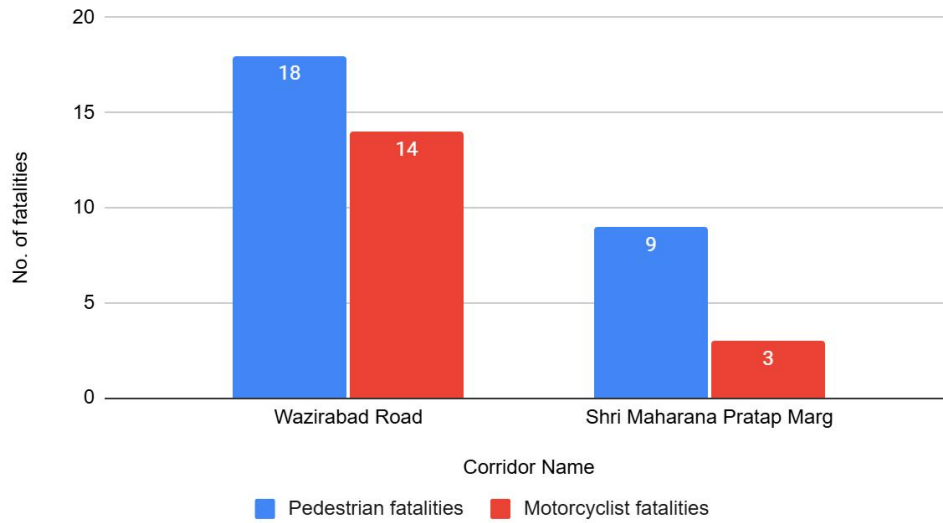


Figure 15: Vulnerable Road users on corridors

Death per km in High Risk Corridors

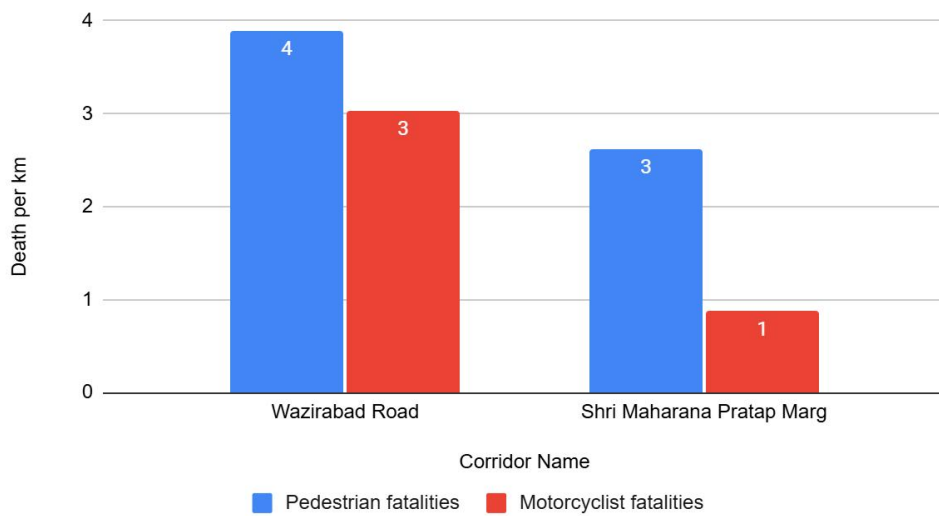


Figure 16: Vulnerable Road users' death per km

B : DATA TO ACTION

B.1 : SHASTRI PARK CHOWK

B.1.1 : GENERAL DESCRIPTION OF THE SITE

Shastri Park Chowk (Latitude:28° 40'21.43"N, Longitude: 77° 15'20.84"E). It is a T-intersection which is signalised. The intersecting road names are Pushta Road(Arterial Road) and Grand Trunk Road (Arterial Road).



Figure 17: Shastri Park Chowk satellite image

B.1.2 : EXISTING LAND USE



Figure 18: Existing land use around Shastri Park Chowk

B.1.3 : EXISTING SCENARIO



Figure 19: Existing scenario of Shastri Park Chowk

B.1.4 : ISSUES IDENTIFIED



Absence of segregated cycle tracks on arterial roads.



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



Lack of pedestrian path at the DMRC construction, should provide as per IRC 55.



Absence of bus stops at junction



Figure 20: Issues identified at Shastri Park Chowk

Issues Identified:

1. Absence of at-grade pedestrian infrastructure at the junction, making the pedestrians extremely vulnerable among the highspeed traffic movement.
2. Lack of pedestrian path.
3. Damaged and obstructed pedestrian infrastructure on each arm
4. Absence of bus stops at junction
5. Damaged & uneven road surface and pedestrian infrastructure.
6. Absence of traffic calming near junctions (to control the speed of vehicles).
7. Absence of road markings, signages and speed control measures at the intersection.
8. Absence of delineators and reflectors on the median and carriageway edges.
9. Absence of chevron marking and hazard markers or flexible markers at bull noses.
10. Absence of segregated cycle tracks on arterial roads.

B.1.5 : PROPOSED DESIGN

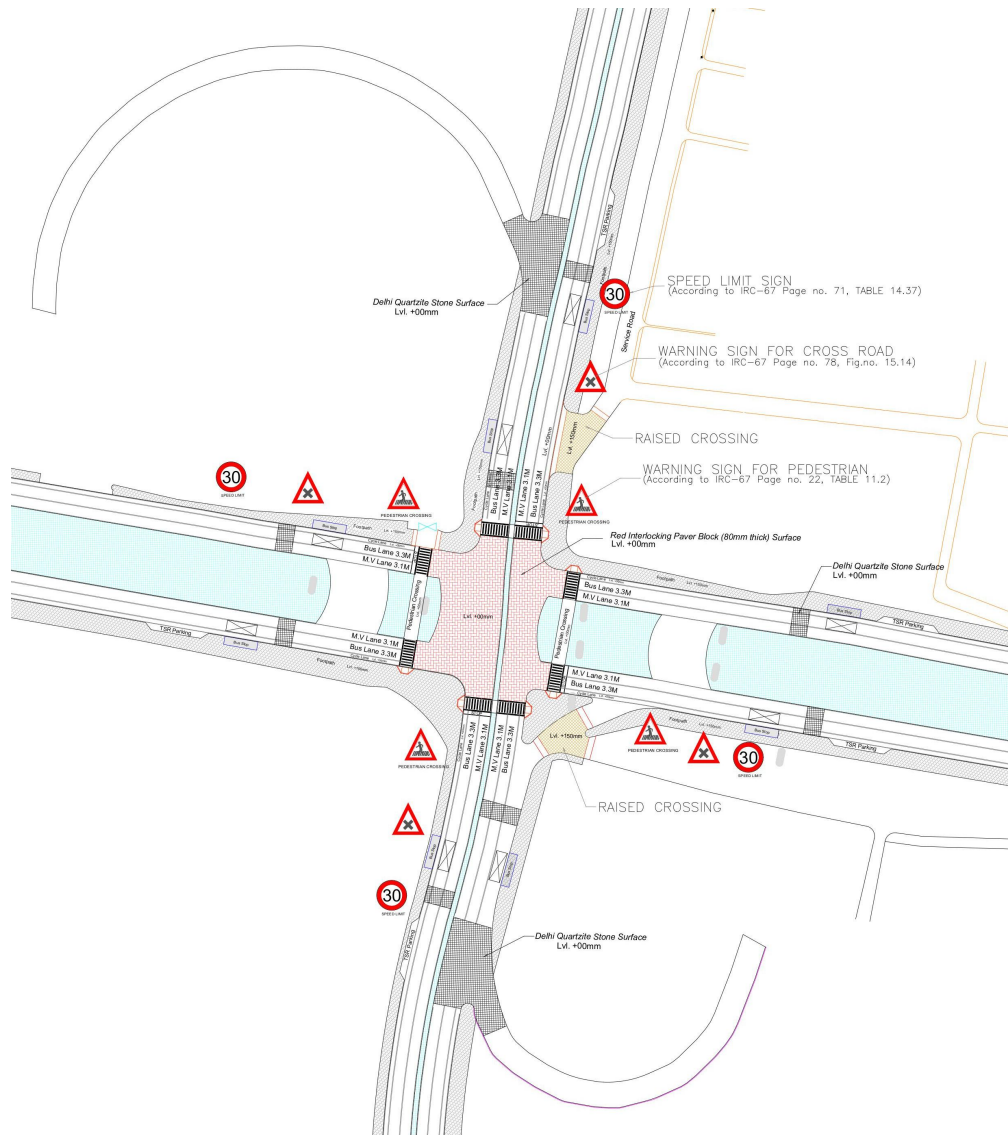


Figure 21: Proposed design for Shastri Park Chowk

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 (as per IRC:103-2022)
3. Proposed new bus stop near the junction (30m to 50m) to reduce the pedestrian crossing movement
4. Installation of signages - Speed Limit, stop sign, pedestrian crossing and other necessary Signages on all approaching roads
5. Corrected turning radius, road width and proposed raised crossing on free left turn
6. Provision of Delhi Quartzite stone surface before bus stops and entry/exits of flyover ramps to slow down the approaching traffic
7. Demarcation of Road Markings (properly painted as per IRC 35)
8. Provision of tactile pavers and kerb ramps for the accessibility of differently abled users (as per IRC:103-2022)
9. Provision of kerb ramp, bollards and refuse island for pedestrian crossing.

: 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.	3075	19,677,029	1.968
A.2	Raised Crossing	Raised crssing 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.	3445	6,286,564	0.629
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	#DIV/0!	1,366,304	0.137
A.4	CC Items (Kerbs, Pipe, etc)	Kerb stones, Bollards, Kerb Channels etc.	Providing and fixing Kerbs, Bollards , and Kerb Channel etc. in CC.		1,066,865	0.107
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, Zebra Crossing, Bar Marking, etc)	Providing and applying road marking strips (retro-reflective) of specified shade/ colour using hot thermoplastic material for road marking .	748	969,149	0.097
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.		286,939	0.029
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	294,826	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 upto 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	2,363,850	0.236
A.11	Safety Management Equipment (as per design requirement)	Provision of Delieator Post, Spring Post, Cat eye/studs etc.	Miscellaneous items for Safety Management Equipment (as per design requirement) -Provision of Delieator Post, Spring Post, Cat eye/studs etc.- including foundation and fixing etc.		139,221	0.014

A.12	Bus Shelter	10.5mX2.5m Bus Shelter (Stainless Steel Structure)				10,800,000	1.080
	SUB TOTAL CIVIL WORK (A)					43,390,618	4.339
B	Drainage, Irrigation & Plumbing	(Drainage items based on design proposal)	Drainage, Irrigation & Plumbing work @ 20% of the cost of Civil work	20%		8,678,124	0.868
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%		10,847,654	1.085
D	Horticulture Work	(Landscape items based on design proposal)	Horticulture work @ 15% of the cost of Civil work	15%		6,508,593	0.651
E	Dismantling / Demolition	--	Dismantling work @ 15% of the cost of Civil work	15%		6,508,593	0.651
F	Work Zone Safety & Management	--	Work zone Management @ 5% of the cost of Civil work	5%		2,169,531	0.217
PART 1	SUB TOTAL PART 1 (A+B+C+D+E+F)					78,103,112	7.810
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.	2%		1,562,062	0.156

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)				79,745,174	7.975
J	Contingencies '2.5%	--	Contingencies (@2.5%)		1,993,629	0.199
I	GST('@18%)	--	GST @18%		14,712,985	1.471
FINAL	GRAND TOTAL (PART 2 + J + I)				96,451,788	9.645

Notes:

1. This is a preliminary estimate. Final costing to be evaluated & approved by the road owning agency .
2. DSR 2023 has been followed for all rates. Market Rate and Costing from part PWD projects has been included for certain items.
3. Cost of Drainage, Irrigation, Plumbing has been calculated at 20% of the civil work cost.
4. Cost of Electrical Work can be calculated at 20% - 25 % of the civil work cost.
5. Cost of Horticulture has been calculated at 15% of the civil work cost.
6. Cost of Dismantling has been calculated at 15% of the civil work cost.
7. Cost of Work Zone Management has been calculated at 5% of the civil work cost

8. 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.
9. Bus Shelter has been calculated at 18 L per shelter; can be changed as per design specific cost.
10. 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 : KHAJOORI CHOWK

B.2.1 : GENERAL DESCRIPTION OF THE SITE

Khajoori Chowk (Latitude: 28° 42' 16.46"N, Longitude: 77° 15' 21.29"E). It is a four-arm signalised junction. This intersection is intersecting Wazirabad Road (Arterial Road) and Shri Maharana Pratap Marg (Sub-Arterial Road)



Figure 22: Khajoori Chowk satellite image

B.2.2 : EXISTING LAND USE



● Mixed (Residential+ Commercial) ● Parks and Open Spaces

Figure 23: Existing land use near Khajoori Chowk Intersection

B.2.3 : EXISTING SCENARIO

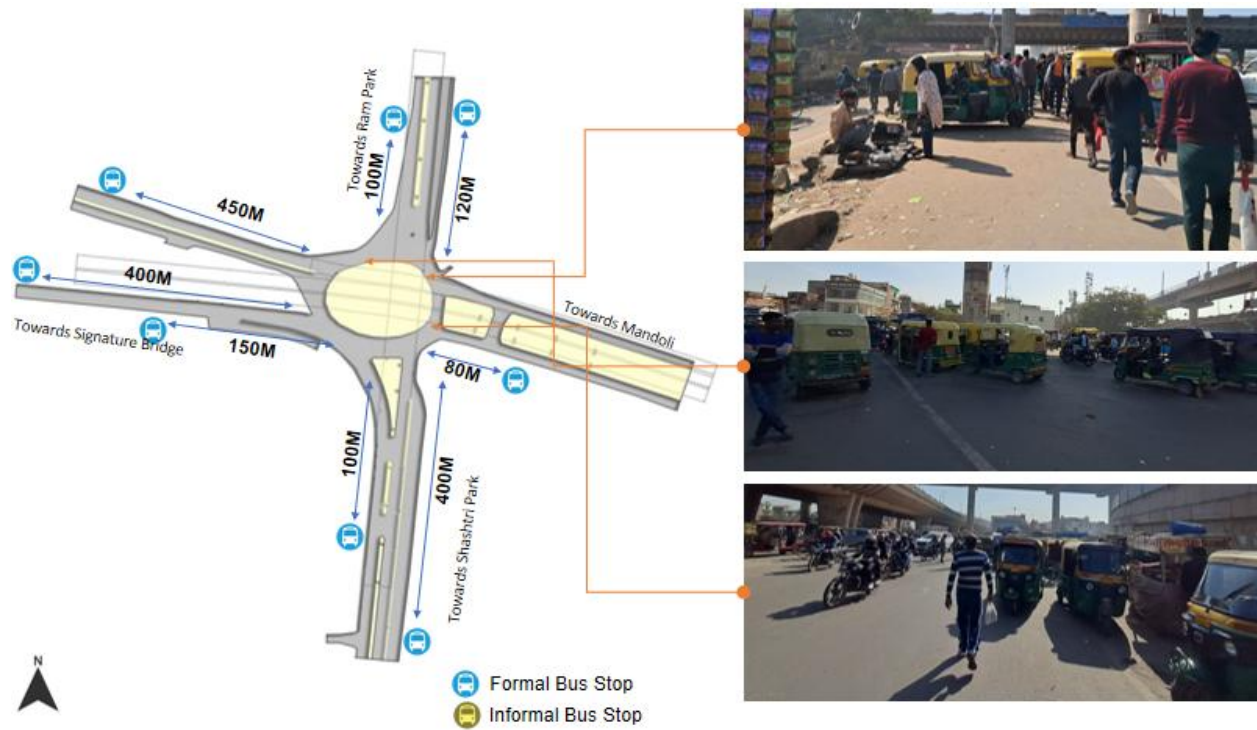


Figure 24: Existing scenario at Khajoori Chowk

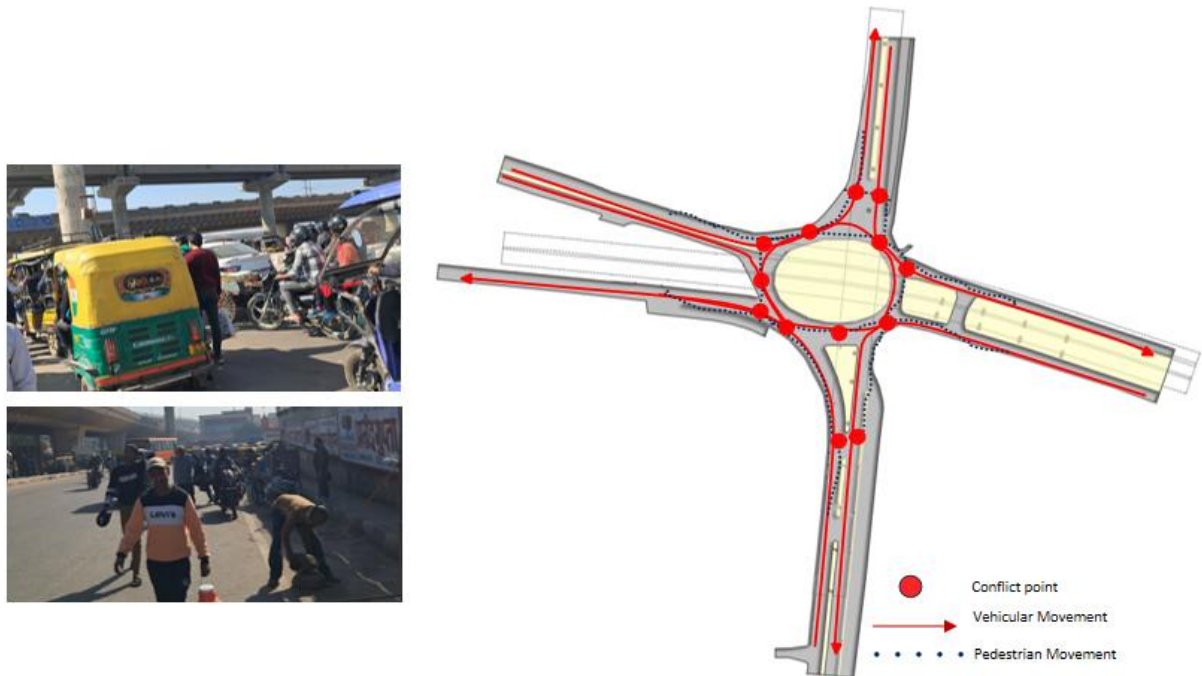


Figure 25: Existing vehicular and pedestrian movement at Khajoori Chowk

B.2.4 : ISSUES IDENTIFIED



Damaged and obstructed pedestrian infrastructure on each arm.



Absence of at-grade pedestrian infrastructure at the junction.



Absence of Bus Stop.



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



Absence of delineators and reflectors on median and carriageway edges.



Absence of traffic calming measures near junction



Damaged & uneven road surface and pedestrian infrastructure.



Absence of segregated cycle lanes on arterial roads.

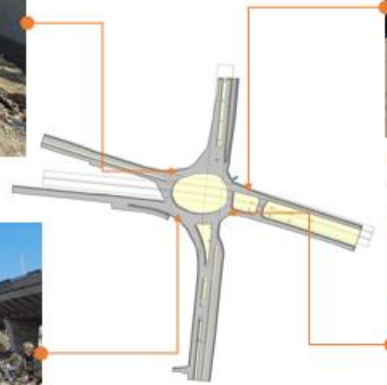


Figure 26: Issues identified at Khajoori Chowk

Issues identified:

1. Absence of at-grade pedestrian infrastructure at the junction, making the pedestrians extremely vulnerable among the highspeed traffic movement

2. Lack of pedestrian path.
3. Damaged and obstructed pedestrian infrastructure on each arm, most of the pedestrian is damaged and obstructed with construction work.
4. Absence of bus stops at junction.
5. Damaged & uneven road surface and pedestrian infrastructure.
6. Absence of tactile flooring for differently abled users.
7. Absence of road markings, signages and speed control measures at the intersection.
8. Absence of delineators and reflectors on the median and carriageway edges.
9. Absence of chevron marking and hazard markers or flexible markers at bull noses.
10. Absence of segregated cycle lanes on arterial roads.

B.2.5 : PROPOSED DESIGN

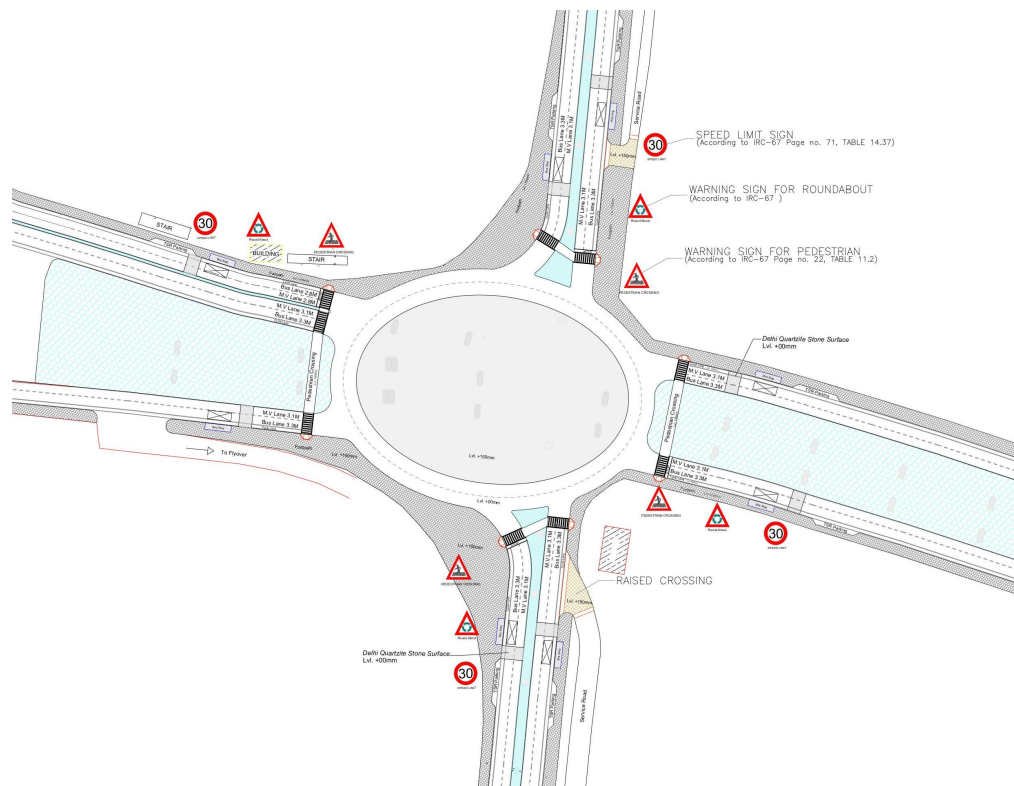


Figure 27: Proposed design for Khajoori Chowk

1. The junction is redesigned for the speed of 30 km/hr to ensure the safety
2. Redesigned the geometry of the junction and proposed a roundabout to decrease the conflict area
3. Proposed at-grade pedestrian infrastructure to increase the accessibility and safety for pedestrians (as per IRC:103-2022)
4. Proposed new bus stop near the junction (30m to 50m) to reduce the pedestrian crossing movement
5. Installation of signages - Speed Limit, stop sign, pedestrian crossing and other necessary Signages on all approaching roads
6. Corrected turning radius and road width.
7. Provision of Delhi Quartzite stone surface to slow down the approaching traffic
8. Demarcation of Road Markings (properly painted as per IRC 35)
9. Provision of tactile pavers and kerb ramps for the accessibility of differently abled users (as per IRC:103-2022)
10. Provision of kerb ramp, bollards and refuse island for pedestrian crossing.

B.2.6 : 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.	2760	24,837,377	2.484
A.2	Raised Crossing	Raised crssing 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.	-	1,079,713	0.108
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	805	1,545,776	0.155
A.4	CC Items (Kerbs, Pipe, etc)	Kerb stones, Bollards, Kerb Channels etc.	Providing and fixing Kerbs, Bollards , and Kerb Channel etc. in CC.		1,410,262	0.141
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,	Providing and applying road marking strips (retro- reflective) of specified shade/ colour using hot thermoplastic material for road	748	1,178,533	0.118

S.No	Component	Details	Notes	Rate (per sq. m)	Cost (INR)	Cost (INR, crores)
		Chevron, Zebra Crossing, Bar Marking, etc)	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.		143,470	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/CU M	147,413	0.015
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	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	4,552,60 0	0.455
A.11	Safety Management Equipment (as per design requirement)	Provision of Delieator Post, Spring Post, Cat eye/studs etc.	Miscellaneous items for Safety Management Equipment (as per design requirement) -Provision of Delieator Post, Spring Post, Cat eye/studs etc. - including foundation and fixing etc.		72,323	0.007
A.12	Bus Shelter	10.5mX2.5m Bus Shelter (Stainless Steel Strcuture)			14,400,0 00	1.440
	SUB TOTAL CIVIL WORK (A)				49,507,338	4.951

S.No	Component	Details	Notes	Rate (per sq. m)	Cost (INR)	Cost (INR, crores)
B	Drainage, Irrigation & Plumbing	(Drainage items based on design proposal)	Drainage, Irrigation & Plumbing work @ 20% of the cost of Civil work	20%	9,901,468	0.990
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%	12,376,834	1.238
D	Horticulture Work	(Landscape items based on design proposal)	Horticulture work @ 15% of the cost of Civil work	15%	7,426,101	0.743
E	Dismantling / Demolition	--	Dismantling work @ 15% of the cost of Civil work	15%	7,426,101	0.743
F	Work Zone Safety & Management	--	Work zone Management @ 5% of the cost of Civil work	5%	2,475,367	0.248
PART 1	SUB TOTAL PART 1 (A+B+C+D+E+F)				89,113,208	8.911
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.	2%	1,782,264	0.178
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)				90,975,472	9.098

S.No	Component	Details	Notes	Rate (per sq. m)	Cost (INR)	Cost (INR, crores)
J	Contingencies 2.5%	--	Contingencies (@2.5%)		2,274,387	0.227
I	GST(@18%)	--	GST @18%		16,784,975	1.678
FINAL	GRAND TOTAL (PART 2 + J + I)				110,034,833	11.003

Notes:

1. This is a preliminary estimate. Final costing to be evaluated & approved by the road owning agency.
2. DSR 2023 has been followed for all rates. Market Rate and Costing from part PWD projects has been included for certain items.
3. Cost of Drainage, Irrigation, Plumbing has been calculated at 20% of the civil work cost.
4. Cost of Electrical Work can be calculated at 20% - 25 % of the civil work cost.
5. Cost of Horticulture has been calculated at 15% of the civil work cost.
6. Cost of Dismantling has been calculated at 15% of the civil work cost.
7. Cost of Work Zone Management has been calculated at 5% of the civil work cost
8. Cost for Design Support can range from 2% - 8%, and can vary from site to site . This should include Technical Assistance on drawings, 3D supports, Site Supervision, Change management.
9. Bus Shelter has been calculated at 18 L per shelter; can be changed as per design specific cost.
10. 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.3 : SAFE SCHOOL ZONE: GBSSS GOKALPUR VILLAGE

B.3.1 : GENERAL DESCRIPTION OF THE SITE

Government Boys Senior Secondary School (GBSSS) Gokalpur Village is located on Wazirabad Road (40-55m ROW), adjacent to the Gokalpuri Flyover and in close proximity to the Gokalpuri Metro Station. It operates as a shift school, with the same campus utilized by a girls' school during morning hours. The surrounding land use is predominantly residential with small shops and institutions. The surrounding witnesses a heavy flow of traffic and high speed traffic due to the flyover opening near to the school entrance. This results in unsafe circumstances for children during the entry/exit hours.

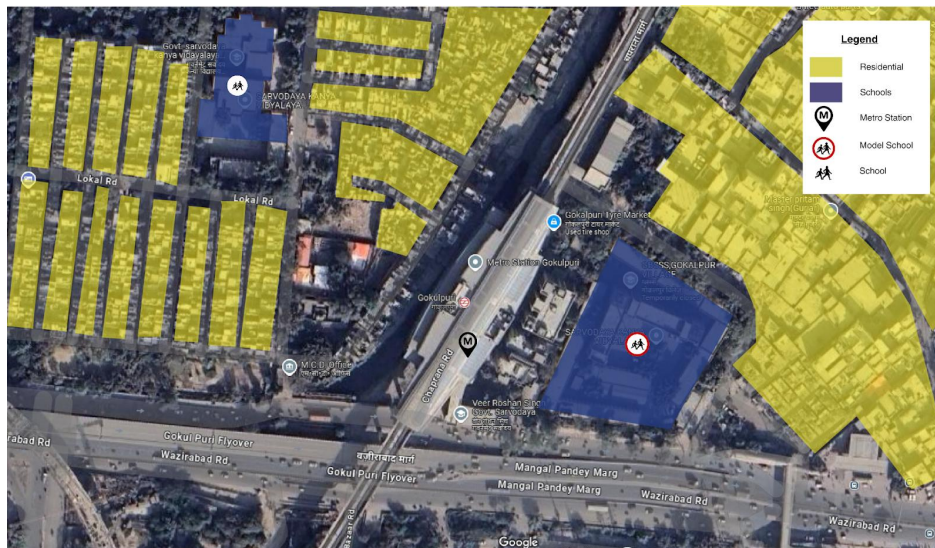


Figure 28: Land Use Map of GBSSS Gokalpur Village (AY 22-23)

Govt. Boys Senior Secondary School has a total enrollment of 2517 students as per the academic year 2022-2023, from class Nursery to 12 (age 4 to 17). The school has two gates, Gate 01 opens at the local marg and Gate 02 opens at the Wazirabad road. Only Gate 02 is used during the entry/exit hours of the school by students and school community.

B.3.2 : ISSUES IDENTIFIED

Observations on Road Infrastructure: The school is located on an arterial road. Due to the traditional vehicle-centric planning approach, the road infrastructure does not promote pedestrian safety and creates an unsafe environment for the vulnerable road users, putting school children at risk. Conflict between students and high speed and heavy vehicles have been observed due to the Gokalpuri flyover and its opening near the school gate. The existing road infrastructure and planning also cause a lot of wrong side driving at the Wazirabad road. Students face difficulties in travelling especially walking without any pedestrian and student friendly environment. Many students have to cross the major and minor intersections near the school without any traffic calmings, creating a sense of fear in students and the school community. All these issues increase the probability of injuries and crashes within the school zone vicinity.

Wrong side driving with insufficient and inaccessible continuous footpath and cycle infrastructure results in unsafe commute environments for students and school communities. There is also a lack of differently-abled infrastructure like ramps, and tactiles. Even the existing footover bridge near the school is not accessible to differently abled and elderly people. In addition to that, lack of traffic calming, signages and markings conducive to school zones are some of the evident issues. Better

planning of the utilities is required with properly integrated street lighting and drainage. The integration of green spaces, waiting areas, defined vendor zones is required to enhance the overall school going experience.



Figure 29: Site Photographs : Students walking with moving traffic outside school and without any pedestrian infrastructure

Type and quality of enforcement

The traffic observed around the school is heavy and high speed because of the presence of the Gokalpuri flyover. This also results in a lot of wrong side driving that makes the arterial road in front of the school gate really unsafe for students and the school community. During the entry/exit hours, unorganized parking and lack of pick-up and drop-off areas leads to chaotic situations near the school gate. Due to the lack of a dedicated traffic personnel and traffic management team, students find it difficult to navigate through the moving traffic and are exposed to high risks. This generates the need for pedestrian friendly infrastructure, with traffic calming devices and a complementing team to overlook the smooth flow of traffic and students in a more organized nature.

Road users behaviour and mobility patterns

To understand the patterns of movements and conflicts in the school zone, activity mapping was conducted in morning hours (home to school traffic) and exit timing during afternoon (school to home).

An activity map documents all users including vendors, vehicular movements and other street related issues in a particular road environment approaching school during certain times.



B. 3. 3 : ACTIVITY MAP

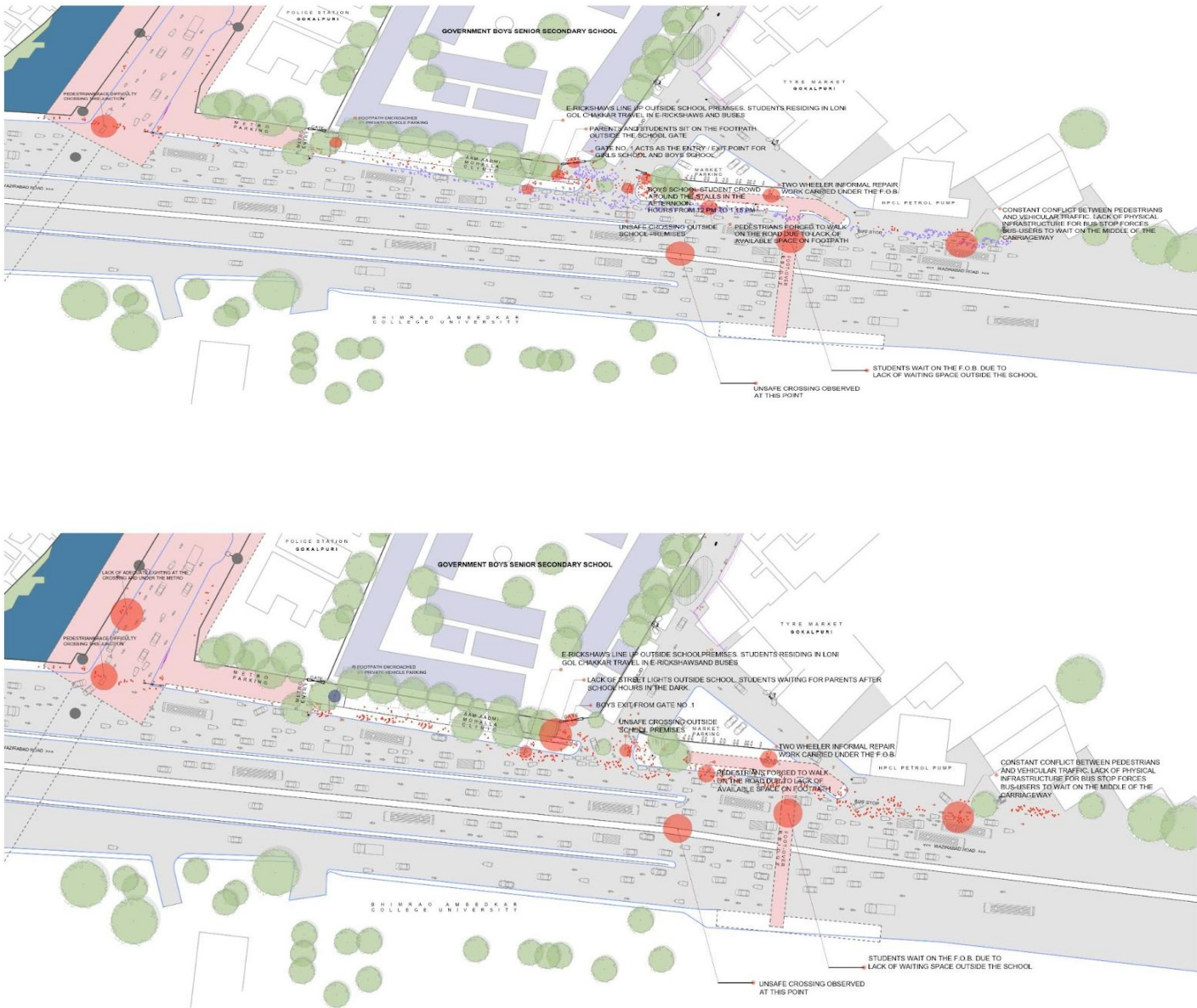


Figure 30: Activity mapping at GBSSS Gokalpur Village (Home to School - Up, and School to Home - Down)

Key Findings:

<p>Morning : Home to School</p> <ul style="list-style-type: none">● Due to the presence of flyovers, there is observed high conflict between students and vehicle traffic. A lot of students walk to school and wait near the school gate and Wazirabad road during the entry hours near the school gates.● Over speeding with no traffic calming leads to an unsafe environment for the entire school community.● Wrong side driving is observed due to the traditional planning. This makes the situation near the school gates very chaotic to navigate especially during the entry/exit hours.● Unorganised parking and lack of drop off and pick up area is observed. With lack of dedicated traffic management teams and traffic personnel. This environment near the school gate becomes really uncontrolled and unorganised. As the afternoon timings are an overlap period between the morning and the afternoon shift.● Requirement for student and school community friendly infrastructure with integrated green spaces, waiting areas, play and street art areas, dedicated cycle parking and vendor spaces.	<p>Afternoon : School to Home</p> <ul style="list-style-type: none">● Lack of dedicated pick up and drop off areas leads to chaotic conditions at the exit times with students walking and unorganised parked vehicles.● Lack of utility planning like less street light, open drains create unsafe environments for students to commute back from school. Also increases the chances of road crash.● Better planning and management for public transport is required. Like integrated bus stops to avoid traffic congestion and for easier management.● Over speeding and wrong side driving are common due to the flyover exit ramps, students walk at risk with the lack of pedestrian safe infrastructure.
--	--

B.3.4 : PROPOSED DESIGN

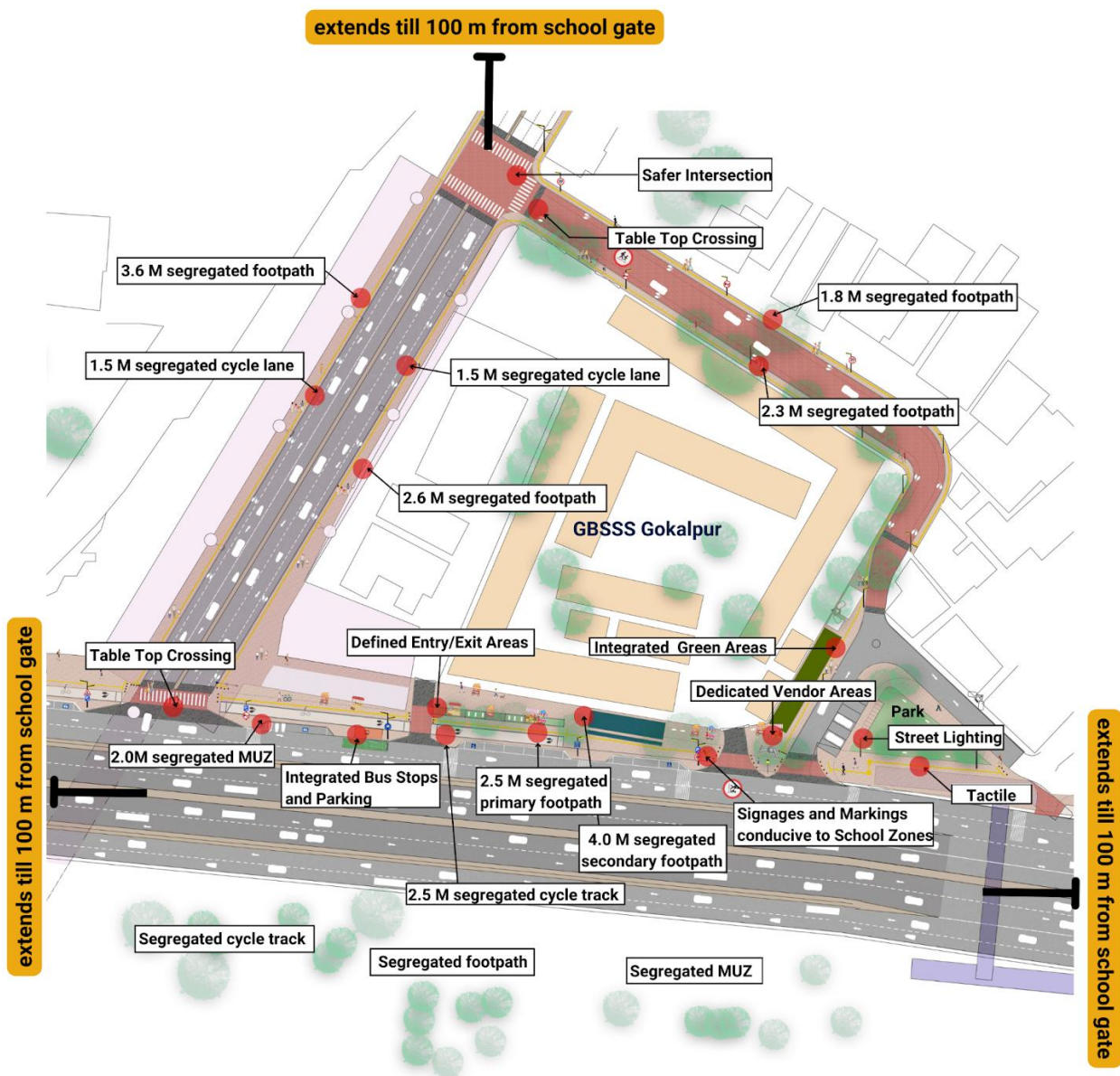


Figure 31: Proposed School Zone Plan for GBSSS Gokalpur Village

DESIGN INTERVENTIONS:

The proposal prepared by road safety clubs (Refer Safer Delhi through Road Safety Clubs) is called 'Sapno ka School' aligning to pedestrian first approach, traffic safety principles, UN Sustainable Development Goals and Ladder of Children Participation. Sapno ka School is an area plan connecting 4 schools and the neighbourhood under 878 m of school zone development (500 M of the Wazirabad road in front of school gates, 178 M of the Chaprana Road, and 196 M on the Lokal Marg between the minor and major intersections). 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 and safe mobility.

The Right of Way (ROW) and intersection design has been designed as per the street typology.

- 2.5 m accessible and segregated primary footpaths at the Wazirabad road
- 3.5-4.0 m accessible secondary footpath with vendor areas, trees and waiting areas at the Wazirabad road.
- 2.5 m segregated cycle track on Wazirabad road. (as per IRC 11: 2015)
- 2.0 m of Multi-Utility Zone for Services such as lighting, signages, and drainage on the Wazirabad road.
- 2.6-3.6m accessible and segregated footpaths on both sides at the Chaprana Road
- 1.5 m of segregated cycle lane on Chaprana road.
- 1.8-2.3m accessible and segregated footpath on both sides of the Lokal Marg
- Traffic calmings designed in front of entry/exits and school gates.
- Designated boarding areas and drop off zones
- Integrated waiting spaces, vendor spaces and street furniture integrated
- Integrated green areas
- Integrated bus stops and parking pockets on the Wazirabad road.
- School specific signage and marking
- Safer Intersection and textured change at the Lokal Marg
- Safer Intersection with Table Top Crossing at the Chaprana Road
- Continuous 2 lane road at Wazirabad Road



Figure 32: Render of the proposed Wazirabad Road in front of GBSSS Gokalpur Village

Estimated budget Approx INR 8.5 Cr for ~885 M length

Source: Estimated budget for 250m length of DAV Vasant Kunj Pedestrianisation (PWD II), Pilot School Zone, District South, Public Works Department, Delhi

B.3.5 : 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)	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.	2670	22297763	2.230
A.2	Raised Crossing	Signalised Intersections and traffic calming at entry/exits	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.	4165	4540008	0.454
A.3	Cycle Infrastructure	2.5m segregated cycle tracks on 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	4425	2212371	0.221
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.		1254077	0.125
A.5	Signages	Provision of signages as per IRC 67 for school zone & 20km/h	Providing and fixing Signage Mandatory, Cautionary and informative sign board including all the fixing and labours etc.		0	0.000
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 .	748	1028225	0.103
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, Pargola, Dustbin etc. complete items- including foundation and fixing etc.		1668778	0.167

S.No	Component	Details	Notes	Rate (per sq.m)	Cost (INR)	Cost (INR, crores)
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	650828	0.065
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	203082	0.020
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 Delieator Post, Spring Post, Cat eye/studs etc.	Miscellaneous items for Safety Management Equipment (as per design requirement) -Provision of Delieator Post, Spring Post, Cat eye/studs etc. - including foundation and fixing etc.		0	0.000
A.12	Bus Shelter	Provision of new bus shelter.			1800000	
	SUB TOTAL CIVIL WORK (A)				3565513 3	3.566
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%	7131027	0.713

S.No	Component	Details	Notes	Rate (per sq.m)	Cost (INR)	Cost (INR, crores)
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%	8913783	0.891
D	Horticulture Work	To increase green cover and shade, landscape plan to promote ground cover and trees for seasonal variation and color. Irrigation plan to be finalised with PWD.	Horticulture work @ 15% of the cost of Civil work	15%	5348270	0.535
E	Dismantling / Demolition	--	Dismantling work @ 15% of the cost of Civil work	15%	5348270	0.535
F	Work Zone Safety & Management	--	Work zone Management @ 5% of the cost of Civil work	5%	1782757	0.178
PART 1	SUB TOTAL PART 1 (A+B+C+D+E+F)				64179240	6.418
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%	3208962	0.321
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	80000	0.008
PART 2	SUB TOTAL PART 2 (PART 1 + G +H)				67468202	6.747

S.No	Component	Details	Notes	Rate (per sq.m)	Cost (INR)	Cost (INR, crores)
2						
J	Contingencies 2.5%	--	Contingencies (@2.5%)		1686705	0.169
I	GST(@18%)	--	GST @18%		1244788 3	1.245
FINAL	GRAND TOTAL(INR) (PART 2 + J + I)				8160279 1	8.160

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 the 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%, and 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.

