REDESIGNING AN URBAN PRECINCT FOCUSING ON CHILDREN's AND CAREGIVER's

Case Application at Darga Road, Park Circus, Kolkata, WB

An Urban Design Thesis Report

Submitted in partial fulfilment of the requirement
For the Post Graduation degree of
Masters of Architecture (Urban Design)
Under the Faculty of Engineering and Technology,
Jadavpur University, Kolkata

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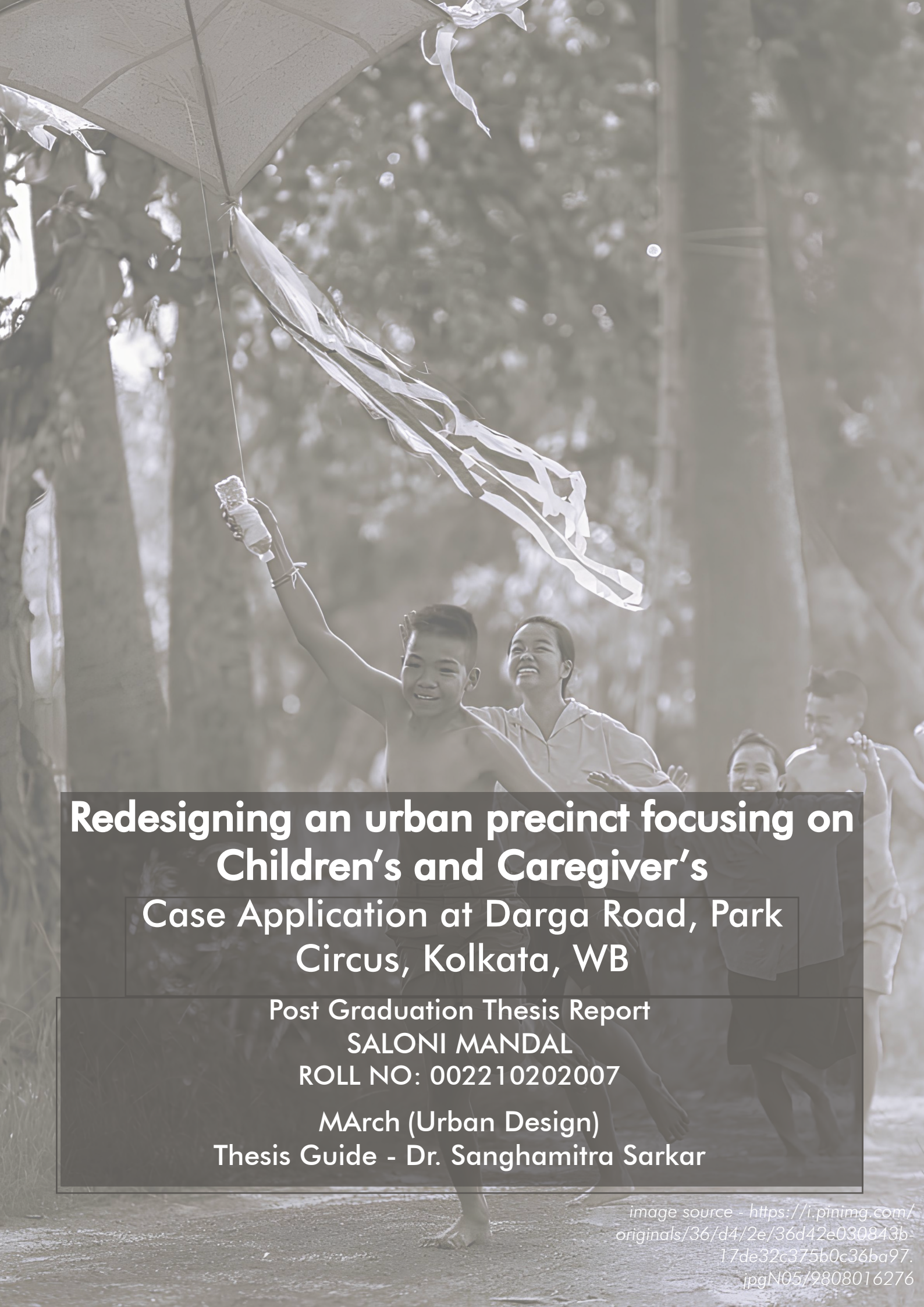

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MArch (Urban Design)

Thesis Guide - Dr. Sanghamitra Sarkar

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acknowledgement

I Saloni Mandal, a student of M. Arch (Urban Design), Department of Architecture, Jadavpur University, Kolkata would profusely like to thank Dr. Tapas Kumar Bhattacharya, Head of Department, Faculty of Architecture, Jadavpur University, who gave me the opportunity to undertake **Redesigning an Urban precinct focusing on Children's and Caregiver's** as my Master's thesis topic.

The still small voice of gratitude pays utmost respect to my guide Asst Prof. Sanghamitra Sarkar for her valuable insights and constant support during the entire course of my thesis project. Her perceptual guidance and constructive criticism has been of immense help during each stage of development.

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Thank you,

Saloni Mandal

abstract

The thesis report "Redesigning an Urban Precinct Focusing on Children and Caregiver" presents an innovative approach to urban design with a case application at Darga Road, Park Circus, Kolkata. The study addresses the unique needs of children and caregivers within urban environments, emphasizing safety, accessibility, and the integration of child-friendly spaces. By reimagining the neighborhood layout, streets, parks, and open spaces, the research aims to enhance the quality of life for these groups. The methodology involves participatory planning with direct input from children and caregivers, ensuring their voices are integral to the design process. Key objectives include redefining movement within neighborhoods, allocating urban spaces for interactive activities, and proposing amenities that foster community benefits. This thesis demonstrates the potential of child-centric urban design to create inclusive, vibrant, and supportive urban precincts, contributing to broader urban sustainability and livability goals .

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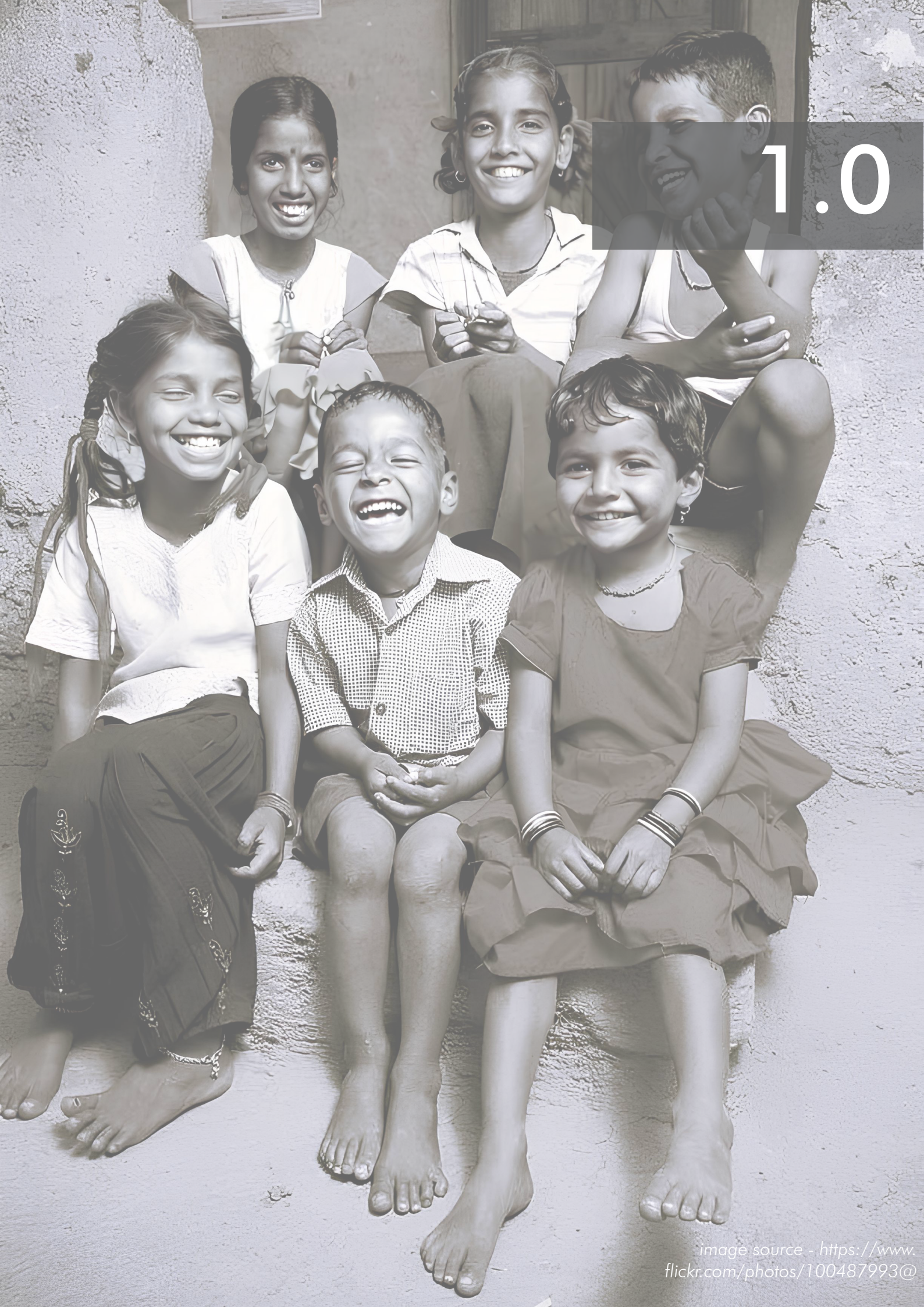

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1.0 introduction

1.1 Background

Urban design plays a crucial role in shaping the lives of its inhabitants, particularly the most vulnerable populations such as children and their caregivers. "Redesigning an Urban Precinct Focusing on Children and Caregiver," with a case application in Darga Road, Park Circus, Kolkata, addresses the urgent need to create urban spaces that are safe, accessible, and engaging for children. This project is grounded in the recognition that traditional urban environments often fail to accommodate the specific needs of children and caregivers, leading to spaces that are not only physically hazardous but also socially and developmentally restrictive.

The project is informed by international and national child-friendly urban planning initiatives and policies, including those from UNICEF, WRI, and the Bernard Van Leer Foundation, as well as India's MOHUA and Smart City Mission. The primary aim is to redefine movement within urban neighborhoods to make them conducive to children and caregivers. By focusing on creating designated spaces for children's activities, enhancing urban amenities, and ensuring community benefits, the project seeks to foster environments where children can thrive both physically and socially.

Key aspects of the redesign involve improving pathways, nodes, urban activities, built environments, and street amenities to align with child-friendly urban planning principles. This includes ensuring safe walkways, creating interactive and engaging public spaces, and incorporating necessary amenities that support both children and caregivers.

The project's scope extends beyond the immediate redevelopment of the Darga Road precinct. It aims to establish a prototype that can be adapted and implemented in similar urban fabrics, thereby promoting wider urban renewal based on child-friendly principles. Despite existing challenges such as traffic congestion, inadequate green spaces, and unplanned growth, the project leverages the neighborhood's strengths, including its strategic location, mixed-use development, and connectivity, to transform it into a model of child-friendly urban design.

By integrating insights from successful case studies in Mumbai, Bhubaneswar, and Eindhoven, the project demonstrates the potential of child-friendly urban design to revitalize neighborhoods, making them safer, more inclusive, and conducive to the well-being of children and their caregivers .

1.2 Definitions

Designing - To plan and make a drawing of how something will be made *(Oxford English Dictionary)*

Redesigning - Design something again or in a different way *(Oxford English Dictionary)*

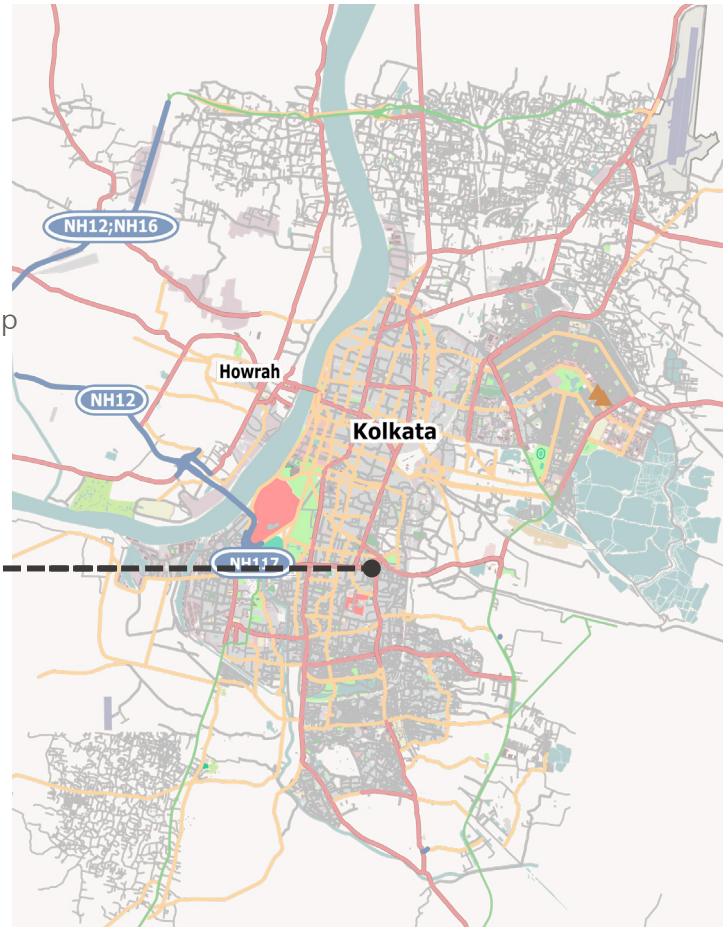
Urban - Connected with a town or a city *(Oxford English Dictionary)*

Urban Precinct - The layout of an Urban area's, blocks, lots, streets and public spaces to accommodate people living in apartments or residential or institutional or mixed-use buildings (Planning, 2023).

Children's - A child is any person under the age of 18*(unicef.org)*.

Caregiver's - An informal caregiver is a family member or a natural person who assists and oversees the day-to-day care of a disabled person. They offer daily services such as listening to the care recipient, providing companionship and phone contact, helping with meals and medications, and helping with worries, anxiety, and emotional needs. It is not necessary for the informal caregiver to live with the frail person in the home (Wikipedia contributors, 2024).

Darga Road, Park Circus - Darga Road, Beniapukur is a locality, located near Park Circus in Kolkata City, WB, India. This area has many Dargah/Masjid along with famous Park Circus Maidan at 7-point crossing. The predominant use looks like majorly Residential with Commercial shop & repair at ground floor level. This area also has many schools/colleges out of which 2 major schools of Kolkata i.e. Don Bosco & MBWA are located in this locality.



Map of Kolkata

Source : https://en.wikipedia.org/wiki/Park_Circus#/

1.3 Literature study

1.3.1 Background

Problems

Children's independence and development are frequently impaired in the chaotic urban environment because it is unfriendly to them and since only mature, healthy people can utilize its infrastructure, which makes children dependent on others.
Here are some highlights from the WHO website to consider: Children's health is significantly impacted by road traffic injuries.

Road traffic injuries account for over 220,000 deaths of children and adolescents worldwide between the ages of 0 and 19 each year, making them the largest cause of mortality for those between the ages of 5 and 19.

That translates to about every two minutes, or more than 600 avoidable traffic deaths among youth and children every day.
Injuries from driving are the second most common cause of mortality for kids between the ages of 5 and 9 and 10 and 14.

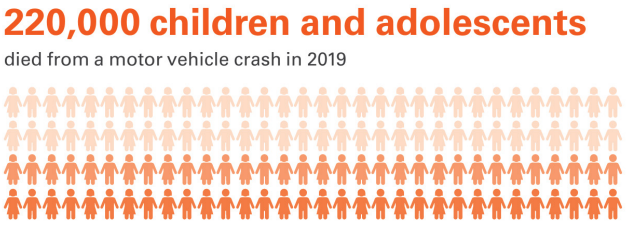


Figure 01 - A 2019 data showing no. of road accidents

Income level*	Road traffic deaths	Proportion of road traffic deaths	Road traffic injury death rate per 100,000 children aged 0–19 years
Low-income	66,914	30%	19.5
Lower middle- income	105,590	48%	8.2
Upper middle- income	39,846	18%	5.8
High-income	7,288	3%	2.8

Source: World Health Organization, Global Health Estimates, 2019 (data made publicly available in 2021).
* See Appendix 1 for the income level of each country

Table 01 - Proportion of child road traffic injury deaths by country income level, 2019

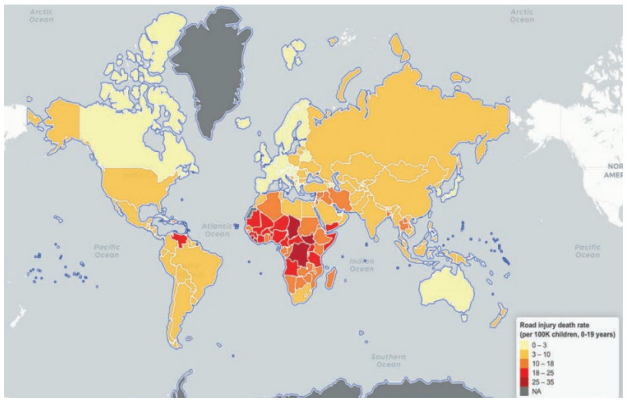
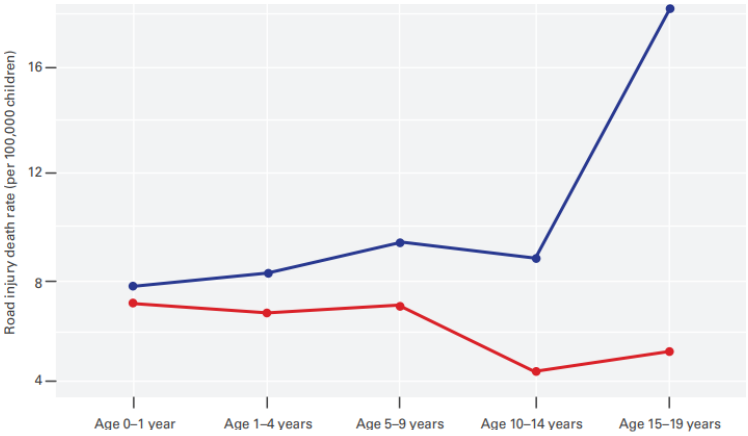


Figure 02 - Map of road traffic injury death rates of children and adolescents, aged 0-19 years (for continuity), globally, 2019



Age group	Male		Female	
	Deaths	Rate	Deaths	Rate
Age 0–1 year	5.402	7.73	4.628	7.04
Age 1–4 years	22.857	8.21	17.534	6.71
Age 5–9 years	31.806	9.34	22.193	6.96
Age 10–14 years	28.758	8.77	13.802	4.51
Age 15–19 years	57.340	18.29	15.316	5.23

Source: World Health Organization, Global Health Estimates, 2019 (data made publicly available in 2021).

Figure 03 - Rate of death due to traffic road injury by age and sex, globally, 2019

Source : https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/ghe-leading-causes-of-death

Rank	Age under 1 year	Deaths	Age 1 to 4	Deaths	Age 5 to 9	Deaths	Age 10 to 14	Deaths	Age 15 to 19	Deaths	Age 0 to 19	Deaths
1	Nutritional deficiencies	2,072,199	Nutritional deficiencies	5,445,246	Nutritional deficiencies	5,864,595	Nutritional deficiencies	3,392,361	Nutritional deficiencies	2,288,070	Nutritional deficiencies	19,062,472
2	Congenital anomalies	619,575	Prematurity	1,692,767	Prematurity	1,172,023	Prematurity	1,105,311	Prematurity	1,002,690	Prematurity	5,515,635
3	Prematurity	542,844	Diarrhoeal diseases	1,277,634	Respiratory infections	1,039,019	Diarrhoeal diseases	884,848	Respiratory infections	768,919	Diarrhoeal diseases	4,328,474
4	Diarrhoeal diseases	523,595	Congenital anomalies	1,085,300	Diarrhoeal diseases	975,395	Respiratory infections	829,010	Diarrhoeal diseases	667,001	Respiratory infections	3,759,775
5	Respiratory infections	201,243	Respiratory infections	921,585	Congenital anomalies	789,426	Congenital anomalies	645,407	Congenital anomalies	549,503	Congenital anomalies	3,689,211
6	Malaria	103,042	Malaria	507,195	Malaria	549,382	Neonatal sepsis and infections	421,859	Cardiovascular diseases	544,202	Malaria	1,789,875
7	Birth asphyxia and birth trauma	97,992	Neonatal sepsis and infections	369,390	Neonatal sepsis and infections	442,410	Cardiovascular diseases	396,686	Falls	530,193	Neonatal sepsis and infections	1,724,131
8	Neonatal sepsis and infections	95,670	Birth asphyxia and birth trauma	317,285	Birth asphyxia and birth trauma	347,942	Falls	365,049	Other unintentional injuries	398,681	Birth asphyxia and birth trauma	1,362,887
9	Whooping cough	57,027	Tuberculosis	171,350	Other unintentional injuries	271,407	Other unintentional injuries	330,908	Neonatal sepsis and infections	394,802	Cardiovascular diseases	1,269,378
10	Other unintentional injuries	38,172	Other unintentional injuries	170,094	Cardiovascular diseases	246,789	Malaria	328,843	Road injury	364,445	Other unintentional injuries	1,209,262
11	Malignant neoplasms	20,139	Cardiovascular diseases	74,433	Falls	218,601	Birth asphyxia and birth trauma	315,252	Malaria	301,412	Falls	1,195,293
12	Exposure to mechanical force	12,840	Falls	74,284	Tuberculosis	189,220	Road injury	176,736	Birth asphyxia and birth trauma	284,416	Tuberculosis	695,685
13	Tuberculosis	10,008	Meningitis/ encephalitis	72,051	Exposure to mechanical forces	116,130	Exposure to mechanical forces	160,149	Interpersonal violence	272,287	Road injury	631,506
14	Meningitis/ encephalitis	9,691	Whooping cough	65,561	Meningitis/ encephalitis	112,587	Chronic obstructive pulmonary disease	153,433	Chronic obstructive pulmonary disease	215,935	Exposure to mechanical forces	560,874
15	HIV/AIDS	8,670	Exposure to mechanical forces	64,089	Collective violence and legal intervention	96,815	Interpersonal violence	137,444	Tuberculosis	213,341	Interpersonal violence	503,148

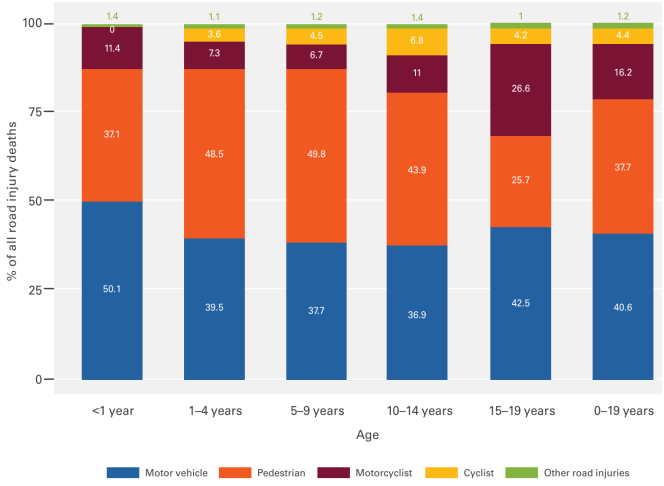
Source: World Health Organization, Global Health Estimates, 2019 (data made publicly available in 2021).

Table 02 - Causes of years lived with disability in children and sdolescents, aged 0-19 years, by age group, globally, 2019

Rank	Age under 1 year	Deaths	Age 1 to 4	Deaths	Age 5 to 9	Deaths	Age 10 to 14	Deaths	Age 15 to 19	Deaths	Age 0 to 19	Deaths
1	Prematurity	1,031,945	Respiratory infections	205,093	Diarrhoeal diseases	76,189	Diarrhoeal diseases	52,982	Road injury	72,656	Prematurity	1,043,452
2	Birth asphyxia and birth trauma	639,342	Diarrhoeal diseases	171,536	Road injury	53,999	Road injury	42,560	Tuberculosis	59,685	Respiratory infections	811,505
3	Respiratory infections	538,796	Malaria	165,894	Tuberculosis	39,894	Malignant neoplasms	21,648	Interpersonal violence	45,952	Birth asphyxia and birth trauma	652,395
4	Congenital anomalies	398,845	Measles	69,255	Respiratory infections	35,142	Respiratory infections	20,691	Self-harm	35,634	Diarrhoeal diseases	536,716
5	Neonatal sepsis and infections	341,379	Tuberculosis	67,201	Meningitis/ encephalitis	24,864	Meningitis/ encephalitis	18,802	Diarrhoeal diseases	27,028	Congenital anomalies	485,701
6	Diarrhoeal diseases	208,980	Whooping cough	53,401	Measles	23,474	Drowning	17,485	Malignant neoplasms	26,284	Neonatal sepsis and infections	341,437
7	Malaria	102,676	Congenital anomalies	48,430	Malaria	22,233	Other unintentional injuries	16,998	Cardiovascular diseases	25,192	Malaria	310,161
8	Meningitis/ encephalitis	76,737	HIV/AIDS	42,707	Malignant neoplasms	20,638	HIV/AIDS	16,883	Maternal conditions	19,124	Tuberculosis	244,791
9	Measles	72,567	Drowning	41,492	Congenital anomalies	18,243	Congenital anomalies	13,486	HIV/AIDS	16,349	Road injury	219,631
10	Tuberculosis	67,029	Other unintentional injuries	40,717	Drowning	17652	Cardiovascular diseases	13,461	Other unintentional injuries	16,075	Meningitis/ encephalitis	167,995
11	Whooping cough	45,547	Road injury	40,392	Other unintentional injuries	16,823	Malaria	11,348	Drowning	13,012	Measles	165,417
12	Nutritional deficiencies	39,146	Meningitis/ encephalitis	38,447	HIV/AIDS	12,373	Tuberculosis	10,982	Respiratory infections	11,783	Other unintentional injuries	136,883
13	Tetanus	30,191	Nutritional deficiencies	38,163	Cardiovascular diseases	9,675	Self-harm	10,172	Meningitis/ encephalitis	9,143	HIV/AIDS	110,748
14	HIV/AIDS	22,438	Malignant neoplasms	19,735	Whooping cough	9,195	Interpersonal violence	8,004	Malaria	8,012	Whooping cough	110,292
15	Cardiovascular diseases	14,551	Fire, heat and hot substances	16,952	Nutritional deficiencies	7,809	Falls	6,584	Congenital anomalies	6,697	Drowning	95,947

Source: World Health Organization, Global Health Estimates, 2019 (data made publicly available in 2021).

Table 03 - Leading causes of death in children and adolescents, aged 0-19 years, by age group, globally, 2019



Source: World Health Organization, Global Health Estimates, 2019 (data made publicly available in 2021).

Figure 04 - Child road injury deaths by mode of transport and age group, globally, 2019

Figure 05 - Children protesting for road safety in Jamaica

Road traffic injuries are the thirteenth overall cause of YLDs for children aged 0–19 years, and the tenth leading cause of YLDs among children aged 15–19 years. Road traffic collisions cause a significant number of children to be disabled, sometimes for life, in addition to a high mortality burden. Years lived with disability (YLD) is a measure of the years of healthy life that are lost due to disability (see Table 2) (Eveleth, 1996)

The burden of road traffic injuries is unevenly distributed between and within UNICEF regions. The child road traffic injury death rate varies from negligible in Antigua and Barbuda to 31.5 deaths per 100,000 children in South Sudan. The sub-Saharan Africa region is home to the majority of the child road traffic injury death rate, with average levels more than nine times higher than in European and Central Asian countries (see Figure 2) (Eveleth, 1996).

In India, the vulnerability of children is much higher as the Urban Environments are more challenging

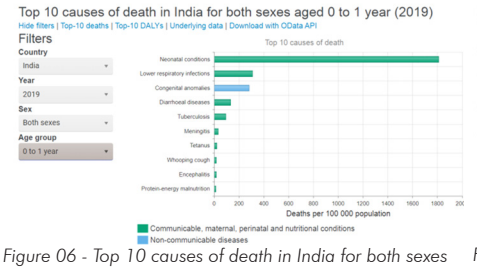


Figure 06 - Top 10 causes of death in India for both sexes aged 0 to 1 year, 2019

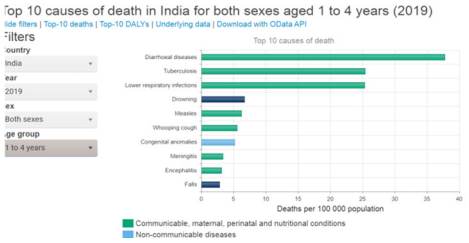


Figure 07 - Top 10 causes of death in India for both sexes aged 1 to 4 years, 2019

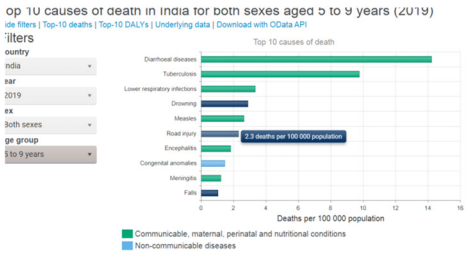


Figure 08 - Top 10 causes of death in India for both sexes aged 5 to 9 years, 2019

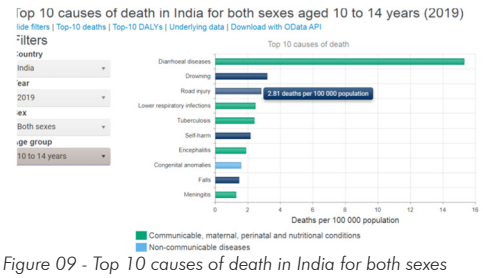


Figure 09 - Top 10 causes of death in India for both sexes aged 10 to 14 years, 2019

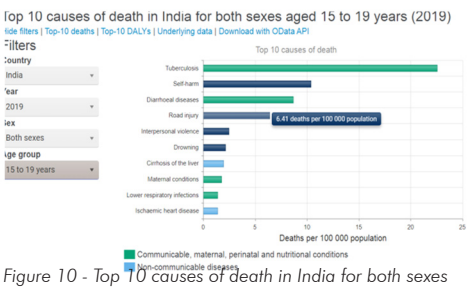


Figure 10 - Top 10 causes of death in India for both sexes aged 15 to 19 years, 2019

Road traffic injuries cause at least one death worldwide every 24 seconds, according to a FICCI-EY report released on Tuesday. According to the World Health Organization (WHO), road crashes rank eighth among all causes of death with over 1.3 billion fatalities and 50 million serious injuries. They are also the leading cause of death among young people. In India, road accidents claim approximately 1.5 million lives annually, accounting for 11% of all such fatalities worldwide. The Brasilia Declaration, which India signed, aims to reduce worldwide road traffic crash deaths and injuries by half by 2030. Tukuni Sahu, the Minister for Transport, Water Resources & Commerce, government of Odisha, released the report in the nation's capital (Eveleth, 1996).

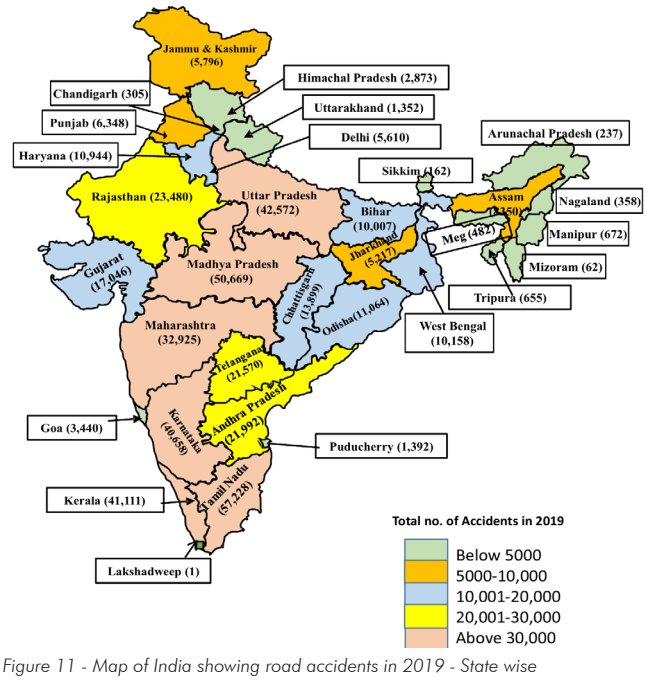


Figure 11 - Map of India showing road accidents in 2019 - State wise

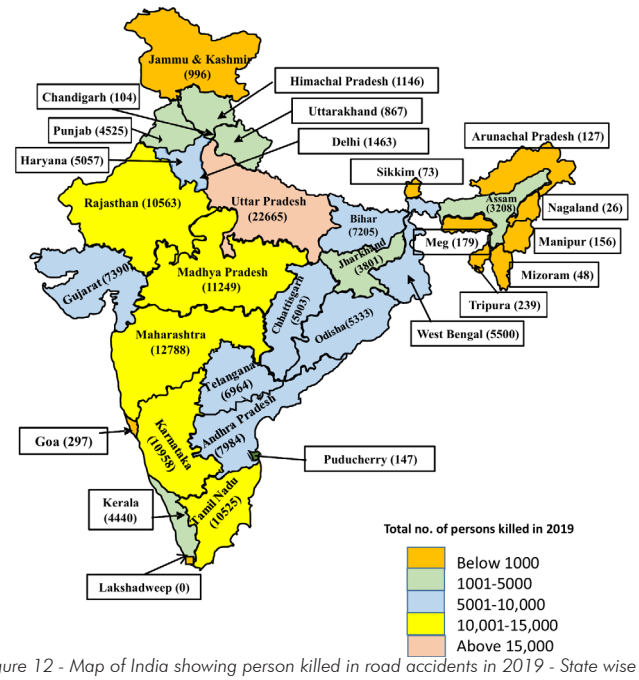


Figure 12 - Map of India showing person killed in road accidents in 2019 - State wise

Country	Accidents			Persons Killed			Persons injured	
	Number	Rank	per Lakh people	Number	Rank	per Lakh people	Number	World Rank
United States	22,11,439	1	684	37,461	3	12	31,44,000	1
Japan	4,99,232	2	393	4,698	21	4	6,14,155	2
India	4,80,652	3	36	1,50,785	1	11	4,94,624	3
Germany	3,08,145	4	374	3,206	34	4	3,96,666	6
Chinese Taipei	3,05,556	5	1302	1,604	57	7	4,03,906	5
Iran, Islamic Rep.	2,93,305	6	365	15,998	7	20	3,63,531	7
Korea, Rep.	2,20,917	7	431	4,292	24	8	3,31,720	8
China	2,12,846	8	15	63,093	2	5	2,26,430	11
Turkey	1,85,128	9	233	7,300	11	9	3,03,812	9
Italy	1,75,791	10	290	3,283	33	5	2,49,175	10

Table 04 - Country wise number of injury accidents, persons killed and injured with rankings per country

Age-group	Number of Persons killed			%-age change in 2018 over 2017	%-age change in 2019 over 2018
	2017	2018	2019		
Less than 18	9,408	9,977	11,168	6.05	11.94
% Share in total	6.4	6.6	7.4		
18-25	34,244	32,777	33,206	-4.28	1.31
% Share in total	23.2	21.6	22.0		
25-35	39,549	39,960	39,023	1.04	-2.34
% Share in total	26.7	26.4	25.8		
35-45	32,788	32,672	32,509	-0.35	-0.50
% Share in total	22.2	21.6	21.5		
45-60	22,462	22,798	22,612	1.50	-0.82
% Share in total	15.2	15.1	15.0		
Above 60	9,384	9,075	9,004	-3.29	-0.78
% Share in total	6.3	6.0	6.0		
Age not known	78	4,158	3,591	5,230.77	-13.64
% Share in total	0.1	2.7	2.4		
Total	**1,47,913**	**1,51,417**	**1,51,113**	2.37	-0.20

Table 05 - Age profile of road accidents related deaths during 2017-2019

S. No.	States/UTs	Total Number of Road Accidents occurred in States/UTs					Change in 19 over 18	% change in 19 over 18	Rank of States/UTs in Total Number of Road Accidents				
		2015	2016	2017	2018	2019			2015	2016	2017	2018	2019
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Andhra Pradesh	24,258	24,888	25,727	24,475	21,992	-2,483	-10.1	7	7	7	7	8
2	Arunachal Pradesh	284	249	241	277	237	-40	-14.4	29	29	30	30	30
3	Assam	6,959	7,435	7,170	8,248	8,350	102	1.2	17	16	16	16	16
4	Bihar	9,555	8,222	8,855	9,600	10,007	407	4.2	15	15	15	15	15
5	Chhattisgarh	14,446	13,580	13,563	13,864	13,899	35	0.3	11	11	11	11	11
6	Goa	4,338	4,304	3,917	3,709	3,440	-269	-7.3	21	21	18	21	21
7	Gujarat	23,183	21,859	19,081	18,769	17,046	-1,723	-9.2	9	10	10	10	10
8	Haryana	11,174	11,234	11,258	11,238	10,944	-294	-2.6	13	13	11	14	13
9	Himachal Pradesh	3,010	3,168	3,114	3,110	2,873	-237	-7.6	22	22	16	22	22
10	Jammu & Kashmir	5,836	5,501	5,624	5,978	5,796	-182	-3.0	19	19	14	19	18
11	Jharkhand	5,162	4,932	5,198	5,394	5,217	-177	-3.3	20	20	14	20	20
12	Karnataka	44,011	44,403	42,542	41,707	40,658	-1,049	-2.5	4	3	4	4	5
13	Kerala	39,014	39,420	38,470	40,181	41,111	930	2.3	5	5	5	5	4
14	Madhya Pradesh	54,947	53,972	53,399	51,397	50,669	-728	-1.4	3	2	3	2	2
15	Maharashtra	63,805	39,878	35,853	35,717	32,925	-2,792	-7.8	2	4	4	6	6

Sl. No.	States/UTs	Total Number of Road Accidents occurred in States/UTs					Change in 19 over 18	% change in 19 over 18	Rank of States/UTs in Total Number of Road Accidents				
		2015	2016	2017	2018	2019			2015	2016	2017	2018	2019
1	2	3	4	5	6	7	8	9	10	11	12	13	14
16	Manipur	671	538	578	601	672	71	11.8	25	27	13	25	25
17	Meghalaya	606	620	675	399	482	83	20.8	27	25	13	28	27
18	Mizoram	70	83	68	53	62	9	17.0	32	32	19	35	35
19	Nagaland	54	75	531	430	358	-72	-16.7	35	33	14	27	28
20	Odisha	10,542	10,532	10,855	11262	11,064	-198	-1.8	14	14	9	13	12
21	Punjab	6,702	6,952	6,273	6428	6,348	-80	-1.2	18	18	11	18	17
22	Rajasthan	24,072	23,066	22,112	21743	23,480	1737	8.0	8	8	9	9	7
23	Sikkim	219	210	196	180	162	-18	-10.0	31	31	17	32	32
24	Tamil Nadu	69,059	71,431	65,562	63920	57,228	-6,692	-10.5	1	1	2	1	1
25	Telangana	21,252	22,811	22,484	22230	21,570	-660	-3.0	10	9	10	8	9
26	Tripura	647	557	503	552	655	103	18.7	26	26	16	26	26
27	Uttarakhand	1,523	1,591	1,603	1468	1,352	-116	-7.9	24	24	16	24	24
28	Uttar Pradesh	32,385	35,612	38,783	42568	42,572	4	0.0	6	6	7	3	3
29	West Bengal	13,208	13,580	11,631	12925	10,158	-2,547	-20.0	12	11	13	12	10
30	Andaman & Nicobar Islands	258	238	189	254	230	-24	-9.4	30	30	18	31	31
31	Chandigarh	416	428	342	316	305	-11	-3.5	28	28	18	29	29
32	Dadra & Nagar Haveli	69	70	67	80	68	-12	-15.0	34	35	20	33	34
33	Daman & Diu	70	71	79	76	69	-7	-9.2	32	34	20	34	33
34	Delhi	8,085	7,375	6,673	6,515	5,610	-905	-13.9	16	17	18	17	19
35	Lakshadweep	3	1	1	3	1	-2	-66.7	36	36	22	36	36
36	Puducherry	1,530	1,766	1,693	1,597	1,302	-295	-12.8	23	23	20	23	23
	Total (All India)	5,01,423	4,80,652	4,64,910	4,67,044	4,49,002	-18,042	-3.9					
	Total (NE States)	9,510	9,767	9,962	10,740	10,978	238						
	Share of NE States	1.90	2.03	2.14	2.30	2.44							

Table 06 - State wise number of accodents and ranking in total accidents during 2015-2019

S. No	States/UTs	Total Accidents				No of persons Killed				No of persons injured			
		In numbers		Ranking		In numbers		Ranking		In numbers		Ranking	
		2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
11	Coimbatore	1,136	1,062	27	27	162	132	39	43	1,140	1,073	24	22
12	Delhi	6,515	5,610	2	2	1,690	1,463	1	1	6,086	5,152	2	2
13	Dhanbad	365	171	47	49	252	127	29	44	123	75	49	50
14	Faridabad	702	689	34	35	254	264	28	26	649	635	35	34
15	Ghaziabad	1,054	890	30	31	421	385	12	15	774	606	31	36
16	Gwalior	2,104	2,109	15	15	294	292	24	21	1,660	1,608	16	16
17	Hyderabad	2,846	2,900	8	8	310	271	23	24	2,629	2,649	9	9
18	Indore	3,434	3,383	5	6	322	328	20	18	2,954	2,991	7	6
19	Jabalpur	3,419	3,397	6	5	374	406	13	14	3,166	3,530	5	5
20	Jaipur	2,781	4,271	9	4	692	1,283	4	2	2,265	3,581	13	4
21	Jamshedpur	311	191	49	48	157	92	41	48	219	129	48	48
22	Jodhpur	549	1,117	41	25	245	589	30	8	434	834	41	28
23	Kannur	621	657	35	37	68	82	49	49	735	811	32	30
24	Kanpur	1,588	1,507	21	21	698	692	3	5	1,211	1,043	22	23
25	Khozikode	1,423	1,597	23	20	154	179	42	38	1,552	1,597	17	17
26	Kochi	2,411	2,290	12	12	141	155	44	42	2,478	2,254	12	12
27	Kolkata	2,663	2,500	10	11	294	267	24	25	2,162	2,004	14	14
28	Kollam	1,940	1,940	17	17	241	225	31	30	1,997	1,981	15	15
29	Kota	466	784	43	34	89	225	47	30	478	813	40	29
30	Lucknow	1,638	1,685	20	19	580	581	8	9	1,005	931	25	27
31	Ludhiana	477	553	42	41	328	264	17	26	240	289	46	46
32	Madurai	962	866	32	32	153	193	43	36	945	799	27	31
33	Mallapuram	2,423	2,562	11	10	367	364	14	16	2,601	2,826	10	8
34	Meerut	1,019	956	31	29	443	413	10	13	717	644	33	33
35	Mumbai	3,162	2,872	7	9	475	447	9	11	3,292	2,925	4	7
36	Nagpur	1,117	1,007	28	28	237	250	32	29	1,187	1,042	23	24
37	Nashik	581	553	37	41	217	177	34	39	557	540	37	39
38	Patna	406	524	45	43	178	192	38	37	220	314	47	45
39	Pune	1,194	791	26	33	352	206	16	33	891	626	28	35
40	Raipur	2,075	2,146	16	14	427	458	11	10	1,374	1,581	21	18
41	Rajkot	568	575	38	39	202	170	35	40	481	437	39	40
42	Srinagar	375	310	46	46	46	45	50	50	383	323	42	44

Table 07 - City wise number of accodents and ranking in total accidents during 2015-2019

Death caused

Class VII girl with mother dies in VIP road accident while riding a two-wheeler
Hiya Ray, 12, was runned away from a truck at Kaikhali on VIP road around 3 p.m. on Sunday. She was riding a scooter with her mother when she got into the collision, and even though she had her helmet securely fastened, she fell to the ground and got crushed between the truck's front wheel and her skull (TOI, 2024).

How the death of a 7-year-old boy beneath a truck stunned Behala Chowrasta
Broken glass pieces littered a 750-meter section of Diamond Harbour Road on Friday morning. Burned and damaged cars had been towed away and disposed of close to Behala Chowrasta. Senior Kolkata Traffic Police officers and members of the special task force were visible. Just hours before, Souranil Sarkar, a Class II student, was crushed beneath the wheels of a truck while traveling to Barisha High School to take his physical education test (TOI, 2023)

Figure 13- Accidents cases

Figure 14 - Accidents cases

An estimate from the Global Institute of McKinsey and Company (2010) states that by 2030, 590 million Indians would reside in cities, which will create 70% of all new jobs.
Given that cities account for more than 65% of India's GDP, cities are increasingly acknowledged as catalysts for economic expansion.
Therefore, the "youngest children" are one category of Indian citizens who can help optimize the potential of rapid urban growth.

According to the 2011 Census of India, 11.45% of the urban population is made up of children aged 0 to 6. The way India's cities develop now will decide the kind of workforce and citizens that emerge from them. "Young Children" are the next generation of the urban workforce, a human resource to drive progress.

Young children are affected by all aspects of the cities, of which the most significant impacts are experienced in the following areas :-

- Water & Sanitation
- Decent Housing
- Early childhood services
- Healthcare
- Recreational Spaces
- Transport
- Safety

1.3.2 Demography

Calcutta/Kolkata stands on the Eastern Bank of River Ganga. The Vital Statistics of a capital city, called by the British Raj as The Jewel of the East, and remained its capital till 1911, Kolkata is now the capital of West Bengal a state of India.

Location : Kolkata is situated at the longitude of 88° 30'E - 22° 33' N.Altitude : 9m (30'). From sea level it is 6.4 meters (20 ft). (Mount Everest 8848m.)
Climate : Maximum temperature - 24 - 42° C and the minimum temperature falls up to 8 - 26°C on an average. Climate is hot and humid.
Average rainfall in Kolkata is 158 cm.

AREA
Old Kolkata : Sutanuti - Chitpur, Baghbazar, Sobhabazar & Hatkhola.
Kolkata - Dharmatala, Bowbazar, Simla, Janbazar.
Gobindapur - Hastings, Maidan & Bhowanipur
New Kolkata : North - Sinthi, Cossipore & Gughudanga
South - Tollygunge, Khidderpore & BehalaEast - Salt Lake , Beliaghata & Topsia.West - Hooghly river.
Greater Kolkata : Baruipur to Bansberia & Kalyani to Budge Budge.
Area in kilometers : 1480 sq. km. (London 1580 sq. km.) 205 sq. km. is within Corporation Area.
Population : A growing population of 45,80,544 according to 2001 Census. (Mumbai 14.8 million.)
Density of Population : 24.760/ sq. km.
Ratio of Population : Male - 1000; Female - 956;Literacy
Rate : 81.31%
Mother Tongues : Bengali 55%, Hindi 20%, English 10%, Others 15%
Position : 7th biggest city of India in area and population.

Kolkata Population Facts as per Census data (2011)

- Number of Households 1024928
- Population 4496694
- Male Population 2356766 (52.41%)
- Female Populati 2139928 (47.59%)
- Children Population 339323
- Sex-ratio 908
- Literacy 79.8%
- Male Literacy 81.76%
- Female Literacy 77.63%

WARD NOS.	Population
Kolkata Ward No - 59	70261
Kolkata Ward No - 60	35732
Kolkata Ward No - 61	29704
Kolkata Ward No - 62	34832
Kolkata Ward No - 63	24387
Kolkata Ward No - 64	31280
Kolkata Ward No - 65	72427
Kolkata Ward No - 66	98024
Kolkata Ward No - 67	56284
Kolkata Ward No - 68	20724
Kolkata Ward No - 69	44111

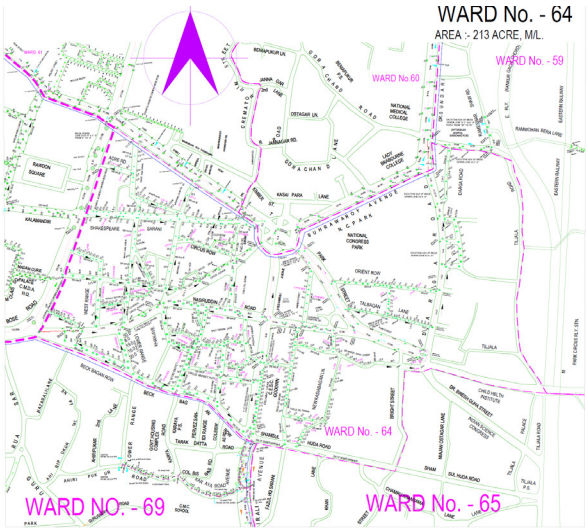


Figure 15 - Map of ward 64

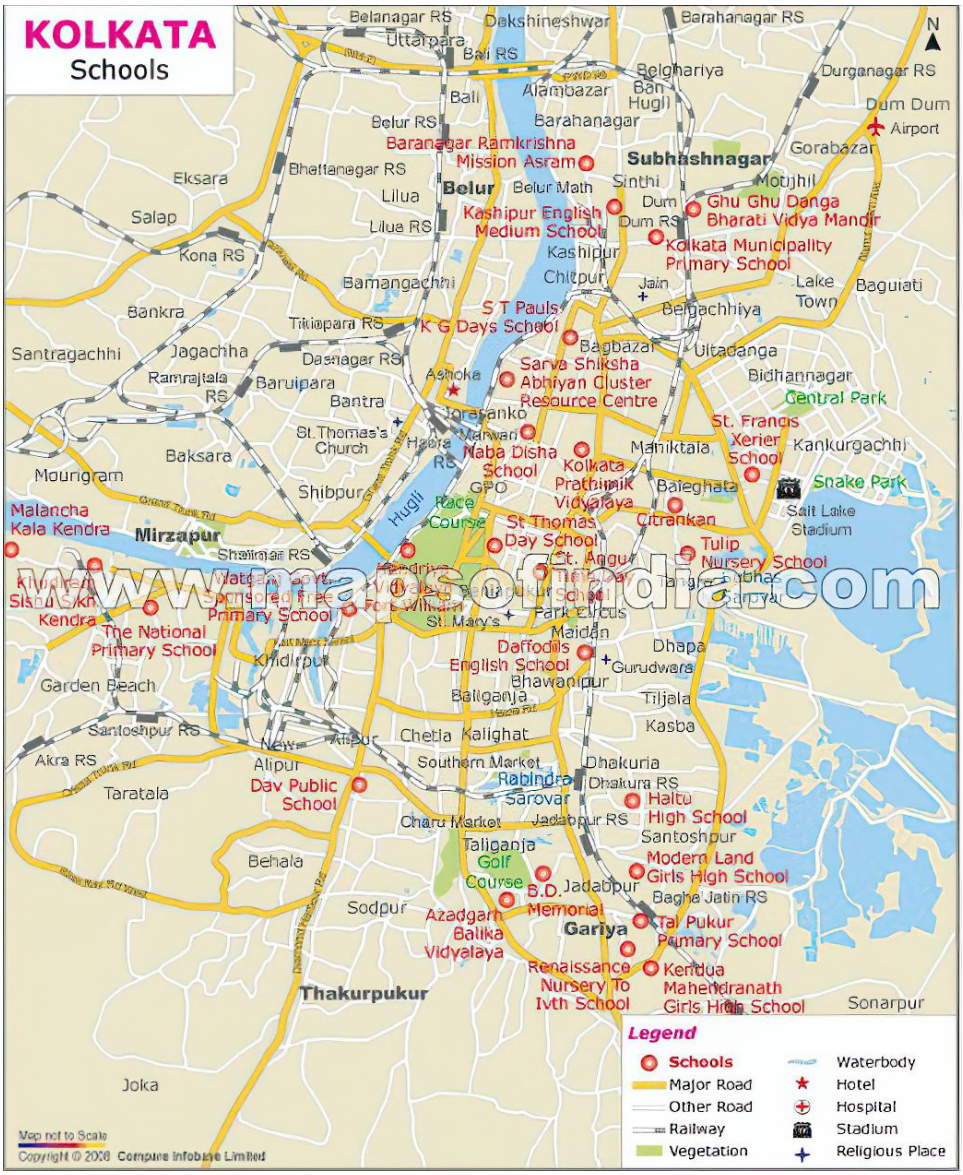


Figure 16- Area level map with major schools in Kolkata

Year	Total Schools	Total Primary Schools	Total Secondary Schools	Total Higher Secondary Schools
Number of Schools in India in 2014	15,18,160	12,89,958	1,41,941	86,261
Number of Schools in India in 2015	15,16,892	12,87,065	1,42,592	87,235
Number of Schools in India in 2016	15,22,346	12,86,803	1,43,196	92,347
Number of Schools in India in 2017	15,35,606	12,95,314	1,47,933	92,359
Number of Schools in India in 2018	15,58,903	12,69,236	1,64,403	1,25,314
Number of Schools in India in 2019	15,51,000	12,70,374	1,50,604	1,30,022
Number of Schools in India in 2020	15,07,708	12,22,485	1,51,489	1,33,734
Number of Schools in India in 2021	15,09,136	12,17,670	1,51,946	1,39,520
Number of Schools in India in 2022	14,08,115	11,96,265	1,50,452	1,42,398

Table 08 - Table to show the number of schools in India

States	Total Schools	Total Schools with Library/ Book Bank/ Reading Corner	Total Schools with Playground	Total Schools with Digital Library	Total Schools with Kitchen Garden	Total Schools with Girls' Toilet	Total Schools with Functional Girls' Toilet	Total Schools with Boys' Toilet	Total Schools with Functional Boys' Toilet	Total Schools with Electricity	Total Schools with Functional Electricity	Total Schools with Solar Panel
Number of Schools in West Bengal	94744	82811	62567	375	6496	93624	93617	91845	91838	92182	91103	3

Table 09 - Table to show the infrastructure facilities offered by schools in India

There are approximately 262 schools in Kolkata

1.3.3 Area Delineation

Figure 17 - Map of India showing West Bengal

Figure 18 - Map of West Benga showing Kolkata

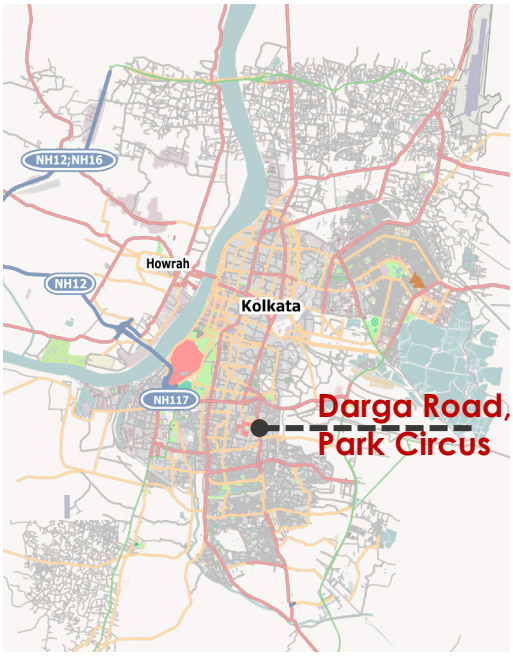


Figure 19 - Map of Kolkata with Darga Road, Park Circus

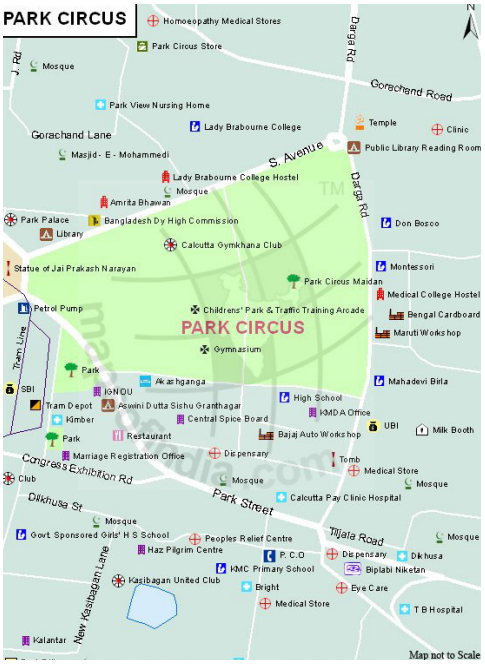


Figure 20 - Map of Park Circus

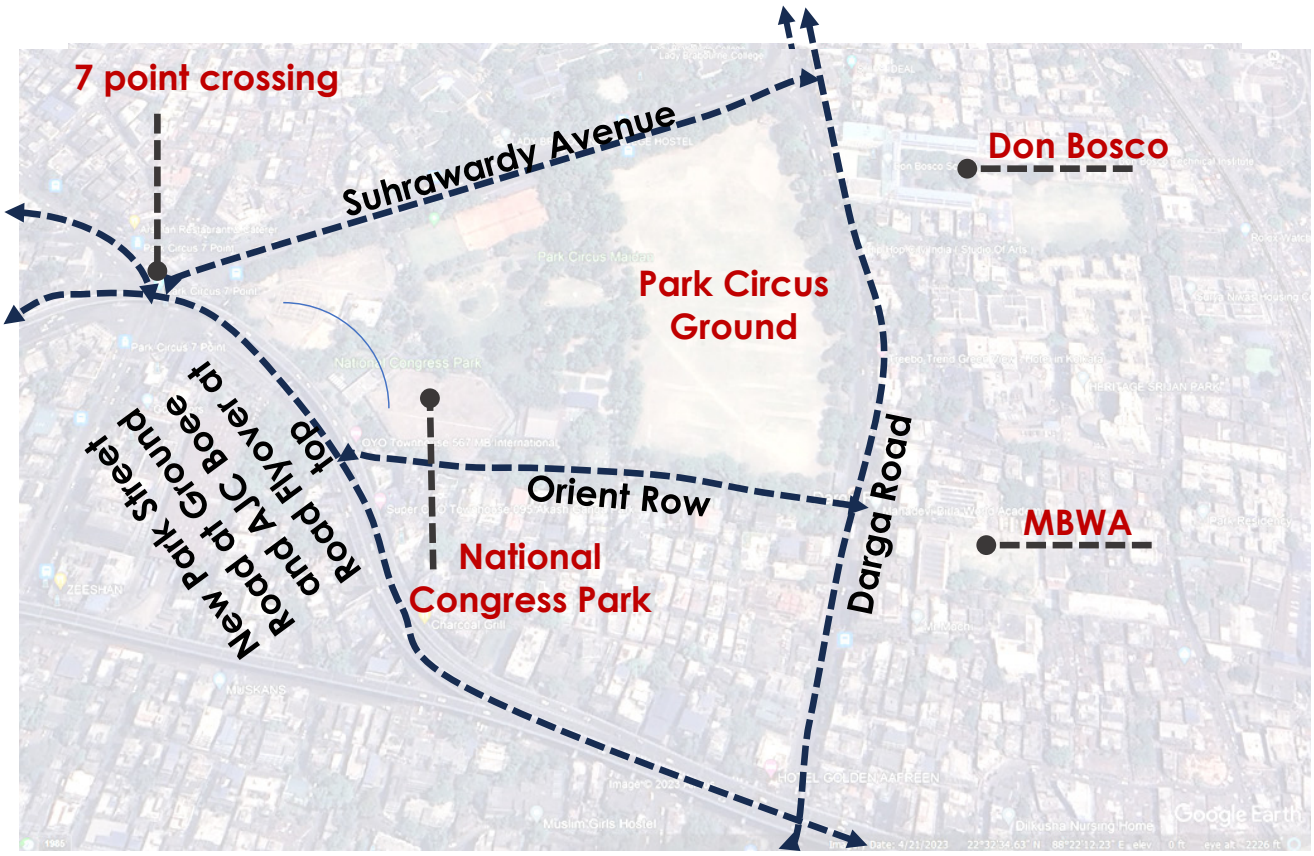


Figure 21 - Delineation of Darga Road, Park Circus

SWOC Analysis

Strength

- Located in heart of the city
- Residential, Commercial, Institutional land Industrial Neighborhood
- Good Connectivity

Weakness

- Unplanned growth and development
- Mixed use development
- Congested and cluttered activity movements

Opportunities

- Upgradation of Neighborhood and Instuitional precinct
- Redesigning and Introduction of of public spaces in neighborhood

Challenges

- Traffic Congestion and inadequate parking spaces
- Availability of public spaces
- Inadequacy of green spaces
- Existing city level challenges

1.3.4 Relevance

The similar cases can be seen relevant in various other sectors as follows :

International Policies

- UNICEF
- WRI
- Bernard Van Leer Foundation
-

National Policies

- MOHUA
- Smart City Mission
- NIUA

Similar Type of Work going on

- Bhubaneswar Smart City
- Nurturing Neighborhood Challenge
- Urban 95
- Cities 4Kids

Parameters for study

- Child Friendly Design Guidelines

1.3.5 Aim

*"**Revitalization** of **Neighborhoods** using **Child friendliness** as a key"*

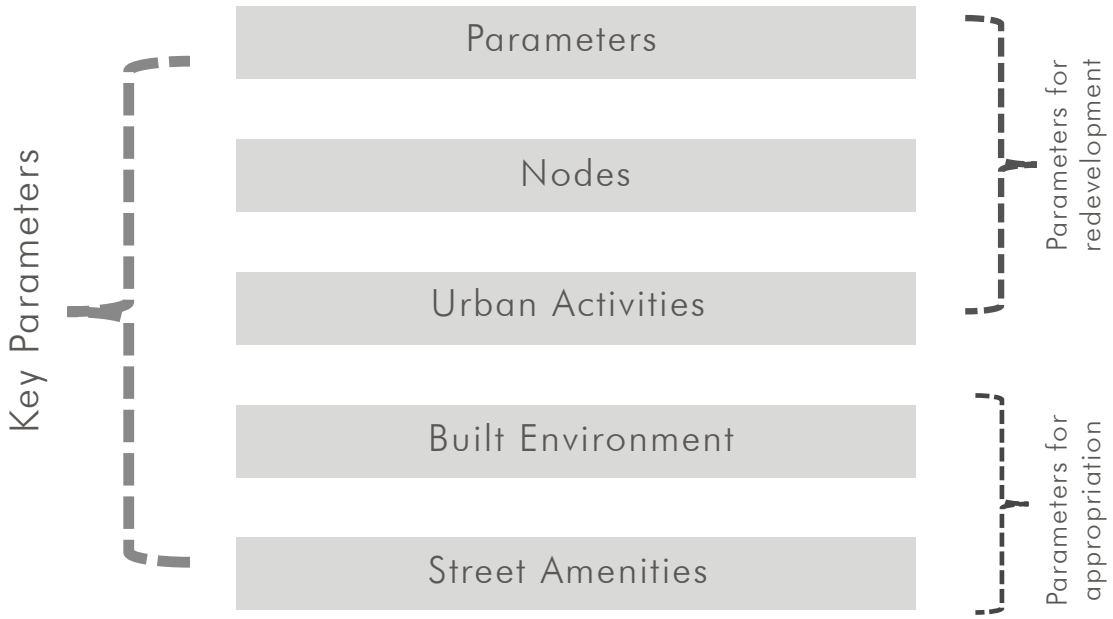
1.3.6 Objective

- To redefine movement within urban neighborhoods making it conducive for Children & Care-givers
- To allocate urban spaces for the activities focusing on improving Children & Care-givers interaction.
- To propose urban amenities & facilities ensuring community benefits for Children & Care-givers

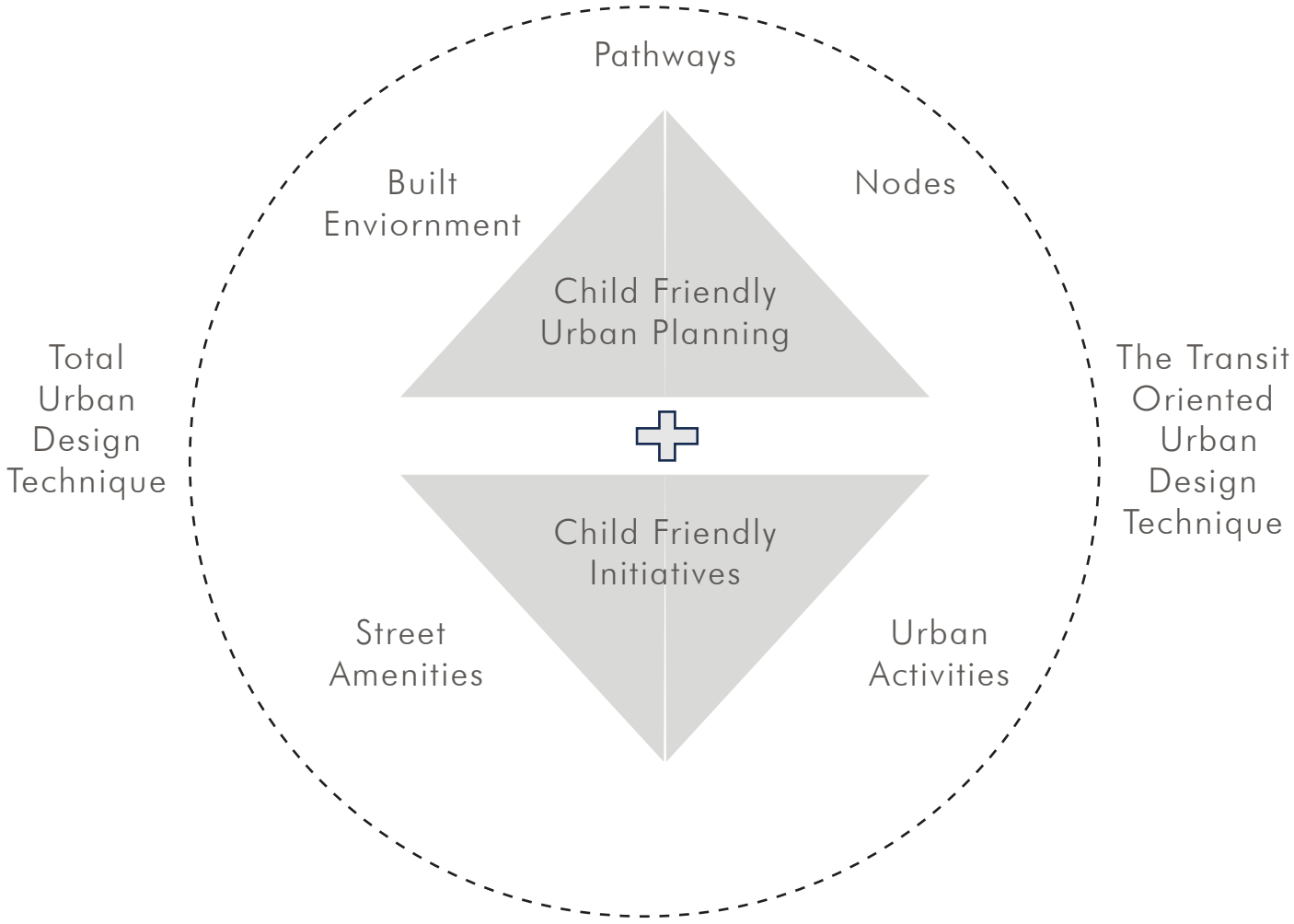
1.3.7 Scope and Limitation

- This thesis has a scope of work to use Child Friendly initiatives for redevelopment of Institutional areas for improving neighborhood layout, streets, parks & open spaces. Social infrastructure and Urban Services.
- This thesis also has a scope of work to implement prototype model in similar urban fabric.
- This thesis is limited to suggest redevelopments considering existing land-usage and urban activities of the city.

1.3.8 Study Parameters



Existing Concepts

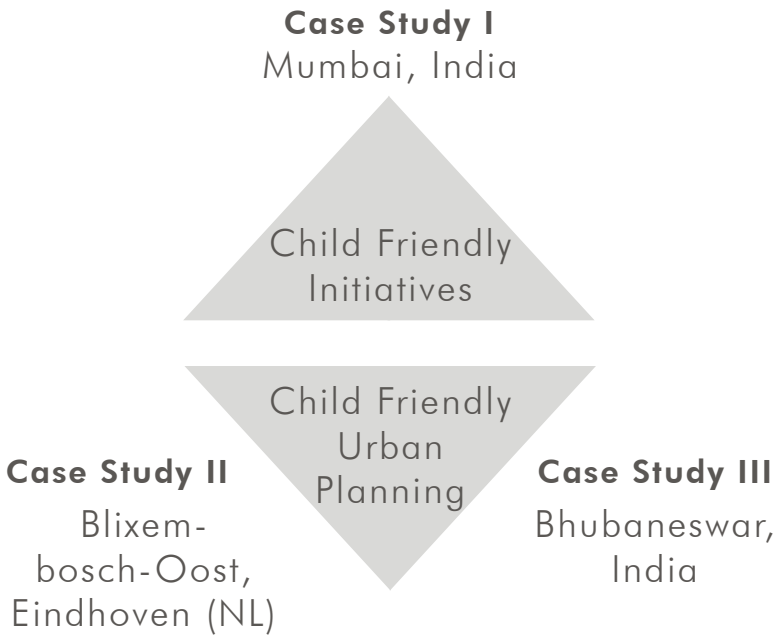


2.0

2.0 case example I selection

It's crucial to take into account a number of important elements when selecting case studies for a child-friendly initiative design in order to guarantee relevance, efficacy, and impact. Understanding the target population's context and demography is the first step, with a particular emphasis on the needs and cultural backgrounds of the children involved. A thorough grasp of different issues and their solutions can be obtained by choosing research from a variety of geographic areas, it's important to think about the projects' breadth, including whether they focus on play, safety, education, or health. To identify best practices and steer clear of earlier blunders, it is imperative to assess the success indicators and results of prior efforts. Involving parents, educators, community leaders, and kids in the selection process guarantees that the initiatives are based on needs and viewpoints that are relevant to the actual world.

Figure 22 - World map showing the different locations of Case Applications for Child Friendly Initiative Design



2.1 Case Application 1 I Mumbai India

Introduction

- Mumbai Traffic Police, MCGM, with technical assistance from WRI India, together with locals and experts, made way for safer, lively, walkable, kid-friendly streets in Mumbai as schools around the nation reopened following the Covid pandemic.
- The project is predicated on tactical urbanism concepts. A quick, affordable, and scalable method of creating urban landscapes is tactical urbanism.
- In order to improve pedestrian safety, the project's design aimed to redesign school zones and make minor adjustments to the 500-meter radius.
- Using GIS mapping, 2610 schools were plotted in Mumbai, and it was found that 60% of the city's road surfaces provide access to schools, meaning that they are all within walking distance of one another.
- In Mumbai, almost 70% of fatal crashes occur within a 500-meter radius of schools, and 28% of schools have seen more than three fatal crashes inside that radius.
- Two educational institutions, Christ Church School and St Agnes High School, are located on Mirza Ghalib Road in the city's E-ward (Byculla).
- A 500-meter radius around Christ Church saw 23 collisions and three fatalities between 2017 and 2019. This also featured the deaths of one pupil and two children who were seriously hurt returning home.
- As part of the Bloomberg Initiative for Global Road Safety, WRI India, the Municipal Corporation of Greater Mumbai (MCGM), the Mumbai Traffic Police, and the Christ Church School collaborated to establish a safer school zone in the Byculla neighborhood of Mumbai in October 2021.

(WRI Ross Center for Sustainable Cities, 2024)

Figure 23 - Child Friendly Initiatives in Mumbai by WRI

Mumbai Traffic Police, MCGM, with technical assistance from WRI India, locals, and experts create safer, lively, walkable, kid-friendly streets in Mumbai as schools around the nation reopen after a year and a half (Mumbai Gets Its First Safe School Zone, n.d.).

At Byculla's Mirza Ghalib Road, the Municipal Corporation of Greater Mumbai (MCGM) and Traffic Police, in collaboration with World Resources Institute (WRI) India Ross Center, have started the city's first "Safe School Zone" trial.

Under the Bloomberg Philanthropies Initiative for Global Road Safety (BIGRS), the "Safer Access to Schools" initiative was carried out. It seeks to develop Mumbai's school zones into kid-friendly, pedestrian areas. Design ideas that make the road safer, more lively, barrier-free, walkable, and enjoyable for all users—especially kids—will be tested as part of the trial.

Mumbai Traffic Police, MCGM, specialists, and community members collaborated on Wednesday to start the trial with paint, cones, and barricades. The architectural ideas include utilizing road markings and signage to demarcate the school zone and designating specific spaces for waiting and walking areas, pick-up and drop-off zones, kid-friendly areas with entertaining features, and a bustling pedestrian crossing are just a few of the amenities available. The low-cost material trial will help gather neighborhood input before implementing it permanently on the ground.

Figure 24 & 25 - Child Friendly Initiatives in Mumbai by WRI

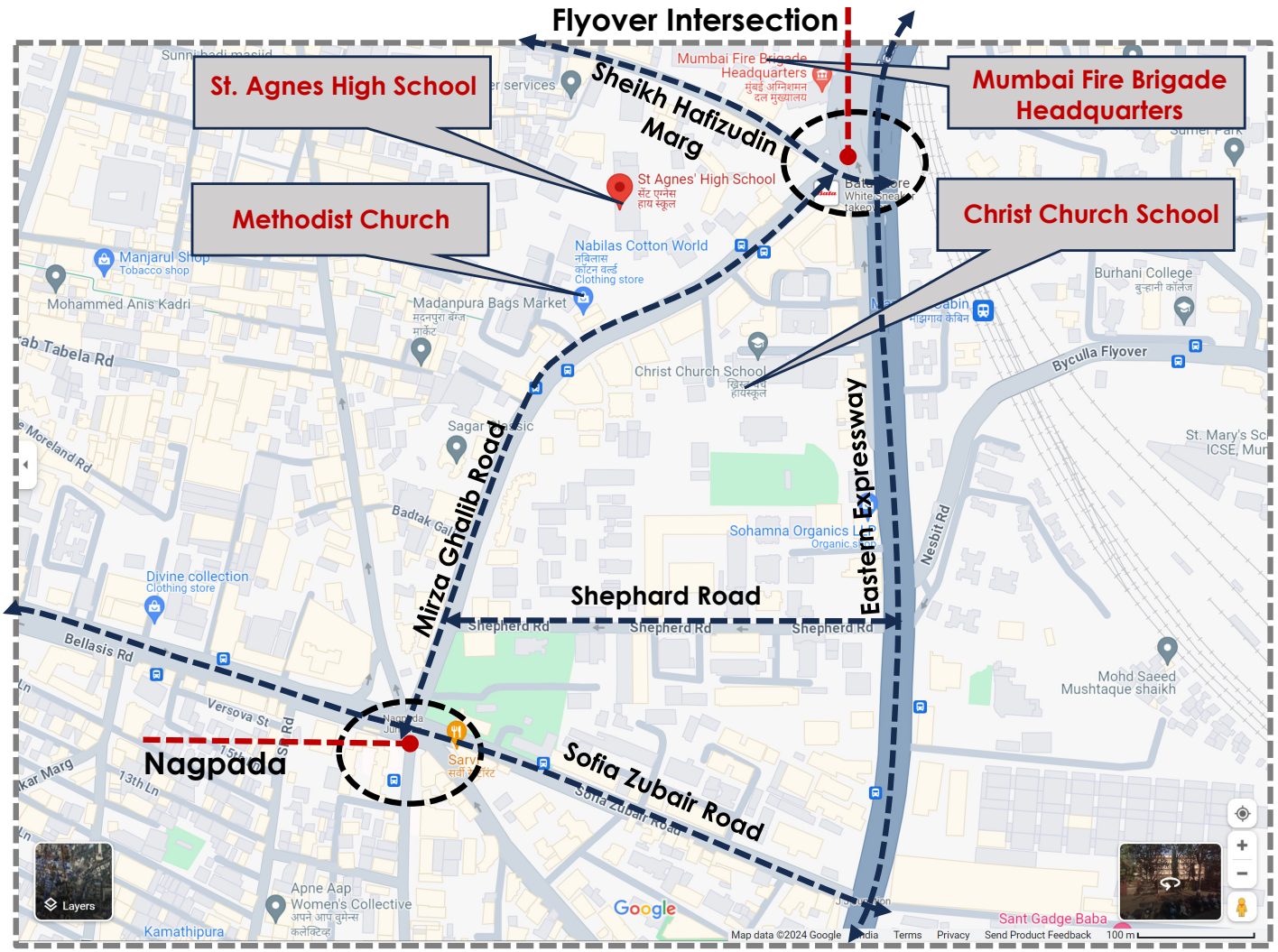


Figure 26 - Map showing the map of Mumbai where the Child Safe Zone project is implemented

Relevance

- The "Safer Access to School" focal point
- Make school zones kid-friendly and pedestrian-friendly a priority.
- Design ideas that can be duplicated to comparable metropolitan neighborhoods are being trial tested.

2.1.1 Pathways

- A portion of the road was modified to create a "Safe Walking Space."
- It was determined that speed-calming techniques, such as speed breakers and suitable signs, were required to lower vehicle speeds by up to 17% and establish safer school zones.
- In order to direct traffic in areas designated for waiting and walking, pick-up and drop-off, kid-friendly areas, and active pedestrian crossings, road markings and signage have been installed.
-
- In order to make parking spaces for school vehicles and local transportation, pedestrian walkways were shortened.
- Although Mirza Ghalib Street featured broad sidewalks, there were frequently obstructions in the way of walking or encroachment upon them.
- The pathway was marked with waiting places and walking paths. This lessens the invasion of vendors, particularly at the pick-up and drop-off locations with heavy traffic.
- The street section's upgrade seemed to have been conceptualized from a child's point of view in order to better grasp their routes.
- To enhance the pedestrian experience for students in this school zone, the design incorporated basic road markings, guide stripes on walkways, and vibrant pavement markings.

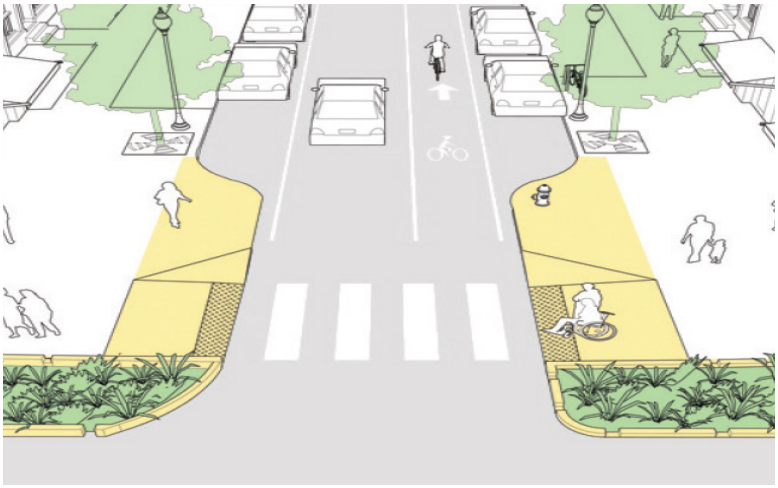


Figure 27- Road Cross Section Improvement

Figure 28- Christ Church School and Mirza Galib Street View

2.1.2 Nodes

- Organizing travel lanes was a crucial step in ensuring optimal safety. The road becomes less broad for students to cross when bulb-outs are introduced.
- These are additions to sidewalks that lessen the distance that people must cross streets and the amount of time that they must come into touch with moving cars.
- Vehicle speeds are known to drop by 2–8 km/h on average when there are bulb outs.

Figure 29 - Bulge out near important nodes at Mirza Galib Street

2.1.3 Urban Activities

- To make school zones more noticeable to cars and other users, traditional zebra crossings have been updated with vibrant colors.
- Children were also assisted in identifying crossings and pathways near the school entrance by painting them. This greatly reduced the amount of jaywalking.

Figure 30 - Traditional Zebra Crossing updated with Vibrant Colors

2.1.4 Built Environment

- Compared to the masterplan, Mumbai has only one square meter of green space per person.
- Mumbai has the second-lowest per-capita open space availability, a dearth of reasonably priced housing, and beach litter.
- Mumbai's 55% impoverished population is frequently left out of urban development and lives in slums.
- These kinds of transformations seldom have a quantitatively significant, broad impact. Instead, it emphasizes the vibe that a place gives off, which could alter how people perceive and interact with it.

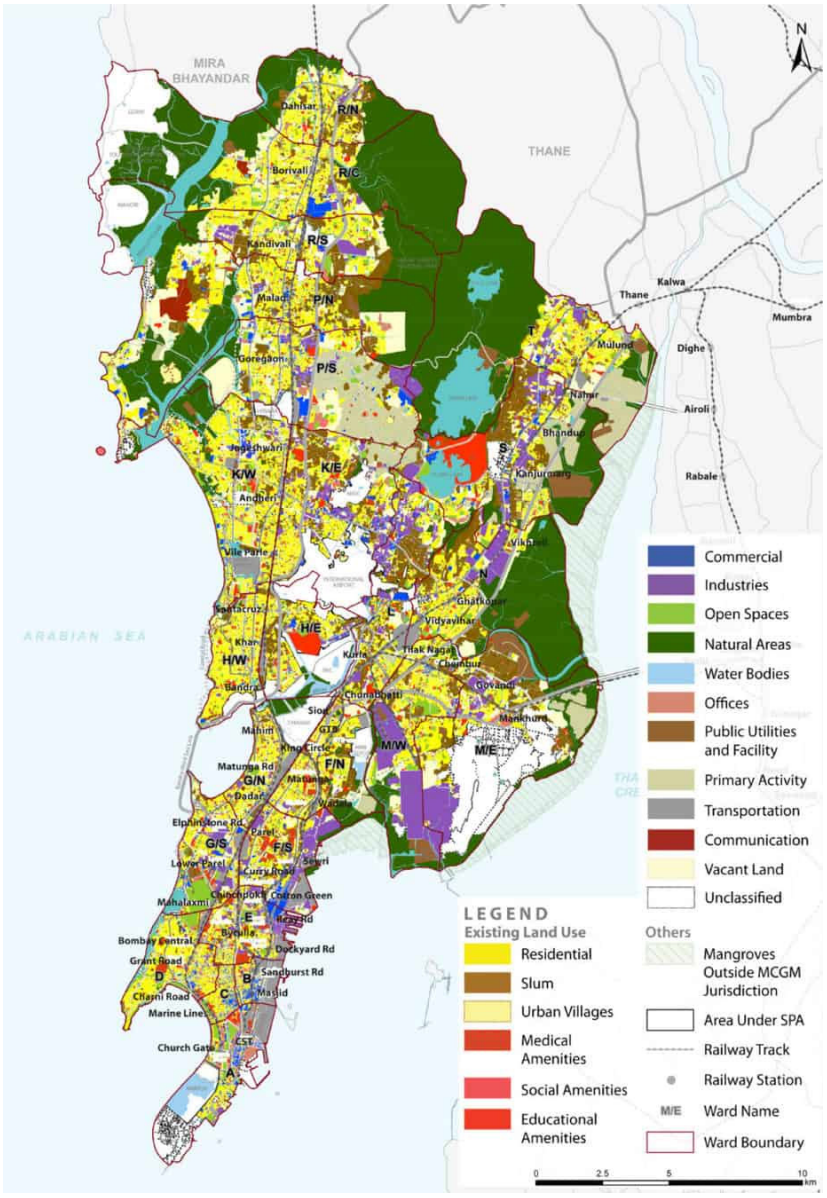


Figure 31 - The existing DP landuse Map of Mumbai

2.1.5 Street Amenities

- Areas where kids would stroll and cross the street were marked with signs like "School Zone" and "School Zone Ahead."
- Whenever appropriate, the signs "Stop" and "Slow down" were placed at intersections and crossings.
- This guaranteed efficient traffic flow and raised motorist awareness.
- Bollards were placed on the sidewalk to separate different forms of traffic movement and to guarantee a safe stroll.

Figure 32 & 33 - Street Amenities

2.1.6 Inferences

Pathways - The project improved pedestrian pathways by implementing speed-calming measures, reducing walkway obstructions, and adding clear road markings and signage. This included creating "Safe Walking Spaces" and shortening pedestrian walkways to accommodate school vehicles and local transport

Nodes- Critical nodes were enhanced with bulb-outs to reduce crossing distances and increase safety. Bulb-outs hel Pathways The project improved pedestrian pathways by implementing speed-calming measures, reducing walkway obstructions, and adding clear road markings and signage. This included creating "Safe Walking Spaces" and shortening pedestrian walkways to accommodate school vehicles and local transport .

Nodes Critical nodes were enhanced with bulb-outs to reduce crossing distances and increase safety. Bulb-outs helped lower vehicle speeds and made pedestrian crossing areas safer and more prominent

Urban Activities Activities focused on making school zones more visible and engaging. Colorful crossings were introduced to assist children in identifying safe pathways, reducing jaywalking, and enhancing the pedestrian experience in the school zone

Built Environment The redesign aimed to address the lack of green spaces and the poor living conditions in slums. Improvements were more qualitative, focusing on the overall atmosphere and perception of safety and usability within the urban environment .

Street Amenities Street amenities included installing signs such as "School Zone" and "School Zone Ahead," and bollards to separate traffic types and ensure safe pedestrian movement. These additions were crucial for raising driver awareness and ensuring the safety of school children . ped lower vehicle speeds and made pedestrian crossing areas safer and more prominent .

2.2 Case Application 2 | Blixembosch-Oost, Eindhoven (NL)

Introduction

- In the past, the Netherlands has consistently sought to create child-friendly surroundings by employing socially just techniques. An urban development plan for Amsterdam in 1935 signaled a sea change by prioritizing the needs of the city's youngsters. The initial step toward play areas was the inclusion of kid-friendly recreation centers. Playground design by architect Aldo van Eyck was tasked with encouraging outdoor play.
- The Randstad region of the Netherlands, and Rotterdam in particular, have had success creating and assessing Child Friendly Cities.
- Between 2007 and 2011, the city of Rotterdam used "Child Friendliness" as a useful urban planning tool to create a sustainable, livable city.
- To become a Child Friendly City, Rotterdam created a pedagogical strategy and an urban planning process. Unlike other child-right-based initiatives, this one put more of an emphasis on the planning process and the neighborhoods.
- The policy was examined in 2014 by the city-appointed auditors. Numerous observations were made during this review process, and these were then adopted at the city level.

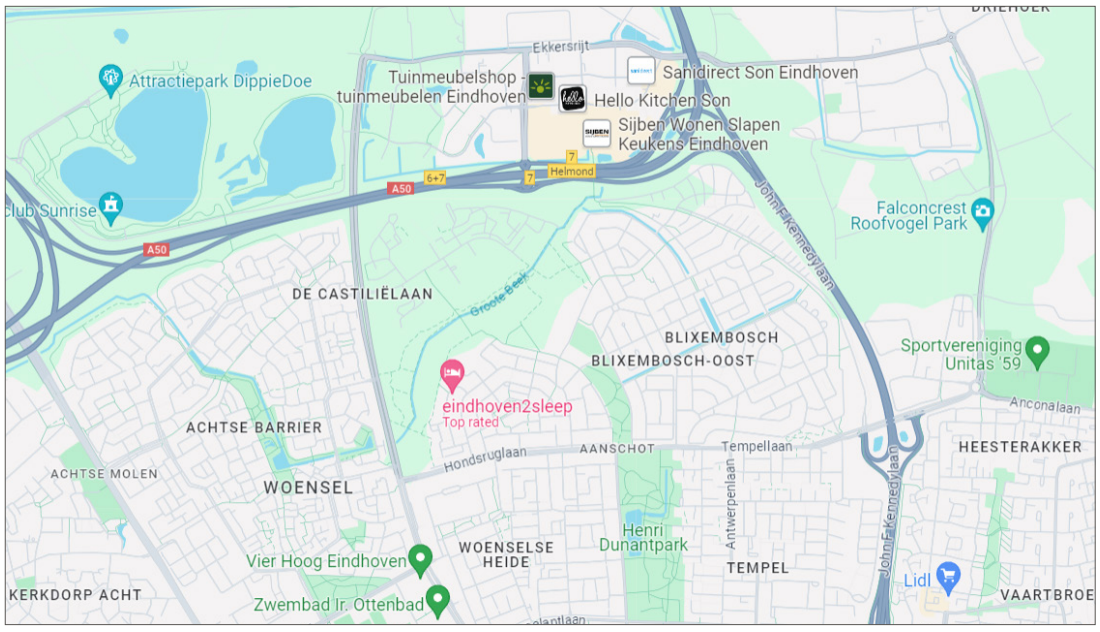


Figure 34,35 & 36 - Plan of Blixembosch-Oost

- Largest family-oriented sub-urban neighborhood on the outskirts of Eindhoven
- In terms of area and population, Blixembosch-Oost is the largest neighborhood, encompassing 166 hectares and 7,051 residents.
- Twenty.5% of the people in Blixembosch-Oost are in the 0–14 age group.
- In Blixembosch-Oost, the majority of households—nearly six out of ten—have children. This is evident not only in the local street names but also in the statistics.
- Street names in one section of the neighborhood are references to fairy tales, such as Rood-Kapje (Little Red Riding Hood), Assepoester (Cindrella), and Sprookjesbos (Fairytale Forest).
- The majority of the kids in the neighborhood attend the two sizable primary schools located in the neighborhood.
- There is virtually little social housing, with family residences making up the majority of the housing stock.
- It is said that the new urban level extension is a family neighborhood: Rich greenery, low traffic volume, and kid-friendliness are all implemented at the municipal level.

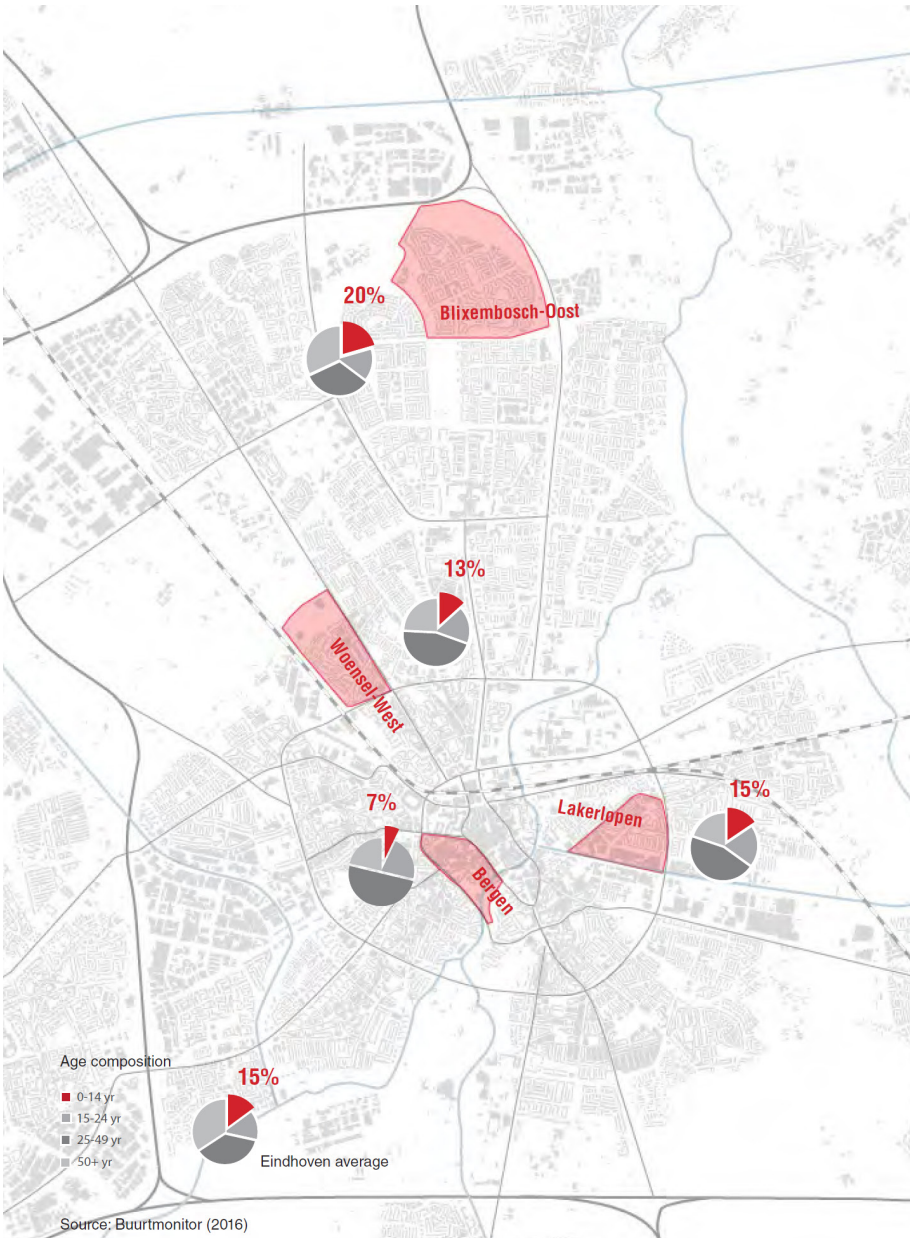


Figure 37 - Age composition chart of Eidhoven
Source:Child Friendly Urban Design by Krishnamurthy ET Al. 2018

2.2.1 Pathways

- Access routes limited to 30 km/h
- At 80% of the total traffic, Woonerf Street is used to its fullest potential.
- The Dutch word "woonerf," which means "street for living," refers to shared areas intended for use by bicycles, pedestrians, and slow-moving cars. Trees, planters, parking lots, and other obstructions on the street slow down moving traffic. These are standard streets without sidewalks or curbs.
-
- On the Woonerfs, limitations on two-wheelers were not implemented.
- The Woonerfs serve as the crossing point as children move from private to public areas.

Figure 38 & 39 - Types of Roads
Source:Child Friendly Urban Design by Krishnamurthy ET Al. 2018

Neighbourhood		Blixembosch-Oost
Various types of the streets	Access 30 km/h	80%
	Access woonerf	---
	Access Car free	2%
	Distrib-utor	18%
Children can easily move from the private to the public space		●●●●●
Measures for traffic calming		●●●●●
Separated bike paths		●●○○○
Separated walkways		●●●●○
Lighting		●●●●●
Presence of shared space		●○○○○
Benches or places to rest along walkways		●●○○○
Kindlint		No
Based on interviews		
Satisfied with public space		●●●●○
Safety of streets		●●●●○

Figure 40 - Street crossing in Blixembosch-Oost, close to school

2.2.2 Nodes

- To provide more waiting room and a buffer to the functional sections, more pedestrian space was added at the nodes.

Figure 40 - Extensions of pedestrian spaces at intersections
Source:Child Friendly Urban Design by Krishnamurthy ET Al. 2018

2.2.3 Urban Activities

- The Blixembosch-Oost qualitative experience reveals a neighborhood that seems to be fairly balanced in terms of green space, play areas, and residential areas.
- There are little green spaces and areas of play strewn over the neighborhood, as well as a bigger green area encircling the residential area.
- It is clear that the neighborhood's early 2000s urban fabric design was intended to enhance family use, low home density, abundant open space, and a variety of play choices. In addition to another elementary school (De Vuurvlinder) in the northeast, services such as the shopping center and elementary school (De Boschuil) are centralized in the center.
- People perceive the entire neighborhood as a pleasant place to stroll through.
- For the kids, a walkable experience creates a meaningful connection between the residential and institutional spaces.

Figure 41 - Urban Activities
Source:Child Friendly Urban Design by Krishnamurthy ET Al. 2018

Figure 42 - Route Intensity map of Blixembosch-Oost

Source:Child Friendly Urban Design by Krishnamurthy ET Al. 2018

2.2.4 Built Enviornment

- The majority of the green space for recreational purposes is situated in Blixembosch-Oost, primarily composed of verdant playgrounds and grassy fields.
- They are dispersed across the area and linked by the Woonerfs' network.
- It's estimated that youngsters in Bilxembosch-Oost spend the most time playing outside, with over half of them doing so in spaces that are allocated for that purpose.
- The network of Woonerfs and the private, public, and institutional spaces are connected by the authorized play places.
- Proposals to create car-free neighborhood collector roadways are popping up in order to improve the connectivity between private and public areas for kids.

Figure 43 - Analytical map of Greenscape for Blixembosch-Oost

Source:Child Friendly Urban Design by Krishnamurthy ET Al. 2018

Figure 44 - Example of designated playspaces of Blixembosch-Oost

Figure 45 - An example of an access road in neighborhood, Blixembosch-Oost

Neighbourhood	Blixembosch-Oost
Amenity green	80%
Functional green	2%
Natural habitats	13%
Aesthetic green	5%
Quality of greenscapes	●●●●●
Quantity of greenscapes	●●●●●

Figure 46 - Highlights of finding on the Green Spaces of Blixembosch-Oost

Source for all :Child Friendly Urban Design by Krishnamurthy ET Al. 2018

Figure 47 - Analytical map of Playscape for Blixembosch-Oost
Source for all :Child Friendly Urban Design by Krishnamurthy ET Al. 2018

2.2.5 Street Amenities

- Permeable ground floors are permitted on Woonerf Streets.
- As a result, a variety of sociocultural and commercial activities are extended onto the street, making the most of the amount of seating, traffic signals, signage, etc.

Figure 48 & 49 - Proposal for car-free neighbourhood collector streets
Source for all :Child Friendly Urban Design by Krishnamurthy ET Al. 2018

2.2.6 Inferences

- .When it came to collector and local streets, Woonerf Streets had received special attention.
- In order to prevent disorder in the nodes, arterial road networks are simple in terms of spatial geometry.
- Pedestrian routes have been implemented in front of educational institutions and other buildings.
- There is a network of kid-friendly urban activities spread out across the neighborhood.
- The required common areas behind the apartments are converted into activity streets that link to particular urban activities, such as parks, schools, etc.

			Blixem.-Oost
Type of green			
Amenity green	playground		17
	sportfield		5
	park		2
	grassfield		22
	private backyard		2
Functional green	allotments		1
	burial ground		0
Natural habitats	wetland		2
	woodland		6
Aesthetic green			3
Availability			
Existence of semi private of private green space		Yes	7
		No	3
Quality of greenscapes			
Paved and unpaved walking trails		Yes	10
		No	18
Play areas for children		Yes	18
		No	10
Seating		Yes	18
		No	10
Food options		Yes	0
		No	28
Quantity of greenscapes			
Play areas for children			33
Seating			92
Food options			4
Access			
No residence is located more than 600 meters from at least one greenspace		Yes	18
		No	1

2.3 Case Application 3 I Bhubaneswar, Odisha

Introduction

- The capital of Odisha, Bhubaneswar, is now regarded as a model city for child-friendly projects.
- Following a number of initiatives, the government came to the conclusion that the city requires a set of rules to guarantee child-friendly public places during all phases of the process—from design to implementation to management to upkeep.
- The rules would guarantee equitable distribution, consistent growth, and everyone's safe access to public areas.
-
- The first-ever city-specific Child-Friendly Public Space Design Guidelines, which take into account the potential and problems unique to the city, are currently being statutorily established in Bhubaneswar.
- Additional measures that have contributed to Bhubaneswar's status as a kid-friendly city include creating a master plan for parks and open spaces based on accepted practices and demand-based surveys,
- among other things, developing a color scheme for play equipment, planting a color scheme, and building modular design blocks for parks, citizen connect, and examining the natural settings of various locations.
- constructing child-friendliness into both the new and the current urban stock.
- **Using open areas for education**
- **Families in cities as an obvious feature**
- **Cities that are kid-friendly: a chance to solve issues that affect generations across**

Figure 50 : Goals

2.3.1 Pathways

- In order to provide efficient and seamless mobility, the project's primary goal is to upgrade both main and feeder highways. Better feeder roads link smaller areas to the main arteries, providing thorough coverage and accessibility for all kids and families. Meanwhile, upgraded main highways expedite access to central amenities.
- With a focus on kid safety, the initiative involves building and maintaining safe routes especially for school commutes.
- Improving the road network's accessibility to medical facilities is essential to guaranteeing children's prompt access to care. Modernized roadways expedite routine health examinations, vaccines, and emergency medical care by cutting travel times and enhancing emergency response capabilities.

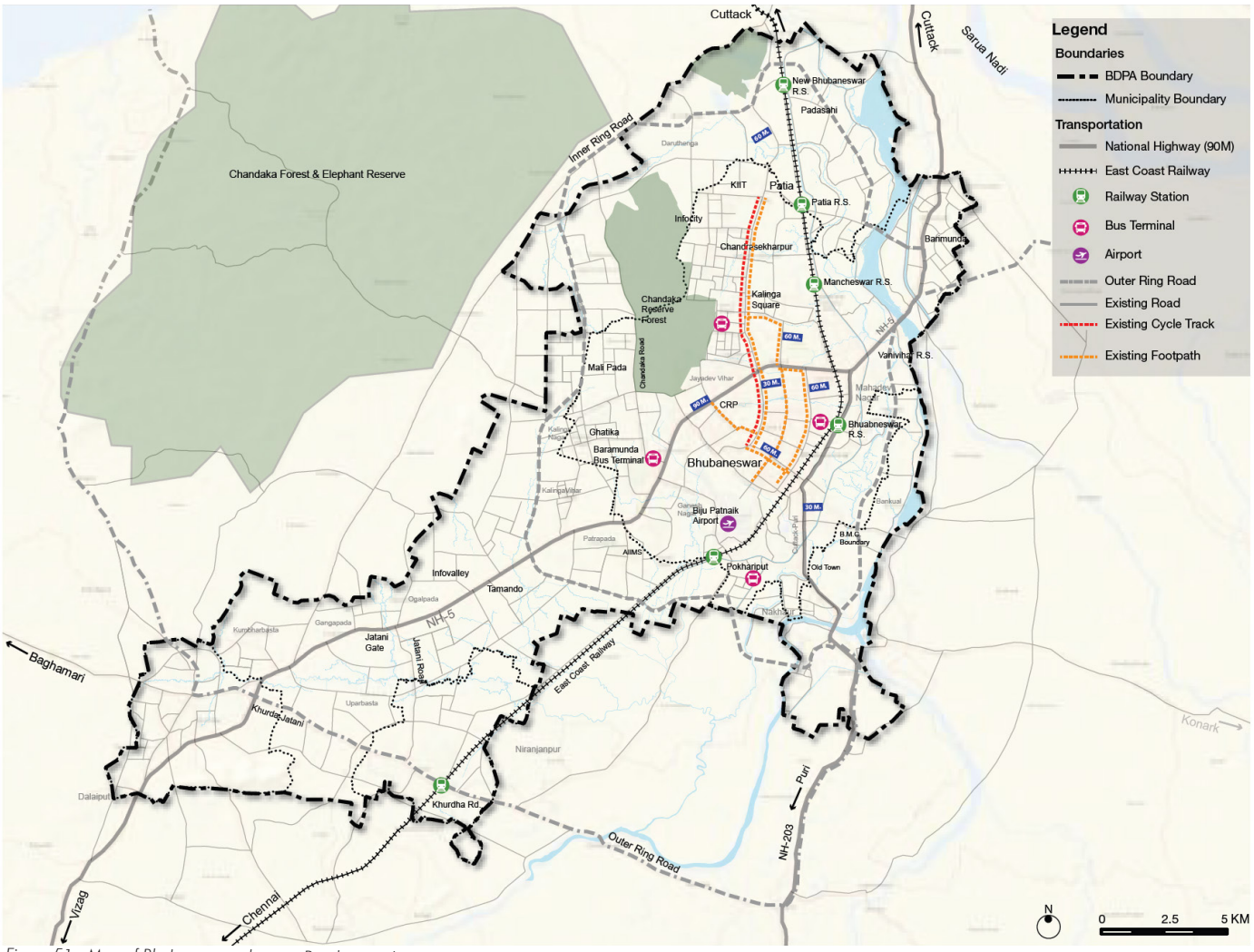
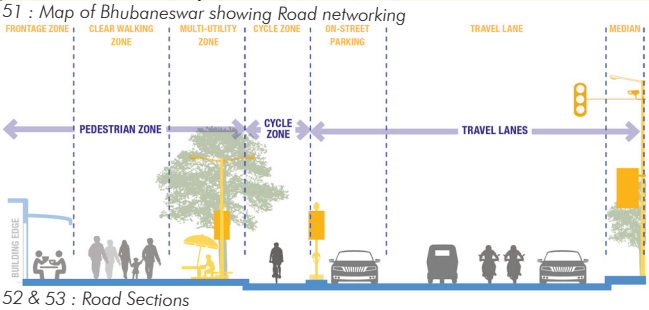


Figure 51 : Map of Bhubaneswar showing Road networking



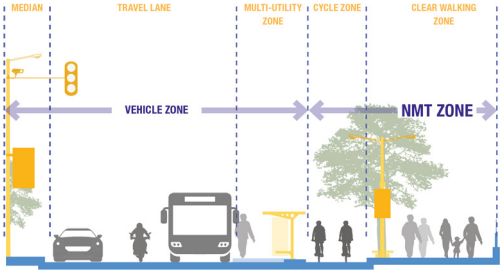
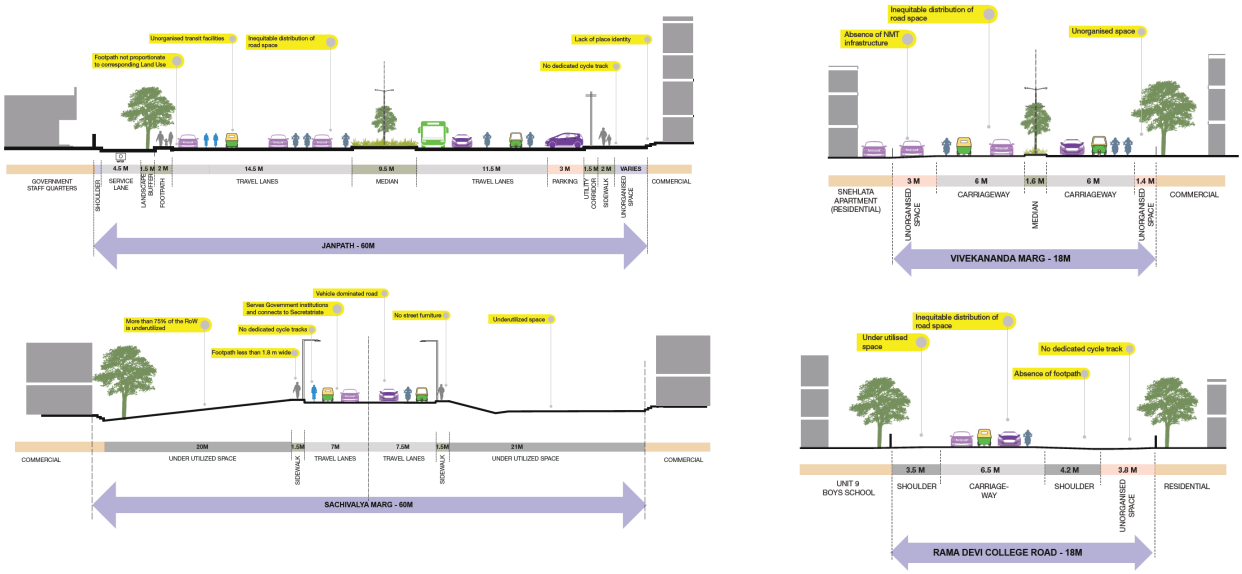
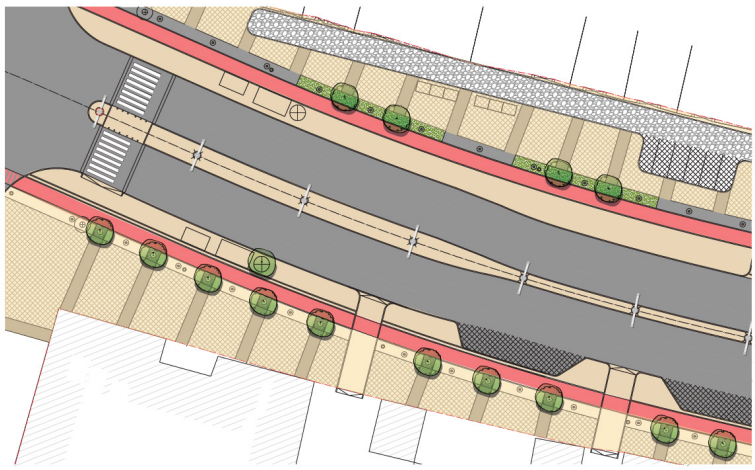


Figure 52 & 53 : Road Sections



2.3.2 Nodes

- These nodes are the hubs where a number of libraries, elementary schools, and early childhood education facilities are grouped. These hubs, which are positioned to optimize accessibility, make sure that kids from different communities can easily access instructional materials, encouraging consistent attendance and learning continuity.
- Hospitals, clinics, and health institutions that offer complete medical care to children are important nodes. In order to guarantee prompt and effective access to healthcare, these nodes are connected by well-kept highways, making routine checkups, vaccines, and emergency medical interventions possible.
- These nodes are set up at strategic points where food programs and nutritional supplements are provided. These nodes are conveniently accessible by road network and are situated close to community centers or schools, guaranteeing that kids get the nourishment they need to sustain their physical growth.



Medians and refuge islands for organising traffic and pedestrians

Figure 54 & 55 : Vending Zones proposed along Janpath

2.3.3 Urban Activities

- Urban activities encompass a range of educational enrichment initiatives created to enhance the core curriculum. Community centers and public libraries host many programs, including scientific groups, literacy campaigns, after-school tutoring, and digital learning initiatives. Their objectives are to improve children's academic performance, give them more learning chances, and cultivate a love of learning.
- In metropolitan regions, regular camps for health and wellbeing are held to offer children full medical care. Free dental, eye, and medical checkups as well as immunization drives are provided by these camps. In order to promote healthy habits and the early detection of health disorders, they also offer health education programs for parents and kids.
- The project supports children's overall development by incorporating a variety of cultural and recreational activities. These consist of theatrical productions, sports competitions, music and dance classes, and workshops for arts and crafts. These kid-friendly events, which take place in parks, community centers, and halls of culture, foster children's social skills, creativity, and physical fitness.
- Urban initiatives that include support groups and training sessions also emphasize parental involvement. To empower parents, workshops are held on child psychology, nutrition, good parenting methods, and educational support. Support groups give parents a forum to exchange stories, look for guidance, and create a network of connections within the community, improving the general atmosphere for a child's growth.

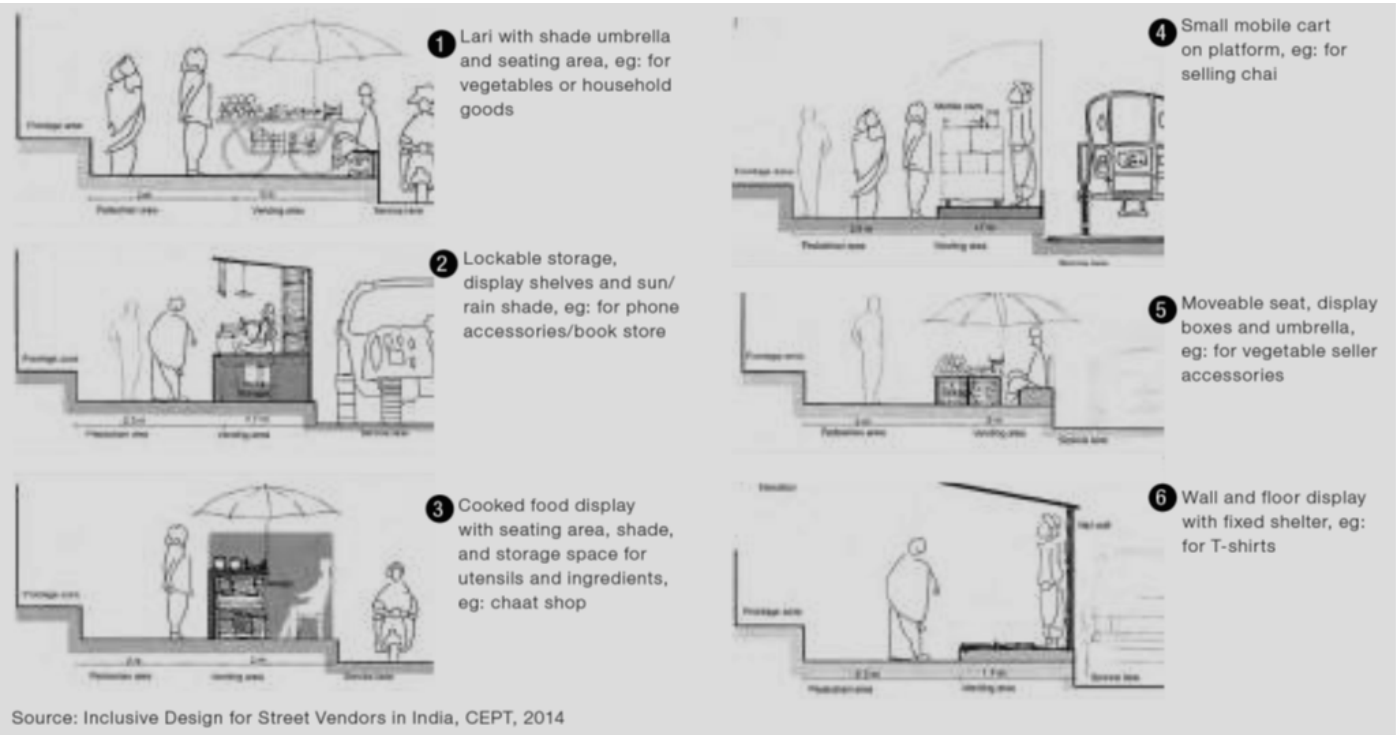


Figure 56 : Inclusive Design for Street Vendors in India, CEPT, 2014

2.3.4 Built Environment

- The project's main goal is to build and renovate learning environments that are both kid-friendly and safe. These establishments consist of elementary schools, early childhood education centers, and after-school activities. They have kid-friendly classrooms furnished with suitable furniture, colorful décor, and engaging educational resources. To encourage movement and discovery, there are also outdoor areas with gardens and playgrounds.
- The concept includes creating pediatric clinics, kid-focused spaces in hospitals, and mobile health units that may travel to underserved communities in order to ensure the health and well-being of children. These medical facilities have pediatric specialists on staff and are furnished with state-of-the-art pediatric medical equipment. The infrastructure is made to be friendly and unthreatening in order to ease people's fear and promote routine medical examinations.
- One of the project's most important goals is to upgrade the transportation system to protect kids. This entails building dedicated drop-off and pick-up zones, traffic signals, speed bumps close to schools, and well marked pedestrian crossings. In order to provide children and their families with safe and healthy commuting options, efforts are also made to construct safe walking and cycling trails that link residential areas with healthcare institutions, schools, and community amenities.

Figure 57 : Parks and Open spaces master plan prepared in a citizen responsive manner

2.3.5 Street Amenities

- Building secure pedestrian routes is a top priority for this project in order to guarantee that kids may walk to community centers, parks, and schools without incident. These walkways have characteristics like tactile paving for kids with vision impairments, sufficient illumination, and non-slip surfaces. To provide accessibility for everyone, sidewalks are enlarged and kept clear of obstacles to make room for wheelchairs and strollers.
- One of the most important parts of the project is installing pedestrian crossings and child-friendly signs. To ensure youngsters cross streets safely, bright, colorful signs with clear symbols and instructions are positioned at key locations. To make sure kids can cross highways safely, pedestrian crossings include zebra stripes, traffic lights, and occasionally crossing guards during school hours.
- Improving street lighting and security guarantees children's safety and security when they move about the city. Well-lit roadways discourage criminal activity and lower the chance of accidents. A further layer of protection is given by placing CCTV cameras around schools, playgrounds, community centers, and important intersections. This enables prompt response to any issues that may arise.
- It is imperative to enhance the availability of kid-friendly public transit facilities. Bus stations have been updated to include seating areas, shelters, and easily readable information boards with schedules and routes. Special accommodations are made for kids, strollers, and caretakers, such as low-floor buses and priority seats. To safeguard kids from traffic and inclement weather as they wait for transit, safe waiting zones have been established.

2.3.6 Inferences

Pathways The project focuses on upgrading both main and feeder highways for efficient mobility and safety. It emphasizes building and maintaining safe routes for school commutes and improving accessibility to medical facilities to ensure prompt care for children.
Nodes Nodes are strategically placed to include libraries, schools, and health institutions. These nodes ensure accessibility to educational materials, healthcare, and nutrition programs, fostering a supportive environment for children's development
Urban Activities Bhubaneswar has integrated educational uses into open spaces, facilitating outdoor learning and interaction. This approach encourages the use of public spaces for educational and recreational activities, making the city more engaging for children
Built Environment The city has developed guidelines for child-friendly public spaces, focusing on equitable distribution, consistent growth, and safe access. These guidelines ensure that both new and existing urban areas are adapted to be child-friendly
Street Amenities Bhubaneswar includes modular design blocks, color schemes for play equipment, and greenery, enhancing the aesthetic and functional quality of public spaces.

2.4 Comparative Conclusion

Parameter	Mumbai, India	Blixembosch-Oost, Eindhoven (NL)	Bhubaneswar, India
Pathways	Mumbai's child-friendly pathways include re-designed school zones featuring safe walk-ing spaces with wide sidewalks, speed-calm-ing techniques such as speed bumps and raised crosswalks, and clear road markings and signage to lower vehicle speeds and guide traffic safely. This approach helps to create a secure envi-ronment for children traveling to and from school.	In Blixembosch-Oost, pathways are designed with a "woonerf" concept, where shared space allows pedes-trians, cyclists, and vehicles to coexist. This design includes perme-able ground surfaces, reducing the domi-nance of vehicles and encouraging pedestrian and social activities. The emphasis is on naturally slowing down traffic through design rather than enforce-ment.	Bhubaneswar features child-friendly pathways that include designated play areas integrated within the pedestrian zones, enhancing walk-ability. The pathways are designed with safe crossings, including zebra crossings and pe-destrian islands, making it easier and safer for children to navigate the urban space.
Urban Activities	Mumbai integrates playful elements within urban activities, partic-ularly in school zones. These include updated zebra crossings paint-ed with vibrant colors and patterns to make them more visible and engaging for children. Additionally, there are interactive elements like hopscotch and other games incorporated into the pavement design to encourage playful interaction.	In Blixembosch-Oost, the streets are designed to support a variety of social and commercial activities. The ground floors of buildings extend onto the streets, creating lively spaces where children can play, and residents can interact. The design supports activities rang-ing from street markets to community events, making the environ-ment dynamic and child-friendly.	Bhubaneswar incor-porates active play areas within the urban fabric, ensuring that children have ample opportunities for rec-reation. These spaces are designed for both children's play and community gatherings, featuring playgrounds, open spaces for sports, and areas for cultural activities. The design promotes a sense of community and inclu-sivity

Parameter	Mumbai, India	Blixembosch-Oost, Eindhoven (NL)	Bhubaneswar, India
Built Environment	Mumbai's built environment is characterized by high-density urban settings with limited green spaces. The focus is on improving pedestrian experiences and reducing traffic hazards near schools. Enhancements include better lighting, landscaping, and barriers to separate pedestrian zones from vehicular traffic, ensuring a safer environment for children.	Blixembosch-Oost features a low-density suburban environment with ample green spaces. The built environment prioritizes residential safety and community interaction, with houses designed to open onto shared streets. This setup encourages socializing and outdoor activities, creating a child-friendly atmosphere.	Bhubaneswar's built environment is a mixed-use setting with a focus on creating inclusive and safe spaces for children and caregivers. The emphasis is on integrating open spaces and greenery into the urban landscape, providing children with places to play and caregivers with areas to relax. The environment supports both residential and commercial uses, enhancing overall livability
Street Amenities	Mumbai provides street amenities such as signs indicating "School Zone" and "School Zone Ahead," bollards to separate different types of traffic, and designated waiting and walking areas. These amenities enhance safety and organization, making it easier for children and caregivers to navigate the streets	In Blixembosch-Oost, shared street amenities support a variety of uses. These include seating areas, play structures, and community gardens. The design encourages residents to use the streets for social and recreational purposes, making the environment more engaging and supportive for children	Bhubaneswar offers child-friendly street amenities such as interactive play installations, child-friendly signage, and seating areas for caregivers. These features are designed to enhance safety and engagement, providing children with stimulating environments and caregivers with comfortable spaces to supervise and interact.

This comprehensive analysis highlights the different approaches taken by Mumbai, Blixembosch-Oost, and Bhubaneswar in creating child-friendly streets. Each city's strategies are tailored to its unique urban context, but all share the common goal of making urban spaces safer, more accessible, and more enjoyable for children and their caregivers.

Key inferences based on the comparative analysis:

- • Emphasis on Safety: All three cities prioritize the safety of children in their urban designs. Mumbai, Blixembosch-Oost, and Bhubaneswar implement various measures such as speed-calming techniques, bulb-outs, and safe crossings to reduce traffic hazards and create secure environments.
- • Participatory Design: The approaches highlight the importance of involving community members, especially children and caregivers, in the planning process. This participatory method ensures that the designs cater to the specific needs and preferences of the users.
- • Vibrant and Engaging Pathways: Each city incorporates playful elements into pathways to make them more engaging for children. Mumbai's vibrant road markings, Blixembosch-Oost's shared spaces, and Bhubaneswar's integrated play areas exemplify this trend.
- • Multifunctional Nodes: Nodes in all three cities serve as multifunctional spaces that enhance visibility and accessibility. These areas are designed to be safe, interactive, and supportive of both pedestrian movement and community activities.
- • Integration of Urban Activities: The designs integrate urban activities to create dynamic and engaging environments. Mumbai's playful zebra crossings, Blixembosch-Oost's socio-cultural spaces, and Bhubaneswar's active play areas reflect a commitment to promoting social interaction and physical activity.
- • Diverse Built Environments: Each city adapts its built environment to support child-friendly initiatives. Mumbai focuses on pedestrian safety in a high-density setting, Blixembosch-Oost emphasizes community interaction in a suburban context, and Bhubaneswar blends open spaces with mixed-use development.
- • Street Amenities: The provision of child-friendly street amenities is a common feature. Mumbai's signage and bollards, Blixembosch-Oost's play structures and community gardens, and Bhubaneswar's interactive installations and seating areas cater to the needs of children and caregivers.
- • Promotion of Social Cohesion: The designs foster social cohesion by creating spaces where residents can interact. Shared spaces in Blixembosch-Oost, community nodes in Bhubaneswar, and interactive elements in Mumbai encourage communal activities and strengthen community bonds.
- • Use of Green Spaces: Green spaces are integral to child-friendly street design. Blixembosch-Oost's ample green areas and Bhubaneswar's emphasis on integrating greenery enhance environmental quality and provide areas for recreation and relaxation.
- • Scalability and Adaptability: The strategies implemented in these cities can be scaled and adapted to other urban contexts. The principles of safety, engagement, and inclusivity demonstrated in Mumbai, Blixembosch-Oost, and Bhubaneswar can serve as models for other cities aiming to create child-friendly urban environments.

3.0

3.0 case application

3.1 Description and Delineation

Figure 58 - Map of India with West-Bengal

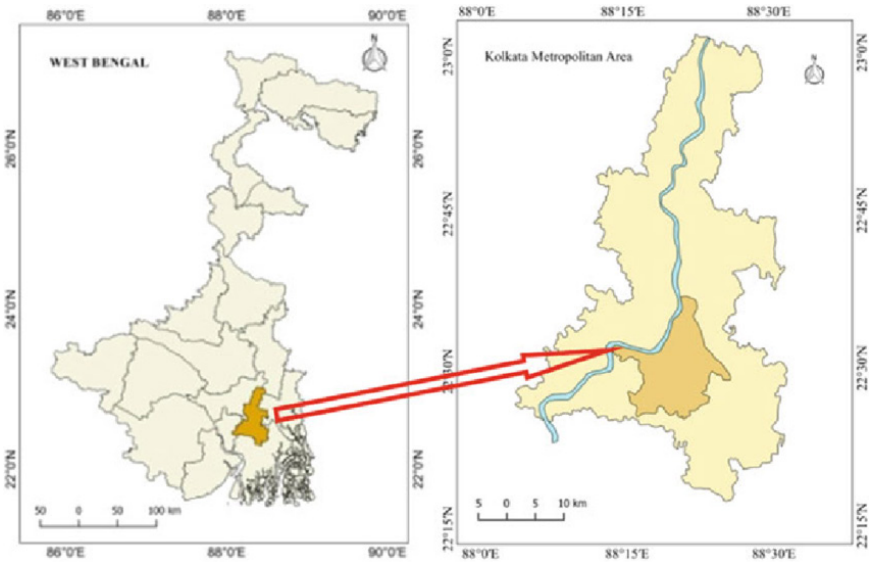


Figure 59 - Map of West-Bengal with Kolkata

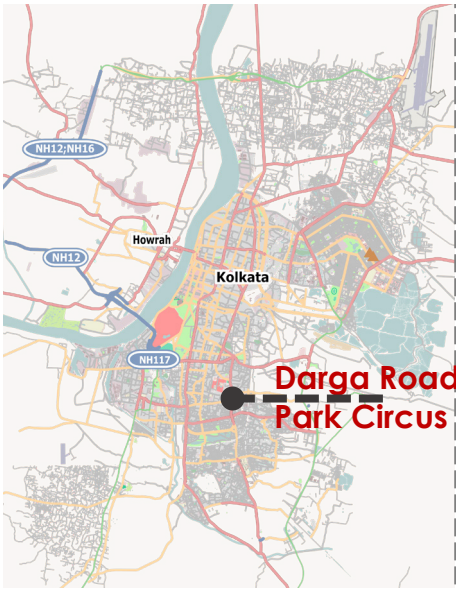


Figure 60 - Map of Park Circus
Source : Maps of India

Figure 61 - Depending on the previous analysis this figure denotes the Case Application Area w.r.t. Kolkata important landmarks
Source – Google Earth, Site Survey - Author

Figure 62 - Google Map showing Case Application Area
Source – Google Earth, Site Survey - Author

Figure 63 - Picture of Case Application area in front of MBWA School
Source - Author

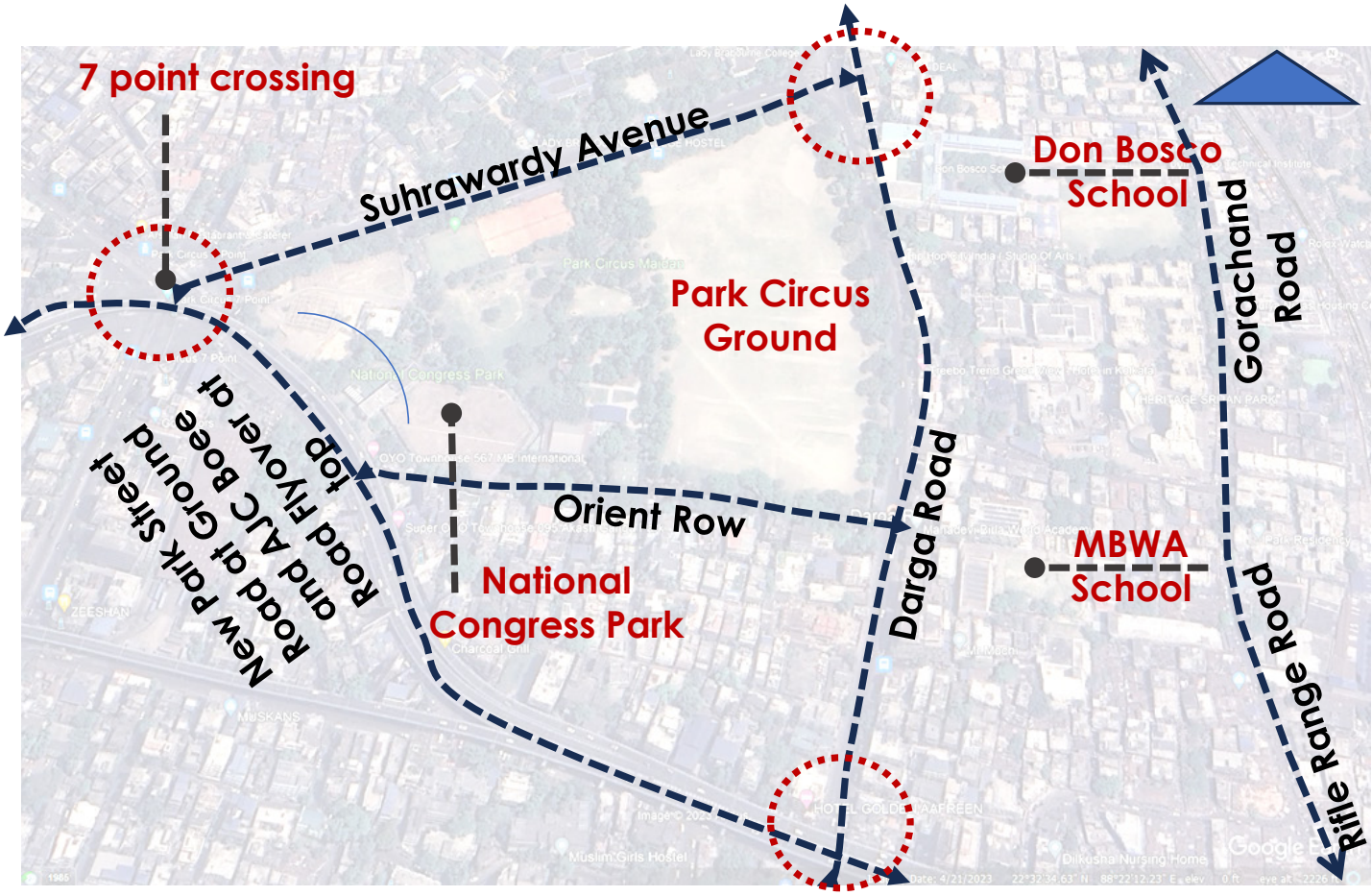


Figure 64 - Map of Case Application Area (Source – Google Map, Graphic Source – Author)

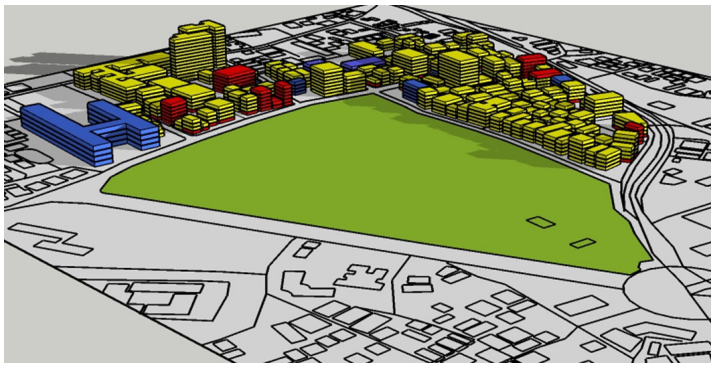
Area – 70 Acres approx.
Perimeter – 2300 M approx.

Case Application Boundaries :-
North – Suhrawardy Avenue
South – EM Bye Pass
East – Park Circus 7 point crossing
West – Gorachand Road & Rifle Range Road

3.1 Description and Delineation

Built Use Map

Figure 65 - Built Use Map of Case Application Area



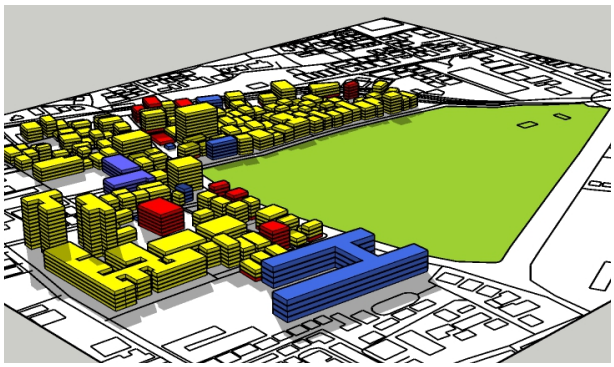


Figure 66 - 3d Visualisation of Case Application Area with usage

Important Landmarks

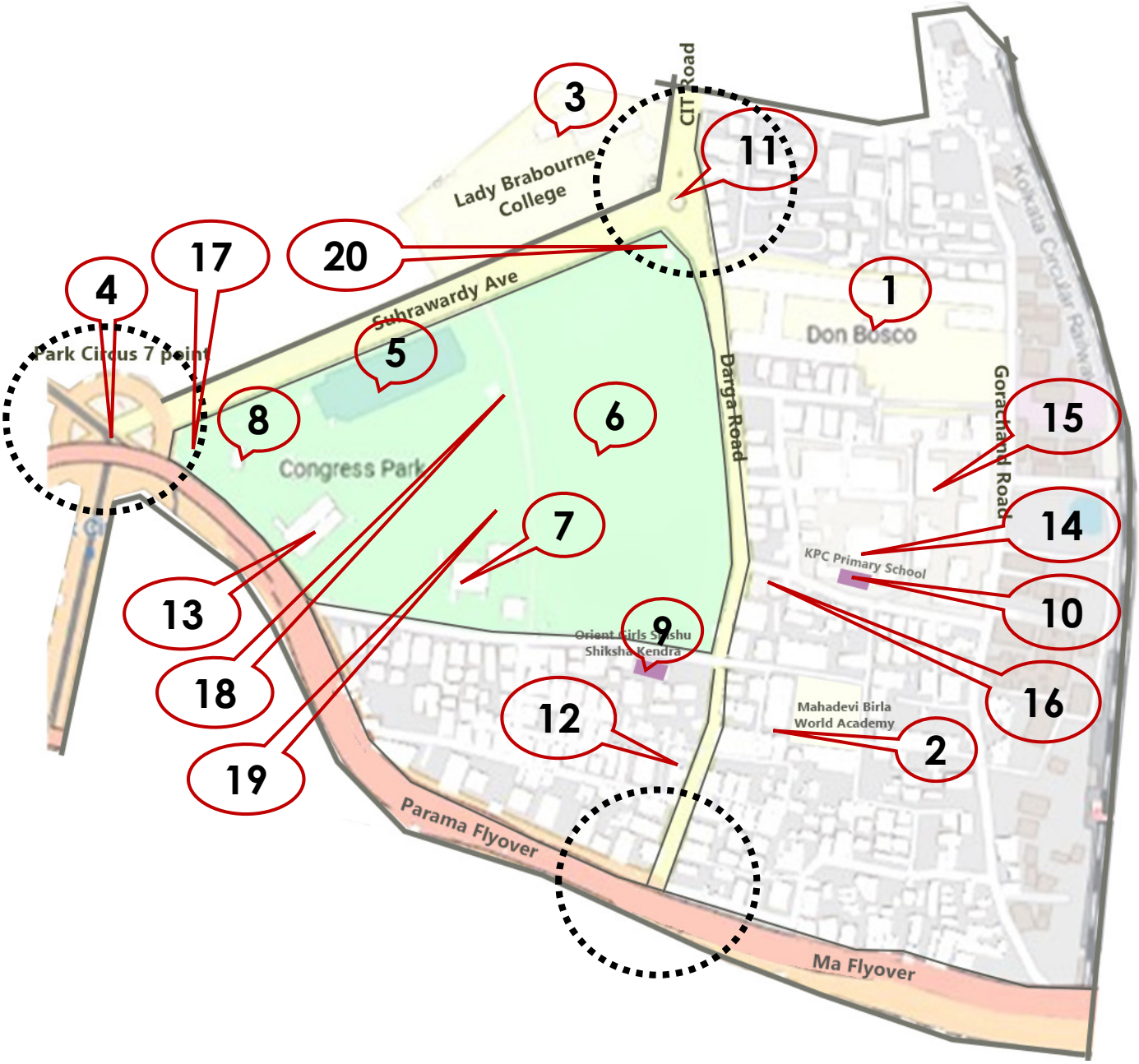
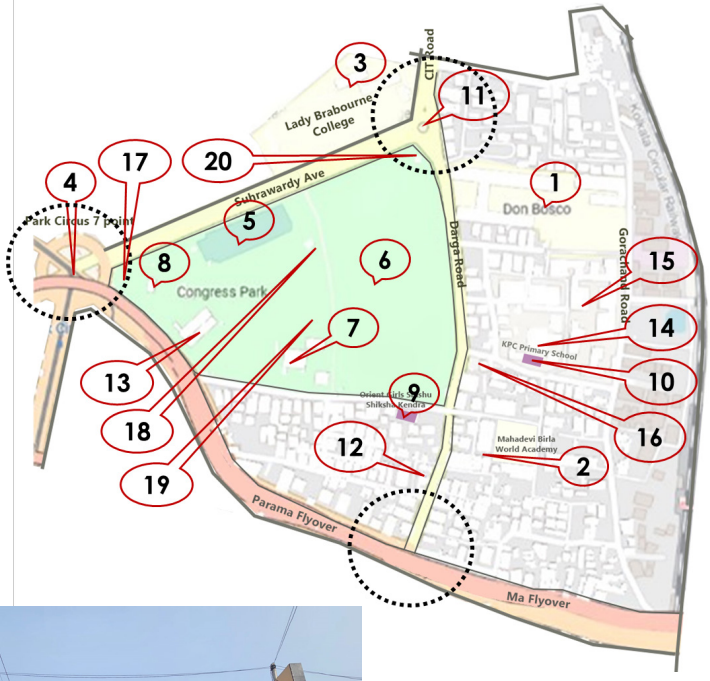


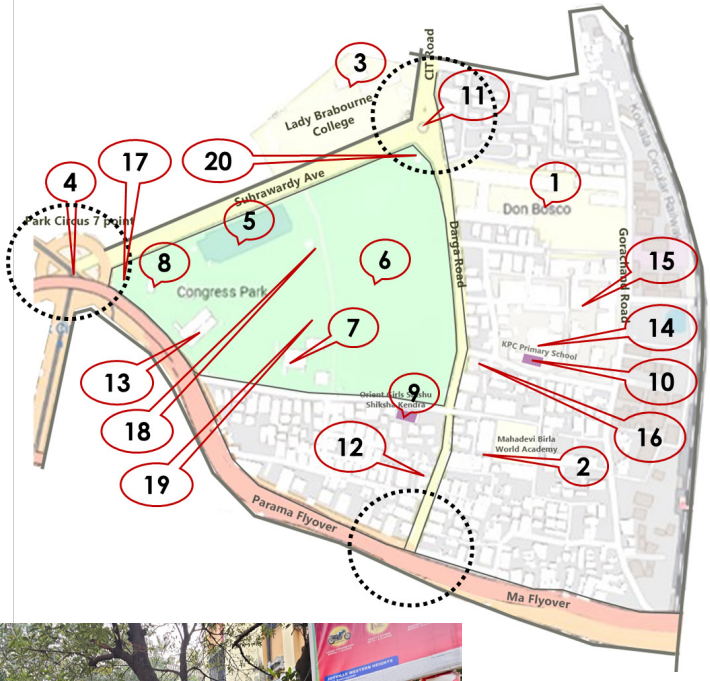
Figure 67 - Site Plan of Case Application Area

Important Landmarks :

1. Don Bosco School
2. Mahadevi Birla World Academy
3. Lady Brabourne College
4. Park Circus 7-point crossing
5. Tennis Club
6. Congress Park
7. Puja Committee Office
8. Masjid
9. Orient Girls Shishu Siksha Kendra
10. KPC Primary School and TMC Club
11. Don Bosco Circle
12. Masjid
13. KMC Water Supply
14. Maruti Suzuki Building
15. Heritage Srijan Park Residential Complex
16. Dargah
17. Mela Ground
18. Children's Park
19. Traffic School
20. Toilet Block

Important Landmarks




3
11
Lady Brabourne College
CIT Road
17
20
4
Subhawardy Ave
1
Don Bosco
5
Park Circus 7 Point
8
6
Congress Park
Bangra Road
Gorachand Road
15
7
14
KPC Primary School
13
10
9
18
16
12
Mahadevi Birla World Academy
2
19
Parama Flyover
Ma Flyover

Road and Traffic Conditions

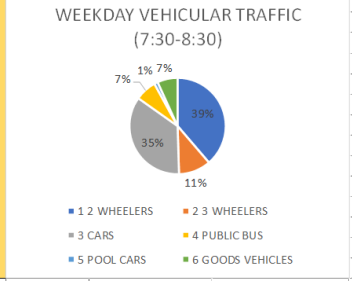
figure 68 - Site Plan of Case Application Area with Road Layout

- Arterial Roads gets congested during school hours due to heavy traffic.
- Aerterial Streets are blocked by on-street parking.
- Traffic and Parking spill-overs extends up-to nearby collector streets.
- Pathways are occupied by commercial activities.
- So, no dedicated pedestrian walkways left.
- Neither dedicated cycling way
- Suhrawardy Road Service Lane, Orient Road and other connected collector roads are blocked by parked Shuttle Cars and Private Buses throughout the school hours.
- No adequate Bus Terminal, Bus Parking.
- Not adequate Bus-stop or shelters
- No adequate public parking space


SCHOOL

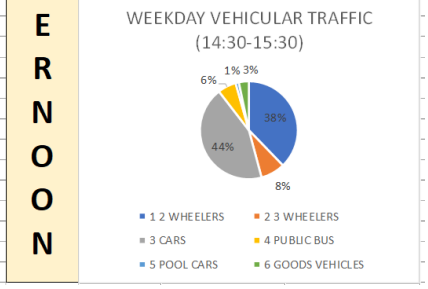
MORNING

SERIAL NO.	TYPE OF VEHICLE	NO. OF VEHICLE/H
1	2 WHEELERS	1013
2	3 WHEELERS	283
3	CARS	923
4	PUBLIC BUS	189
5	POOL CARS	31
6	GOODS VEHICLES	178



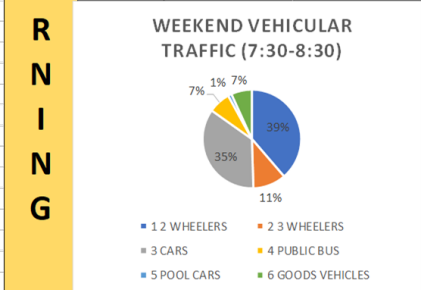
AFTERNOON

SERIAL NO.	TYPE OF VEHICLE	NO. OF VEHICLE/H
1	2 WHEELERS	1068
2	3 WHEELERS	228
3	CARS	1236
4	PUBLIC BUS	172
5	POOL CARS	31
6	GOODS VEHICLES	93



MORNING

SERIAL NO.	TYPE OF VEHICLE	NO. OF VEHICLE/H
1	2 WHEELERS	538
2	3 WHEELERS	252
3	CARS	782
4	PUBLIC BUS	142
5	POOL CARS	0
6	GOODS VEHICLES	78



Inferences

1. Traffic analysis at peak hours shows approx. double inflow of 2-wheelers and 4 wheelers during school hours on weekdays then on weekends.

2. Approx. 30 nos. of Pool cars and approx. 10 nos. of Private Buses are parked on Suhrawardy Road throughout the day and blocks road carriageway. So either parking spaces will be required for parking these pool cars throughout the day or augmentation of School Buses will be required to mitigate these parking requirements.

3. Approx. 1000 cars crosses every hour on this Darga Road, i.e. 16-20 cars every minute which needs to be accommodated on road for dropoff parking.

4. The road width is adequate as traffic is smooth during non school hours and only chokes during school hours.

5. So school traffic creates load on the Darga Road and pressure also passes on to surrounding roads.

3.2 Site Analysis

3.2.1 Pathways

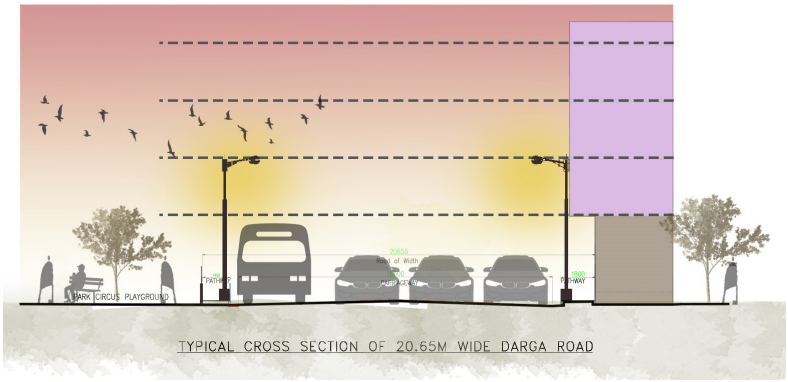


Figure 69 Schematic cross-section of 21M wide Darga Road
Source - Author

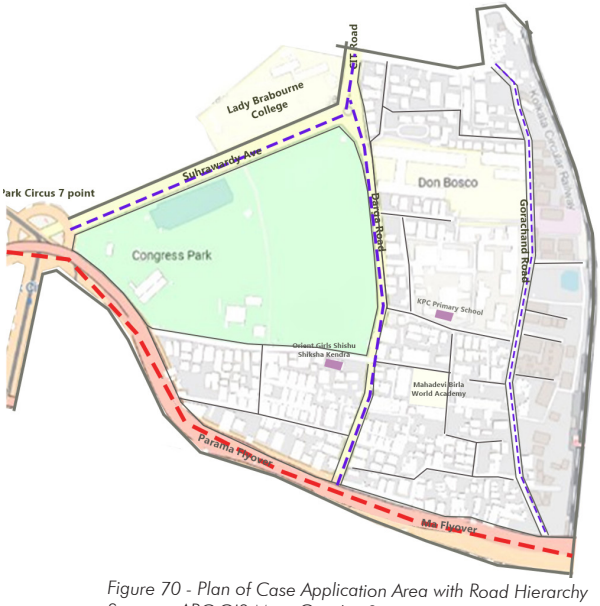


Figure 70 - Plan of Case Application Area with Road Hierarchy
Source – ARC GIS Map, Graphic Source - Author

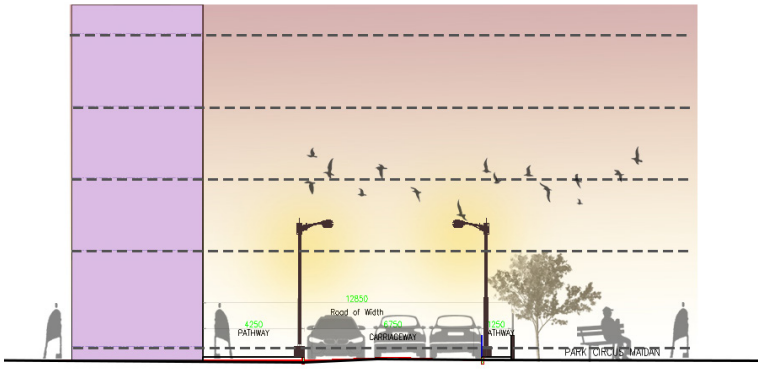


Figure 71 - Schematic cross-section of 13M wide Orient Row Road
Source - Author

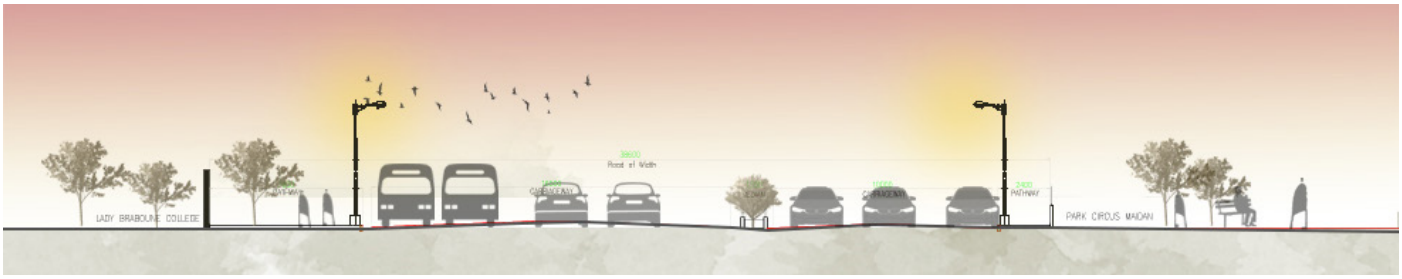


Figure 72 - Schematic cross-section of 40M wide Suhrawardy Road
Source - Author

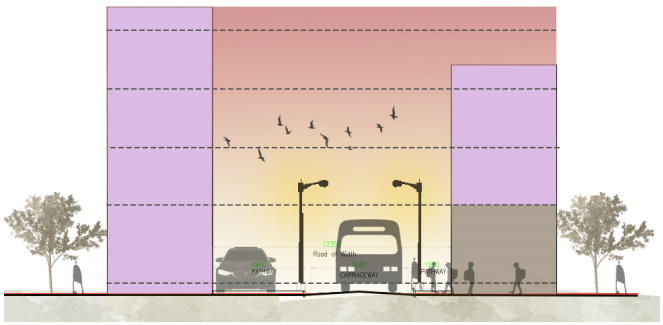
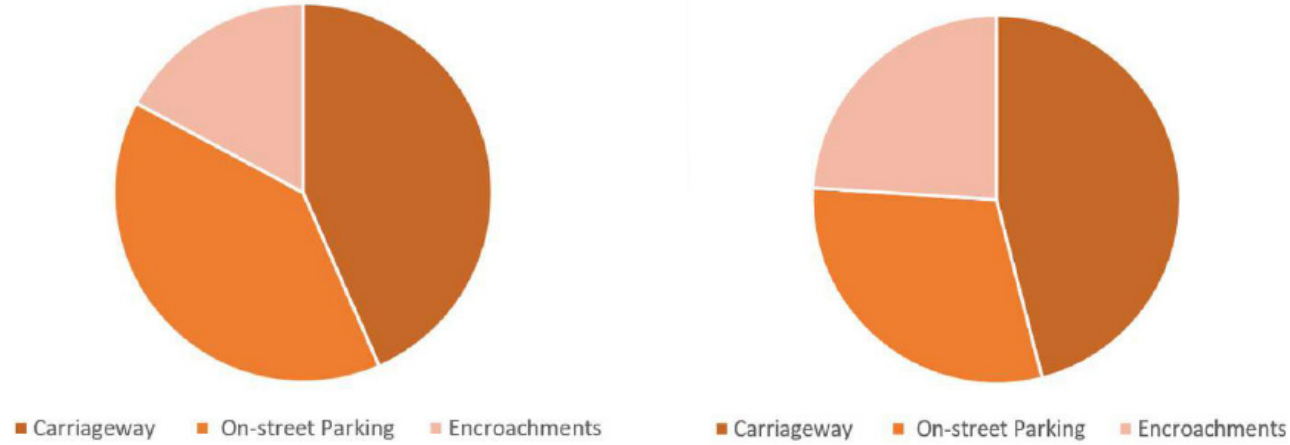


Figure 73 - Cross-section of 12M Wide Collector Streets
Source - Author



Inferences

1. Maximum width of footpath & carriageway have been occupied by encroachments and on-street parking.
2. Width of main Arterial roads are not adequate after on street parking during school hours.
3. Footpaths are not continuous and are occupied for commercial activities.
4. No proper turning radius for Bus movement.
5. Pathways are not continuous and causes inconvenience for pedestrian.
6. No dedicated cycle tracks.

3.2.2 Nodes

1. Nodes are the main center of major public activities
2. Nodes are not reinforced and visibility of nodes are mostly blocked with on-street parking
3. Footpaths are encroached by unorganized commercial activities.
4. 2-way movement of vehicles from collector road on main roads also creates too much chaos.
5. Absence of speed breakers and zebra crossings

Figure 74 - 7-Arm Node at 7 point crossing
Source - Author

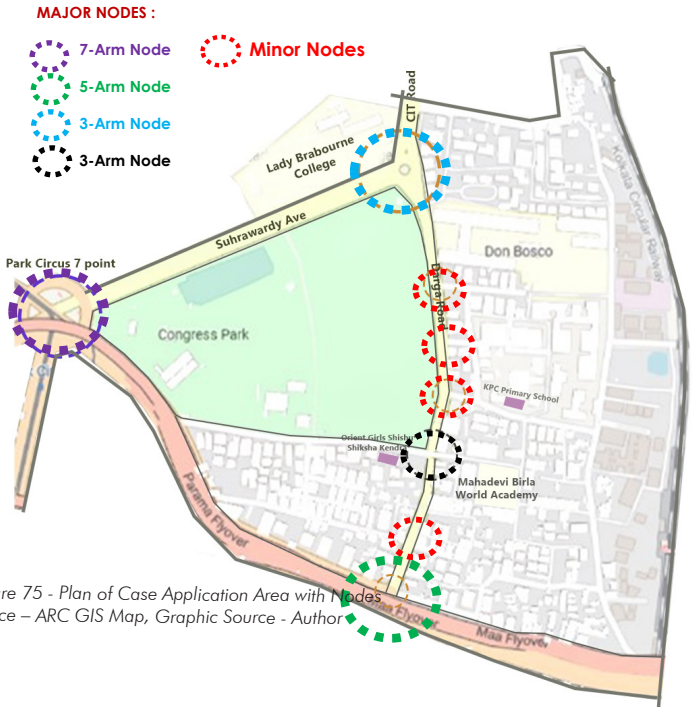


Figure 75 - Plan of Case Application Area with Nodes
Source – ARC GIS Map, Graphic Source - Author

Figure 76 -3-Arm Node at Don Bosco Circle
Source - Author

Figure 77 - 4-Arm Node near MBWA & Orient Row
Source - Author

Figure 78 - 2-Arm Nodes near Bon Bosco
Source - Author

3.2.3 Urban Activities

URBAN MAGNETS

1. Lady Brabourne College
2. Don Bosco School
3. MBWA School
4. Congress Park Ground
5. Mela Ground
6. Masjid & Dargah
7. Commercial Shops
8. Industrial small set-ups
9. Government Schools
10. Park Circus Station

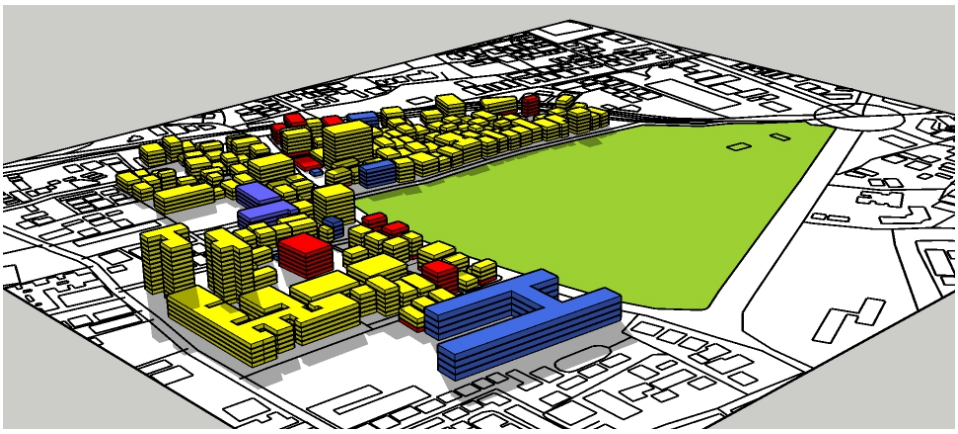


Figure 79 - 3D of Case Application Area with Usage
Source – Google Map Raster, 3D Source - Author

URBAN ACTIVITIES

- Majorly Residential with ground floor as Commercial Spaces.
- Many Institutions and school located all arounds.
- Traffic congestion on school days and timings.
- Carpool and School Buses choke the street on school days.
- Park Circus Maiden hosts many celebrations and public gatherings.
- Park Circus Maiden is lung of that area and many activities can be seen all around the day in the designated play spaces.
- Roads are blocked with car-pools waiting on the road from when the school opens to close.
- Many Darga and Masjids are around and the precinct also hosts as many socio-cultural activities.

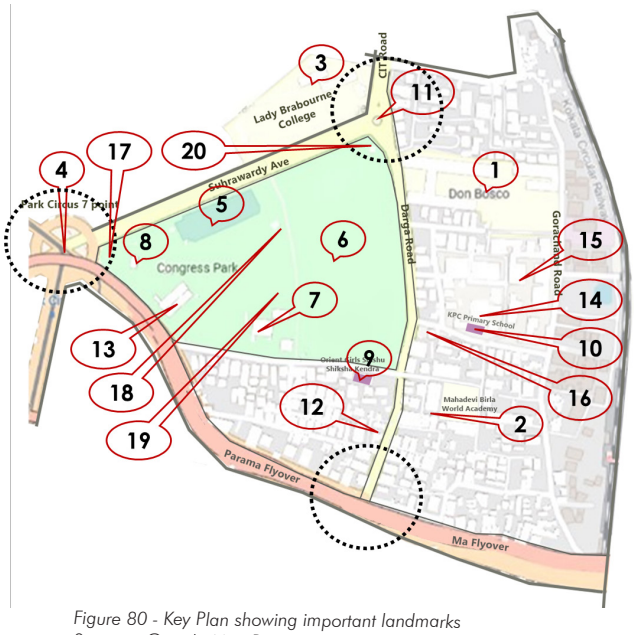


Figure 80 - Key Plan showing important landmarks
Source – Google Map Raster, 3D Source - Author

Important Landmarks :

1. Don Bosco School
2. Mahadevi Birla World Academy
3. Lady Brabourne College
4. Park Circus 7-point crossing
5. Tennis Club
6. Congress Park
7. Puja Committee Office
8. Masjid
9. Orient Girls Shishu Siksha Kendra
10. KPC Primary School and TMC Club
11. Don Bosco Circle
12. Masjid
13. KMC Water Supply
14. Maruti Suzuki Building
15. Heritage Srijan Park Residential Complex
16. Dargah
17. Mela Ground
18. Children's Park
19. Traffic School
20. Toilet Block

3.2.4 Built Environment

- The neighborhood is primarily Residential with mixing of Institutional and Commercial.
- The most important amenity green found around Darga Road is the Park Circus Ground.
- The private schools around has their own playground which are privately owned by the school.
- Most of the amenity greens found around Darga Road if formed by road intersections and green playground.
- They are sparse within the neighborhood and connected by the network of allies.
- Children in this area are considered to play outside the most in Park Circus Maidan, of which they play most in designated play areas, more than half of the children play in designated play areas.
- The designated play areas connects the private, public and institutional spaces along with the network of allies

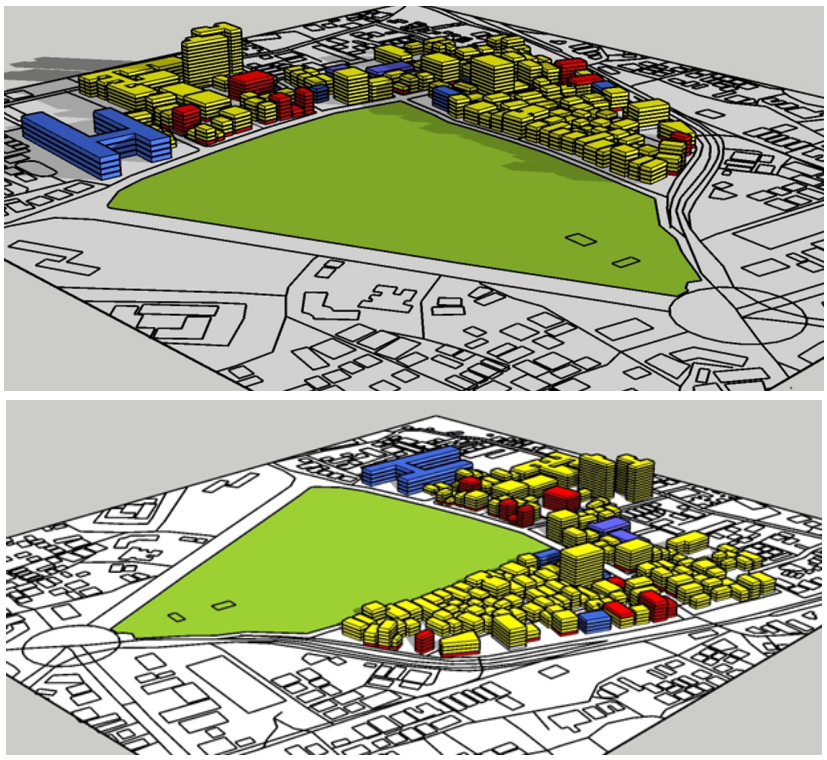


Figure 81- 3D of Case Application Area showing Built form
Source – Google Map Raster, 3D Source - Author

- The most important amenity green found around Darga Road is the Park Circus Ground.
- The private schools around has their own playground which are privately owned by the school.
- Most of the amenity greens found around Darga Road if formed by grassy fiends and green playground.
- They are sparse within the neighborhood and connected by the network of allies.
- Children in this area are considered to play outside the most in Park Circus Maidan, of which they play most in designated play areas, more than half of the children play in designated play areas.
- The designated play areas connects the private, public and institutional spaces along with the network of allies.
- Parapet height of park is maintained all around the arterial streets.
- Buildings and shop fronts have the same elevation character.
- No iconic structure to refer the skyline of the area except Congress Park.
- The park is located exactly opposite to the Neighbourhood but not connected to the Neighbourhood

Images of green areas













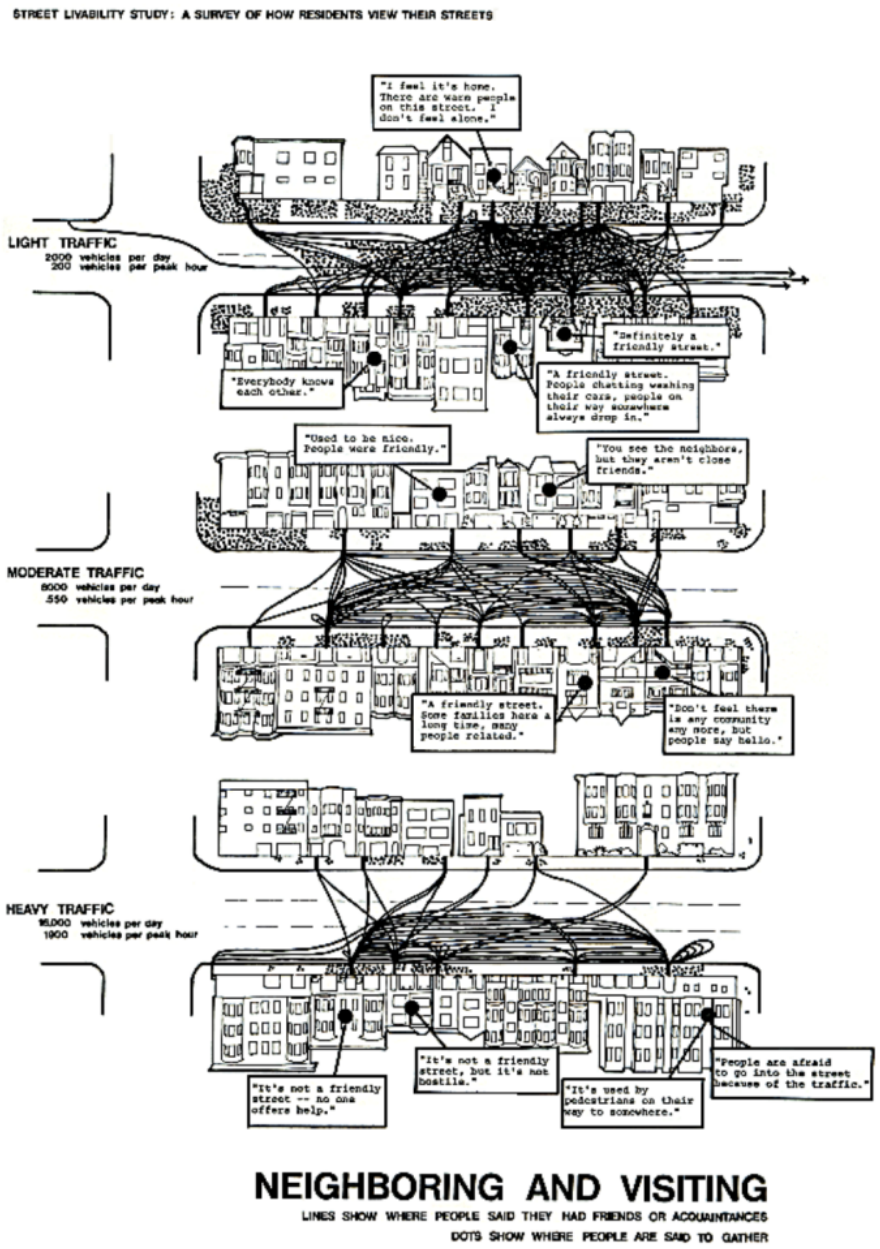



Figure 82 - The endurance of Liveable Streets
Source – Livable Streets 2.0 by Donald Appleyard

Through striking images, thorough research, and poetic text, the original Livable Streets exposed to the public the ways in which cars negatively impacted the lives of those living in towns and cities. However, there was still more to be said regarding the concerns of weaker and more vulnerable groups, such as people of color, bicycles, pedestrians, and those with impairments, as well as how we reconcile conflicting livability objectives.

Inference

- The park lacks activities as it is not integrated with the neighbourhood and is surrounded by major aerterial roads on 3 sides and only accessible by collector road on one side i.e. Orient Row

3.2.5 Street Amenities





Inference

- Nodes do not have direction, speed regulator signages.
- Nodes have lost its character due to irregular encroachments, signal post is also invisible.
- Footpaths do not have seating arrangements, waste bins etc.
- Trees do not have guards or seating arrangements.
- Safety signages and speed breakers unavailable.
-

3.2.6 Conclusion

PATHWAYS :
- Pedestrian walkways should be well defined within the street section.
- Some routes should be entirely pedestrian.
- On-street parking and un-organized commercial encroachments should be avoided.
- Footpath width should be used effectively including commercial activities.
- Arterial roads should utilize its 100% carriageway

NODES :
- Nodes should be free from encroachments.
- Through different elevational elements, straight vista or serial vision can be created.
- Park front can be developed as landmark zones and add character to the street.

URBAN MANAGEMENT :
- Major Urban activities should be avoided directly from aerterial streets.
- Pedestrian movement should be given priority.
- Vehicular & Pedestrian conflicts should be avoided.

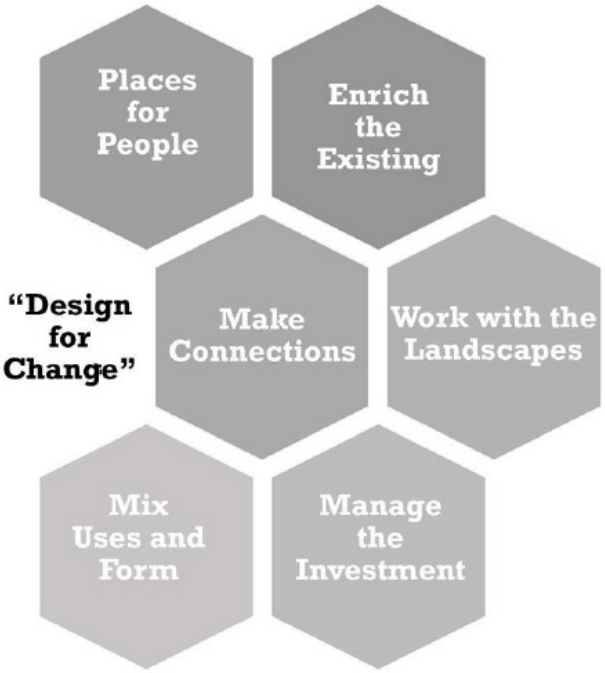
BUILTFORM :
- Building boundary heights to be maintained to preserve similar streetscape.
- Open space requirements should meet the regional guidelines.
- Open space can be connected with other important urban magnets.
- Park to be integrated with the neighbourhood.

STREET SIGNAGE AND FURNITURE :
- Adequate & effective street furniture should be provided with tree shading.
- Signages should be clearly visible and legible from the vehicular approach.
- Bill boards should not be emphasized over traffic signages.
- Inclusive design requirements to be added

3.3 Modes of Development

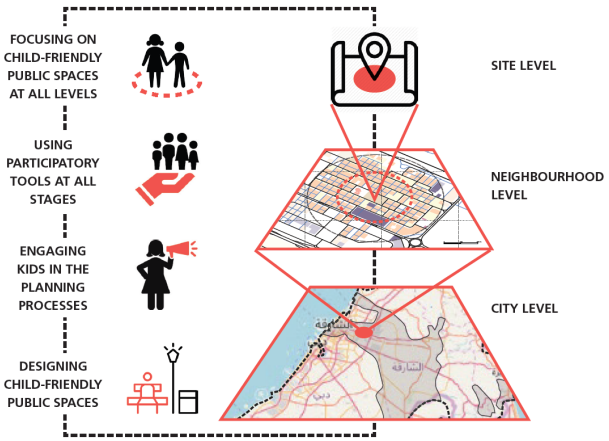
3.3.1 Objective

1. To redefine movement within urban neighborhoods making it conducive for Children & Care-givers
2. To allocate urban spaces for the activities focusing on improving Children & Care-givers interaction.
3. To propose urban amenities & facilities ensuring community benefits for Children & Care-givers.



3.3.2 Approach

So the objective of participatory child-friendly public space planning is to evaluate, together with the Children and the Care-giver's, the state of public open spaces in their school neighborhood. This process will ensure that the voices of the Children are not left out and their needs are reflected in urban form. Looking at quality, accessibility, urban facilities and other urban features will help us propose strategic recommendations, particularly to improve safety and security and increase inclusion of children in public realm.



3.3.3 Methodology : 5 Dimensions

The quality assessment of public space looked at 5 main dimensions :

- Use of Space
- Accessibility
- Facilities
- Comfort and
- Green coverage

3.3.4 Public Responses

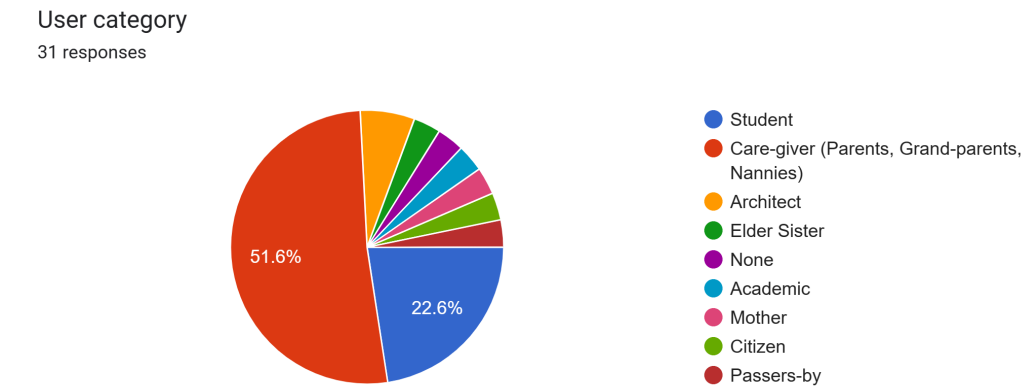


Figure 83 - User Category

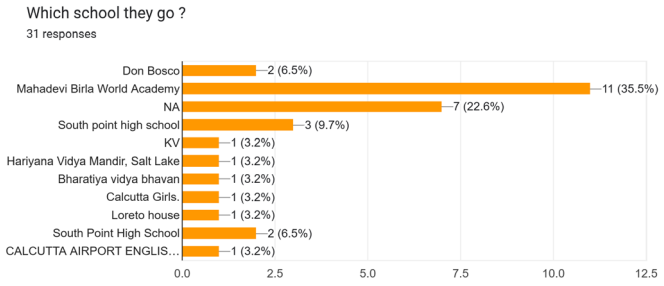


Figure 84 - Which school they go to

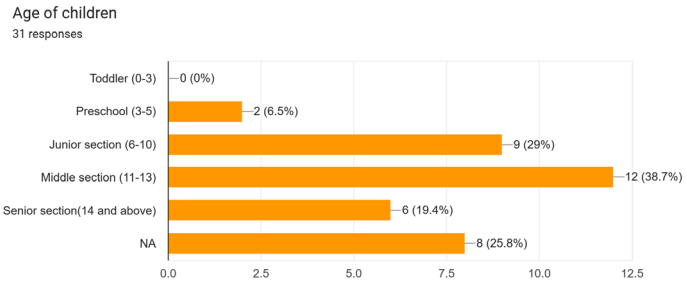


Figure 85 - Age of Children

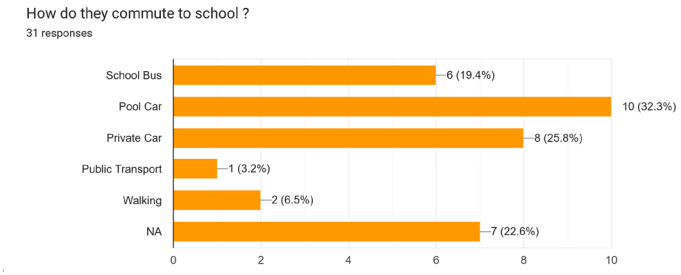


Figure 86- How do they commute to school?

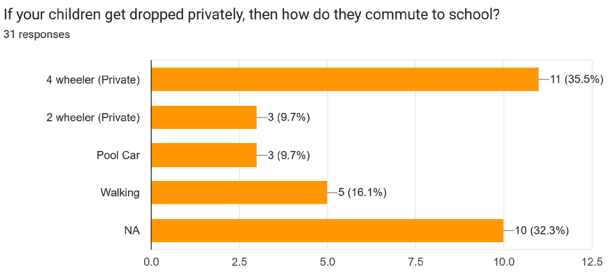


Figure 87 - How do privately dropped children commute to school?

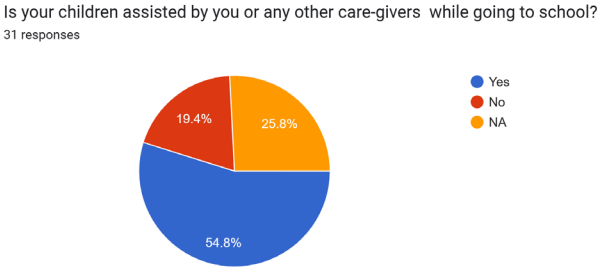


Figure 88 - How is the child assist?

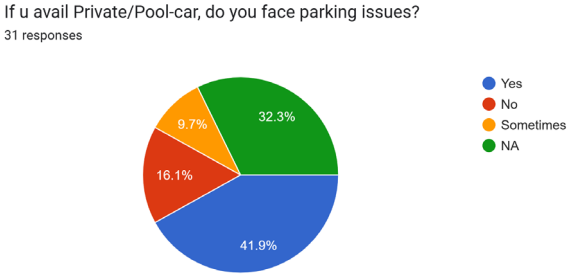


Figure 89 - Issues regarding parking of private/pool car

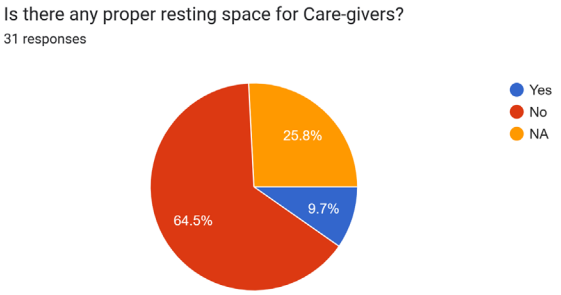


Figure 90- Provision of proper resting space for care-givers

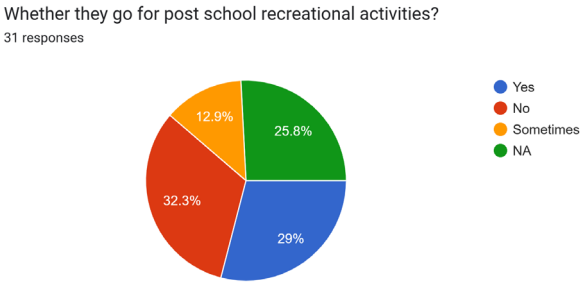


Figure 91 - Post School recreational activities

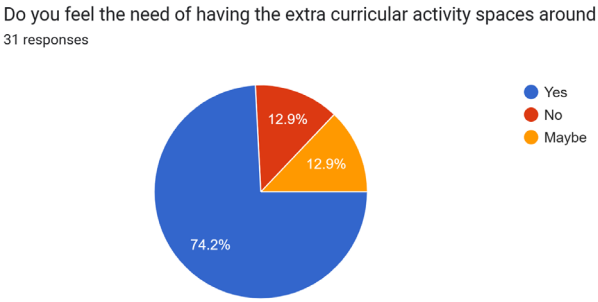


Figure 92 - Need for having the extra curricular activity space around school neighborhood

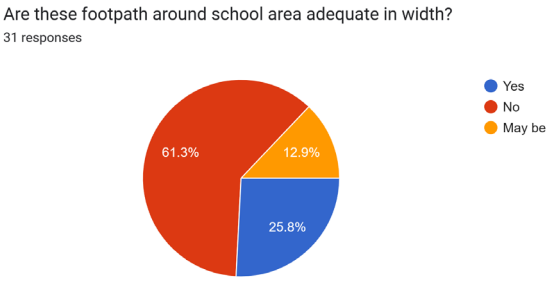


Figure 93 - Footpath around school area

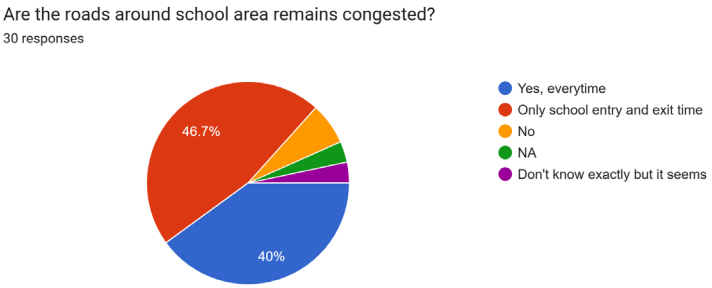


Figure 94 - Congestion around school area

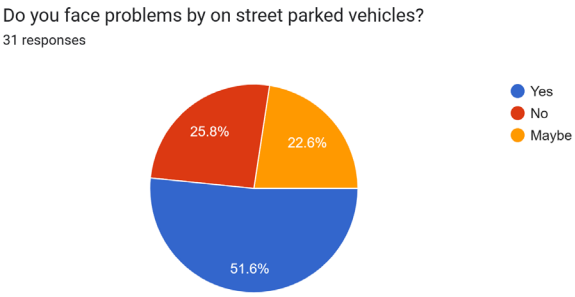


Figure 95 - Problems faced by street parked vehicles

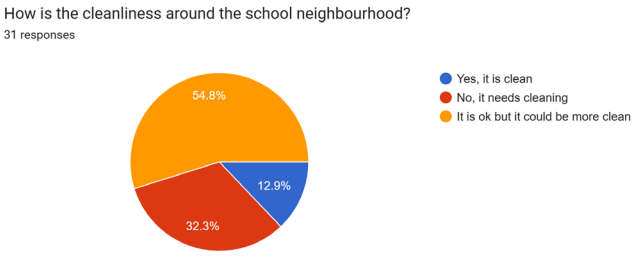


Figure 96 - Cleanliness around the school neighborhood

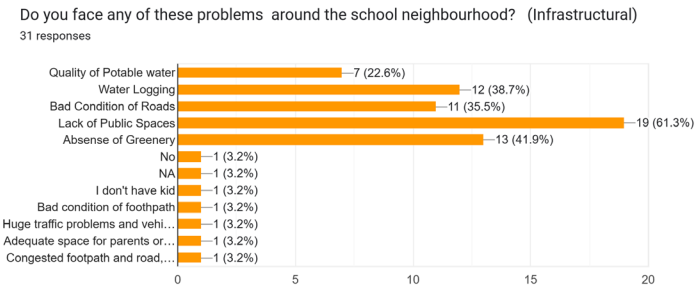


Figure 97 - Problems around the school neighborhood

If Yes, then briefly describe the problem faced due to on-street parked vehicles

20 responses

- Road driveway gets blocked
- There's no space of parking ....
- NA
- Bad condition and road please save the child
- Too much congestion and unavoidable traffic
- On street vehicle parking is almost not allowable
- I don't have kids
- No private parking for school have been specified by school / by local authority.
- Congestion, Dirty and Heat
- Randomly parked vehicles
- It occupies space which leads to problem of parking by others.
- P-109, MICHAEL NAGAR, NORTH 24 PARGANAS
  PS - AIRPORT
  KOLKATA 700133
- Problem is not faced.
- No proper space for parking
- No
- 63/3 P.G.H.Shah Rd.Jadavpur.
- Parking are not allowed as it is no parking zone

Problems around the school neighborhood

Is there anything that you suggest for necessity aspects of improvement ?

24 responses

- Make the streets walkable for people
- Cleaning near the school.
- Yes improvement most important
- Necessity of more parking spaces in residential area
- There should be more fun/extra curricular activity spaces that helps a child develop a natural affinity for fitness in a playful mannerism, it will help an individual in the long run. Some other activities could be organising events related to planting trees and reduce plastic consumption, as pollution rate and air quality index in Kolkata is something that every people should be worried about but no one is bothered. The increased rate of asthma patients is a clear indication of the negligence.
- More parkings
- there should be two way traffic
- The Schools should necessarily have wider road widths and lots of parking, separate shelters for waiting parents or care givers from rain and sun.
- Drinking water and proper toilet facilities for parents who wait for their children
- The traffic should be more vigilant as it's the main road which is always congested and the children travel to and fro consuming more time. Time could be saved.
- There can be public spaces closer to the schools for the parents, where they can sit while waiting for their kids.
  There must be traffic control at the time of school disperse.
- Road should not be congested by private cars at school time.
- The footpaths in the school neighbourhood should be maintained.
- The immediate surroundings of any school, in general, should be designed in a way that's accessible to all children, including those who might require special assistance or those who are differently abled, so as to provide a seamless and an inclusive experience.
- Proper sitting space
- Roads are congested. Pupil could not walk properly due to parking of school bus.
- Vehicular free safe and healthy environment
- A) Seating /waiting area for parents
  B) more green plants around the waiting zone
  C) parking zone for parents vehicle
  D) free play zone for students with scientific games ..so that students can play these games and use physical energy and also use brain to be enhance mental strength..considering the unavailability of play grounds at present days
  E) hygiene food stalls for kids. While coming out from Schools , kids jump on unhygienic foods and parents find difficulties to avoid the available unhealthy foods
  F) sufficient bus facilities should be provided by the educational institutes probably for all the students
  G) no sound polutions by any mode either or by any set of people/ religion..already the law in place, same must be look into seriously
- Walkability, safer access, enhanced visual corridor, child friendly streets

Anything else you would like to mention about your school neighbourhood?

23 responses

- No
- NA
- Let kids walk to school and create memories
- Lot of traffics and difficulty in crossing the roads. Sometimes it takes alot of time to cross the roads.
- First of first safety and carry
- The school neighborhood is pretty safe and clean but traffic during entry and exit times are irritating and unavoidable due to on-road parking.
- it is quite unsafe there are all sorts of harassment ,rape or kidnapping chances in these areas.
- Parking should be more organised in front of school
- Most schools are old and not in proper location, which creat all shorts of adequate infrastructure problems.
  New schools should located with proper locations with most of infrastructures.
- The School thrives in residential neighbourhood but over the years with growth the space available falls short. Hence keeping in mind a 50 yrs plans, every school should be planned in a way for horizontal growth of outdoor activities like, playgrounds, sports arena, dispersal, assembly, parking, vegetation and shade, etc. And vertical growth of indoor activities.
- School timing for all schools on this road can be reasonably staggered
- The cars parked around takes up the space. The noise from the vehicle also creates problem which could be reduced.
- A demarcation of space for the daily thelas must be allotted where they can have a permanent or temporary kiosks for children, this will make the surrounding of the school much disciplined. Students must be dispersed from a gate where there is less or no connection with high traffic.
- 1)Extremely populated,
  2)Full of sound and Air pollution,
  3)Difficulties in sending and collecting students,
  4)Unsafe environment,
  5)Unsafe roads with harsh vehicles movements,
  6)Difficulties in walking since encroachments of roadside zone by shops and shop's items display
  7) lesser attention by the government on the real solutions either due to incompetency or ignorance
- Safer accessible streets with proper traffic measures. Need to divert traffic during school timings. Better public infrastructure required

3.3.5 Assessment of Responses

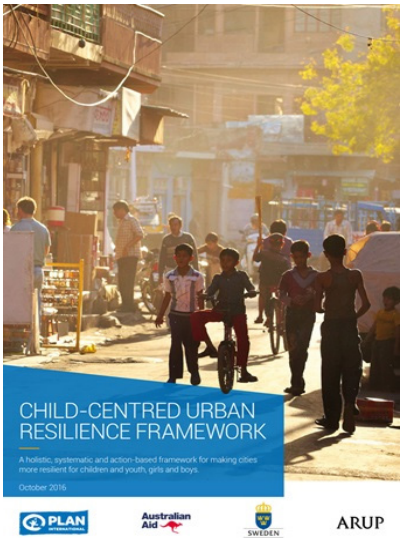
The assessment of responses highlighted mostly 5 important aspects :

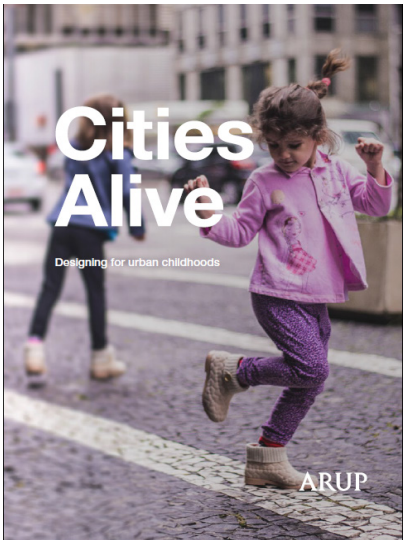
- Use of Space – Prioritizing school users and their requirements
- Accessibility – Walkability and Inclusiveness
- Facilities – Requirement of various facilities and amenities in school neighborhood
- Comfort – Parking, Decongestion, Pollution and Safety
- Green coverage – Parks & Playgrounds, Shaded Paths and Green Covers

GOAL

"To create PLACES that can in future, serve as Repository of Memories"

3.3.6 Government Initiatives





Child-friendly urban planning is a vital part of creating inclusive cities that work better for everyone.

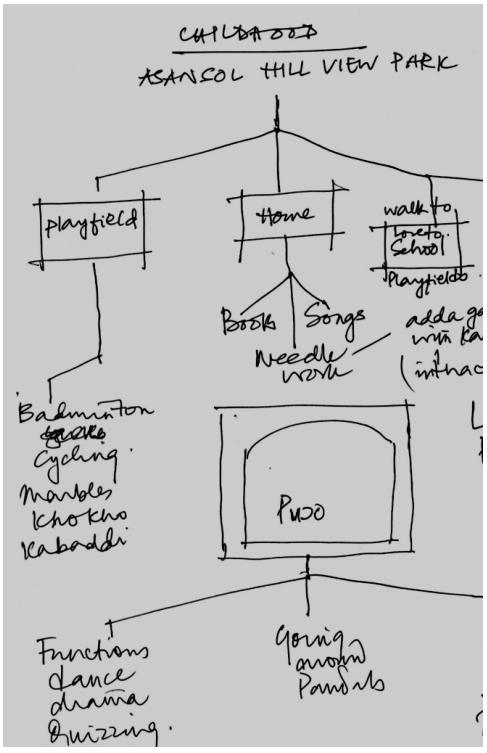
Child-friendly urban planning is an emerging field.

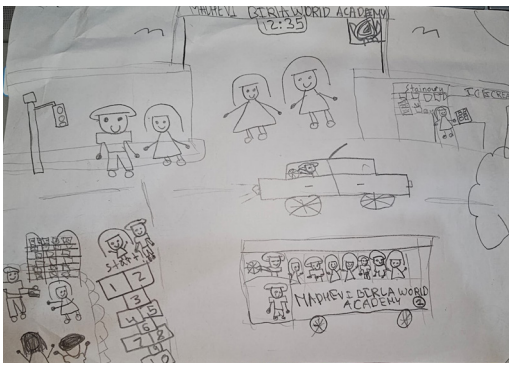
It advocates a coherent and systematic approach to planning and designing cities that improves children's development, health and access to opportunities, moving well beyond simply providing playgrounds.

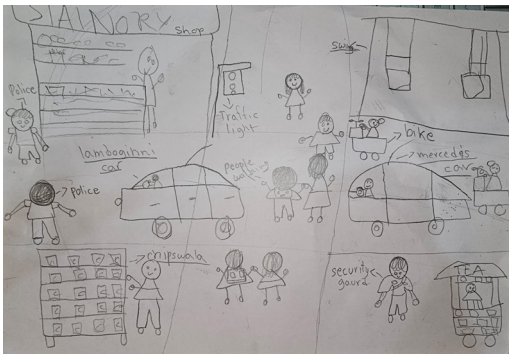
It recognizes the fundamental importance, not just of independence and play, but of the built environment as a whole in helping to shape a child's development and prospects, and hence their adult lives.

3.4 Design Guidelines

Understanding Child Friendly Environments

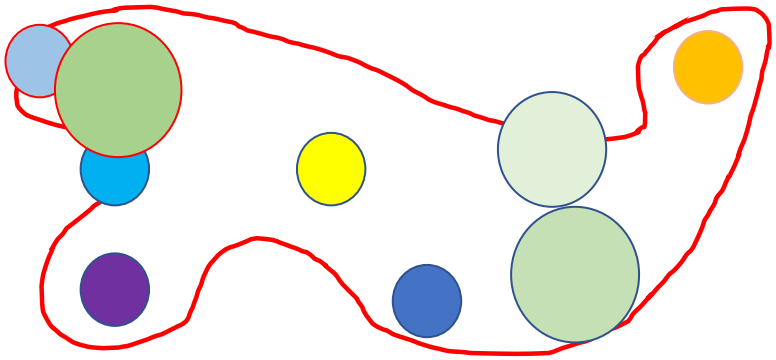






A child friendly environment is made up of numerous interlocking child friendly places that children themselves explore, engage with and develop emotional and affective relationships with through their own experiences.

Dr. Sudeshna Chatterjee (2006)



Typology of Child friendly places based on the construct of children's friendship with place by
Dr. Sudeshna Chatterjee (2006).

- places that children care for
- places that children learn from
- places that support children's free action
- places that nurture children's secrets

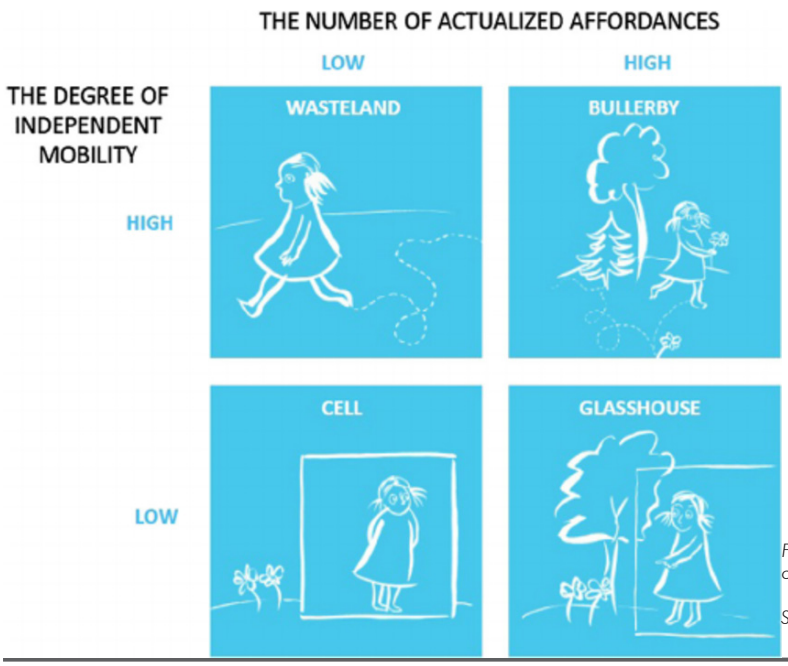


Figure 98 - The Bullerby model for describing four hypothetical types and levels of child- friendly environments

Source : Marketta Kytta (2004)

What is a Child Friendly City (UN definition)?

A Child Friendly City guarantees the right of every young citizen to

- Influence decisions about their city
- Express their opinion on the city they want
- Participate in family, community and social life
- Receive basic services such as health care, education and shelter
- Drink safe water and have access to proper sanitation
- Be protected from exploitation, violence and abuse
- Walk safely in the streets on their own
- Meet friends and play
- Have green spaces for plans and animals
- Live in an unpolluted environment
- Participate in cultural and social events
- Be an equal citizen in their city with access to every service, regardless of ethnic origin, religion, gender or disability

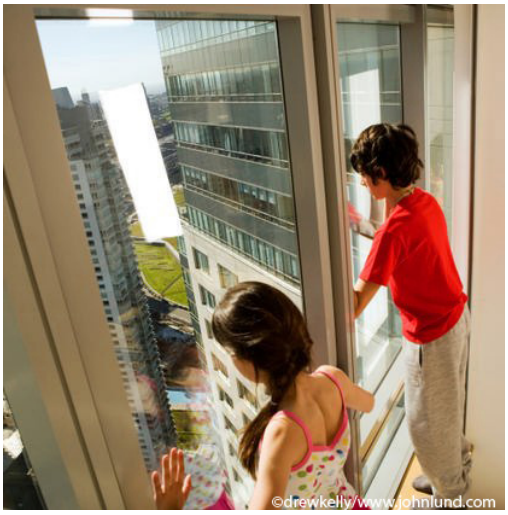


Figure 99 - Shrinking space for children in urban living

Core Challenges to children in urban living

Traffic and pollution
Traffic and pollution are global challenges, affecting children's physical and mental development and hindering independent mobility. Safe roads, crossings and mixed-use neighborhoods that support cycling and walking can reassure parents, reduce pollution and encourage social interaction.

High-rise living and urban sprawl

Sprawling cities encourage car-dependency, increased traffic and pollution, and reduce trust. While overly dense high-rise living can lead to isolation and cramped conditions, well-designed developments can enable lively communities and access to outdoor space.

Crime, social fears and risk aversion

A parent's perception of risk in terms of accidents, crime, strangers and traffic determines a child's independent mobility and their access to space.

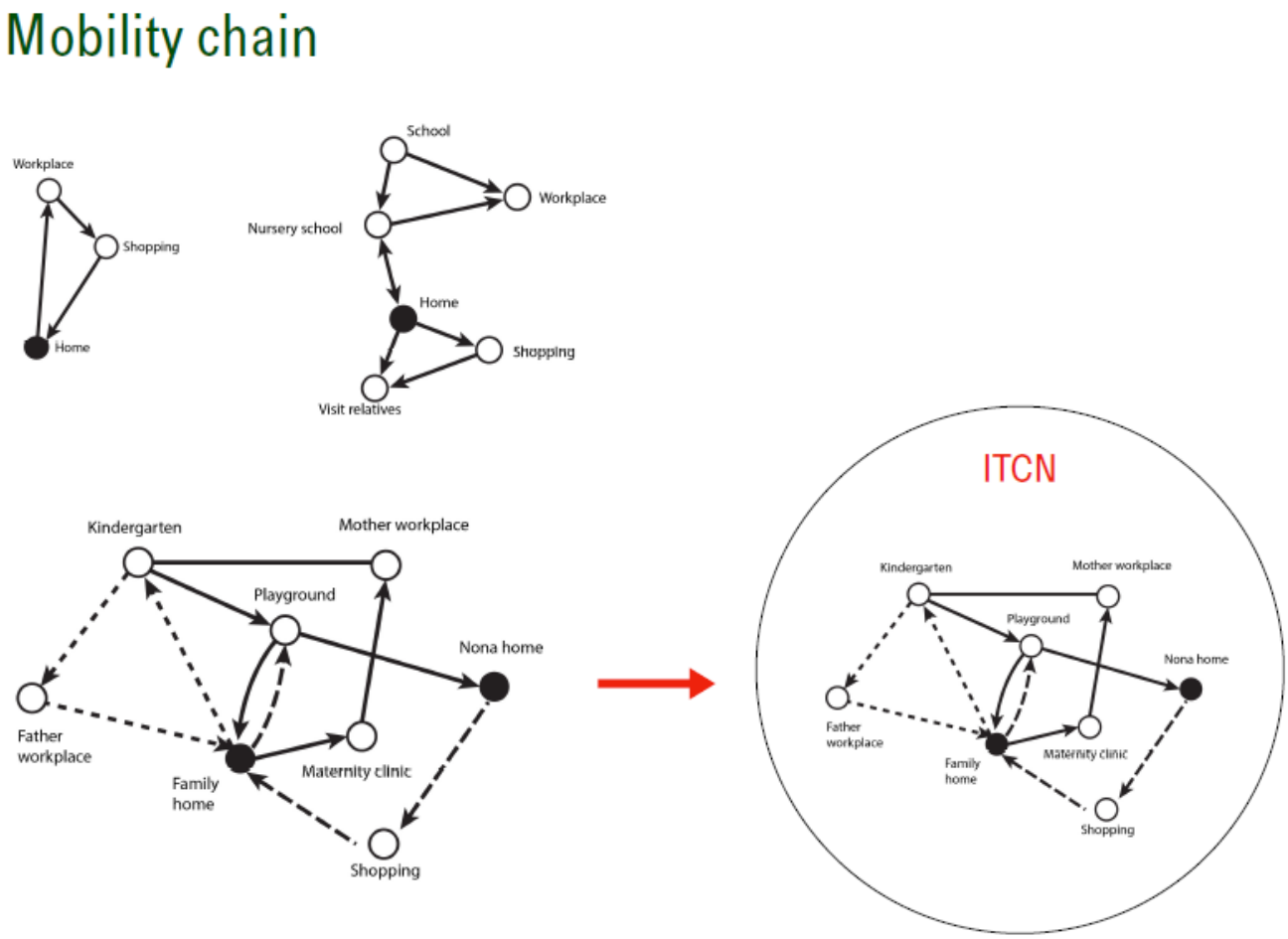
Inadequate and unequal access to the city

Poor quality green spaces, uneven distribution of playable publicrealm and a lack of safe access can exacerbate social inequality across the city, as can a shortage of free family activities.

Isolation and intolerance

Children's opportunities for discovery can be restricted by spaces and attitudes that discourage their presence. Teenagers in particular are often perceived negatively and marginalized. Better street and public space design, for example through co-creation, can encourage more interaction and trust.

Understanding Child Friendly Enviornments



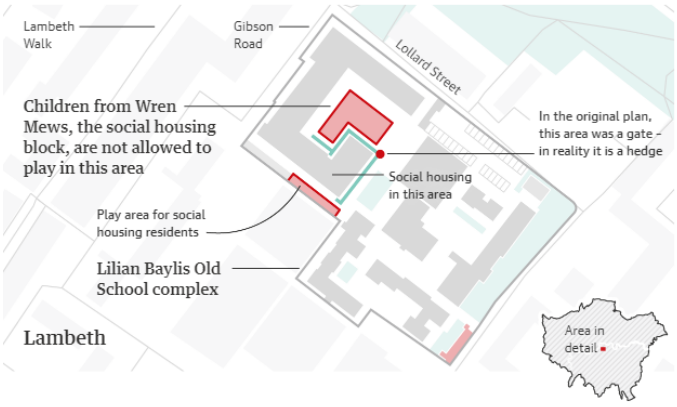
Qendra Marrëdhënie 18

Figure - Policy and Practices to Mainstream Infant, Toddler, and Caregiver–Neighborhood Planning (ITCN)

Lack of inclusion in play spaces

Figure 100 - Too poor to play : children in social housing blocked from communal playground

Social housing residents have been blocked from using shared play spaces at a 149-home development in south London



Guardian graphic

The original planning documents, which were approved by Lambeth Council and went through public consultation, showed gates from all the flats giving access to the main play area. But before residents moved in, the designs were

Intergenerational spaces
can become community hubs that increase interaction and exchange between the young and the old.

Traffic measures
such as colourful crossings or shared spaces redefine use and aid driver awareness of pedestrians and street activities.

Pedestrian priority
removes or calms traffic to create a safe environment for everyday street play and socialising.

Community gardens
provide opportunities for intergenerational activities, socialising, skills development and outdoor physical activity.

Neighbourhood mapping
led by children, provides deeper insights into an area's issues and opportunities.

Play streets
temporarily closed to through traffic allow communities to use the space while reducing air pollution and traffic danger.

Playable spaces
look beyond basic design functions, take a balanced approach to risk and provide facilities for families to spend time together for longer.

Multifunctional green infrastructure
caters for multiple purposes, such as stormwater parks that enable play in both flooded and dry conditions.

Sense of ownership
of public space through co-creation and increased activity can help to decrease vandalism and maintenance costs.

Playful encounters
such as public art or creative bus or tram stop designs invite playful interaction as part of everyday journeys and activities.

Cultural and heritage spaces
can become assets for inclusive and playful city life when combined with sensitive conservation.

Wild spaces
are flexible and adaptable areas that reactivate vacant or underused plots and bring nature back into the community.

Construction sites
can become engaging places and educational assets for the local community, e.g. by hoarding design that makes works visible.

Multi-use community spaces
make smart use of space around schools, and other community facilities and enable out of hours use.

Integrating a system of open spaces horizontally and vertically

The award-winning parks along the SEFC waterfront provide continuous play spaces including: soft and hardscaped surfaces, elevation changes, open lawns, shrubs and tree canopies, logs, boulders and blocks for sitting and climbing and public art.

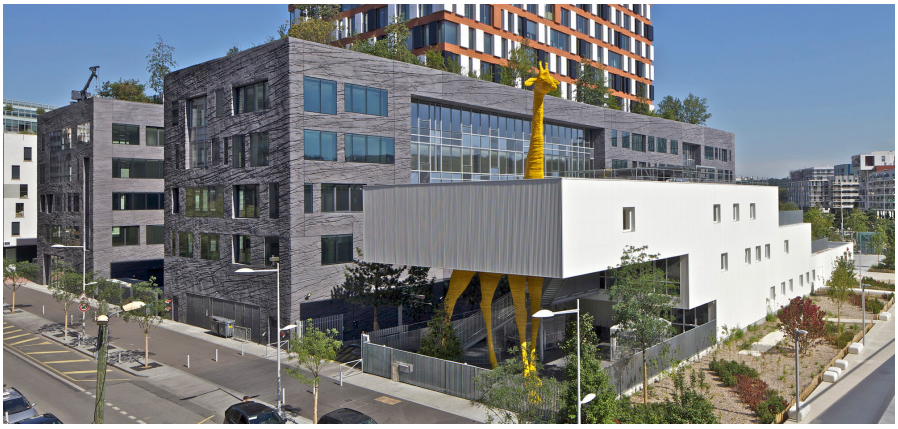
Hinge Park was designed with both active and passive play areas for children. The design combines references to former industrial uses with natural features to create a memorable place that attracts and accommodates people of all ages.

Landscaped courtyards offer a variety of outdoor programming, including children's play areas, rain gardens and urban agricultural gardens. Courtyards offer enclosed places for children to play while supervised from the surrounding units above.

The Bayside development in Toronto shows how the child care's outdoor space was located on the 2nd level by taking a 'bite' out of the building. This alternative massing solution was a response to a constrained site and involved cooperation between the developer (Waterfront Toronto), City Planning and Children Services.

URDPFI/NBC Standards for education infrastructure
Primary School (Class I to V): 1 per 2,500 people (NBC, 2005)
Senior Secondary School (VI to XII): 1 per 7,500 people

Integrating pre-schools and daycare centres



Integrating primary healthcare and counselling services for children and adolescents

Indian Public Health Standards (IPHS): 1 primary healthcare unit per 20,000 population

Services offered: routine, preventive, promotive, curative and emergency care in addition to all the national health programmes at special education centre

Integrating child friendly open spaces

Figure 101 - Adventure Playground : Created and controlled by Children for free

Figure102 - Pop up playgrounds - Could be anywhere and everywhere

Future of Play and Play Spaces: Global Trends

Free Play managed/encouraged by Play Rangers in public places

Imagination Playground, NYC: A celebration of Loose Parts, managed by Playworkers

Pathways

- To remodify the Aerterial Roads (Suhrawardy Road, Darga Road, Orient Road, MBWA Road, Road beside Don Bosco School and service lane beside AJC Bose Road connecting Oriend Row and 7 point crossing.
- To redefine pedestrian sidewalk with the arterial roads wherever possible.
- To introduce new connections between the aerterial roads, by making connections through important landmarks and urban magnets.
- To introduce entirely pedestrian roads or Woonerf Streets with adequate amenities to enhance pedestrian experience.
- To provide multilevel parkings, new bus-stops and inclusive supportive facilities for on street parking and on street parking commercial activities.

Nodes

- To develop accessible nodes with less conflicts between vehicular and pedestrian movement.
- To avoid on-street facilities at close proximity on the nodes.
- To give a character to the nodes with bulge outs and adding elements.

Urban Activities

- To design and provide mixed-use facilities for Institutional and Residential users.
- To augment existing pedestrian connectivity sufficing existing and upcoming urban magnets.
- To develop and design Urban Plaza as a hub of Urban Magnets and Institutional activities.
- To introduce multi-level parking cum commercial cum public buildings to enhance mixed-use forms.
- To augment existing sports facilities and upgrade so that this zone caters to sports requirement of this Neighborhood as well as city requirements.
- To improve the footprints of existing park and playgrounds available and upgrading to the requirements of Child and Care-givers.
- To accommodate allied requirements for Institutional and Residential Zone :-
    1. Day Care Centre
    2. Health Centre
    3. Commercial Shops
    4. Skill Development for Care-Givers
    5. Indoor and Outdoor sports arena
    6. Pre-primary School
    7. Coaching Centres
    8. Boi-para and Library
    9. Park for inclusive audience
    10. Parking facilities

Built Environment

- To provide or augment more open spaces as in the form of public parks, playgrounds and safe play spaces.
- To create Urban Plaza accommodating all allied amenities and facilities required for Children's and Care-givers.
- To maintain the legible building scale.
- To propose building in regular pattern within the irregular existing setting keeping green zones and trees intact.
- To enhance the visual experience, building heights are to be maintain a definite pattern.
- To provide a unique skyline by maintaining a pattern in building heights.
- To impose high value of permissible FAR to create specific landmark zones and to designate park edges.
- To maintain the streetscape similar parapet height connecting park visually.

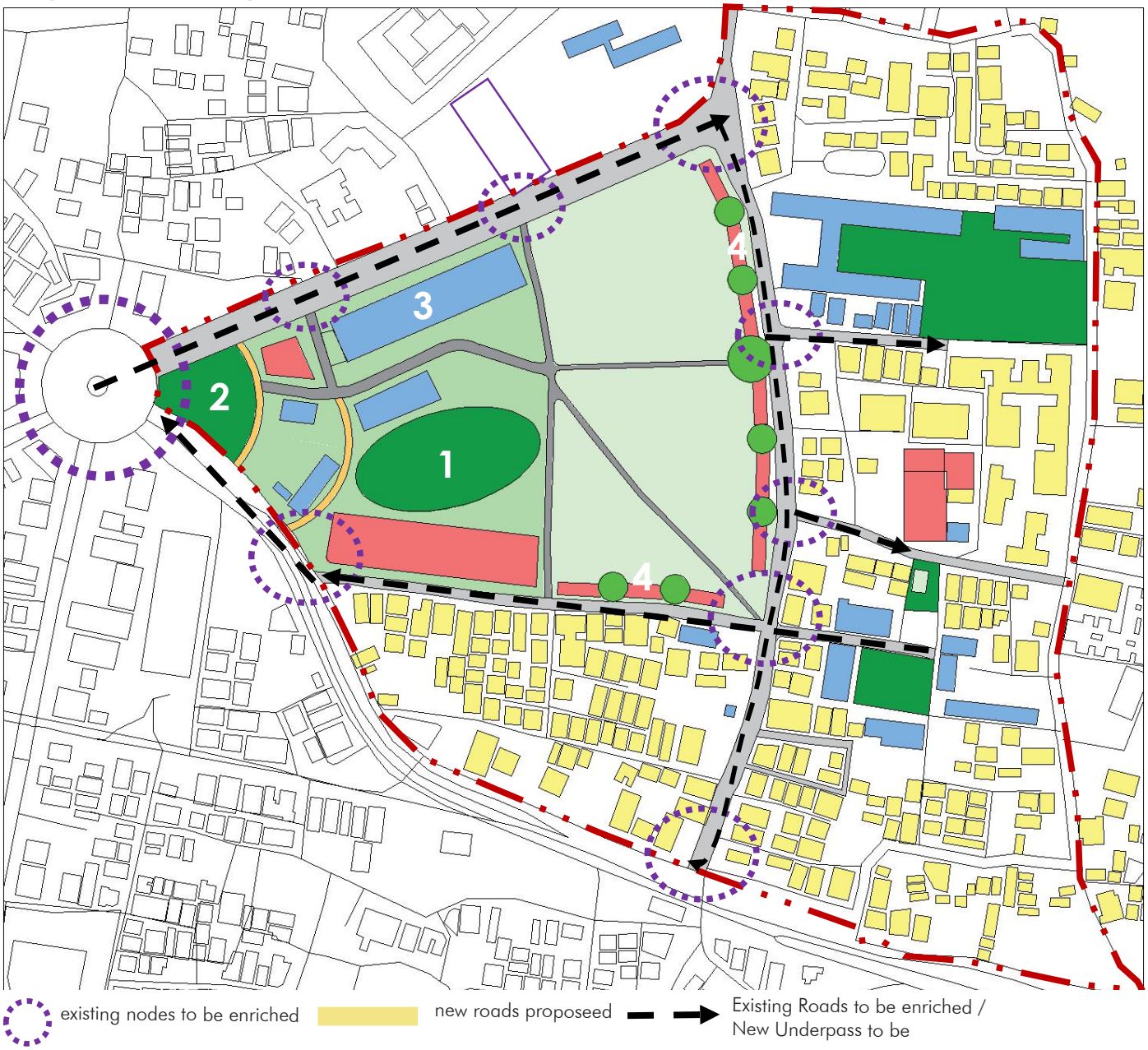
Street Furniture and Signages

- To provide adequate seating arrangement with natural shading, waste bins at regular intervals, tree guards, temporary structures for on-street commercial activities.
- To provide visible and legible traffic and directional signages at all nodes.
- To design spaces for bill boards integrated with the street elevations.

3.5 Site Selection and Conceptual Proposals

Landuse plan

Proposed Master plan



ZONE 01

- Existing structure to be upgraded and proposed for Instutional, Public-Semi public and Commercial Usuage with sufficient parking

ZONE 02

- To be remodified for social gathering and this zone also acts as green buffer zone

ZONE 03

- To be remodified for sports and institutional purpose

ZONE 04

- Edges to be redefined and commercial streets to be introduced

Concepts

Figure 103 - Existing Street Views

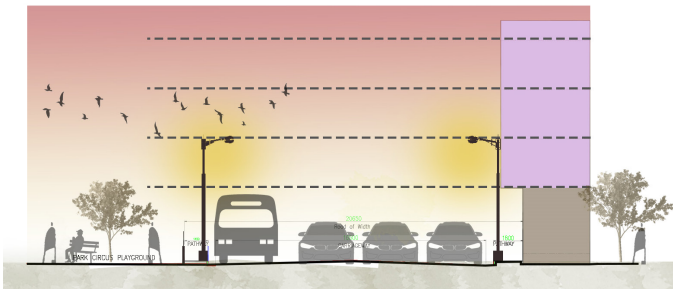


Figure 104 -Existing Cross-section of 13M wide Orient Row Road

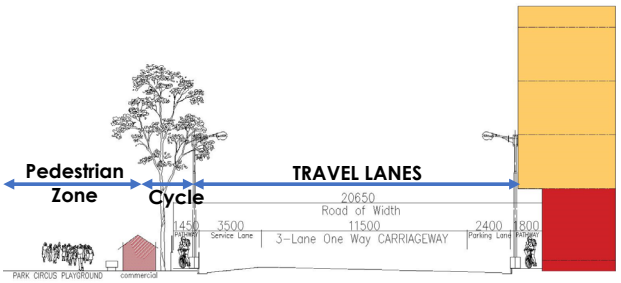


Figure 105 - Proposed Cross-section of 21M wide Darga Road

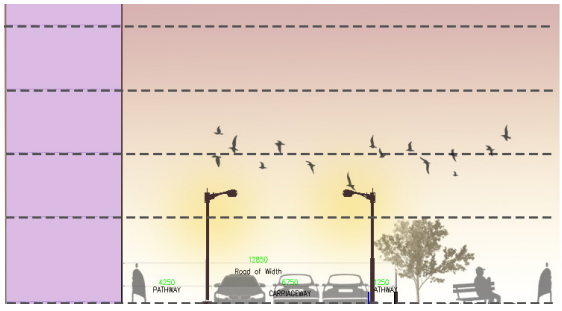


Figure 106 - Existing Cross-section of 13M wide Orient Row Road

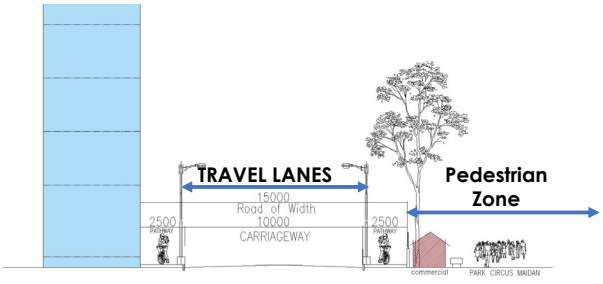


Figure 107 - Proposed Cross-section of 15M wide Orient Row Road

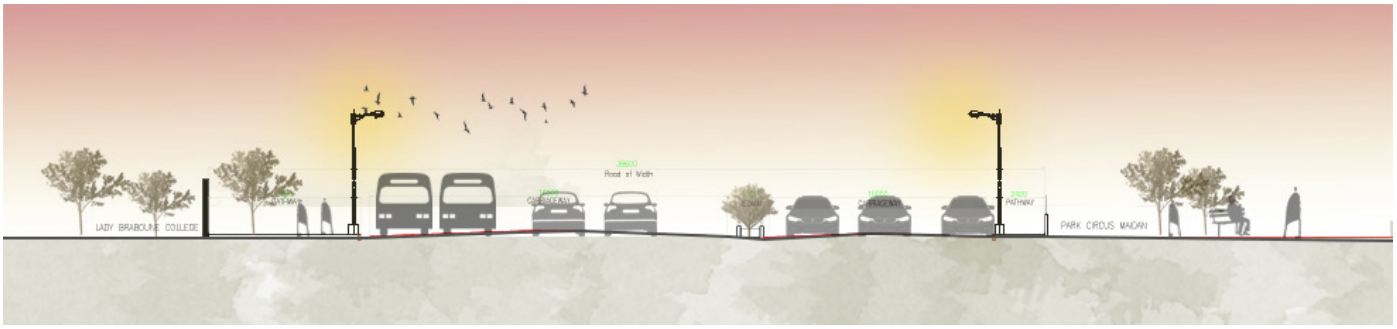


Figure 108 - Existing Cross-section of 40M wide Suhrawardy Road

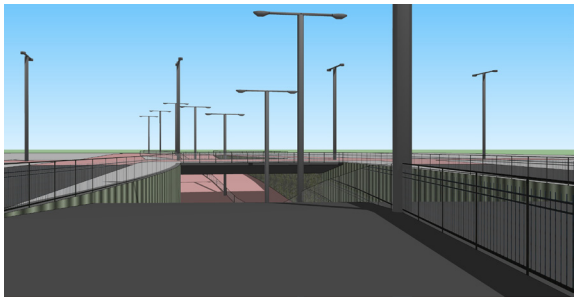


Figure 109 - Proposed Underpass beneath Suhrawardy Road

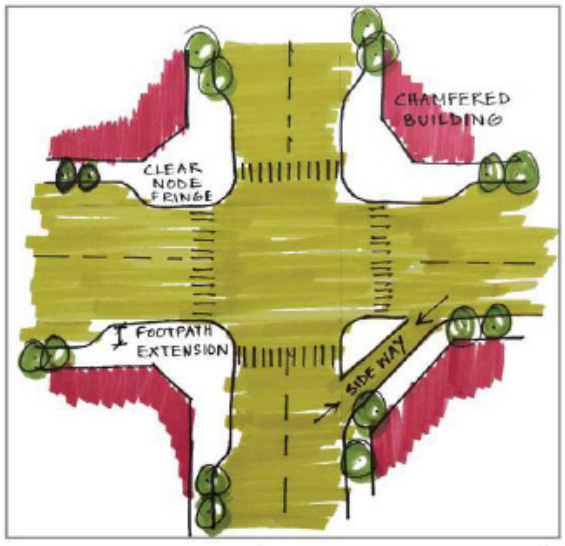


Figure 110 - Conceptual Design Nodes

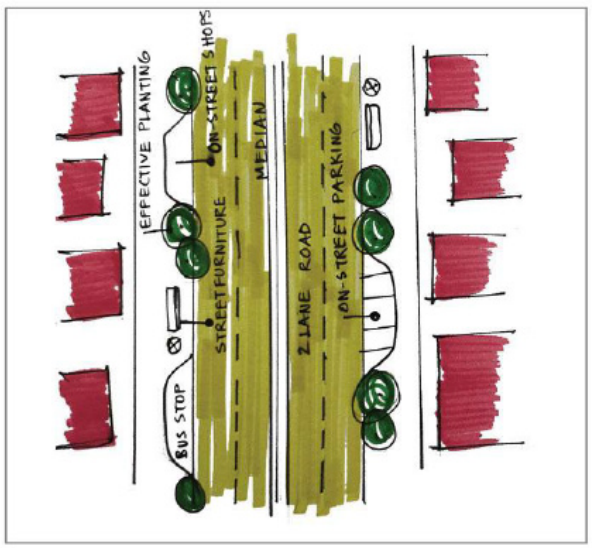


Figure 111- Conceptual Street Plan

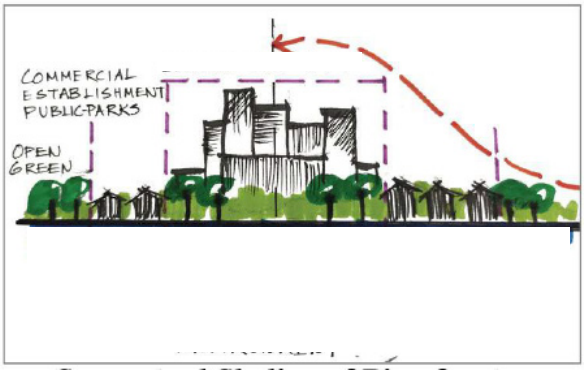


Figure 112 - Conceptual Skyline View, Institutional Block

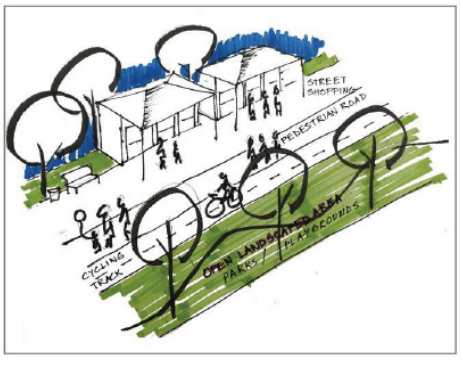


Figure 113 - Conceptual Open Space with Street Shopping

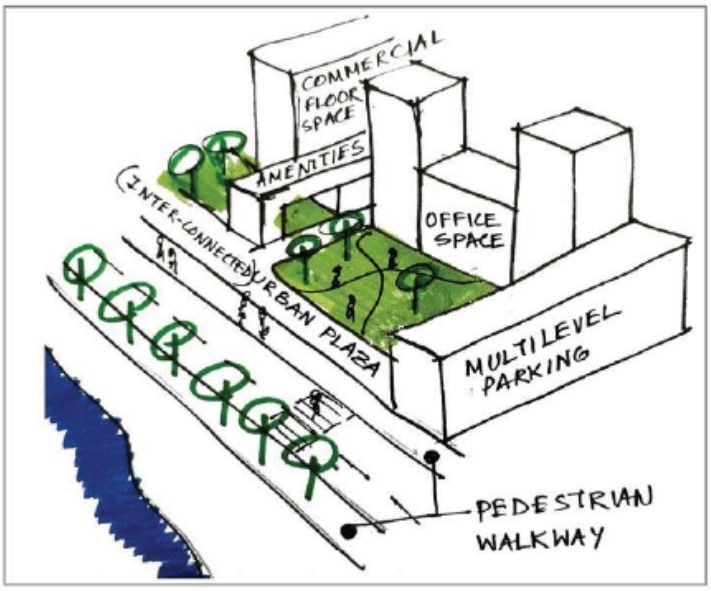


Figure 114 - Conceptual Institutional Block and Urban Plaza

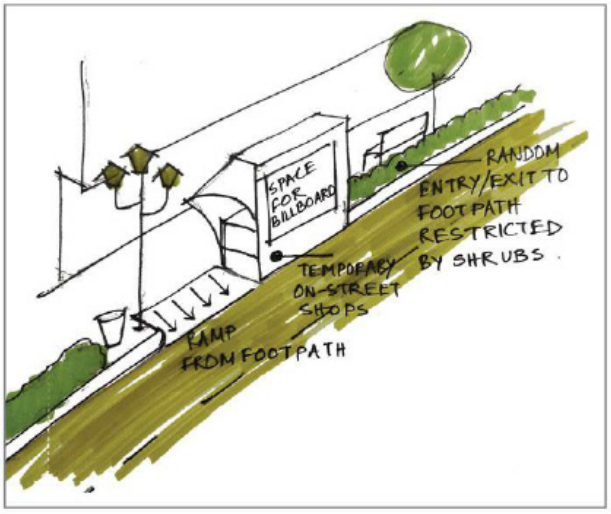


Figure 115 - Conceptual Street View

Key Plan

Figure 116 -Safe School Zone Elements
(Source – WRI website)

Figure 117 -Bulge out near important school nodes
Source – www.wriindia.org

Figure 118 -Bulge out near important nodes in Neighbourhood
Source – author

Figure 119 - Unused spaces in Neighborhood
Source – author

Figure 120- Road Medians Upgradation
Source – www.wriindia.org

Figure 121 - Proposed Concepts

Figure 122- Neighborhood Streets

Figure 123- Neighborhood Streets

Figure 124 - Woonerf Street Concept

Figure 125 - KMC Primary School(A in key plan)
Source – author

Figure 126 - Kapoor House (Bin Key Plan)
Source – author

RIGHT TO PLAY

- As KMC Primary School lacks proper play area, so we should suggest to upgrade Kapoor House green area just opposite to the school into community park, so that even lum kids in the neighborhood and schhol kids can play
- This green area is adjoining to MBWA school as well and can be used by the school kids also sometimes

Future of Play and Play Spaces : Global Trends

Scrapstore PlayPod™

The Scrapstore PlayPod provides a container or "pod" full of materials and equipment (loose parts) that can stimulate, facilitate and enhance children's play.

4.0

4.0 design proposals

4.1 Future Scope

The redesign of Darga Road, Park Circus, focusing on children and caregivers sets a precedent for child-centric urban planning. The future scope of this project includes several promising directions. Firstly, the approach can be extended to other urban precincts within Kolkata and beyond, adapting the principles of safety, accessibility, and child-friendly spaces to diverse urban contexts. This scalability can foster widespread improvements in urban environments, making cities more inclusive for children and caregivers on a larger scale.

Additionally, the project opens avenues for integrating advanced technologies and smart city solutions. Implementing real-time monitoring systems for traffic and pedestrian flow can enhance safety and efficiency, while interactive play spaces equipped with digital learning tools can further enrich the developmental environment for children. These technological integrations can also assist in gathering data to continuously refine and improve urban planning strategies.

Moreover, the participatory planning model used in this project can be expanded to include broader community engagement. Involving various stakeholders, such as educators, healthcare providers, and local businesses, can lead to more comprehensive and sustainable urban development. This inclusive approach ensures that the needs and perspectives of the entire community are considered, leading to more resilient urban designs.

The project also highlights the potential for policy advocacy and collaboration with governmental and non-governmental organizations. By aligning with initiatives like UNICEF's child-friendly cities framework or national programs like the Smart City Mission, future projects can gain support and resources, facilitating the implementation of similar designs in other regions.

Finally, ongoing research and education in urban design can benefit from the findings of this project. Academic institutions can use it as a case study to develop curricula that emphasize child-centric urban planning, fostering a new generation of urban planners who prioritize inclusivity and community well-being in their designs.

4.2 Conclusion

The urban precinct redesign focusing on children and caregivers at Darga Road, Park Circus, demonstrates the transformative potential of urban planning tailored to the needs of its most vulnerable residents. The study highlights the importance of creating safe, accessible, and engaging environments that promote the well-being and development of children while supporting their caregivers. Through a participatory approach, the project engaged local communities, particularly children and caregivers, ensuring that their insights and needs were central to the design process.

Key findings emphasize the necessity of integrating child-friendly spaces within urban settings. These include well-defined pedestrian pathways, safe school zones, and accessible recreational areas. The proposed redesign incorporates elements such as widened sidewalks, traffic calming measures, and designated play areas that are not only safe but also stimulating for children's growth and social interaction.

The project's focus on nodes and pathways ensures that essential services such as schools, healthcare facilities, and recreational spaces are easily accessible. This connectivity fosters a supportive environment where children can thrive, and caregivers can efficiently manage their daily responsibilities. The redesign also addresses urban management challenges, such as reducing vehicular and pedestrian conflicts and managing commercial encroachments, to create a more organized and user-friendly urban landscape.

Moreover, the proposal underscores the importance of maintaining and enhancing green spaces within urban precincts. By upgrading existing parks and introducing new green areas, the redesign promotes physical activity and offers a respite from the urban environment, contributing to the overall health and well-being of the community.

In conclusion, the case application at Darga Road, Park Circus, serves as a model for other urban areas seeking to become more inclusive and supportive of children and caregivers. By prioritizing the needs of these groups, the redesign not only enhances the quality of life for its residents but also fosters a stronger, more cohesive community. This thesis demonstrates that thoughtful, inclusive urban design can play a crucial role in building sustainable, livable cities that cater to the diverse needs of all their inhabitants.

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